DETAILED PROJECT REPORT

VISHWAKARMA YOJANA: Phase VIII

AN APPROACH TOWARDS RURBANISATION

Shankar Talav Village

Valsad District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
Rana Foram Hemendrabhai	Civil	170190106054
Yadav Ankit Lalbahadur	Electrical	170190109060

GOVERNMENT ENGINEERING COLLEGE, VALSAD

PROF. DHAVALKUMAR T. BAROT
(NODAL OFFICER)

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

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Chandkheda, Ahmedabad – 382424 Gujarat

CERTIFICATE

This is to certify that the following students of Degree Engineering successfully submitted

Detailed Project Report for,

VILLAGE SHANKAR TALAV

DISTRICT VALSAD

Under

Vishwakarma Yojana: Phase VIII

in partial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA
during the academic year 2020-21.

This project work has been carried out by them under our supervision and guidance.

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
RANA FORAM HEMENDRABHAI	CIVIL	170190106054
YADAV ANKIT LALBAHADUR	ELECTRICAL	170190109060

Date of Report Submission:	
Principal Name and Signature:	**Dr. Vinay S. Purani**
VY-Nodal Officer Name and Signature:	**Prof. Dhavalkumar T. Barot**
Internal (Evaluator) Guide Name and Signature:	**1. Prof. Dhavalkumar T. Barot** **2. Prof. Devendra N. Tandel**
College Name:	**Government Engineering College, Valsad**
College Stamp:	

ABSTRACT

"Developing village with a rural soul but with all urban facilities that a city may have"

Urbanization has become a common feature of Indian society. Growth of industries as a result of industrialization, people have started moving toward the industrial area in search employment. Vishwakarma Yojana is one of the initiatives towards Rurbanization by Government of Gujarat. This Yojana is for development of village by identifying the requirement of village. This yojana has main aim to covert rural to rurban, means to include city facilities in village. Under this scheme, the village are surveyed and development schemes are proposed and implemented. Our project is about development of appropriate facility and suggestion for upgradation of Shankar Talav.

Shankar Talav is one of the village in Valsad district. So it is essential to develop the village under the district for the growth of state and also for the country. Slow pace of development in village and pursuit of better life style has led to huge migration from village to cities. For most village on one hand some essential infrastructural facilities like children playground, public garden etc. have been over looked and on the other hand provided infrastructural facilities like drinking water, drainage etc. have become insufficient.

As per the present scenario, the village has larger area but lack of infrastructure and facilities. There is no proper facilities of transportation and other basic needs. There are many facilities which lack in this village like health center, proper road network, Post office, solid waste management plant, Aaganwadi building and community hall. The coordination between villages is good. But there is lack of employment.

On the basis of data collected from Techno-economic survey and smart village survey, we found GAP between existing facilities and required facilities as per norms. Based on GAP, we have provided designs for repair and maintenance of village Aaganwadi, R.O. water plant & Bus stop building in part-1, we have also proposed design of Automatic Street Light Bulb Holder, Live Energy Billing and Water Level Indicator with Alarm. We have also mentioned the designs for part-2 under designs for sustainable development of village.

Key Words: Rural Soul, Reduce migration, Urbanization, Social Infrastructure, Physical infrastructure facilities, sustainable village development

ACKNOWLEDGEMENT

We are highly indented to **Gujarat Technological University**, Ahmedabad for providing us such opportunity to work under Vishwakarma Yojana to get real work experience and applying our technical knowledge in the development of Villages.

We wish to express our deep sense of gratitude to **Dr. Navin Sheth**, **Hon'ble Vice Chancellor, Gujarat Technological University-Ahmedabad**, for his encouragement and giving us the wonderful project.

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We express our sincere thanks to **Commissionerate of Technical Education, Gujarat State** for appreciating and acknowledging our work.

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We are also thankful to **Dr. Vinay S. Purani, Principal**, **Government Engineering College, Valsad** and faculties of our colleges for their encouragement and support to complete this project work.

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ABBREVIATIONS

SHORT NAME/ SYMBOL	FULL NAME
AD	Anaerobic digester
B.B.C.C.	Brick Bat Cement Concrete
B.M.	Bench Mark
BPL	Below Poverty Level
Cm	Centimeter
CSC	Concentrate solar cooker System
CSP	Concentrate solar power
D.P.C	Damp Proof Course
DGVCL	Dakshin Gujarat Vij company
FDI	Foreign direct investment
FOS	Factor of safety
GEB	Gujrat electricity board
GF	Ground Floor
GL	Ground Level
Kg	Kilogram
Km	Kilometer
PCC	Plain Cement Concrete
ppm	Parts per million
PV	Photovoltaic
RC	Reinforced Concrete
RCC	Reinforcement Cement Concrete
RPR	Residue to product ratio
SHS	Solar home system
UN	United nations
URDPFI	Urban and regional development plans formulation and implementation
Wi-Fi	Wireless fidelity

CHAPTER 1: Ideal village visit from District of Gujarat State (Civil & Electrical Concept)

1.1 Background & Study Area Location

Fig. 1.1 Land Map of Baben village

This village shows awareness towards physical development as well as education of people. People of this village believe that ideal village is made by smart people. For satisfy this condition, sarpanch of this village on its own, come to ground to develop awareness about neatness in people of village. In this village have NRI and resident of interstate people. This village starts its journey of progress is so simple because of the village is rich and its village located in capital of Gujarat.

Baben village is located in the Surat district of Gujarat. The amount of development that this village has achieved is much higher than any ordinary village in our country. Baben village got the best gram panchayat of the year award in 2011 from the state government. Baben village is a Bench mark for the development of other villages in India. These Baben village had received Swarnim gram award in the year 2012. It had also received many such awards from the year 2007-2016.

As per the census 2011 Baben has population of 15,610 of which 8,642 are males while 6,968 are females as per report released by Census India 2011.Population of Children with age of 0-6 is 2121 which is 13.59 % of total population of Baben. Talking about the Female Sex Ratio, it is of 806 against state average of 919. Moreover, Child Sex Ratio in Baben is around 822 compared to Gujarat state average of 890. Literacy rate of Baben city is 75.70 % lower than state average of 78.03 %. In Baben, Male literacy is around 82.55 % while female literacy rate is 67.18 %.

The village has got all basic facilities like sanitation, irrigation, transportation, health care, etc.. The village has got pakka houses. The roads are all weather with street lights. The standard of living of this village is much better than the ordinary village people. Farmers has got private borewells, accomplished with modern farming techniques.

Baben is a village panchayat located in the Surat district of Gujarat state, India. The latitude 21.1378786 and longitude 73.0966019 are the geocoordinate of the Baben. Baben is located around 29.5 kilometer away from its district head quarter Surat.

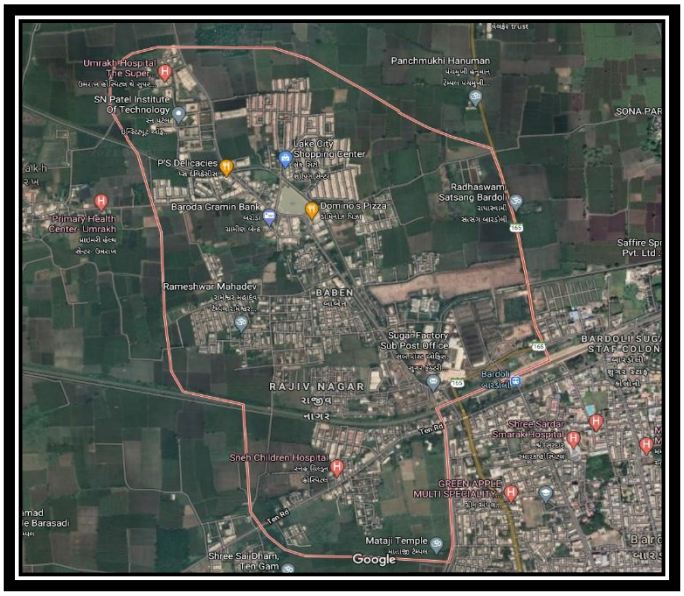


Fig. 1.2 Satellite Map of Baben village

Village	Baben
Taluka	Bardoli
District	Surat
Pin	394601
State	Gujarat
Places near Baben	
Railway station	Bardoli Railway Station
Air Port	Surat Airport (36.8 km)
Town/City	Bardoli (2.1 km)
District	Navsari (27.0 km)

Table 1.1 Baben and its locality

Baben's nearest town/city/important place is Bardoli located at the distance of 2.1 kilometer.

1.2 Concept: Ideal Village, Normal Village

Fig. 1.3 Sample image for ideal village

An ideal village has good facility are available like sanitation and drainage etc. Because solid waste and rubbish of the village should regularly remove into the compost pits or landfill area. An ideal village good road connectivity and good drainage system so that the dirty water of the village is properly drained away from residential area. It's important to do comparison with the ideal village of a village to be developed because it helps in understanding what are gaps which need to be filled.

Education facilities: In this village primary schools and High school are available. And for higher studies college is available in this village. Primary education is free and compulsory.

Medical facilities: Village has clinical facilities for villagers and animals. Hence, there are lots of dispensaries.

House: The residential or house in an ideal village are very neat and clean. The owners of these houses look to their house sanitation and house drainage. The houses have sufficient windows to let in air and light. And also pucca houses is available.

Agriculture: People of an ideal village are good farmer and good in nature. They grow food crop and seasonal crop, etc. Now they have various improved methods of farming for more production of crop.

People: People of an ideal village are very neat and clean. They have a sense of discipline and collaboration. They have a spirit of service and let go.

Conclusion: An ideal village makes all possible provision for development of its people. It is our main duty that we should develop every village of India. The ideal village will certainly help us in discharge our duty. In above concept used and development of other villages in India can be undertaken.

1.2.1 Objectives

A developed village is called is model or ideal village. An ideal village has all primary facility.

- Make the model/ideal village a "hub" that could attract resource for development of other villages in its vicinity.
- Provide easier, faster and cheaper access to urban to urban markets for shop, agriculture markets and other markets commodities produced in such market.
- Contribute towards social empowerment by engaging all section of the community in the task of village development.
- Create and sustain a culture of cooperative livings for inclusive and rapid development.
- Ideal/model village developed village is contribute nation economy growth of country.
- Prevent distress migration from rural to urban areas, which is a common phenomenon in India's villages due to lack of opportunities and facilities that guarantee a decent standard of living.
- Make the model village a "hub" that could attract resources for the development of other villages in its vicinity.
- Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages.
- Contribute towards social empowerment by engaging all sections of the community in the task of village development.
- Create and sustain a culture of cooperative living for inclusive and rapid development.

1.2.2 Example / Live Case studies of ideal village of India/Gujarat

A survey of Pride India says that about 15 villages of India can be said as the Ideal villages and aim is to make 180 villages come into this category.

Few of the ideal villages are selected for the study and each village have its own key features which are discussed below. Among these villages one of the villages is studied is described in detail.
Few Ideal villages are as follows:

1. Pothanikkad (Kerala)

Pothanikkad or Pothanicad is a village in Ernakulam district in the Indian state of Kerala. It's also the first village to achieve 100% literacy in India. The name derives from the Malayalam words poth, meaning buffalo, anaa, meaning elephant, and kaddu, meaning forest, as it was originally a forest with wild buffalos and elephants. Now, this small village has developed into one of the most educated and culturally advanced villages in Kerala. St. Mary's High School is the oldest high school in Pothanicad, where very prominent people in the society and many local politicians have been educated. St. John's Higher Secondary school Pulinthanam is a pioneering educational institution in the village. A government Lower Primary school and two other private Senior Secondary High schools, following CBSE curriculum, also provides better educational opportunities for the young community.

Fig. 1.4 Pothanikkad village

2. Chizami, Nagaland

Fig. 1.5 Chizami, Nagaland

A small village in Nagaland's Phek district, Chizami, has been scripting a quiet revolution in terms of socioeconomic reforms and environmental protection for almost a decade. A model village in the Naga society, Chizami is today visited by youth from Kohima and neighbouring villages for internships in the Chizami model of development. This model focusses on health issues, women's rights, community programmes, food security, and environmental conservation.

Fig. 1.6 Handicraft

What is unique in the Chizami model of development is that economically marginalised women have played an important role in bringing about this transformation that is rooted in traditional practices of Nagaland.

The Chizami village is perched in the upper reaches of the densely forested hills of Phek district in Eastern Nagaland. It has around 600 households with a population of 3,000 that is largely involved in *Jhum* cultivation, a slash-and-burn type of agriculture that is traditionally practised in the hilly terrains of north-east India. Chizami's village council comprises of six *khels (*the Naga word for clans within the same community) who have equal representation in the council. The council plays an important roles in the village governance. The village council prohibits hunting and trapping of birds and animals and

imposes strict fines on those violating norms as proclaimed by a sign board at the entrance to the village. The seeds of socioeconomic and environmental reform in Chizami were planted back in the late 1990s. In 1994, Monisha Behal, women's rights activist and founder of North East Network (NEN), landed in Nagaland to improve women's health standards in the state. Noticing the collective strength of women in the Naga society, Behal decide to use it to do something about the deplorable health and sanitation environment that prevailed in the state that time.

In 1996, Behal met Seno Tsuhah during a workshop on organization building, reproductive health, tackling alcoholism and community development in Pfutsero town. Seno was a representative of the Chizami Women's Society (CWS) and worked as a teacher at the government primary school in Sumi, a village adjacent to Chizami.

Their interaction developed into a partnership that developed into a partnership that set up the Nagaland chapter of the NEN.

At that time, Nagaland was coming out of conflict after six long decades. Behal and Seno knew that the main challenges ahead was to engage and empower the youth to bring about socioeconomic change. After initially focussing on improving health, sanitation and nutrition, they expanded their work to other areas as well.

NEN, working with CWS, started skill enhancement programmes such as bamboo craft, food processing, organic farming, rooftop water harvesting and low-cost sanitation. Discourses on governance, women empowerment human rights issues were also organised.

It took eight years for Seno to convince the village council to accept that women are entitled to equal pay as men in unskilled farm labour. In January 2014, in a landmark move, the village council passed the resolution for equal wages in agricultural labour and next year, another milestone was achieved with the induction of two women as members in the Enhulumi village council.
In Naga society, women work largely in the unorganized sector that includes farming, food processing, and weaving, a skill that is omnipresent in every Naga household. Though Naga shawls and the traditional *mekhela* (wraparound) enjoyed cult status in the apparel market, traditional weaving in the villages was languishing due to the lack of viability and entrepreneurship.

3. Shani Shingnapur, Maharashtra

Fig. 1.7 village with no lock at main door

Imagine a village where homes have no front doors, shops are always left unlocked and locals never feel unsafe.

➢This is the story of Shani Shingnapur in India's Maharashtra state, where villagers eschew security because of their undying faith in Lord Shani, the god of Saturn, who is considered the guardian of the village.

- Legend has it that about 300 years ago, after a bout of rain and flooding, a heavy black slab of rock was found washed up on the shores of the Panasnala River, which once flowed through the village. When locals touched the 1.5m boulder with a stick, blood started oozing out of it.
- Later that night, Shani appeared in the dreams of the village head, revealing that the slab was his own idol. The deity ordered that the slab should be kept in the village, where he would reside from here on. But Shani had one condition: the rock and its colossal powers must not be sheltered as he needed to be able to oversee the village without hindrance. Shani then blessed the leader and promised to protect the village from danger.
- After the villagers installed the huge slab on a roofless platform in the heart of town, they decided to discard all doors and locks. They didn't need them anymore, not with the Lord to watch over them.
- This tradition has continued for generations. Locals occasionally lean wooden panels against their front door frames to keep stray dogs out – but they have no permanent doors, and leave their jewellery and money unsecured, firmly believing that their holy guardian will protect them from any mishap. Even the public toilets in the village square just have a thin curtain at the entrance for privacy.
- New constructions have to honour these protocols, too. The police station – which only opened in September 2015 and has not yet received a single complaint from the villagers – has no front door; while the United Commercial Bank opened India's first "lockless" branch in Shani Shingnapur in 2011, installing a glass entrance in the spirit of transparency and a barely visible remote-controlled electromagnetic lock in respect of the villagers' beliefs.

4. Mawlynnong (Meghalaya)

Fig. 1.8 Mawlynnong village

Not being dirty seems a rather odd reason for fame, but this condition is enough of a rarity in India in times of Swachh Bharat for tourists to make the journey to the village of Mawlynnong in Meghalaya, close to India's border with Bangladesh, which advertises itself as "Asia's Cleanest Village". For at least a decade now, hordes of tourists have daily descended on this quaint little village with a population of approximately 500 people, almost all of them members of the local Khasi tribe, to see for themselves what spic and span looks like.

The road from Shillong winds over misty green hills towards the border post of Dawki. Clouds float into gorges below. Streams glisten like silver ribbons in the distance. Beyond the little town of

Fig. 1.9 Real Picture of Asia's cleanest Mawlynnong village

Pynursla, there is a fork off this main road. The narrow village road becomes a corridor through a wall of green. Betel and broomstick plantations lean in from both sides. A short drive through this corridor brings one to Mawlynnong.

Pretty much the first thing in the village is the parking lot for the tourist vehicles. It is surrounded by little shops selling curios, and small and homely restaurants and tea shops run by locals.

1.2.3 The Idea of a model/Smart Village

This concept note explores the idea of a model/ideal village and also need of adopt a SAGY(Sansad Adrash gram Yojana), Pradhanmatri Adrash Gram yojana like strategy, Technology, community involvement, sustainability and connectivity need to be key elements of any such village, and any efforts towards convergence must rely extensively on these approaches.

This scheme was implement in pilot mode in 1000 villages of Assam, Bihar, Himachal Pradesh , Rajasthan, Tamilnadu, with an allocation of Rs 10 lakhper village. This limit was later raised to Rs 20 lakhs per village.The target under the scheme were those with more than 50% of the population belonging scheduled castes and schedule tribes. Himachal Pradesh launched a Mukhya Mantri Adarsh Gram Yojana along in 2001, with the allocation of Rs 10 lakh per village.

Qualities of a model village is as follows:

- Such a village will have a fully-operational Gram Panchayat or local government that will be responsible for the holistic development of the area.
- It will provide better living standards and quality of life to people of different walks of life.
- It will provide access to improved basic amenities, including educational institutions, healthcare facilities, drinking water, sanitation, along with the rights and entitlements.
- This village will use technological innovations to achieve higher productivity in farming and to help local businesses by mobilizing self-help groups.
- It will provide residents improved infrastructure such as roads, parks, drainage system, etc.

1.2.4 Ancient History Civil / Electrical concept about Indian Village / other Countries Perspective about village and its new Development

Civil Concept:

Ancient Civil concepts about Indian Villages:

Ancient Indian architecture was very comprehensive. It included cities, buildings, temples, sculptures, and painting. The cities consisted of roads, water supply system, public utility, bathroom, drains, buildings were also categorized according to their shapes, their direction, measurement, type

of land/soil on which they were built, nature of objects used in construction etc. And most importantly, all the structures were integrated with nature. In the water supply system, the idea of dams, wells, basins, canals, rivers etc. was also considered. For centuries, construction work was done in villages and cities of India on this basis. For craft work, soil, inlays, limestone, wood, metal and gems were used. Each of these materials was properly tested and used as per their need.

The opinion of ancient sages on land use and construction:

Ancient India not only practised scientific methods of design and construction but also documented them for future generations. Here are some tips given by ancient sages on selection of site and construction.

1. **Vishwakarma Vastu Shastra:** Vishwakarma explains the first point of construction in the ancient book Vastu Shastra **'पूर्व भूमिं परिक्ष्येत पश्चात् वास्तु प्रकल्पयेत्',** This means that before construction one should test the land. Vishwakarma further says that construction should not be done on the land which is very mountainous or on land with large cracks.
2. **Kashyap Shilpa (Craft):** In this ancient book, Kashyap Rishi has said that the foundation should be dug until water is seen because this way you would ensure that you have reached the rock level and the foundation would be strong.
3. **Bhrigu Samhita:** In this scripture saint Bhrigu says that before buying land, one should test it for form, colour, juice, smell and touch. Rishi Bhrigu also explains its methods in his book.

Ancient cities of India found on the basis of archaeological discoveries:

Mohanjodaro (Sindh)

Fig. 1.10 Mohanjodaro

The Mohanjodaro, created 3000 years ago, is considered as a wonderful piece of civil engineering. Found in archaeological excavations even the ruins prove that this town was well settled and its buildings and roads – all were made using symmetry and geometrical measurements. The roads found in this city were straight and were made from east to west and north to south and surprisingly they were at an angle of 90 degrees from each other. Buildings were also constructed in proportion. The intersection of the corners, the heights of the walls was equal. The city had public buildings, gardens, a restaurant, a large public bath as well as residential buildings. There was a provision for bathroom, living room etc in the residential buildings.

The public buildings were 11.82m long, 7.01m wide and 2.44m high, and there were two streams of water. The building material and bricks of the walls were coated with a substance on which there was no effect of water. Archaeological research shows that people living here were well-versed in the construction techniques.

Dwarka

Fig. 1.11 Dwarka

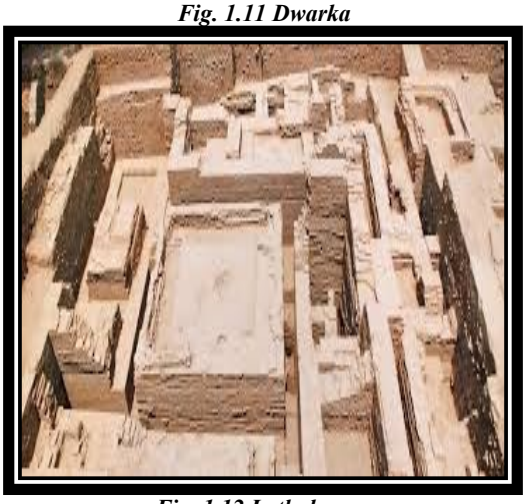


Fig. 1.12 Lothal

Dwarka, also known as Lord Krishna's city, also narrates a similar story. Dr S R Rao discovered Dwarka in the archaeological excavation and found that the ancient city (Dwarka Nagar) was well built and settled. There was a wall around the city. The stones used for the construction of buildings did not erode despite the fact that the city was very close to the sea. Two-storey buildings, roads and water system are also found in the city. Copper, bronze and some alloys with zinc mixed up to 34 percent have also been found during the excavation. The size of columns, windows, etc. reveals that they were designed with a complete mathematical precision.

Lothal port (Saurashtra)

The port of Lothal was built 2500 years ago, where not only small boats but large ships also halted. The fact that the port was a busy one a big city was also established near it. Its composition was almost like Mohanjodaro, Harappa. Roads, buildings, gardens, public utility buildings etc were part of the design of this port city. Interestingly, the cremation ground was made far from the urban settlement. The advanced civil engineering at that time is also evident from the fact that Lothal port was spread to 300m north-south and 400m east-west and to prevent it from storms and floods, 13m tall walls were built using bricks, soil and other materials. This port was more developed than the Phoenician and Roman ports built in the later times.

Electrical Concept:

Ancient Electrical concepts about Indian Villages:

For the past years, India has had a strong program in place to promote rural electrification. The result has been dramatic progress in extending electricity service to the country's vast population. The past decade, in particular, has witnessed accelerated household adoption rates in poorer rural areas. This long-term growth in rural electrification has been accompanied by institutional problems that generally plague India's electricity sector. These include the poor financial condition of the state electricity companies, poor revenue recovery from agricultural pumping, lack of enough investments in operation and maintenance, and meddling by politicians in electricity expansion and service plans. These problems are fairly common, and have been experienced by many countries strongly committed to expansion of rural electrification.

The government considers a village to be electrified if the number of households electrified is at least 10% and electricity is provided to public buildings including schools, health centers, dispensaries, community centers and village councils. So, by definition, all Indian villages have now been

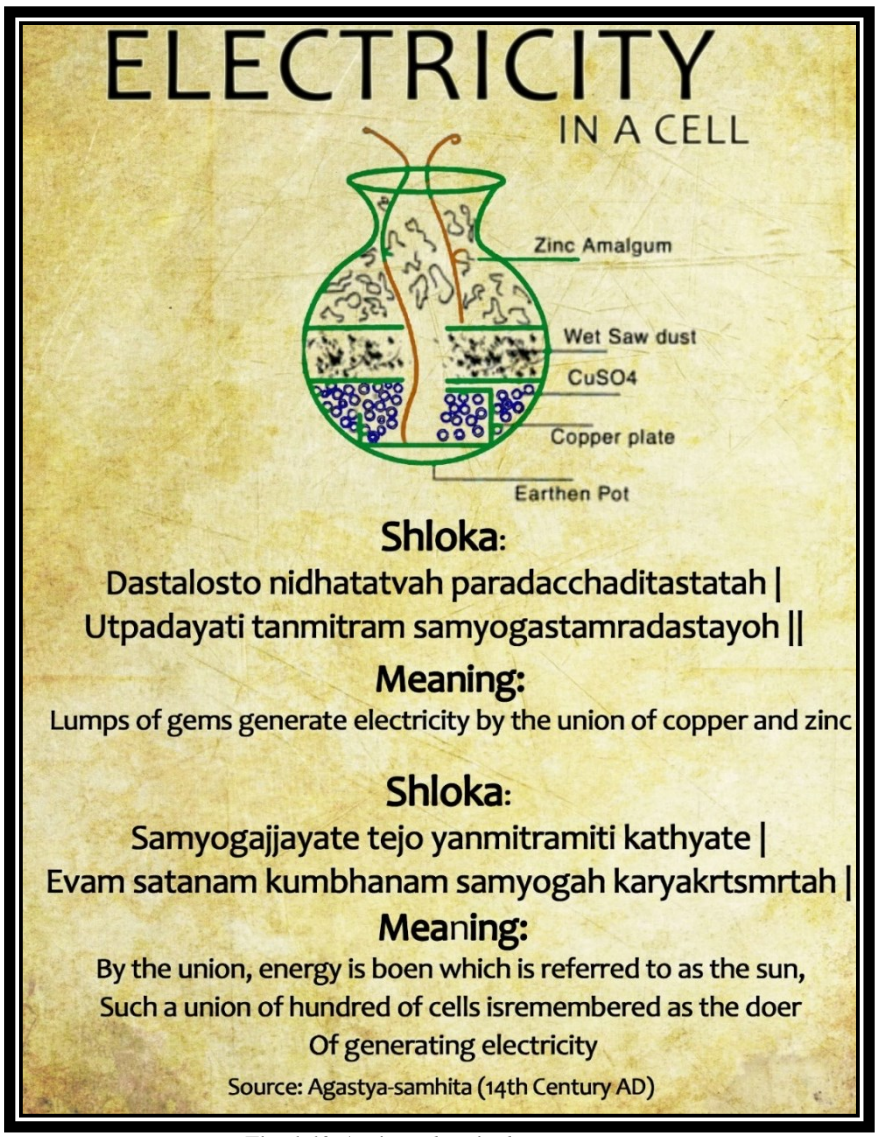


Fig. 1.13 Ancient electrical concept

electrified. Remote and inaccessible villages have always proved to be a major challenge in the country's electrification drive. Though most Indian villages have some electrical connection today, connecting the last remote households in the surrounding areas can be expensive. Additionally, state-owned power distribution companies are struggling with debt and poor demand, which has made it difficult to practically electrify every Indian household.

Evolution of Rural Electrification in India:

Prior to the late 1960s, India's growth in rural electrification was extremely slow. At the time of the country's independence in 1947, only 1,500 villages had electricity. With the enactment of the Electricity Supply Act in 1948, power was extended to semi-urban and rural areas through the creation of the electrical grid system. But during that time, no mention was made of rural electrification.

By the early 1950s, the focus of rural electricity supply had shifted to irrigation projects and village-level electrification. The goal was to provide electricity to 1 out of every 200 villages. The latter half of the 1950s saw a continued focus on village electrification.

Also, special emphasis was placed on covering all towns with populations of 10,000 or above. By the end of the decade, coverage had been extended to 18,689 villages; however, only 350 of the originally targeted 856 towns had been provided with electricity.

Timeline in the Evolution of India's Rural Electrification:

Below is a snippet from **A WORLD BANK STUDY**, Power for All: Electricity Access Problems in India, showing the timeline in the evolution of India's Rural Electrification:

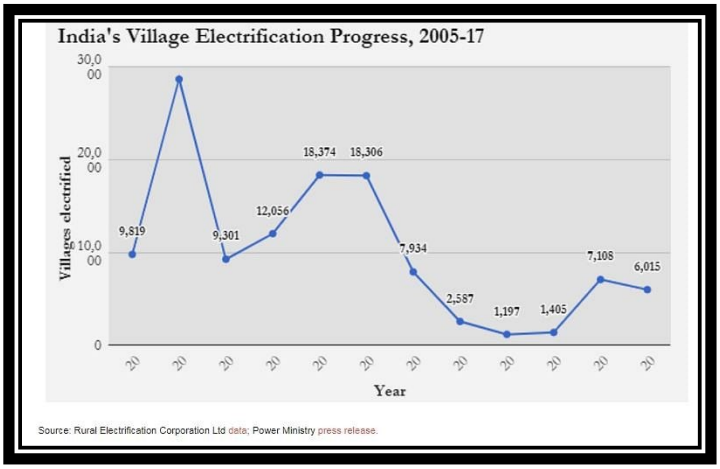


Fig. 1.14 Timeline in the Evolution of India's Rural Electrification

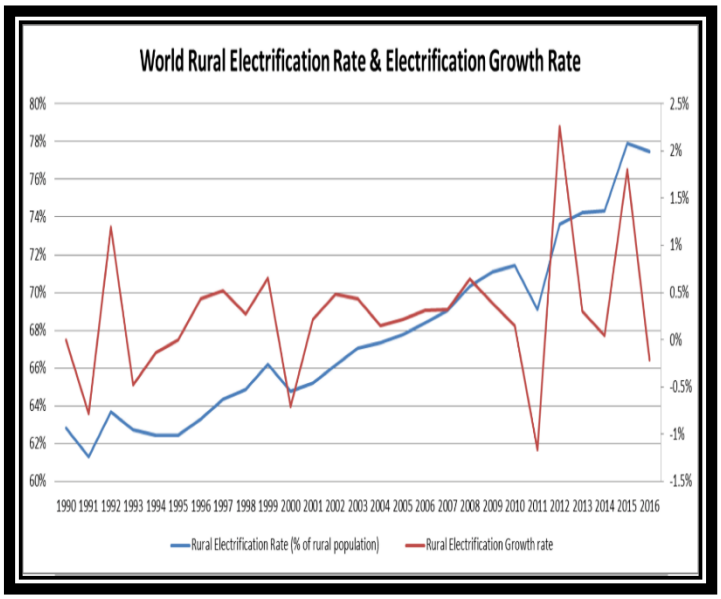


Fig. 1.15 World Rural Electrification Rate & Electrification growth Rate

As of August 2017, about 1% of the villages in India remain un-electrified (3,146 villages). However, with regard to households, around 23% (4.1 crore households) are yet to be electrified.

Evolution of Rural Electrification Around World:

This graph shows the world rural electrification rate along with the electrification growth rate from 1990-2016 and synthesizes data from the World Bank

1.3 Detail study (Socio economic, physical, demographic and infrastructure details) of Ideal village / Smart Village with photograph

We surveyed the Baben (Ideal) village located in the Surat district of Gujarat. Below is detailed study of various dimensions of village such as Socio economic, physical, demographic and infrastructure.

Socio economic Details:

The Socio-economic details include a vast array of information on health and disease, literacy and education, standard of living and poverty, labour force and employment, status of women and gender empowerment, population parameters relevant to fertility, mortality and migration, ecology and environmental protection.

It is essential to do a socio-economic survey of the village to understand various social dimensions and their relation with the economic conditions of the village.

Literacy:

Literacy is directly proportional to the development of a village. Literacy plays a major role in social as well as economic aspects of village.

As Shown above the Male literacy is around 82.55 % while female literacy rate is 67.18 %. So, taking the average Baben has an average of 75.70 % that is less than the state literacy which is 78.03 % as per 2011 census.

Analyzing the above data, it can be said that the literacy rate of women is less as compared to men. There is difference of 15.37 % between the men and women literacy rate.

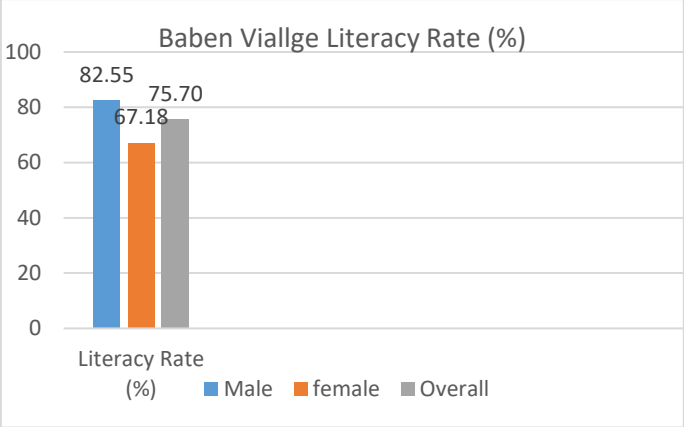


Fig. 1.16 Literacy of the village (2011 census)

There is a need to work upon the literacy of women as indicates gender inequality. In developing countries, it is essential to focus over the literacy of each and every individual irrespective of the gender. As, it is said that mother are the first guru to their children, so we need to ensure that all the women are educated. The literacy rate of the village, is about 75.70% which is less than the state average. This is because the women literacy rate is very less as compared to men.

The village has good educational infrastructure such Aaganwadi and primary, secondary, higher secondary schools. The village also has a Engineering college.

Health:

Health is determined by many factors, including income, environmental conditions - such as access to adequate sanitation and safe water supplies - individual behavior, and health services.

The village has overall good sanitation facilities, consisting of 8 public toilets, community toilet with bath facilities and waste collection from road facility. The village also have good drinking water. Good tap water is available or the people of village. This ensures that they have access to safe drinking water. The village consists of a Sub-Centre PHC in the village along with private clinic/ hospital. So the people of this village has health care facilities available at there nearest place i.e. in their village itself. The overall village health can be concluded as good from the fact that it consists of proper sanitation, access to safe drinking facilities and a good health care facilities.

Baben Work Profile:

As per 2011 census out of total population, 6,628 were engaged in work or business activity. Of this 5,152 were males while 1,476 were females. In census survey, worker is defined as person who does business, job, service, and cultivator and labour activity. Of total 6628 working population, 89.85 % were engaged in Main Work while 10.15 % of total workers were engaged in Marginal Work.

Religion Data 2011:

Population	Hindu	Muslim	Christian	Sikh	Buddhist	Jain	Others	Not sated
15,610	89.27%	10.10%	0.43%	0.01%	0.04%	0.10%	0.00%	0.04%

Table 1.2 Percentage data of Baben Village based on religion (2011 census)

Physical Details:

Physical characteristics include the natural environment, such as landforms, elevation, water features, climate, soil, natural vegetation, and animal life.

Below Table shows physical features of the village:

DESCRIPTION	INFORMATION/DETAIL
Area of Village	466 Hec.
Forest Area	-
Agricultural Land	282 Hec.
Residential Area	140 Hec.
Other Area	41 Hec.
Water Bodies	-
Nearest Town	Bardoli (1km)

Table 1.3 Land distribution (2011 census)

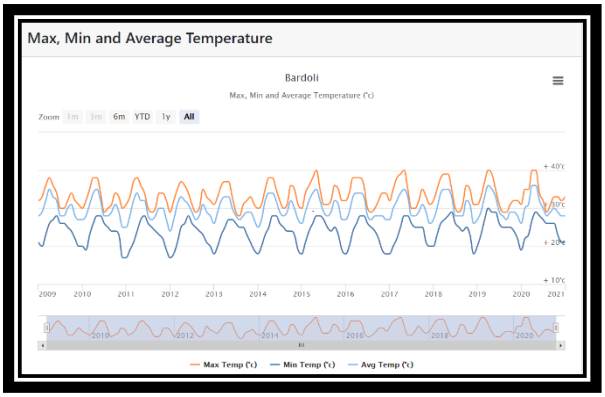


Fig. 1.17 Weather of Baben Village (as per year wise)

Climate:

The village is located in Bardoli taluka. So, the climate and whether report of Bardoli can be referred as of the Baben.

Fig. 1.17 shows the weather report as per year wise from www.worldweatheronline.com:

Average Rainfall:

The average rainfall for the Bardoli district is 1466.1 mm per year.

Elevation:

The elevation of the district Bardoli is 29 m above the sea level.

Infrastructure Details:

Infrastructure facility Similarly, as social infrastructure Socio-Cultural Infrastructure Facilities are also essential for any village to compete with the urban area and any village must have all the above-mentioned facilities so that the residents of village may not get forced to migrate to the urban areas.

Baben is a village facilitated with bituminous and R.C.C. roads for main village roads as well as society streets. The roads are facilitated with sign boards, markings and signals for proper functioning of the vehicular traffic as well as pedestrian's traffic.

The village is facilitated with 32 CCTV cameras for proper monitoring and protection from thefts, damages etc. to the village. The roads are also facilitated with proper street lights for 33 night travel.

Pure Drinking Water for morning and evening peak hours is also provided door to door with the help of 6 over head water tanks which range from 15000L to 25000L which are cleaned at regular intervals to maintain hygienic conditions.

Along with the facility of pure drinking water the facility for the removal of waste water is also provided. Drainage network for the whole town is constructed from door to door and is connected to

the main sewage line at Bardoli Taluka. Along with sewage disposal solid waste management is also given a wide importance and is collected from door to door with the help of 3 collecting vans and is given to the Bardoli Nagarpalika for disposal and treatment.

5 public toilets are also constructed with the help of government grant and by the fund collected from the local residents which had led the people to leave a better life than before.24hrs electricity supply is also provide to the residents from GEB.

The village Baben has all the socio-cultural facilities such as playground, library, garden, recreation facilities, community hall etc. A project named AVADH LAKE CITY has led the development of the village to a greater extent which is located in the central part of the village and works as a recreational hub for the residents as well as outsiders. Other than the above facilities 1 CNG Pump, 1 Petrol Pump, 12 Temples and 2Masjids are also located in the premises of Baben. This leads to the growth of town to a greater extent.

24hrs electricity supply is also provide to the residents from GEB.

1.4 SWOT analysis of Ideal village / Smart Village

SWOT Analysis is a framework for identifying and analyzing the internal and external factors that can have an impact on the viability of a project, product, place or person and useful technique for understanding the Strengths and Weaknesses, and for identifying both the Opportunities and Threats.

SWOT ANALYSIS OF BABEN VILLAGE

Strengths	Weaknesses	Opportunities	Threats
➢ Ponds and sidewalks ➢ Lake site ➢ Local businesses ➢ Schools and colleges ➢ Religious places (temples/masjid) Excellent water quality ➢ Easy access to highway ➢ parking facilities ➢ Police / fire	➢ No facility of clubs for adults and seniors ➢ Need to upgrade village parks and playgrounds	➢ Opportunity for more events in parks, ponds and open space ➢ Construction of public library ➢ Construction of movie theatre ➢ Opportunities for local business ➢ Redevelopment of vacant land ➢ Entertainment parks	➢ Algae in ponds ➢ Accidents due to rough driving by college students ➢ High commercial rents

1.5 Future prospects of the ideal village

Baben village can be developed as an educational and recreational hub due to development of Avadh lake city and other upcoming infrastructure projects near the village and due to Vidyabharti college campus in the premises of Baben village. Local business and employment opportunities can also be

improved with regards to increase in the physical and social development of the village. As the Baben is surrounded with industrial facilities like Bardoli sugar factory the expansion of this sugar industry may possible in future.

1.6 Benefits of the visits of Ideal village / Smart Village

1. **Help Understand Model of an ideal village:** In order to accomplish the goal of converting a rural village to a ideal village it is very important for us to visually and consciously understand what an ideal village looks like. Ideal village visit helps us to understand the structure of a modern village.
2. **Picture of Existing Technology:** It helps us to get the picture of technological advancement in the villages. Ideal villages can be looked up for the most advanced technologies prevailing in the villages. We can get the real time analysis of the efficiency and usability of the technologies especially in field of agriculture. If these technologies works fine for them they can be implemented in other villages.
3. **Life experiences of Villagers:** It gives us a brief idea of village life of a ideal village which helps us to analyze what goes through their mind and level f satisfaction they have.
4. **Learn from their mistakes:** The process of development is itself very important to make ensure right thing is done at right time. Interacting with them and knowing the development journey can help us to know the mistakes and make use we don't do it.
5. **Finding scope of improvement in model villages:** Development is life long process and survey ideal villages can create a room for finding the improvement areas.

1.7 Electrical / Civil aspects required in Ideal village / Smart Village

Baben is village with basic power infrastructure such as transformer and distribution line provided to inhabited locality too and the electricity is for any purpose in its revenue boundary. Hence, we can say this village as Electrified village. Electricity provided to public places like schools, panchayat ofices etc. The community hall has Television Facility. The village is facilitated with 32 CCTV cameras for proper monitoring and protection from thefts, damages etc. The roads are also facilitated with proper street lights for night travel. The Baben village has underground system for transmission of power supply for the half of the village. The remaining village will be underground electrified in future according to Sarpanch Bhavesh Patel. DGVLC BARDOLI DIVISION OFFICE, which supplies electricity to the whole baben village. DGVCL is only 5km away from this village. 24hrs electricity supply is also provide to the residents from GEB.

CHAPTER 2: Literature Review (Civil & Electrical Concept)

2.1 Introduction: Urban & Rural village concept

The concept of "Urban" and "Rural" is different for different governments/ countries. Each government/country identifies settlements as "Urban" or "Rural" based on some criteria. We will be talking particularly about India.

For the census of India 2011:

- A minimum population in urban area 5000.
- A density of population of at least 400 persons per sq.km.
- At least 75 per cent of the male main working population engaged in non-agriculture pursuits

Concept of Urban Village:

Fig. 2.1 Urban Sustainable Design

State government definition: Governor of the state declares by public notification an area as "urban" based on certain **parameters**, such as **population of the area**, the **density of the population** therein, the **revenue generated for local administration**, the **percentage of employment in non-agricultural activities**, the economic importance or such other factors.

National government (census office) definition:

All administrative units that have been defined by statute (i.e., settlements declared based on state government definition).

Administrative units satisfying the following three criteria:

(i) A minimum population of **5,000 persons**.

(ii) 75 percent and above of the male main working population being engaged in non–agricultural pursuits.

(iii) A density of population of at least 400 persons per sq. km. (1,000 per sq. mile).

Concept of Rural Village:

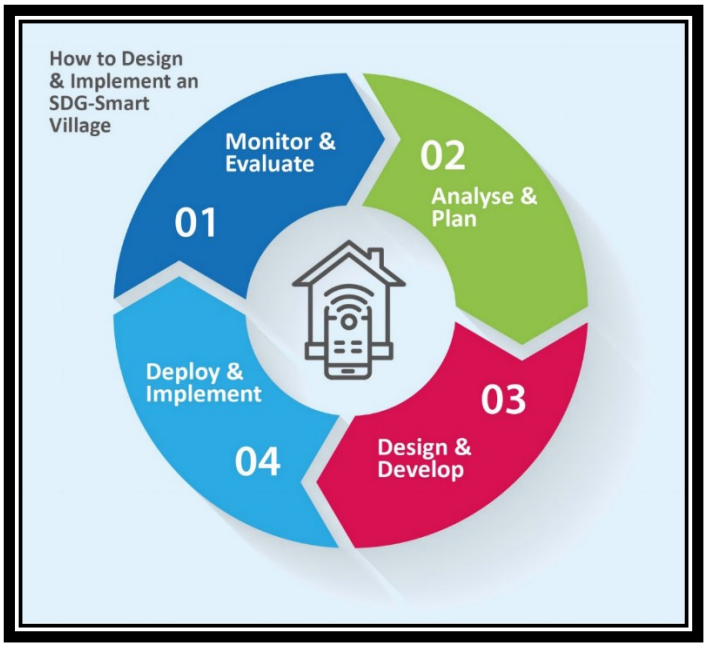


Fig. 2.2 SDG- Smart Village

- An area which has low population density and less human settlement but are predominantly with agriculture activity.
- According to the Planning Commission, a town have not more than 15,000 population is considered rural in nature. In these areas the panchayat makes all the decisions.
- The National Sample Survey Organization (NSSO) defines rural as follows:
- An area with a population density of up to 400 per square kilometer.
- Villages with clear surveyed boundaries but no municipal board.
- A minimum of 75% of male working population involved in agriculture and bounded with other activities.
- RBI defines rural areas as those areas with a population of less than 49,000

2.2 Importance of the Rural development

- More than 60% of population of India lives in villages.
- For most of the time it is a fact that villages don't receive even basic facilities. More over due to less income sources people of villages are forced to move to city areas.
- Hence need of village development is necessary to do stop migration.
- Rural developments also bring in agricultural advancements.
- Development increases job opportunities.
- Better life for village people.
- Development of education institutes in villages is crucial job as it shapes the future of our country.
- Development bring in the Medical facilities which, most of the villages does not have.
- Development also connects the backward villages to the todays modern world which is necessary.
- It is also to protect our village life i.e our traditions and culture.

2.3 Ancient Villages / Different Definition of: Rural Urban Villages

An urban area is the region surrounding a city. Most inhabitants of urban area have nonagricultural jobs. The population density is quite high. Urban area very developed, meaning there is a density of human structure such as houses, commercial building, roads and railways. Urban area can refer to towns, cities and sub-urban. An urban area include the city itself as well as surrounding area. Many urban area are called metropolitan area, where two or more metropolitan area grow until they combine, the results may be knows as a megalopolis.

Rural area is opposite of urban area. Rural area often called 'the country.' Have low population density and large amounts of undeveloped area. Usually, the difference between a rural area and an

urban area is clear. This is because improve technology has decrease the needs for agriculture works and partly because cities are offering greater economic opportunities.

The National Sample Survey Organization (NSSO) defines rural as follows:
An area with a population density of up to 400 per square kilometer.
Villages with clear surveyed boundaries but no municipal board.
A minimum of 75% of male working population involved in agriculture and bounded with other activities. RBI defines rural areas as those areas with a population of less than 49,000.

2.4 Scenario: Rural / Urban village of India population Growth

In India out of the total population of 1210.2 million as on 1st March, 2011, about 377.1 million are in urban areas. The net addition of population in urban areas over the last decade is 91.0 million.

The percentage of urban population to the total population of the country stands at 31.6. There has been an increase 3.35 percentage points in the proportion of urban population in the country during 2001-2011.

The provisional results of Census 2011 reveals that there is an increase of 2774 towns comprising 242 Statutory and 2532 Census towns over the decade. Growth rate of population in urban areas was 31.8%.

Further the number of million plus cities/urban agglomeration UA has increased from 35 in Census 2001 to 53 in Census 2011. The new entrants are Srinagar UA Jam-mu and Kashmir,Union Territory of Chandigarh UA, Jodhpurs UA and Kota Rajas than, Ghaziabad UA Uttar Pradesh, Ranchi UA Jharkhand, Raipur UA and Durg-Bhilainagar UA Chattisgarh, Gwalior UA Madhya Pradesh, Vasai Virar and Aurangabad UA Maharashtra, Kozhikode UA, Thrissur UA, Malappuram UA, Thiruvananthapuram UA, Kannur UA and Kollam UA Kerala, and Tiruchirappalli US Tamil Nadu. So while the States of Jammu and Kashmir and Chhattisgarh now also have million plus city/UA, Kerala now has as many as 7 million plus cities/UA, a quantum jump from the situation in 2001 when just Kochi UA was a million plus city/UA.

Persons in million numbers			Decadal growth in population %	
	2001	2011	1991-2001	2001-2011
Total	1029	1210	21.5	17.6
Rural	743	833	18.1	12.2
Urban	286 27.81%	377 31.16%	31.5	31.8 +0.3%

Table 2.1 Rural and Urban Population India (Year Wise)

2.5 Scenario: Rural / Urban village of Gujarat as per Census 2011 and latest

Gujarat Urban Population 2011

Out of total population of Gujarat, 42.60% people live in urban regions. The total figure of population living in urban areas is 25,745,083 of which 13,692,101 are males and while remaining 12,052,982 are females. The urban population in the last 10 years has increased by 42.6 %. Sex Ratio in urban regions of Gujarat was 880 females per 1000 males. For child (0-6) sex ratio the figure for urban region stood at 852 girls per 1000 boys. Total children (0-6 age) living in urban areas of Gujarat were 2,952,359. Of total population in urban region, 11.47 % were children (0-6). Average Literacy rate in Gujarat for Urban regions was 86.31 percent in which males were 90.98% literate while female literacy stood at 70.26%. Total literates in urban region of Gujarat were 19,672,516.

Gujarat Rural Population 2011

Of the total population of Gujarat state, around 57.40 percent live in the villages of rural areas. In actual numbers, males and females were 17,799,159 and 16,895,450 respectively. Total population of rural areas of Gujarat state was 34,694,609. The population growth rate recorded for this decade (2001-2011) was 57.40%. In rural regions of Gujarat state, female sex ratio per 1000 males was 949 while same for the child (0-6 age) was 914 girls per 1000 boys. In Gujarat, 4,824,903 children (0-6) live in rural areas. Child population forms 13.91 percent of total rural population. In rural areas of Gujarat, literacy rate for males and female stood at 81.61 % and 57.78 %. Average literacy rate in Gujarat for rural areas was 71.71 percent. Total literates in rural areas were 21,420,842.

Below table shows the data of Gujarat for the census 2011:

Description	Rural	Urban
Population (%)	57.40%	42.60%
Total Population	34,694,609	25,745,083
Male Population	17,799,159	13,692,101
Female Population	16,895,450	12,052,982
Population Growth	9.31%	36.00%
Sex Ratio	949	880
Child Sex Ratio (0-6)	914	852
Child Population (0-6)	4,824,903	2,952,359
Child Percentage (0-6)	13.91%	11.47%
Literates	21,420,842	19,672,516
Average Literacy	71.71%	86.31%
Male Literacy	81.61%	90.98%
Female Literacy	57.78%	70.26%

Table 2.2 Urban Vs Rural Census Gujarat (2011)

2.6 Rural Development Issues - Concerns – Measures

Rural development is the process of improving the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas.

There are some issues which are in the path of rural development. Some which are as follows:

1. Lack of Education: Education plays a vital role in any society; this is because education is what differentiates a backward and forward society. Education helps the people to get aware of their basic rights as well as help to get ware of the government policies laid for them. Due to the lack of educational institutes and financial problems village people are not able to get education.

2. Lack of health care facilities: For most of the villages it is still a luxury to have a proper medical care facility. It is important to establish medical care facilities. Many people die off not getting medical facilities at time. Also a key point to know is people in many cases avoids their small

health issues which later on turns into a fatal one. So providing Health care facilities nearby could help a lot.

3. **Less income:** It is one the most concern for the village people. Income has much to do with purchasing power of the people. If we provide them with facilities but if they don't have that purchasing power, there will be no positive impact on their life. So it is important to generate income sources.
4. **Electricity:** Electricity is still an question mark for the people of villages. It is not so that people don't receive electricity but it is more about reliability and application.

5. **Lack of awareness of government policies:** For people to get benefit of government policies it is important to get aware of it. In some cases people are not aware of these policies which is primarily because of the communication gap between the people and the government.

6. **Social issues:** Still villages faces the social issues like gender inequality, racism, etc.. which is not a good sign. This not only leads to disputes between them but also leads to weaken the development activities as development is team work.

The above were a few and we know there is a lot but in order to overcome these issues we can do something and which are listed below.

1. **Educating people**: It is not about schooling, but is much of awareness. We really don't need much of awareness programs to be conducted but it is require to have quality awareness programs.

2. **Establishing health care facilities** are a primary requirement.

3. **NGOs** can play avital role in helping the people in terms of villages. NGOs can help in educating people, help in analyzing the environment of the village which would help a lot to understand and prepare a development plan for them.

4. **Increasing Agriculture Income:** Still today framers face the problem of low income. There should a way out to increase their income.

2.7 Various infrastructure guidelines with the Norms for Villages for the provisions of different infrastructure facilities

Norms and Standards

Construction of buildings on plots in layout to conform to certain standards – Layout Plan The distribution of land use for the preparation of layout plan shall be as follows:

(a) Land under each use:

In the land to be developed, maximum of the plots may be of size less than 100 sq. m. and no plot may be more than 500 sq. m. The layout should generally conform to the following land use:

Area	Land under each use
Residential	50 - 60 %
Work place, Schools, Institutions, Nursing Home, Dispensary, Community places/Facilities, Veterinary Hospitals etc.	15 - 20 %

Shops, Offices, Consumer Stores, Fertilizer Depot and other bazaar's	3 - 5%
Open spaces	3 - 5%
Roads, Pedestrian Paths, Drains, Cooperative Bank, P.O. and other utilities	15- 20%

Table 2.3 Percentage land distribution

(b) Residential Development:

The Residential plotted development, till the development plans are prepared, the following norms shall be as follows:

Plotted Development excluding other activities such as Cattle Shed, Storage etc.	**60 and above plots/hectare**
Covered area per dwelling unit	25 sq. m. (minimum)
Height of buildings	10 maximum (3 storey)

Table 2.4 Residential development

(c) Road hierarchy:

Road which connects villages to nearby areas	9 m (min.)
Main Village Roads	6 m
Internal Village Roads	4.5 m

Table 2.5 Road hierarchy

(d) Social Facilities:

Use	Standard/Population	Area
Primary School	1 for 5000 population	0.4 to 0.6 hectare
High School with primary school	1 for 15000 population	1 hectare
Dispensary/Health Centre	1 for 5000 population	0.05 hectare
Community Hall	1 for 5000 population	0.05 hectare
Aaganwadi	1 for 5000 population	0.05 hectare

Table 2.6 Social Facilities

Space Requirement

The plot size ground coverage, FAR, height and set backs of various uses shall be as per following tables

(a) Residential: Plotted Housing:

Sr. No.	Plot area in Sq m	Max in Ground Coverage %	FAR	No. of D/U	Max. height in M	Set Backs M Front	M Side	M Black
1	Below30	90%	180	2	6	1.2	-	-
2	30 to 50	80%	160	2	6	1.2	-	-
3	51-100	80%	160	3	9	1.2	-	1.5
4	51-100	75%	150	3	9	1.2	-	2.0

5	151-250	66%	130	3	9	1.2	-	3.0
6	251-500	60%	120	3	9	1.2	1.5	3.0
7	Above 501	50%	100	3	9	1.2	3.0	3.0

Table 2.7 Table of Residential: Plotted Housing

(b) Commercial Use Table:

Sr. No.	Plot size in sq m	Ground coverage %	FAR	Max. height in M	Set Backs M Front	Set backs M side
1	1 Convenient Shops	75%	100	6	2	-
2	Local Shopping Centre	50%	100	6	3	-
3	Sectoral/Shopping	40%	120	9	4.5	-

Table 2.8 Table of Commercial Use

(c) Institutional & community facilities:

Sr. No.	Plot size in sq m	Ground coverage %	FAR	Max. height in M	Set Backs M Front	Set Backs M Front	Set Backs M Back
1	500-1500	40%	120	8	3	-	3
2	1001-2000	33%	100	8	4.5	-	3
3	2001-4000	30%	90	8	6	3	3
4	>4001	25%	90	8	9	3	4.5

Table 2.9 Community and Institutional facilities

(d) Educational and health:

Sr. No.	Use	Min. Plot Area in sq m	Ground coverage %	FAR	Max. height in M	Set Backs M Front	Set Backs M Front	Set Backs M Back
1	Aaganwadi	500-1500	33.3%	100	10	4.5	3	3
2	Primary School	1500-3000	30%	90	10	6	3	6
3	Senior Secondary	4000-10000	25%	100	12.5	9	4.5	6
4	Nursing Home Dispensary & Diagnostic Centre	250 251-500 >501	35% 33.33% 30%	70 100 100	6 9 12	3 4.5 6	- 3 3	3 3 4.5

Table 2.10 Educational and health

2.8 Ancient / Existing Electrical concept study as a Literature Review for village development

In 1950, only 3,000 Indian villages had electricity. Rural electrification has been the holy grail for successive governments. While around 1,500 villages had been electrified during Independence, it was 481,124 in 1991. As many as 63,955 villages were provided electricity in the 10th five-year plan (2002-07) and 45,955 villages in the 11th plan (2007-12). 579,012 of Indian villages were electrified by 31 March 2015.

It was an old saying that electricity is a luxary for many of villages of India but the scenario is changed. The results can be seen as approximately 90 percent of villages in **India** were estimated to be electrified in 2019. It is however villages don't receive a 24x7 of supply. A village is declared electrified if 10% of the households can access power, along with public institutions such as schools, the panchayat office, health centers, dispensaries and community centers.

From a report **Rural Electrification in India Costumer Behavior and Demand (February 2019) By SmartPowerIndia** which was done on 200 villages following data was collected:

Average Day Deamd of villages:

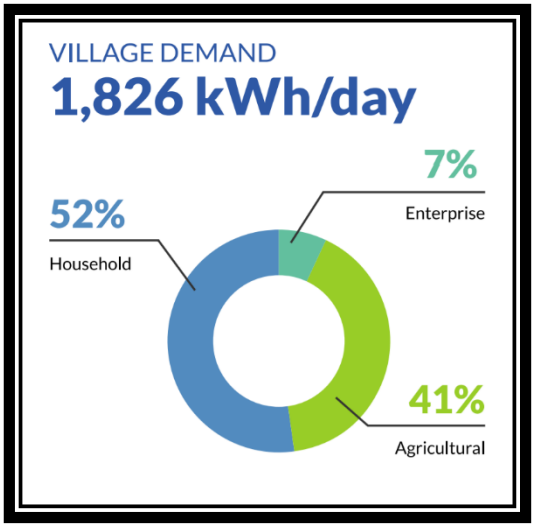


Fig. 2.3 Average Electrical Demand of Village

Composition of Electicity deamnd in village:

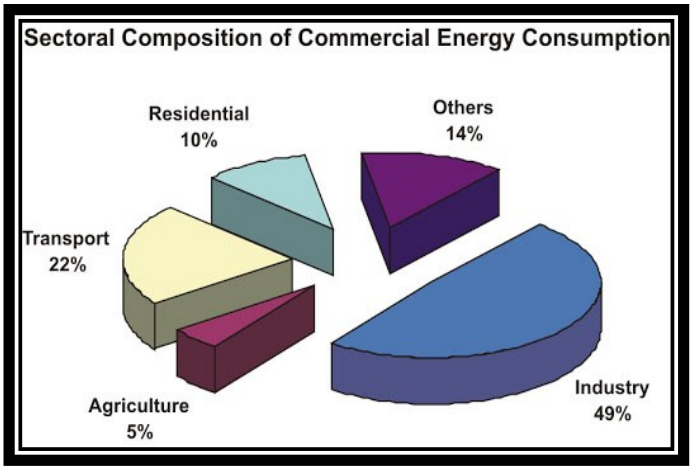


Fig. 2.4 Composition of energy consumption

2.9 Other Projects / Schemes of Gujarat / Indian Government

Government Schemes for Rural India

1. Mahatma Gandhi National Rural Employment Guarantee Act:

It is an Indian labor law to guarantee the 'right to work'. It came into establishment in 2006. The idea is to enhance livelihood security in rural areas by giving 100 days of wage employment to every household there. The employment has to be a minimum of 100 days per financial year for every volunteering household. The gram panchayats handle MGNREGA in their villages. It comes under the ministry of Rural Development.

2. Remunerative Approach for Agriculture and Allied sector Rejuvenation:

It was a National Agriculture Development Programme and a State Plan Scheme of Additional Central Assistance. It began in 2007 as Rashtriya Krishi Vikas Yojana. This was a part of the 11th Five Year Plan by the Government of India. It was under the National Development Council and aims to achieve a 4% annual growth in agriculture. It ended in 2011 after completing the 11th five-year plan.

3. Gramin Bhandaran Yojana:

It is a capital investment subsidy scheme begun in 2001. The subsidy is for constructing or renovating the warehouses for storing farm produce in rural areas. The idea is to increase farmer's holding capacity. This can avoid distress sales and help them establish. It promotes scientific storage capacity with facilities to help farmers.

4. Deen Dayal Upadhyaya Gram Jyoti Yojana:

It is a Government of India scheme to provide a continuous power supply to rural India. This scheme replaced Rajiv Gandhi Grameen Vidyutikaran Yojana in 2015. It focuses on strengthening infrastructure like metering at all levels in rural areas. This will help in providing power to agricultural consumers. It comes under the Ministry of Power.

5. Deen Dayal Upadhyaya Grameen Kaushalya Yojana:

On the 98th birth anniversary of Pandit Deendayal Upadhyaya, this scheme became official in 2014. The motto of this scheme is to "Transform rural poor youth into an economically independent and globally relevant workforce". It targets youth (15–35 years) as a part of the National Rural Livelihood Mission. It aims to give diversity to the rural poor family's income and help rural youth with careers. An amount of Rs 1,500 crores is released for this scheme to improve the employability of rural youth.

6. Pradhan Mantri Gramin Awaas Yojana:

It is a social welfare programme by the Indian Government for providing housing facilities to rural poor in India. This scheme is similar to Housing for All by 2022 scheme 2015. It began as Indira Awas Yojana launched in 1985. It comes under the Ministry of Rural Development and constructs houses for the BPL population in the rural areas. This provides cash assistance and subsidies to the villagers for building their houses.

7. Sampoorna Grameen Rozgar Yojana:

It was a scheme by the Government of India to provide employment for the rural poor. The Panchayati Raj institution maintains this scheme. The Employment Assurance Scheme and Jawahar Gram Samridhi Yojana merged and led to the establishment of SGRY in 2003. The programme aims to provide employment and food in rural areas to BPL families. It comes under the Ministry of Rural Development.

8. Pradhan Mantri Gram Sadak Yojana:

It is a nationwide plan in India to provide good road connectivity to secluded areas. Places with populations of 500 and above are to be connected by all-weather roads. By 2017, 82% of these areas were already connected. This Centrally Sponsored Scheme became official in 2000 by Late Shri Atal Bihari Vajpayee.

9. Pradhan Mantri Adarsh Gram Yojana:

It is a rural development programme by the central government that began in 2009. It is mainly for the development of villages with a higher SC/ST ratio, over 50%. The idea is to merge several central government schemes to develop these villages. The schemes are – Bharat Nirman, Pradhan Mantri Gram Sadak Yojana, Sarva Shiksha Abhiyan, MGNREGA, Integrated Child Development Services, and more. This program is applicable to 44,000 villages SC/ST population above 50%. It comes under the Ministry of Social Justice and Empowerment.

CHAPTER 3: Smart (Cities / Village) Concept Idea and its Visit (Civil & Electrical Concept)

3.1 Introduction: Concepts, Definitions and Practices

Fig. 3.1 Smart City

A smart city is an urban area that uses different types of electronic data collection sensors to supply information used to manage assets and resources efficiently. As the term "smart city" gains wider and wider, there is still confusion about what a smart city is, especially since several similar terms are often used interchangeably. The different metrics of urban smartness are reviewed to show the need for a shared definition of what constitutes a smart city, what its features are, and how it performs in comparison to traditional cities. Furthermore, performance measures and initiatives in a few smart cities are identified.

Making a city "smart" is evolving as a strategy to ease the problems generated by the urban population growth and speedy urbanization. Yet little hypothetical research has sparingly discussed the phenomenon. To close the gap in the literature about smart cities and in response to the increasing use of the concept, this paper proposes an agenda to understand the concept of smart cities. Based on the exploration of a wide and extensive array of literature from various disciplinary areas we identify eight critical factors of smart city initiatives: management and organization, technology, governance, policy context, people and communities, economy, built infrastructure, and natural environment.

- Strategic planning
- Mobility
- Hackathon
- Wi fi
- E – government
- E – transportation
- Technological resiliency
- Cyber defense
- Renewable energy

Access to sustainable energy services in Smart Village acts as a catalyst for development – enabling the provision of good education and healthcare, access to clean water, sanitation and nutrition, the growth of productive enterprises to boost incomes, and enhanced security, gender equality and democratic engagement.

Definitions (Civil):
Smart village means all the necessaries facilities is developed in the village and no need to moves in city for any kind of requirement. Facilities like Bank, Panchayat building, Good road connectivity, Sanitation facility, ATM, Shopping center, Recreation center etc

Definition (Electrical):
Smart village means all the necessaries facilities is available their like Street-light, 24 x 7 hr electricity available, people may use Solar water heater etc
.

Practices (Civil):
A 'Smart Village/Ward' encompasses sustainable and inclusive development of all sections of its Community, so. The 100 per cent achievement of the following basic amenities, they enjoy a high standard of living. Homes for all – with access to toilet, safe-drinking water, and regular power. Skills and Village Enterprise development with bank and market linkages gave more flexible access to youth. Has functional solid/liquid waste management system. For smart village Efficient public transportation system. Improving sanitation conditions Rain harvesting /Rain water drainage system Use of renewable energy. A lot of work needs to be done in making the villages clean and sustainable to live in. There are different aspects of clean village such as: water supply, sanitation, indoor air quality, solid waste management and renewable energy etc.

Practices (Electrical):
The Idea of Smart villages based on Internet of Things. There are certain ideas in smart cities that can be directly implemented in villages. For example, the use of cameras and sensors in streets for surveillance, sensors for healthcare etc. On the other hand, there are certain sectors like agriculture, cattle/livestock rearing etc. which need some improvised ideas for smart working. In the following sections, the various aspects of villages have been considered and how the quality of life in villages can be made better using the IoT and Smart village model.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

1. Economy:
- Gross Domestic Product (GDP) for the City (Core Indicator)
- GDP Per capita (Core Indicator)
- Gini's coefficient (Supporting Indicator)
- City's Unemployment Rate (Core Indicator)
- Assessed Value of Commercial and Industrial Properties as a Percentage of Total Assessed Value of all Properties (Core Indicator)
- Number of Businesses per 100000Population (Supporting Indicator)

2. Education:
- Percentage of Female School-aged Population Enrolled in Schools (Core Indicator)
- Percentage of Students Completing Primary Education: Survival Rate (Core Indicator)

- Percentage of Students Completing Secondary Education: Survival Rate (Core Indicator)
- Primary Education Student/Teacher Ratio (Core Indicator)
- Percentage of School-aged Population Enrolled in Schools (Supporting Indicator)

3. Energy:

- The Percentage of Total Energy Derived from Renewable Sources, as a Share of the City's Total Energy Consumption (Core Indicator)
- Total Residential Electrical Energy use per Capita (kWh/year) (Core Indicator)
- Total Electrical Energy Use per Capita (kWh/year) (Supporting Indicator)
- Average Number of Electrical Interruptions per Customer per Year (Supporting Indicator)
- Average Length of Electrical Interruptions (in Hours)(Supporting Indicator)

4. Environment

- Fine Particulate Matter (PM2.5) Concentration (Core Indicator)
- Particulate Matter (PM10) Concentration (Core Indicator)
- NO2 (Nitrogen Dioxide) Concentration (Supporting Indicator)
- SO2 (Sulphur Dioxide) Concentration (Supporting Indicator)
- O3 (Ozone) Concentration (Supporting Indicator)
- Green House Gas Emissions Measured in Tones per Capita (Core Indicator)
- Air Quality Index (Core Indicator)
- Noise Pollution (Core Indicator)
- Quality of Public Water Bodies (Core Indicator)

5. Finance:

- Debt Service Ratio (Debt Service Expenditure as a Percentage of Municipality's Own-Source Revenue) (Core Indicator)
- Capital Spending as a Percentage of Total Expenditures (Supporting Indicator)
- Own-Source Revenue as a Percentage of Total Revenues (Supporting Indicator)
- Tax Collected as a Percentage of Tax Billed (Supporting Indicator)

6. Fire and Emergency Response:

- Number of Professional Fire Fighters per 100000 Population (Core Indicator)
- Number of Volunteer and Part-time Firefighters per 100 000 Population (Supporting Indicator)
- Number of Fire Related Deaths per 100000 Population (Core Indicator)

3.3 Technological Options

- **Smart Buildings:** security cameras, fire safety, electricity managements.
- **Smart Dairy:** Remote supervision and monitoring in open fields and barns.
- **Smart Farming:** Satellite data for farm activities.
- **Smart agriculture:** Smart agricultural equipment for crop production.
- **Smart Weather and Irrigation:** Weather water levels in dams.
- **Smart health care:** Smart beds and equipment to monitor patient.
- **Smart Education:** Interactive learning through videos.
- **Smart surveillance system:** CC cameras and sensors to detect robbery.
- **Smart Buildings:** Security cameras, fire safety, electricity managements Smart Dairy, etc.

3.4 Road Map and Safe Guards

The purpose of building smart cities is to make the lives of the people safer and easier. Technology can be used as an instrument to protect lives and improve services and, furthermore, it can be used to protect Personally Identifiable Information and cities critical infrastructures, such as water treatment systems, transportation, hospitals, and power plants. Technology can be used to reduce crimes by geographically spotting areas with high crime rates, identifying specific crime patterns, and reporting it to law enforcement instantly, many of these services are achieved.

Sensors are small measurement devices that can be integrated with electronics to detect certain smells, sound, or levels of variations. Sensors can be passive or active. Passive sensors do not necessarily take action; they simply collect data, and they are used mainly to measure weather conditions, such as Ozone levels, wind speed, or the sun's ultraviolet levels. Active sensor devices, on the other hand, use electronics to process data and take action.

To become a digital city, governments will need an appropriate set of solutions that will help them advance to the next stage of ICT maturity. The more a city takes advantage of the potential offered by ICT in terms of the provision of digital services and an integrated urban network, the higher its level of ICT maturity. In many ways, this is easier for newer cities in emerging markets, which are just now investing in urban infrastructure. For example, Lusail City in Qatar, Masdar City in the UAE, and Songdo in South Korea are all making digital technology, networks, and apps a central part of how they operate and interact with citizens. By contrast, existing — or brownfield — metropolitan areas face clear challenges in moving up the ICT maturity ladder, as they need to modernize their existing infrastructure with embedded sensors and control systems and retrofit old buildings — a complicated and expensive process.

Indeed, in some cases it is impossible as the buildings cannot accommodate new technologies. However, becoming a digital city is not so stark a choice that urban authorities either achieve this revolution or fail. Rather, even taking small steps, particularly for established cities, toward becoming more digitized and offering enhanced digital services provides a variety of benefits. In some cases, established cities can use the disruptive power of digitization to leapfrog some of the obstacles.

3.5 Issues & Challenges

1. Retrofitting existing legacy city:

Infrastructure to make it smart, there are a number of issues to consider when reviewing a smart city concept. The most important is to determine the existing cities weak areas that need utmost consideration, e.g., 100-per-cent distribution of water supply and sanitation. The integration of formerly isolated legacy systems to achieve citywide efficiencies can be a significant challenge.

2. Financings of smart cities:

The High-Power Expert Committee on Investment Estimates in Urban Infrastructure has assessed a per-capita investment cost of Rs 43,386 for a 20year period. Using an average figure of 1 million people in each of the 100 smart cities, the total estimate of investment requirements for the smart city comes to Rs 7 lakh crore over 20 years. This translates into an annual requirement of Rs 35,000 crore. One needs to see how these projects will be financed as the majority of project need would move through complete private investment or through PPPs (public-private partnership).

3. Availability of city development plan:

Most of our cities don't have a city development plan, which is the key to smart city planning and encapsulates, and encapsulates all a city needs to improve and provide better opportunities to its citizens. Unfortunately, 70-80 % of Indian cities don't have.

4. Financial sustainability of ULBS:
Most ULBS are not financially self-sustainable and tariff levels fixed by the ULBs for providing services often do not mirror the cost of supplying the same. Even if additional investments are recovered in a phased manner, inadequate cost recovery will lead to continued financial losses.

5. Technical constraints of ULBS:
Most ULBS have limited technical capacity to ensure timely and cost-effective implementation and subsequent operations and maintenance owing to limited recruitment over a number of years along with inability of the ULBs to attract best of talent at market competitive compensation rates.

6. Three-tier governance:
Successful implementation of smart city solutions needs effective horizontal and vertical coordination between various institutions providing various municipal amenities as well as effective coordination between local government, state government, central government, agencies on various issues related to financing and sharing of best practices and service delivery processes.

7. Providing clearances in a timely manner:
For timely completion of the project, all clearances should use online processes and be cleared in a time-bound manner. A regulatory body should be set up for all utility services so that a level playing field is made available to the private sector and tariffs are set in a manner that balances financial sustainability with quality.

8. Dealing with a multivendor environment:
Another major challenge in the smart city space is that software infrastructure in cities contains components supplied by different vendors. Hence, the ability to handle complex combinations of smart city solutions developed by multiple technology vendors becomes very significant.

9. Capacity building program:
Building capacity for 100 smart cities is not an easy task and most ambitious projects are delayed owing to lack of quality machinery and manpower, both at the center and state levels. In terms of funds, only around 5 per cent of the central allocation may be allocated for capacity building programs that focus on training, contextual research, knowledge exchange and a rich database. Investments in capacity building programs have a multiplier effect as they help in time-bound completion of projects and in designing programs, developing faculty, building databases as well as designing tool kits and decision support systems. As all these have a lag time, capacity building needs to be strengthened right at the starting.

10. Reliability of utility services:
For any smart city in the world, the focus is on reliability of utility services, whether it is water, telephone, electricity, broadband services. Smart cities should have to provide electricity 24 Hours.

3.6 Smart Infrastructure - Intelligent Traffic Management

The idea of Smart villages based on Internet of Things Smart Education Is the basic means to implement all the advancements in life. Educating people about the use of new technologies facilitates

Fig. 3.2 Kamrej Village

better implementation. It can be the force behind reducing the digital-divide which is far more prevalent in villages than the cities. The whole idea of Smart villages revolves around its people and how efficiently they make use of the components of a Smart village. They can be educated to participate in each and every activity of the village leading to a better lifestyle for its people and interactive videos can foster the learning in children and even adults. These can be used to educate them to use the facilities provided in the Smart villages in the best way. The village schools can be equipped with Internet and other devices and learning can be made a fun activity turning the schools into Smart schools.

Infrastructural Facility in Kamrej Village (smart village):

The village is well equipped with various infrastructural facilities. Likewise it has good quality of PHC, Aganwadi, library, bus stop, etc. Kamrej is a village panchayat located in the Surat district of Gujarat state,India. The latitude 21.2656122 and longitude 72.9637728 are the geocoordinate of the Kamrej. Gandhinagar is the state capital for Kamrej village. It is located around 228.8 kilometer away from Kamrej.. The other nearest state capital from Kamrej is Daman and its distance is 95.0 KM. The other surrouning state capitals are Daman 95.0 KM., Mumbai 256.8 KM., Bhopal 506.5 KM

Infrastructural Facility in Punsari village (smart village):

Smart Village: Five bore well and four hand pumps, a reverse osmosis plan and house to house piped connections to distribute chlorinated water. 66KVA- substation for electricity generation and 100% coverage of all streets with LED street lights. All 73 wells of the village regularly recharged. Police station, post office, telephone exchange and primary health center. Atal Express minibus for villagers with free of charge commute of student. Internet WIFI covering the whole village; future development of village proposed through GIS mapping. A public address system with 120 waterproof speakers for announcing communal information, bhajans, shocks, and Mahatma Gandhi's massages every street and nook of village under CCTV surveillance, which has helped drop the crime rate to 0%. Every family has a solid constructed home with personal lavatory. Whole village covered with underground drainage system for disposal of waste water. Pay and use public toilet near the bus station. A well managed crematorium for last rites; mortal remains of the deceased kept in pots/urns and disposed collectively at Haridwar or Suitable religious sites.

3.7 Cyber Security

Cyber security in the context of Smart Cities is a hot topic. The objective of Smart Cities is to optimize the city in a dynamic way to offer a better quality of life to the citizens through the application of information and communication technology (ICT). The range of areas where cities can become

smarter is extensive: it is an evolution of "Connected Cities" with the prevalence of data exchange at a larger scale. The benefits of Information and Computing Technologies (ICT) in a Smart City and of the Internet of Things are tremendous. Smart energy meters, security devices, smart appliances for health and domestic life: these and more offer unprecedented conveniences and improved quality of life. City infrastructures and services are changing with new interconnected systems for monitoring, control and automation. These may include water and sanitation to emergency responders and disaster recovery.

Cyber security is the body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorized access. In a computing context, security includes both cyber security and physical security. Ensuring cyber security requires coordinated efforts throughout an information system. Elements of cyber security include:

- Application security
- Information security
- Network security
- Disaster recovery / business continuity planning
- Operational security
- End-user education

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling

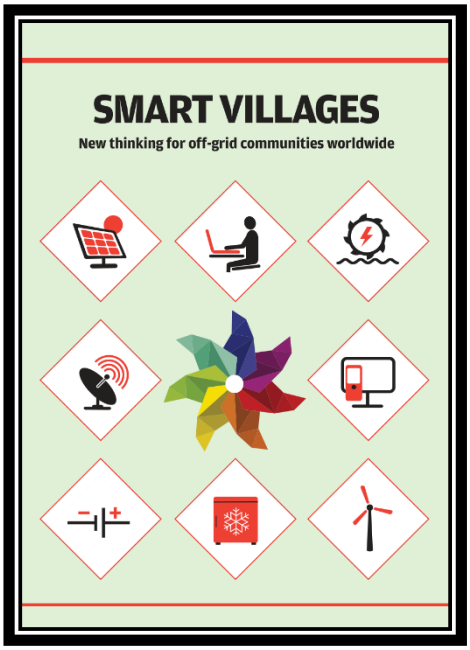


Fig. 3.3 Smart Village

District cooling systems produce chilled water, steam or hot water at a central plant and then pipe that energy out (either underground or over rooftops) to buildings for air conditioning, space heating and water heating. As a result, these buildings don't require their own chillers, air conditioners, boilers or furnaces. District cooling systems are a highly efficient way for many owners and manufacturers to effectively address each of these challenges while meeting their comfort and process cooling and heating needs. Heat sources in use for various district heating systems include, power plants designed for combined heat and power including both combustion and nuclear power plants; and simple combustion of a fossil fuel or biomass; geothermal heat; solar heat; industrial heat pumps which extract heat from, river or lake water, seawater, sewage, and waste heat from industrial processes.

Green Buildings: Green concept includes use of Eco-friendly materials, energy conservation and preservation of environmental quality. Green concept is used to reduce adverse impact on environment due to man-made sources of pollution.

Aspects of green design: Sustainability, Eco-sensitivity, Energy efficiency, Climate-responsiveness, User-friendliness, Cost-effectiveness.

3.9 Strategic Options for Fast Development

Three of the main components of this strategic plan include city improvement (retrofitting), city renewal (redevelopment), city extension (green field development) and pan-city development.

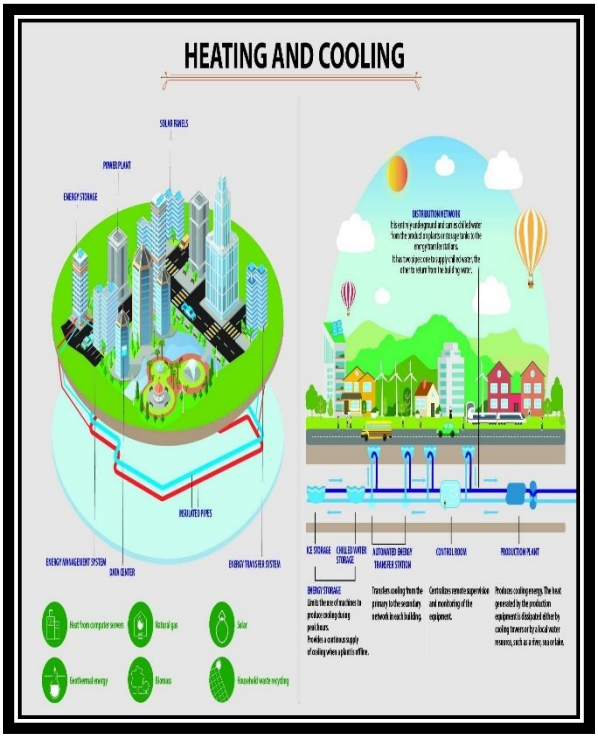


Fig. 3.4 Smart City heating and cooling

1. Reevaluate the Role of The City and Its Administration

Smart city strategies provide a unique opportunity for reconsidering what exactly the city should offer in terms of services, and what the reach of those services should be. The "city as a service" model is often appropriate – along the lines of "we will contact you when your passport needs renewing" rather than the other way around.

2. Involve Citizens and Other Stakeholders

Before you begin to define your smart city strategy, you must understand the needs of your target group. Getting citizens and other stakeholders from civil society, NGOs, business, etc. on board right from the start is essential. It enables you to define the added value that your smart city concept should provide to end users.

3. Avoid Isolated Solutions – Look Beyond E-Government and Actively Apply Best Practices

Many smart city concepts today focus on individual and not integrated solutions. Think about the whole range of action fields in your city and ensure that the interfaces between the different sectors are digital in order to foster cross-sector activities. Actively look for best practices and apply them.

4. Encourage Initiatives, Self-Sustaining Business Models and Other Contributions from The Private Sector

Businesses increasingly see themselves as both global and local citizens. They are willing to engage in activities that strengthen their local environment and will often invest significantly in them. Draw on this support. Not everything has to be financed from the public pocket – many smart city solutions, such as parking guidance and information (PGI) systems, can be financed by the private sector.

5. Create a Comprehensive Data Strategy and Data Platforms

Understand the data you already have, creating data platforms to link existing data structures with each other. Implement an open data policy, proactively making public information available as a basis for a control center and innovative data-based applications.

6. Set up Innovation Labs to Foster an Inspiring Ecosystem

Create an ecosystem for innovation and entrepreneurship by providing facilities such as "maker spaces", "living labs", or "business incubators". Importantly, ensure that these facilities have the necessary regulatory room to maneuver. Provide technical and financial support wherever possible.

7. Ensure Data Security

Interconnected digital systems come with an increased need for data security. Your smart city strategy should include a cyber-security concept.

8. Involve Infrastructure Operators In Designing, Financing And Implementing Initiatives

Most major cities own and operate their infrastructure via intermediary companies, such as public utilities, public transit operators, and so on. These players have an important role in designing, financing and implementing smart city concepts. They can also help to develop smart city business models.

9. Gain Political Backing and Integrate Public Feedback

Once you have drawn up a smart city strategy, it is important to gain political backing for it. Equally important, however, is inviting citizens and other stakeholders to join in a structured and focused dialog about the strategy to ensure alignment over goals and actions. This could involve the use of participation platforms.

10. Establish a Coordinating Body and a Dedicated Planning System

Put a central authority in place to coordinate the various smart approaches across the city. The job of this body is to plan, monitor and support and evaluate the success of individual initiatives and so avoid a piecemeal approach. Clear, realistic goals, timeframes, and budgets are essential.

3.10 India's Urban Water and Sanitation Challenges and Role of Indigenous Technologies

India's Urban Water and Sanitation Challenges

Increasing population and climatic variation driven by climate change has led to water scarcity across world. As cited in United Nations Environmental programmer 2002, by 2025, 1.8 billion people will be living in countries or regions with absolute water scarcity about two-third of the world population, mainly in developing countries will face moderately to high water stress and half of the population will face problem due to water scarcity. Ongoing mismanagement of resources and wasteful behavior in India has led to the overexploitation of water resources, particularly groundwater. A community-wide approach based on participatory principles which seeks to achieve not only 100 per cent open defecation free communities but also broader environmental sanitation objectives such as promotion of improved hygiene behaviors and solid/liquid waste management.

Role of Indigenous Technologies

As per the bilateral agreement between the Government of India and European Commission, a research and development project were granted to Aligarh. Under the initiative, we have developed and deployed a low cost, eco-friendly, sustainable concept, easy to implement and maintain, a non-energy demanding technology. Aligarh is the lead partner in this whole consortium. This project started in 2013, completed in 2016 and is under the monitoring stage.

More than 90% of the urban population has access to drinking water, and more than 60% of the population has access to basic sanitation. However, access to reliable, sustainable, and affordable water supply and sanitation (WSS) service is lagging behind. Are the Services Reliable? No Indian city receives piped water 24 hours a day, 7 days a week. Piped water is never distributed for more than a few hours per day, regardless of the quantity available. Raw sewage often overflows into open drains. Are the Services Technically and Financially Sustainable? Less than 50% urban population has access to piped water. The Non-Revenue Water (NRW: due to leakages, unauthorized connections, billing and collection inefficiencies, etc.) is huge, estimated between 40-70% of the water distributed. Operations and maintenance cost recovery through user charges is hardly 30-40%. Most urban operations survive on large operating subsidies and capital grants.

3.11 Initiatives in village development by local self-government

In the past "government as provider" approach, the priorities were to secure budget allocations and develop projects. The Housing Policy and the NCU statement implicitly give higher priority to two other requirements: first, the reform of policies and regulations that now inhibit development initiatives by the people; and second, more efficient resource management and the building of institutional capacity. Resource Management and Institutional Development. As discussed in Section 5, India's urban institutions do not have the capacity to provide adequate services at present, let alone address the requirements of accelerated urban growth in the future. Proposals relate to three types of institutions.

Rural Local Governments (or Panchayat Raj Institutions):

- Zilla Panchayat
- Mandal or Taluka Panchayat
- Gram Panchayat

Initiation by Local People:

- Organizing program for increase literacy for peoples of village.
- Providing enough information regarding to using of various facilities.
- Peoples have to learn various things regarding how to keep facilities in good condition.

3.12 Smart Initiatives by District Municipal Corporation

Managing solid waste is a daunting task for every urban local body (ULB) in India. The irony is such that out of 400 municipal corporations and councils in India, only a handful of ULBs are managing their solid waste management, while reinventing some of the age-old garbage disposal methods with a touch of new technologies. The Council has listed some of the proven examples that can be considered for tackling such a sensitive issue.

Take example of Pune city. The city has managed to tackle the waste of over 1,700 tones that it generates daily, while ensuring minimization of land fill, freeing up urban land for more productive purposes. At present, the Pune Municipal Corporation (PMC) has combined an integrated approach with decentralized waste management by installing 25 bio-methane plants that produce 600 kW of electricity and compost as a byproduct

.

The 300 TPD plant by Noble Exchange Environment Solutions Pvt. Ltd (NEX) that converts food waste to bio-CNG, is a 300 tpb (total plumbum) vermi-compost project by Ajinkya Biofert and Disha. It uses the Rochem Separation System that processes mixed waste to produce 300 TPD of refuse derived fuel (RDF). This DBOT project by NEX, which converts food waste into valuable bio fuel, has already started producing 45 TPD of bio-CNG and 150 tones of organic manure, based on the anaerobic digestion system. At maximum capacity, it can process 300 tonnes of waste, making it the largest biogas plant in India.

Another example is Jabalpur. With the installation of a 600 tons per day (TPD) municipal solid waste plant, the Jabalpur Municipal Corporation has become India’s first to install a Smart WTE facility producing 11 MW of energy. The plant, installed by Council’s lead partner Essel Infraprojects Ltd, has used refuse-derived fuel (RDF), biomethanisation and an advanced technology called combustion. Although these technologies work differently, all of them eliminate waste and produce energy. That apart, although technology has played a major role in arresting the waste menace, some manual intervention has came in handy as well. To cite an example, Alleppey Municipal Corporation in Kerala, which was grappling with a garbage dumping issue, has now transformed the city’s waste

disposal scenario. The focus of the initiative was segregation and treatment of wet waste at source. The pilot project, which was started in just 12 wards, has now spread over 52 wards, covering 40,000 households. The corporation has installed biogas plants, both portable and fixed, with a pipe composting system.

3.13 Any Projects contributed working by Government / NGO / Other Digital Country concept

Government projects:

Name of Authority: National Highways Authority of India (NHAI)

Name of Contractor: Unique Construction

Project Name: Road up gradation (Kamrej-Chalthan) Project

Project Brief: The project envisages six laning of Kamrej-Chalthan section from 248.10 km to 264.35 km of NH-8 with long term remedial measures for four black spots on Kamrej Bharuch section of NH-8.

Sector: Transport

Sub-Sector: Roads and bridge

Project Status: Pre-construction Stage

Digital country concept:

Digital India is a campaign launched by the Government of India in order to ensure the Government's services are made available to citizens electronically by improved online infrastructure and by increasing Internet connectivity or by making the country digitally empowered in the field of technology. The initiative includes plans to connect rural areas with high-speed internet networks. Digital India consists of three core components: the development of secure and stable digital infrastructure, delivering government services digitally, and universal digital literacy, Launched on 1 July 2015 by Indian Prime Minister Narendra Modi, it is both enabler and beneficiary of other key Government of India schemes, such as Bharat Net, Make in India, Startup India and Standup India, industrial corridors, Bharatmala, Sagarmala. As of 31 December 2018, India had a population of 130 crore people (1.3 billion), 123 crore (1.23 billion) Aadhaar digital biometric identity cards, 121 crore (1.21 billion) mobile phones, 44.6 crore (446 million) smart phones, 56 crore (560 million) internet users up from 481 million people (35% of the country's total population) in December 2017, and 51 per cent growth in e-commerce.

3.14 How to implement other Countries smart villages projects in Indian village context Taiwan

Off-grid communities: - Electrification is highly desired by all rural communities. Different international, national and local organizations use different indicators for measuring and reporting mini-grids or stand-alone systems. South Asian countries have been focusing on off-grid electrification of current trend for Rural Electrification (RE) at regional level.

Solar power:

In recent years, Taiwan is also catching up on promoting renewable energy throughout the country. According to SciTech Reports, 20% of the solar panels in the world are exported from Taiwan, making the country the second largest solar panel provider globally. Moreover, the current government has been planning on employing solar energy to public amenities and incorporate the green energy to people's daily lives.

Wind Power:

In addition, Taiwan's island geographic provides ideal wind power locations. Since 2000, there have been 347 wind power systems constructed, yielding a total of 684.4 MW of storage nationwide. The offshore wind power development has also been lately invested by world-renown companies such Northland Power Inc., and Copenhagen Infrastructure Partners etc. and it is anticipated Wind power that the offshore wind power would be generating 5.5 GW by 2025.

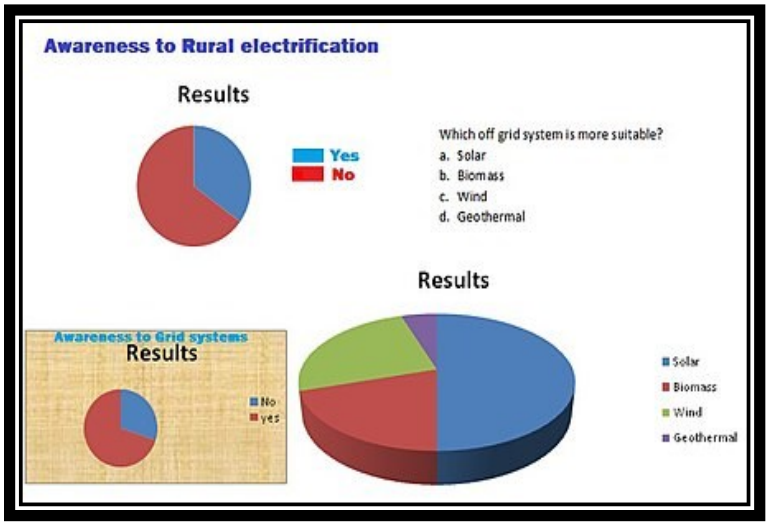


Fig. 3.5 Awareness of Rural Electrification

Thermal power:

Besides wind power, the volcanic formation of Taiwan also provides the country with geothermal resources.

Hydropower:

Hydropower is another crucial renewable energy in Taiwan and it is estimated that the current hydropower can provide 4500 MW per year. The system running is a combination of predominantly cascade, diversion and large accumulation types in order to handle the unpredictable typhoons and droughts. The mountainous landscape of Taiwan has gifted the country a better foundation for hydropower development.

Other power sources:

Beyond natural resources, some tech companies invented alternative energies such as transforming pig dung into biogas power and excess wax apple wood sticks to biomass energy. The former can produce around 25 kW of energy and the technology was introduced in the Discovery Channel. Furthermore, an applied physics research team at Ching Hua University also came up with extracting DNA from fish roe to obtain certain material for DNA biopolymer photonics, which can be used to as a kind of sustainable energy.

3.15 Electrical concept (Design Ideal and Prototype model)

Smart villages are sustainable electricity supplies and the availability of clean and efficient appliances for cooking. Productive enterprises and facilities with higher energy demands will tend to be located in hub villages supplied by the national grid if sufficiently close or – for the many remoter communities – by local mini-grids driven by renewable energy sources, possibly in hybrid form with diesel generators in some cases. The more dispersed communities around the hub villages will typically use pico-power and stand-alone home systems to provide more basic levels of electricity supply until distribution networks can be extended to them.

Energy management:

- Smart meters and management
- Renewable sources of energy

CHAPTER 4: About Shankar Talav

4.1 Introduction

Information of Shankar Talav Village is as follows:

4.1.1 Introduction About Shankar Talav

Fig. 4.1 Shankar Talav Village

Shankar Talav village is situated in Tehsil Valsad, District Valsad and in State of GUJARAT India. Village has population of 679 as per census data of 2011, in which male population is 356 and female population is 323. Total geographical area of Shankar Talav village is 173.02 Hectares. Population density of Shankar Talav is 4 persons per Hectares. Total number of house hold in village is 160.

In Shankar Talav village population of children with age 0-6 is 75 which makes up 11.05 % of total population of village. Average Sex Ratio of Shankar Talav village is 907 which is lower than Gujarat state average of 919. Child Sex Ratio for the Shankar Talav as per census is 596, lower than Gujarat average of 890.

Shankar Talav Photos:

Fig. 4.2 Shankar Talav Primary School

Fig. 4.3 Shankar Talav Village Panchayat office

4.1.2 Justification/ need of the study

- The study of these village is necessary in order to have an idea of the problems prevailing in these villages.
- It is essential to estimate the various aspects of the villages in order to find the gaps in these villages.
- Studying is not only about getting the information but is the way of understanding the people of villages so that, the major problems of the villages can be found out.
- Studying also helps us in understanding the social aspects of the villages which is very necessary for the involvement of the people of the village for development purpose.
- Study also helps in collecting the data for future analysis of the history of a village.
- These studies done under Vishwakarma Yojana can be a database for other government policies and documentation.

4.1.3 Study Area (Broadly define)

Shankar Talav village is situated in Tehsil Valsad, District Valsad and in State of GUJARAT India. Shankar Talav village has population of 679 of which 356 are males while 323 are females as per Population Census 2011.

Shankar Talav village population of children with age 0-6 is 75 which makes up 11.05 % of total population of village. Average Sex Ratio of Shankar Talav village is 907 which is lower than Gujarat state average of 919. Child Sex Ratio for the Shankar Talav as per census is 596, lower than Gujarat average of 890.

Sex Ratio of Shankar Talav -Census 2011

As per the Census Data 2011 there are 907 Females per 1000 males out of 679 total population of village. There are 596 girls per 1000 boys under 6 years of age in the village.

Literacy of Shankar Talav

Shankar Talav village has higher literacy rate compared to Gujarat. In 2011, literacy rate of Shankar Talav village was 89.90 % compared to 78.03 % of Gujarat. In Shankar Talav Male literacy stands at 94.82 % while female literacy rate was 84.75 %.

Shankar Talav Census 2011 Data ---Census 2011

Description	Census 2011 Data	Description	Census 2011 Data
Village Name	Shankar Talav	Total Person Literates	543
Teshil Name	Valsad	Total Male Literates	293
District Name	Valsad	Total Female Literates	250

State Name	Gujarat	Total Person Illiterates	136
Total Population	679	Total Male Illiterates	63
Total Area	173 (Hectares)	Total Female Illiterates	73
Total No of House Holds	160	Scheduled Cast Persons	22
Total Male Population	356	Scheduled Cast Males	9
Total Female Population	323	Scheduled Cast Females	13
0-6 Age group Total Population	75	Scheduled Tribe Persons	251
0-6 Age group Male Population	47	Scheduled Tribe Males	130
0-6 Age group Female Population	28	Scheduled Tribe Females	121

Table 4.1 Shankar Talav Census Data (2011)

4.1.4 Objectives of the study

The main objective of the study undertaken is to utilize the results to provide true feedback of the present state of implementation of all development schemes in the rural areas. The observation made during the study are to inputs to help in bringing about changes in the formulation or reformulation.

- To assess problems, constrains in the effective implementation.
- To know the basic requirement of village.
- To provide the basic facilities in rural areas like Education, Health, irrigation, electric power etc.
- To suggest strategies and policies that would enable Government of India to increase the pace of rural development.
- To assess the adequacy of these schemes in solving and providing solution to problems of rural development.
- To provide the impact of these various Program.
- To gauge the general opinion of the people towards these schemes and programs of the government.

4.1.5 Scope of the Study

The aim of project is finding the problem or need of a village in terms of socio – cultural or physical or social infrastructure and to design that facility with efficient engineering solution which include the design proposal and estimate cost to facilitate the require facility for the future growth of village with urban facilities. The study will focus the development trend, intensity of growth of the village, and find out the problems related to the socio-cultural or physical development of the area, social infrastructure services, and the administrative systems of the village.
The study of village gives the reason where there is need of sustainable facilities like infrastructure facilities, community hall, primary health center, post office, general market, pure drinking water, road network, schools, electricity, sanitation, library, aganwadi, overhead tank, police station, fire station, etc. are available or not. Rural settlement engulfed in urban limits during the process of development, and also those located in the fringe areas of large cities, can be termed as urban villages.

4.1.6 Methodology Frame Work for development of your village

Fig. 4.4 Methodology Frame Work for Developement of village

4.1.7 Available Methodology for development of related to Civil/Electrical

Available methodology (Civil)

- Dev eloping public infrastructure.
- Construction of village road
- Utilizing waste to generate some by product
- Technical aspects
- Implementation of various government granted infrastructure development scheme i.e. PMAY, etc.
- Implementation of sustainable development plan by government
- Redevelopment plans.
- Identifying various engineering and construction specifications

Available methodology (Electrical)

- Solar panel scheme by government.
- Building renewable energy resources
- Using led instead of conventional one.
- Efficient irrigation method
- Storage system.
- Power factor improvement

4.2 Shankar Talav Study Area Profile

Shankar Talav village is situated in Tehsil Valsad, District Valsad and in State of GUJARAT India.

Total geographical area of Shankar Talav village is 173.02 Hectares. Population density of Shankar Talav is 4 persons per Hectares. Total number of house hold in village is 160. The nearest Railway Satiation to this village is Dungari Railway station which is 1.4 km away. The nearest Air Port to the village is Surat Air Port which is about 54.1 km from the village. The nearest Town from the village is Valsad which is 8.8 km from the village.

4.2.1 Study Area Location with brief History land use details

Location:

Shankar Talav is located in Valsad Tehsil of Valsad district in Gujarat, India. It is situated 14km away from Valsad, which is both district & sub-district headquarter of Shankar Talav.

Village: Shankar Talav
Taluka: Valsad
District: Valsad
State: Gujarat

NEAREST
Railway Station:
Dungari Railway Station (1.4 km)
Air Port:
Surat Airport (54.1 km)
Town/City:
Valsad (8.8 km)
District:
Navsari (31.9 km)

Fig. 4.5 Satellite Map of Shankar Talav

Fig. 4.6 Map of Shankar Talav

Brief History of Land use:

According to census 2011 the village area is approximately 173.02 Hect., out of which 134.03 Hect. is Agricultural area, 12.46 Hect. Residential, 26.53 Hect. is other area.

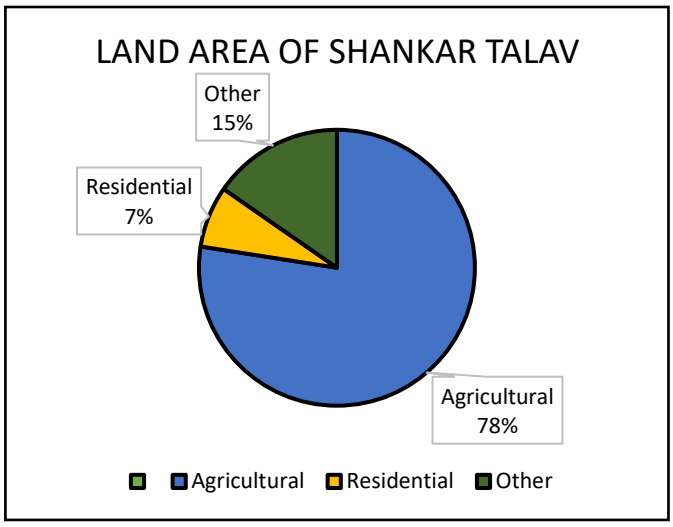


Fig. 4.7 Shankar Talav Land Use (%) (2011 Census)

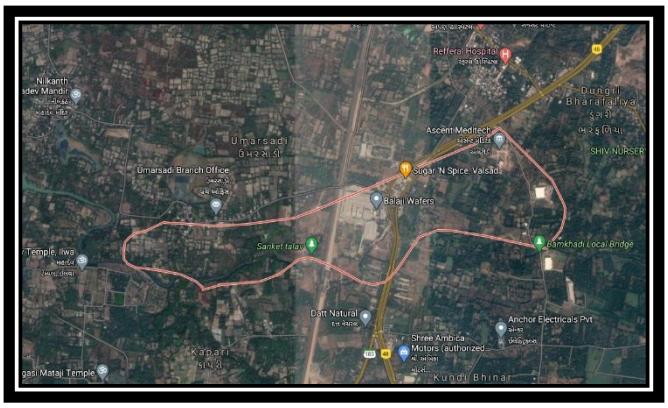


Fig. 4.8 Shankar Talav Land Map

There are many industries in the village namely: Balaji Wafers Ltd., Flair Pen Ltd., Tata Motor Service Centre, Katariya Enterprises.

4.2.2 Base Location map, Land Map, Gram Tal Map

Fig. 4.9 Shankar Talav Loaction Map

4.2.3 Physical & Demographical Growth

Demographics:

Shankar Talav village has population of 679 of which 356 are males while 323 are females as per Population Census 2011. In Shankar Talav population of children with age 0-6 is 121 which makes up 7.26 % of total population of village. Average Sex Ratio of Shankar Talav is 979 which is higher than Gujarat state average of 919. Child Sex Ratio for the Shankar Talav as per census is 862, lower than Gujarat average of 890.

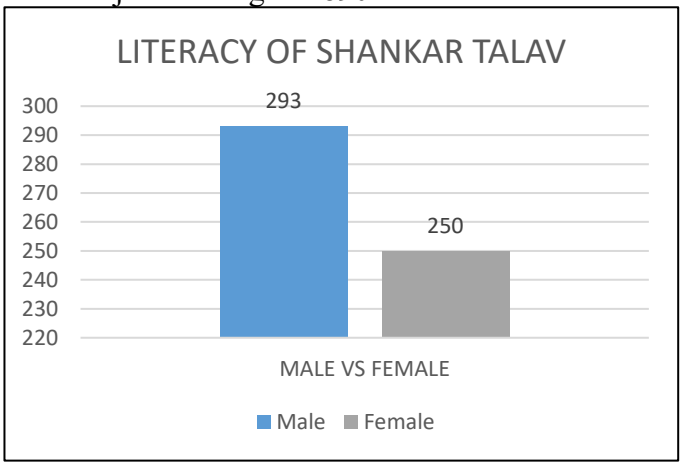


Fig. 4.10 Shankar Talav Population Distrbution (2011 Census)

Population Distribution:

Sex Ratio: As per the Census Data 2011 there are 907 Females per 1000 males out of 679 total population of village. There are 596 girls per 1000 boys under 6 years of age in the village.

Literacy: Shankar Talav village has higher literacy rate compared to Gujarat. In 2011, literacy rate of Shankar Talav village was 89.90 % compared to 78.03 % of Gujarat. In Shankar Talav Male literacy stands at 94.82 % while female literacy rate was 84.75 %.

4.2.4 Economic generation profile / Banks

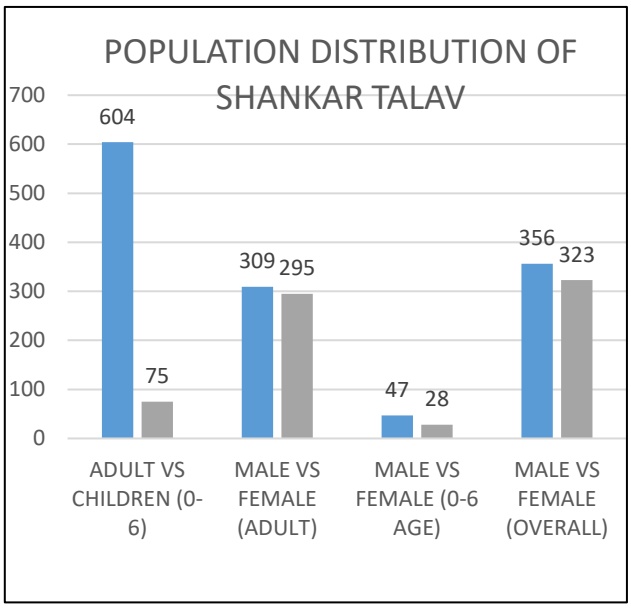


Fig. 4.11 Shankar Talav Population Distrbution (2011 Census)

	Total	Male	Female
Total Workers	256	204	52
Main Workers	253	202	51
Main Workers Cultivators	46	41	5
Agriculture Labourer	73	44	29
Household Industries	0	0	0
Other Workers	134	117	17
Marginal Workers	3	2	1
Non-Working Persons	423	152	271

Table 4.2 Shankar Talav Work Profile

Total working population of Shankar Talav is 256 which are either main or marginal workers. Total workers in the village are 256 out of which 204 are male and 52 are female. Total main workers are 253 out of which female main workers are 202 and male main workers are 51. Total marginal workers of village are 3.

Banks: No bank or ATM

Post Office: No Post Office in the village

Shops: There are many shops in the village.

Major Employment: Balaji Wafers Ltd.
Flair Pen Ltd.
Tata Motor Service Centre

4.2.5 Actual Problem faced by Villagers and smart solution

During our visit in the village, we interacted with the sarpanch of the village. The sarpanch told us about the problems of the village. Also, we with ourselves found out some problems.
Following are the various problems faced by the village:

Problems:

- School redesign
- Community hall redesign.
- Panchayat office redesign.
- There is no health care facility in village.
- There is no pharmacy in village
- There are no public toilets.
- No garbage collection system.
- No solid waste management system.
- No renewable Energy sources.
- No general market.

The above problems can be solved by implementing the following things:

Solutions:

- Redesign of School
- Redesign of Community Hall.
- Redesign of Panchayat Office.
- Private clinics should be made.
- Public toilets should be made.

- Panchayat should provide a garbage collection system.
- Solid waste management is needed.
- Solar panels can be installed.
- Banks and ATM.

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine

Fig. 4.12 Gujarat Dance Form

The ethnic lineage of the Gujarati's is derived from the Gurjars who arrived in India along with Huns as and when the Huns were travelling and crossing Punjab. Large groups of them settled in Gujarat and any of them are of Indo Aryan origin. 20% of the Gujarati's are of tribal groups like Naikda, Bhils, Kolis and Macchi-Kharwa who still stay in Gajarat as they weren't defeated by the Aryan invaders. In fact the Bhil community soon became the rulers of Gujarat while the Kurjars occupied middle level positions. Gujarat has a multi religious culture as a lot of immigration happened in the medieval age which brought in Islam and Zoroastrianism. In 14th century Saurashtra, the Kathis or the Sun Worshippers held dominance and they were experts in the art of horse breeding. Soon the Rabaris who had a royal lineage dominated Saurashtra and they were mainly cattle breeders. As of today most of Gujaratis speak the Gujarati language and people of this ethnicity are concentrated in Gujarat, Madhya Pradesh, Maharashtra and Rajasthan. However sizeable numbers also live in far flung areas of the country like Daman and Diu, Dadra and Nagar Haveli etc. incidentally Guajarati communities like Bohra, Memom and Khoja who have settled in Karachi still consider their ethnicity to be Gujarat. Marwari, Hindi, Marathi and Urdu are also spoken in Gujarat and in the Rann of Kutch…Kutchi is the primary language.

Fig. 4.13 Gujarati Food

Traditions:

Music And Dance:

The traditional folk dance forms of Gujarat are Dandiya Raas, Garba, Garbi, Tippani, Padhar and Dangi. While Dandiya Raas is a romantic, playful and vibrant form of dance inspired by Krishna. The Garba is lighter and more graceful dance form performed by females in reverence of Goddess Amba. Garbi is a forceful dance characterised by forceful movements of the limbs and is essentially meant for raising the morale before battle. The Padhar dance was performed by the rural community living around Nal Lake and it's inspired from the undulations of the sea waves.

Cuisine:

Gujarati food originated from Gujarat, the western coastline state of India, often referred to as "Jewel of Western India". Although the long coastline ensures huge variety of seafood, the influence of Jain culture and philosophy makes the region a predominantly vegetarian barring some communities who incorporate non-vegetarian items such as goat, chicken, eggs and seafood in their platter. Gujarati cuisines are not only varied and lip smacking but also high in nutritional value. Different cooking styles and combination of spices are incorporated in preparing different dishes marking uniqueness of each.

Traditionally a Gujarati thali comprise of rotli, kadhi or dal, rice, and shaak/sabzi. Some of the dishes are stir fred, while others are boiled. Gujarati food is more often served on a silver platter. Gujaratis use a combination of different spices and flavours to cook their meals and this is what makes their food truly exotic. People in Gujarat eat one or the other type of curry along with rice and roti in almost every meal. Gujarati dishes usually have a very subtle taste that makes it truly distinct from other Indian cuisines. Most of the Gujarati dishes are sweet, while others have a quite larger concentration of sugar as compared to salt and spices. Sometimes, jaggery is used as an alternative to sugar.

4.2.7 Migration Reasons / Trends

- Most of the people of people are involve in agriculture activity and animal husbandry possibility of the migration of the villagers are rare
- Migration of the villagers are due to finding job
- Most of the migration due to government job and work in the company
- Average 1 people from each house are work outside from the village for finding batter job.

4.3. Data Collection Shankar Talav (Photograph/Graphs/Charts/Table)

Data collection is first and the foremost work which is need to be done in order to understand the village profile. The data collection need to be done is a proper and systematic way in order to have a clear picture of village. During this covid times it was a tough work for us to do, but we managed to do it with the positive response of the sarpanch and the online media.

4.3.1 Describe Methods for data collection

Our approach for the data collection was the mixture of regular offline visits and online research both. Since it was the covid time we preferred to collect much of the data from our homes as per the government norms for the covid times.
Below are the ways by which we did our data collection:

Interacting with the Sarpanch:

We interacted with the sarpanch of the village Shri. Naresh B. Patel. In this interaction we filled the techno survey forms and discussed the various problems with the sarpanch. We particularly focused over knowing the various problems of the village.

Visiting the Village:

We visited the village conforming the data provide by the sarpanch with the actual scenario of the village. The most the things matched with the actual scenario. We opt for the cleanliness, infrastructure details, roads, etc. of the village.

Interaction on call:
When sometimes it was not possible to go to the village, we used to get in touch with the village sarpanch on call.

Online Research:
We did a lost research on the internet for the collection of data of the village especially regarding the 2011 census.

4.3.2 Primary details of survey

Demography:
Village has population of 679 as per census data of 2011, in which male population is 356 and female population is 323. In Shankar Talav village population of children with age 0-6 is 75 which makes up 11.05 % of total population of village. Average Sex Ratio of Shankar Talav village is 907 which is lower than Gujarat state average of 919. Child Sex Ratio for the Shankar Talav as per census is 596, lower than Gujarat average of 890.

Infrastructure:
The village consists of descent infrastructure with primary school, Aganwadi, good roads with street lights, a greater number of pucca houses as compared to kuccha etc. The village consist of some basic infrastructure like community hall, schools, panchayat office which need to be redesign.

Electrical Distribution:
The village is equipped with good electrification. The village gets power supply for more than 6 hours a day, with electric supply provided for both domestic and agricultural use.

Literacy:
Shankar Talav village has higher literacy rate compared to Gujarat. In 2011, literacy rate of Shankar Talav village was 89.90 % compared to 78.03 % of Gujarat. In Shankar Talav Male literacy stands at 94.82 % while female literacy rate was 84.75 %.

Health and Health Care Facilities:
The village people have good health conditions. The village has no sub PHC or PHC as well as private clinics. The village also does not have any pharmacy nearby.

Transportation:
Within the village the roads are in bad condition. Within the village the mode of transportation is rickshaws.

Water Facilities:
The village has good water facility for drinking and their domestic use. The village has a more than 150000 Ltr. water tank. They receive treated tap water and RO facility.

4.3.3 Average size of the House - Geo-Tagging of House

There is a wide variation in the size of the village. There is no geo tagging done in the Shankar Talav

4.3.4 No of Human being in One House

From the 2011 survey the village has 160 houses in total and about 679 people lived in the village so an average can be estimated of 4 people in a house.

Note: Data as per average per 2011 census and also to keep in mid that there are variations in the type of family ranging from nuclear families to the joint families.

4.3.5 Material available locally in the village and Material Out Sourced by the villagers

The materials like milk, other grocery materials, wheat, and other agricultural cereals are locally available. For the grocery items some are available at local grocery but for sometimes they hae to visit nearby market out of village.

4.3.6 Geographical Detail

The village is most of forest land with a total land are of 915 acers divided as follows:
Forest area: 173.02 Hect.
Agricultural area: 134.03 Hect.
Residential: 12.46 Hect.
Other area: 26.53 Hect.

Elevation, Latitude and Longitude:
Elevation above MSL: 13 meters
Latitude: 20.674401
Longitude: 72.9504858

4.3.7 Demographical Detail - Cast Wise Population Details / Which ID proof using by villagers

The case wise distribution of the village is shown as in table 4.3

Caste	Population
Scheduled Cast Persons	22
Scheduled Cast Males	9
Scheduled Cast Females	13
Scheduled Tribe Persons	251
Scheduled Tribe Males	130
Scheduled Tribe Females	121
Scheduled Cast Persons	22
Scheduled Cast Males	9

Table 4.3 Shankar Talav Caste wise distribution

4.3.8 Occupational Detail - Occupation wise Details / Majority business

Total working population of Shankar Talav is 256 which are either main or marginal workers. Total workers in the village are 256 out of which 204 are male and 52 are female. Total main workers are 253 out of which female main workers are 202 and male main workers are 51. Total marginal workers of village are 3. There are many industries in the village namely: Balaji Wafers Ltd., Flair Pen Ltd., Tata Motor Service Centre, Katariya Enterprises.

4.3.9 Agricultural Details / Organic Farming / Fishery

About 78 % of the village land is agricultural land i.e. about 134.03 Hect. So, the village have majority occupation as farming.
The main farming commodities grown in the village are Sapota, Paddy, Mango.

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses

There are many industries in the village namely: Balaji Wafers Ltd., Flair Pen Ltd., Tata Motor Service Centre, Katariya Enterprises.

4.3.11 Tourism development available in the village for attracting the tourist

There is no tourism spot in the village.

4.4 Infrastructure Details (With Exiting Village Photograph)

The infrastructure detail of the village is as below:

4.4.1 Drinking Water / Water Management Facilities

Fig. 4.14 Water Tank of Shankar Talav

Fig. 4.15 Small Water Tanks for personal use (Shankar Talav)

The village has two water tanks, 1 Overhead; 1 Underground
Overhead Tank: 50,000 Ltr.
Underground Tank: 1,00,000 Ltr.
The water is provided to the houses with the help
of pumps. The water is available to the people on taps. The water is treated and made available to the people of village. The water is used for domestic usage. There, is a need to repair the R.O plant.

4.4.2 Drainage Network / Sanitation Facilities

Drainage Network:

The village does have drainage facility available in the village. **Drainage Type:** Closed

Sanitation Facilities:

The village does not have any public toilets. Also, village does not have garbage collection system. There are public dust bins in the village.

4.4.3 Transportation & Road Network

The village has got good all road with street lights. The village approach road is about 8 km.

Road Network:

Village approach Road: 1 km

Nearest NH: NH-48 (1 km)

Transportation Facility:

The village has internal roads. The people of village travel though their own private vehicles or auto rikshaw. The nearest Railway Station to the village is Dungari Railway Station (1.4 km). The village roads need to be redesigned as are not in good condition.

Fig. 4.16 Road Construction (Shankar Talav) Road (Shankar Talav)

4.4.4 Housing condition

Fig. 4.17 Houses (Shankar Talav)

The village houses are both pakka and kachaa. But most of the houses are pakka. Below are some photos as per our visits:

4.4.5 Social Infrastructure Facilities, Health, Education, Community Hall, Library

Heath Infrastructure:

There are no such health infrastructure located in the village. Village does not consists of any private or government clinics or hospitals. But, there is health care facility available in Dungari 2 km away from the village.

Education Infrastructure:

The village has 1 primary school and 1 Aganwadi. The Aganwadi and Primary school requires Redesign.

Fig. 4.18 Primary School (Shankar Talav)

Fig. 4.19 Community Hall (Shankar Talav)

Community Hall:

The village has a community hall without T.V. The condition of the community hall is good.

Library:

There is no library available in the village.

Temples:

The village have temple located within the village.

Fig. 4.20 Temples (Shankar Talav)

4.4.6 Existing Condition of Public Buildings & Maintenance of existing Public Infrastructures

The Panchayat Office of the village is under re-construction. The community hall is in good condition. The primary school and aganwadi requires redesign.

4.4.7 Technology Mobile/ WIFI / Internet Usage Details

The technological usage of the village is kind of good. Almost all the families have at least one phone in their home and android too.

There is Wi-Fi facility is not available in the village. The internet usage of the village is good as the youth of the village as well as the sarpanch are active on the social media

4.4.8 Sports Activity as Gram Panchayat

Fig. 4.21 Sports (Shankar Talav)

There are cricket league being conducted in the village named by SPL.

4.4.9 Socio-Cultural Facilities, Public Garden /Park/Playground /Pond/ Other Recreation Facilities

There are no such public garden, park and playground in the village. Though there is One pond in the village but are not in very good condition.

4.4.10 Other Facilities (e.g like foot path development-Smart toilets-Coin operated entry, self-cleansing, waterless, public building)

There are no so such facilities.

4.4.11 Any other details

The village development can be one more effectively if there is a commercial development of the village. More of the land is forest.

4.5 Electrical Concept

Electrical concept for the village is as follows:

4.5.1 Renewable energy source planning particularly for villages

There are solar street lights available in the village. There are no such renewable sources available in the village.

Fig. 4.22 Street Light (Shankar Talav)

Fig. 4.23 Electric poles (Shankar Talav)

4.5.2 Irrigation Facilities

There are irrigation facilities in the village. The village do have one pond. About 50.56 Hect. of the agricultural land is irrigated and 83.47 Hect. is not irrigated.

4.5.3 Electricity Facilities with Area

The area is equipped with good electrical network. The village receive more than 6 hours of electricity. The electric supply is also provided for the farming.
The supply is supplied with proper supply meters.

4.6 Existing Institution like - Village Administration – Detail Profile

4.6.1 Bachat Mandali

There is no such bcaht madali in the village.

4.6.2 Dudh Mandali

There is no Dudh Mandali

4.6.3 Mahila forum

There is no Mahila forum in village.

4.6.4 Plantation for the Air Pollution

No such activity.

4.6.5 Rain Water Harvesting - Waste Water Recycling

There is no such type of planning in the village for Rain Water Harvesting.

4.6.6 Agricultural Development

The agricultural activities are good in this village. The village farming have received development in the irrigation facilities.

4.6.7 Any Other

There is no other administration institution.

CHAPTER 5: Technical Options with Case Studies

5.1 Concept (Civil)

The civil concept for technical options with case studies is as follows:

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying

The term 'advanced sustainable construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies.

Various Advance techniques:

- **Precast Concrete Foundation**

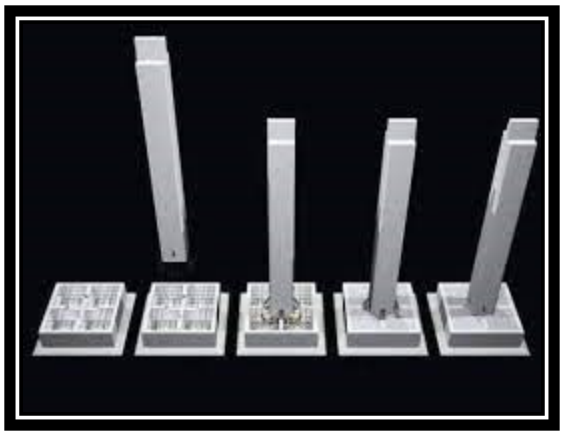


Fig. 5.1 Precast Concrete Foundation

The precast concrete foundation technique is very prominent today. The airtight and weather resistant property of these types of foundation makes it common. The design of the precast concrete foundation is performed by considering the following important parameters:

1. Determination of soil type and its bearing capacity
2. Checking with the precast concrete foundation manufacturer that the foundation unit can safely support the calculated loads.
3. Design of the footing
4. Checking for the uplift.

Once the foundation units are manufactured and bought to the construction site, they are installed on an undisturbed soil layer.

In the case of a precast pad foundation, the pad foundation unit is placed over a lean concrete layer that was already prepared. Over the pad foundation, a precast column is placed. The bent bars kept out of the column are inserted inside the foundation element as shown in figure 1. The column rebars are embedded inside the precast foundation by a final casting using concrete. When the work is complete, the adjustment devices and arrangements are removed.

Advantages of Precast Concrete Foundation

The important advantages of precast concrete foundation are:

1. The precast concrete foundation is constructed in a controlled environment and hence it follows strict quality control.
2. The precast concrete foundation units are stronger and lighter when compared to other competing materials.
3. Employing a precast concrete foundation construction technique helps to minimize the construction period.
4. The method helps to undergo the installation faster
5. The precast construction method has less weather dependency. Weather is a concern only during its installation.
6. The foundation units produced by this method are leak-resistant and are less susceptible to cracking.
7. Precast concrete foundation units can be manufactured in varied architectural finishes.
8. The manufacture and installation of these units hence are environmentally friendly compared to on-site foundation construction.
9. This method reduces the overall cost of the builders and homeowners.
10. Precast foundation units can be employed for both residential and light commercial foundation construction.

Disadvantages of Precast Concrete Foundation Construction

1. The foundation units that are precast are heavy and they demand heavy equipment for their proper handling and transportation.
2. Proper care and experience are required during their transportation and assembling in order to avoid any chance of damage.
3. In the case of precast concrete pile foundation construction, the length is limited due to difficulty in transportation.
4. The length alteration or design variation cannot be performed as in the case of on-site construction.

➢ Twin Wall Technology

Twin Wall combines the dimensional accuracy and quality control of precast walls with the flexibility of in-situ concrete. The Twin Wall arrives on site as two leaves tied together with steel lattice girder and is filled with in-situ concrete on site. The final wall is a solid concrete wall with a high-quality paint-ready finish on both sides.

Twin Walls are ideal for use in Cross-wall Construction, Hotels, Nursing Homes and Apartments, and when combined with our Filigree slabs they provide a complete monolithic “Paint-Ready” structure.

➢ Key Features

Fig. 5.2 Twin Wall Technology

- Innovative Precast Twin Wall System, designed to meet the highest of engineering standards in the construction industry
- Consists of two 70mm thick precast leafs with high quality smooth external finish and chamfered edges
- Panel sizes up to max 3.0m x 9.5m and weighing up to 10 ton with thickness's ranging from 200mm to 400mm
- High strength reinforced concrete to EN206 used in all Twin Walls
- Acoustic Properties - Typically 50DB reduction for 200mm Twin Wall
- "Paint Ready" Precast Concrete Twin Walls are cured in the factory

Benefits

- The advantages of off-site construction with factory tolerances and high-quality factory finishes
- The structural integrity equivalent to any in-situ designs
- The high levels of acoustic control and fire ratings that cannot be achieved by any other precast system
- Reduced staff on site - less operatives required for erecting walls
- The pre-installation of electrical conduits and outlets during production provides for faster construction of a building
- The speed of erection and certainty of programmed schedules
- The finished precast structure will have a monolithic quality that is unique to twin wall and will provide superior levels of air tightness
- Reduced drying out time required - walls can be decorated immediately.

Precast Cladding Panels

Precast concrete cladding is formed by off-site manufactured precast concrete panels, which can be used to clad a wide range of buildings, such as commercial buildings, residential, retail, leisure, hospitals, schools, and so on.

Precast concrete is a form of concrete that is prepared, cast and cured off-site, usually in a controlled factory environment, using reusable molds. Precast concrete elements can be joined to other elements on site to form a complete cladding structure. The production of precast concrete elements takes place under controlled conditions in factories, and so tolerances can be accurately controlled, waste can be minimized, and that a denser, stronger and better-quality concrete produced.

Fig. 5.3 Precast Cladding Panels

Due to innovative production methods, precast concrete panels can be manufactured in a wide range of colors, finishes, facings, shapes and sizes. It can replicate the color, finishes, facings, shapes and sizes. It can replicate the color and finish of stone, masonry or terracotta and can incorporate architectural details such as cornices, quoins, arches and decorative relief panels.

Sculptured shapes such as recessed windows, shading devices and so on can be included, and insulation can be fixed to the back of the panels, or incorporated into a sandwich wall panel composition.

Panels can be supported by fixing back to the structural frame of the building or can be self-supporting. They can also be designed themselves to parts of the building structure such as floors. Panels are typically in the range of 150 mm thick, designed to span either between columns or between floors.

Panels are manufactured by casting in purpose-built timber or fiber glass molds. Steel reinforcement cages can be placed in the mold prior to pouring the concrete. Increasingly, prefabrication can incorporate the fixing of other elements such as insulation and windows. When the molds are removed, the exposed surfaces can be treated in a number of ways, such as acid-etching, smooth or coarse grounding, grit or sand-blasting, rubbing or polishing, according to the surface finish specified.

Having been transported to site, tower or mobile cranes lift the panels into position, with fixings restraining them back to the structure. This means that external scaffolding may not be required.

Precast concrete panels can result in a thinner external wall construction than traditional walls, and so they can allow a larger lettable floor area.

5.1.2 Soil Liquefaction

Soil liquefaction, also called **earthquake liquefaction**, ground failure or loss of strength that causes otherwise solid soil to behave temporarily as a viscous liquid. The phenomenon occurs in water-saturated unconsolidated soils affected by seismic S waves (secondary waves), which cause ground vibrations during earthquakes. Although earthquake shock is the best-known cause of liquefaction, certain construction practices, including blasting and soil compaction and vibroflotation (which uses a vibrating probe to change the grain structure of the surrounding soil), produce this phenomenon intentionally. Poorly drained fine-grained soils such as sandy, silty, and gravelly soils are the most susceptible to liquefaction.

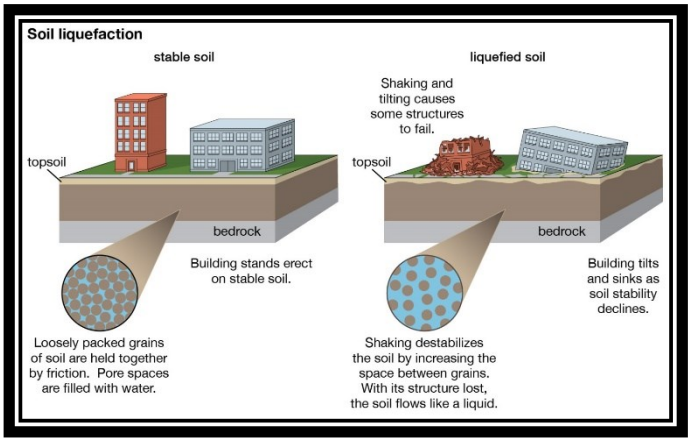


Fig. 5.4 Soil liquefaction

Granular soils are made up of a mix of soil and pore spaces. When earthquake shock occurs in waterlogged soils, the water-filled pore spaces collapse, which decreases the overall volume of the soil. This process increases the water pressure between individual soil grains, and the grains can then move freely in the watery matrix. This substantially lowers the soil's resistance to shear stress and causes the mass of soil to take on the characteristics of a liquid. In its liquefied state, soil deforms easily, and heavy objects such as structures can be damaged from the sudden loss of support from below.

Buildings constructed on loose soil pitch and tilt easily when liquefaction occurs, since the soil no longer supports the structures' foundations. In contrast, structures anchored to bedrock or stiff soils in earthquake-prone areas suffer less damage, because less vibration is transmitted through the foundation to the structure above. In addition, buildings anchored to bedrock have a reduced risk of pitching and tilting.

5.1.3 Sustainable Sanitation

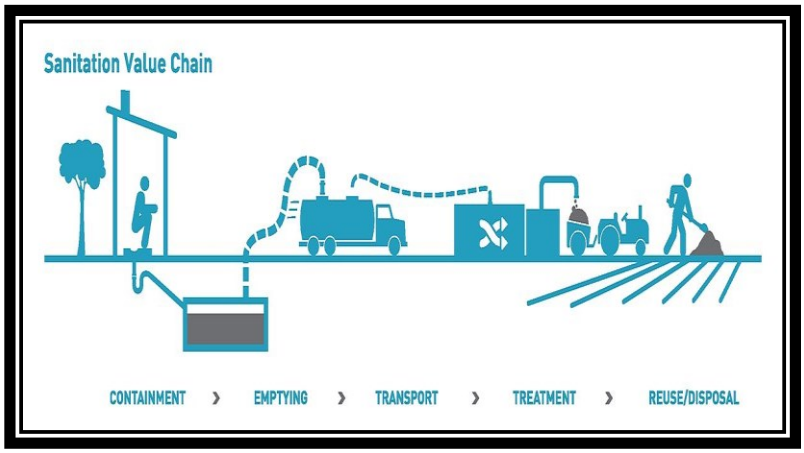


Fig. 5.5 Sanitation Valve Chain

The main objective of a sanitation system is to protect and promote human health by providing a clean environment and breaking the cycle of disease.

To qualify as sustainable sanitation, a sanitation system has to be economically viable, socially acceptable, technically and institutionally appropriate, and protect the environment and natural resources. Most sanitation systems have been designed with these aspects in mind, but they fail far too often because some of the criteria are not met. In fact, there is probably no system which is absolutely sustainable. The concept of sustainability is more of a direction than a state to reach. Nevertheless, it is crucial that sanitation systems are evaluated carefully with regard to all dimensions of sustainability.

Since appropriateness to the context is such a core criterion for sustainable sanitation, there is no one-size-fits-all sanitation solution. However, taking into consideration the entire range of sustainability dimensions, it is important to observe some basic principles when planning and implementing a sanitation system.

5.1.4 Transport Infrastructure / system

Fig. 5.6 Pedestrian / Bicycle paths

Transport infrastructure consists of the fixed installations necessary for transport and includes roads, railways, airways, waterways, and terminals.

Roads

A road is a paved surface to facilitate the movement of people or goods with means, such as automobiles, bicycles, buses, vans or trucks.

Rails

Rails are the infrastructure for rail transport. A rail road which connects two locations is also called a rail line.

As for roads, rails on itself are not an interesting security target, but blocking a railroad will cause large problems with the rail transport.

Pedestrian / Bicycle paths:

Pedestrian paths or sidewalks, curbs, pavements, footpaths or platforms are paths alongside a road designated for pedestrians. Bicycle paths comprises of several different forms of cycling infrastructure, from non-segregated pathways aligned next to the road to segregated cycle facilities. Segregated cycle facilities are a form of cycling infrastructure consisting of marked lanes, tracks, shoulders and paths designated for use by cyclists and from which motorised traffic is generally excluded. The term includes bike lanes, cycle tracks, separated bike lanes, road shoulders and side paths located within a road right-of-way

Urban waterways:

Inter and intra urban transport over waterways such as canals, rivers or other waterways forms a smaller although still important aspect of the urban transport system. For port cities such as Rotterdam, Antwerp or Hamburg the waterway system is of vital importance for their economic development.

Subway system:

A rapid transit, underground, subway, elevated railway, metro or metropolitan railway system is an electric passenger railway in an urban area with a high capacity and frequency, and grade separation from other traffic. Rapid transit systems are typically located either in underground tunnels or on elevated rails above street level.

Bridges and fly-overs:

A bridge is a structure built to span physical obstacles such as a body of water, valley, or road, for the purpose of providing passage over the obstacle. A flyover is a bridge, road, railway or similar structure that crosses over another road or railway forming a grade separation. Various different designs are possible depending on the length of the span and the conditions of the site.

Fig. 5.7 Subway system

Bridges and fly-overs form a vital and vulnerable element of a transport system since blocking can cause serious disruptions in the transportation system. Security risks are high since bridges and fly-overs are generally difficult to reach in case of emergencies

Terminals:

A terminal is any location where freight and passengers either originates, terminates, or is handled in the transportation process. Terminals are central and intermediate locations in the movements of passengers and freight. They often require specific facilities and equipment to accommodate the traffic they handle.

Airports:

An airport is a location where aircraft such as fixed-wing aircraft, helicopters, and blimps take off and land. Aircraft may be stored or maintained at an airport. An airport consists of at least one surface such as a runway for a plane to take off and land, a helipad, or water for takeoffs and landings, and often includes buildings such as control towers, hangars and terminal buildings.

Train station

A train station, also called a railroad station (mainly in the United States) or railway station (mainly in the British Commonwealth) and often shortened to just station, is a railway facility where trains regularly stop to load or unload passengers or freight. It generally consists of a platform next to the track and a station building (depot) providing related services such as ticket sales and waiting rooms.

Fig. 5.8 Railway station

Bus terminal:

A bus terminus is a designated place where a bus or coach starts or ends its scheduled route.

Freight terminal:

A freight terminal is a processing node for freight. Most freight terminals are located at ports. They may include airports, seaports, railroad terminals, and trucking terminals. Freight is usually loaded onto and off the transport.

Sea port:
A sea port (or shortly port) is a location on a coast or shore containing one or more harbours where ships can dock and transfer people or cargo to or from land.

Traffic intersections:
At traffic intersections, a certain type of traffic infrastructure is intersecting. Mostly this concerns road intersections, though also rail and air intersections are possible.

5.1.5 Vertical Farming

Vertical farming is the practice of producing food on vertically inclined surfaces. Instead of farming vegetables and other foods on a single level, such as in a field or a greenhouse, this method produces foods in vertically stacked layers commonly integrated into other structures like a skyscraper, shipping container or repurposed warehouse.

Using Controlled Environment Agriculture (CEA) technology, this modern idea uses indoor farming techniques. The artificial control of temperature, light, humidity, and gases makes producing foods and medicine indoor possible. In many ways, vertical farming is similar to greenhouses where metal reflectors and artificial lighting augment natural sunlight. The primary goal of vertical farming is maximizing crops output in a limited space.

Fig. 5.9 Vertical Farming

How Vertical Farming Works:
There are four critical areas in understanding how vertical farming works:

1. Physical layout
2. Lighting
3. Growing medium
4. Sustainability features.

Firstly, the primary goal of vertical farming is producing more foods per square meter. To accomplish this goal, crops are cultivated in stacked layers in a tower life structure. Secondly, a perfect combination of natural and artificial lights is used to maintain the perfect light level in the room. Technologies such as rotating beds are used to improve lighting efficiency.

Thirdly, instead of soil, aeroponic, aquaponic or hydroponic growing mediums are used. Peat moss or coconut husks and similar non-soil mediums are very common in vertical farming. Finally, the vertical farming method uses various sustainability features to offset the energy cost of farming. In fact, vertical farming uses 95% less water.

Advantages and Disadvantages of Vertical Farming:
Vertical farming has a lot of promise and sounds like the farm of the future. However, there are a few stumbling blocks to consider before rushing full-speed ahead into vertical farming.

Advantages:

- It offers a plan to handle future food demands
- It allows crops to grow year-round
- It uses significantly less water
- Weather doesn't affect the crops
- More organic crops can be grown
- There is less exposure to chemicals and disease

Disadvantages:

- It could be very costly to build and economic feasibility studies haven't yet been completed
- Pollination would be very difficult and costly
- It would involve higher labor costs
- It relies too much on technology and one day of power loss would be devastating

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

Though concrete is quite strong mechanically, it is highly susceptible to chemical attack and thus structure gets damaged and even fail unless some preventive measures are adopted to counteract this and thereby increasing the durability of structure. In the case of Reinforced concrete structure the ingress of moisture or air may lead to corrosion of steel, cracking and spalling of concrete cover thereby reducing durability of concrete structure. Repair ha been suggested as the protective solution for damaged structure due to corrosion.

Overall, there is very little published empirical evidence that provides insight into the durability of silane treatments and their long-term residual protection (i.e. following at least 10 years of service). Such a gap in knowledge is undesirable given the scale of infrastructure treated with hydrophobic treatments such as silanes.

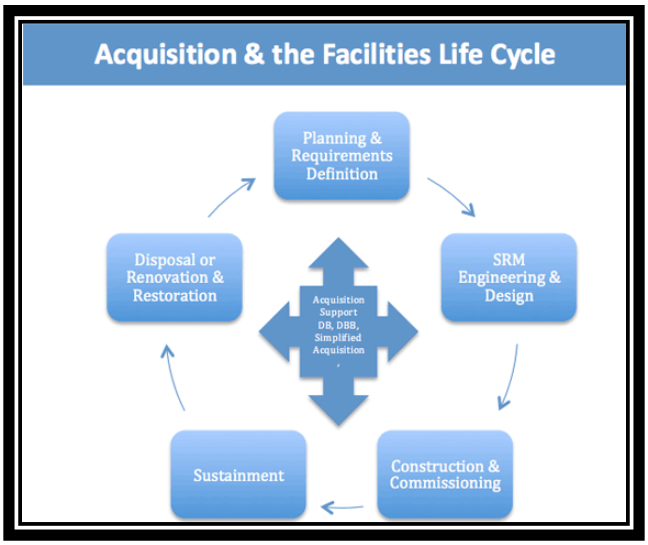


Fig. 5.10 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

5.1.7 Sewage treatment plant

A sewage treatment plant is a system that treats all the wastewater that is produced in any type of building. The wastewater includes black water or sewage, which comes from the use of toilets and bidets; and greywater, which comes from the use of kitchen sinks, washing machines, dishwashers, baths, and showers.

The treatment process is environmentally sustainable, as it uses bacteria that is naturally occurring in the wastewater. It does not use dangerous chemicals and additives that can harm humans and the

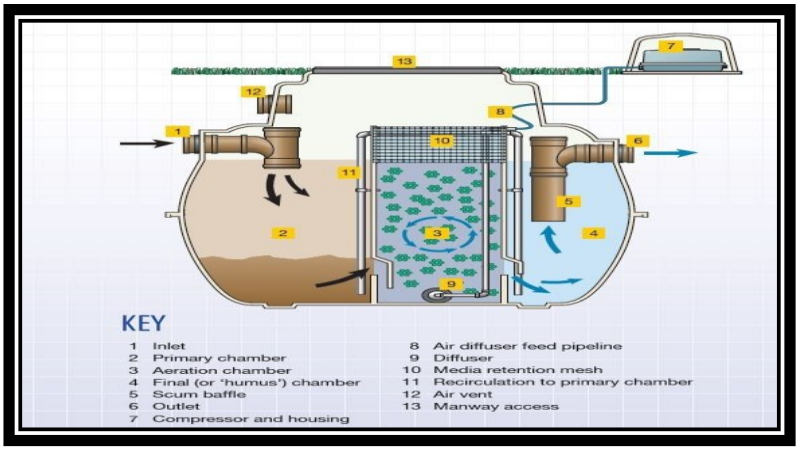


Fig. 5.11 Sewage Treatment plant

environment. The treatment plant is designed to hold the polluted liquid waste in tank compartments, where all types of bacteria can grow or develop.

Through this process we treat the wastewater naturally, which is not only safe for you and people and pets but it's safe and kind to the environment.

ECO-SEPTIC can install a home sewage treatment plant efficiently, as our system has been engineered to make installation easy. It also makes servicing the treatment plant fast and easy. Before we start any install, we first assess the quality of your topsoil and take accurate measurements. Our attention to every detail makes any installation stress and hassle free.

How Do Home Sewage Treatment Plants Work?

Stage 1

The first stage starts in the primary chamber, this is where solids that are slow to treat, such as grit, oils, fats, personal hygiene items are retained. The heavier matters settle, while the lighter one's float to the surface. This compartment, basically, is a primary filter and there is no dissolved oxygen here. When the liquid waste reaches the mid water level, it flows through the secondary chamber. Here, the pollutants are consumed by anaerobic bacteria (bacteria that do not need oxygen to live) to begin breaking the impurities down.

Stage 2

The second pre-treatment stage is the aeration chamber, where air is added to the liquid waste, using a fine bubble aerator located at the bottom of the section. As the bubbles rise, dissolved oxygen becomes present in the water, which is then accessed by the aerobic bacteria (bacteria that need oxygen to live). This type of bacteria works faster than the anaerobic type and can multiply and increase their number very rapidly; some eating the pollutants and some eating other bacteria. The outcome is a total mass of organisms cleaning the water of its pollutants.

Stage 3

The third stage is the clarification step, with clearer water. The biomass settles to the bottom. The top-level water flows out, as it is pushed by the water from the home that enters the primary chamber. It then passes through an ultraviolet disinfectant tube. The irrigation pump transfers the clarified water out into the environment, where it can be utilized to irrigate gardens and plantations, without threatening your health and your family's, your neighbours and everything around you.

5.1.8 Technical Case study of "Chenab Bridge"

Chenab Bridge, Jammu and Kashmir, India

The Chenab Bridge is an Indian railway steel and concrete arch bridge under construction between Bakkal and Kauri in the Reasi district of Jammu and Kashmir, India. When completed, the bridge will span the Chenab River at a height of 359 m (1,178 ft) above the river, making it the world's

highest rail bridge. In November 2017 the base supports were declared completed allowing for the start of the construction of the main arch.

Key technical data of the bridge include:

- Deck height (height above river bed): 359 m (1,178 ft), (height above river surface): 322 m (1,056 ft)
- Bridge length: 1,315 m (4,314 ft), including the 650 m (2,130 ft) long viaduct on the northern side
- Arch span: 467 m (1,532 ft)
- Arch length: 480 m (1,570 ft)

This makes the Chenab Bridge:

- The world's highest railway bridge
- The bridge with the widest span in the Indian broad gauge railway network
- Coordinates 33°9′3″N 74°52′59″E
- Carries Indian Railways
- Crosses Chenab River between Bakkal and Kauri
- Characteristics
- Design Arch Bridge
- Material Steel and Concrete
- Total length 1,315 m (4,314 ft)
- Height (river bed to formation) 359 m (1,178 ft)
- Longest span 467 m (1,532 ft)
- No. of spans 17

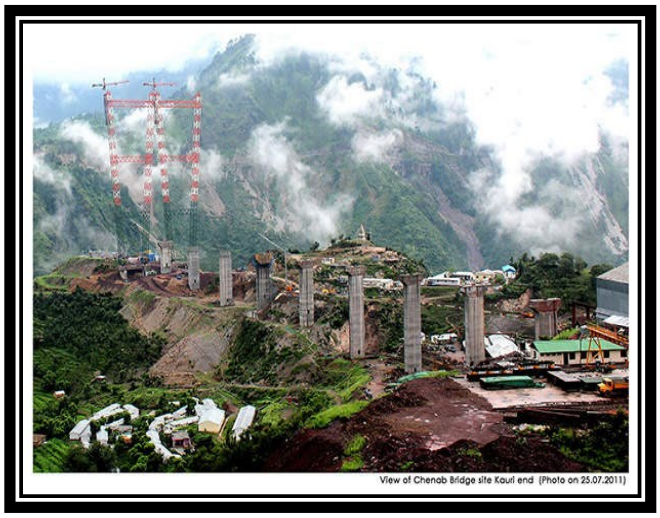
Fig. 5.12 Rail bridge over chenab river

Need for the Chenab rail bridge

Travelling in and around the mountainous terrain of Jammu and Kashmir has been a great difficulty for locals. An urgent need to provide better transportation facilities was recognized by the Government of India. Construction of a national railway project that will connect J&K with the rest of India was therefore proposed.

The JUSBRL project was launched in 2003 as part of this proposal. The 345km-long railway line between the Jammu and Baramulla regions will enhance mobility within the state and across India. The railway line will traverse along Jammu-Udhampur-Katra-Quazigund-Baramulla. Construction of the Jammu to Udhampur section was completed and opened in April 2005. Work is progressing on the Udhampur to Baramulla section. The project includes construction of several bridges and tunnels along the route, of which Chenab Bridge is one. It is will span across the deep Chenab river and provide access to the Kashmir valley from Udhampur.

The project was suspended in 2008 due to construction challenges. The alignment of the entire JUSBRL project was reviewed to propose solutions for the challenges faced. The review work was submitted to the Railway Board and approved in 2009. The design of the bridge, however, was approved in July 2012.



Chenab Bridge design details

The following design considerations were taken into account before the construction of Chenab Rail Bridge:

1. It has been determined to adopt the state architecture concept according to BS codes.
2. Wind load effects estimation according to wind tunnel testing.
3. Indian Institute of Technology (IIT) Roorkee developed site-specific seismic spectra.
4. Provision of Eurocode 8 for determining the ductility of very high and hollow RCC piers.
5. Long welded rail supply (LWR) on bridges and the subsequent force measurement in compliance with UIC – 774 – 3R guidelines.
6. Robust and blast-resistant architecture is used.
7. Fatigue control in full compliance with BS codes.
8. UIC 776-2R and UIC 776-3R guidelines have deformity limits according to convenience criteria.
9. Redundancy provided for systems in the case of a failure and collapse for a lower level of activity.

Fig. 5.13 Preconstruction view

Chenab Bridge forms a massive steel arch, the first of its kind in India. The country has no codes or design guidance for such massive structures. Based on experiences drawn from similar projects worldwide, the design practices for the bridge are being followed.

BS: 5400 is being used as the basic guideline for the design and construction of the bridge. The deep Chenab River valley under the bridge is prone to high wind pressure risking the stability of the bridge.

Norway-based Force Technology Laboratory conducted several wind tunnel tests to understand the effects of wind speed, static force coefficients and gust buffeting. The bridge

Fig. 5.14 Construction Glimpse

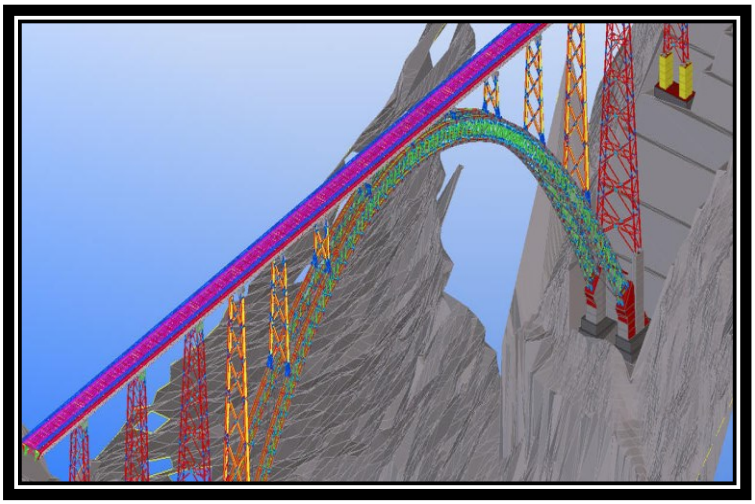


Fig. 5.15 CAD Design

is designed to resist wind speeds of up to 260km/h. The seismic nature of the project zone was also considered during its design.

The bridge will include 17 spans, as well as the 469m main arch span across the Chenab River, and viaducts on either side. The main span of the bridge will include two 36m-long approach spans. It will be built as a two ribbed arch with steel trusses made of concrete-filled sealed steel boxes. The structure will be supported by two 130m-long, 100m-high pylons on either end through cables.

Steel was chosen to construct the bridge as it will be more economical and able to resist temperatures of -20°C and wind speeds of above 200km/h. The Jammu and Kashmir region witnesses frequent terrorist attacks. To enhance safety and security, the bridge will be made of 63mm-thick special blast-proof steel. The concrete pillars of the bridge are designed to withstand explosions. It is expected that the structure will be able to withstand earthquakes of magnitude eight on Richter Scale and up to 40kg of TNT blasts.

A ring of aerial security will be provided to safeguard the bridge. An online monitoring and warning system will be installed on the bridge to protect the passengers and train in critical conditions. Footpaths and cycle trails will be provided adjacent to it. The bridge will be painted with a special corrosion-resistant paint, which lasts for 15 years.

Construction Method

The steel structures of the bridge will be manufactured in workshops built in the mountains. The workshops have been moved to the building site, because there is no proper road network in the challenging terrain. The longest building parts that can be delivered to the site are 12 meters in length. Therefore, four workshops have been built in the mountains. Workshops and paint shops built next

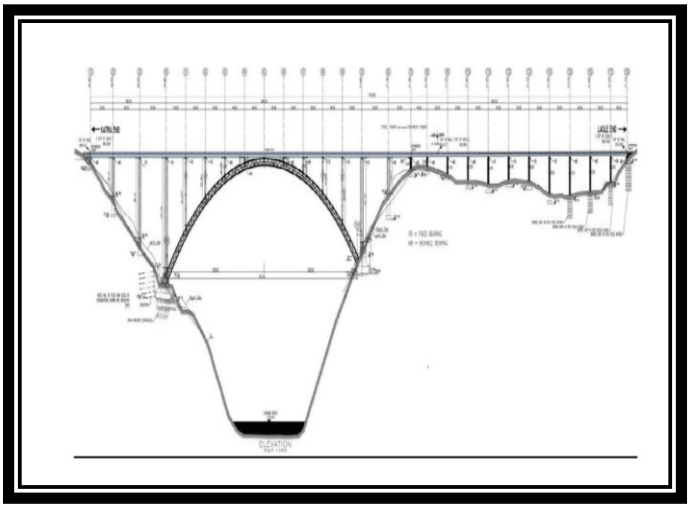


Fig. 5.16 Design Layout

to them are located on both sides of the valley. All steel materials, except for the smallest rolled profiles, are delivered to the mountains as steel boards.

The insufficient infrastructure of the area causes additional problems. There is no electricity and the water of the river is not suitable for manufacturing concrete. All electricity must be produced at the site and the water is delivered from further away in the mountains. The job is also challenging, because the track has curvature in the approach bridge. In this section, the construction stage bearings have been designed in such a way that it is possible to launch the steel deck in the curvature portion as well. The bridge will consist of about 25000 tonnes of steel structures, the main portion of which will be used for the arch bridge section. First, a cable crane will be built over the valley for constructing the steel structures. The cable crane will move between pylon towers built on both sides of the valley. The crane can deliver a maximum amount of 40 tonnes of steel parts. For example, the over 100 meters long steel columns with bolted couplings will be constructed using this technique. When the long steel columns are ready, the steel deck will be pushed on top of the columns. After this, a derrick crane, which is capable of lifting about 100 tonnes, will be placed on top of the deck. The derrick will crane the arch segments from deck level to the erection front of the arch as shown in Fig. 7. Deck erection will proceed simultaneously with the erection of the arch. Both the arch and the deck cantilever freely by up to 48 metres. When the next arch pier location is reached, temporary cables will be installed to support the arch, and the new arch pier will be constructed on the free end. The superstructure can then be supported by the arch pier and so forth until the last arch pier is reached. The very last span of the arch and the elements of the key segment will again be delivered by the cable crane; closure of the superstructure is done by means of derrick erection. The deck of the bridge will be welded in the workshop upside down in about 8 meters long sections, because the welding points in the final structure are mainly located under the bridge. When the job is completed, the sections are turned around and delivered to the next stage of the process.

Bridge construction and challenges faced

The bridge is being constructed in one of the most complicated and isolated terrains. One of the biggest challenges involved was construction of the bridge without obstructing the flow of the river. Approach roads, five kilometres in length, were constructed to reach the foundations of the bridge.

The deck of the bridge is partly in straight horizon and partly in curves. It is located on a transition curve with changing radius. Construction is therefore being carried out in stages following the gradual change in the alignment. This is the first time a bridge is being constructed incrementally on a transition curve.

Cable cranes and derrick will be used to construct the bridge. The cable cranes used for the project will be the largest in the world.

Construction of the bridge is expected to require 25,000MT of steel, 4,000mt of reinforced steel, 46,000m³ of concrete and eight million cubic metres of excavation. The construction of the bridge was discontinued in 2008 due to alignment and safety issues. It was resumed in 2010, with estimated completion in 2015, which was subsequently pushed to 2019. The erection of 5,462MT of the 9,010MT of steel was completed as of January 2020, which marked the completion of 83% of the construction work.

Contractors involved in constructing the Indian bridge

Amberg Engineering was appointed to carry out review work of the alignments. Konkan Railway Corporation is executing the project. Design and construction of the bridge was awarded to a joint venture of Afcons Infrastructure, Ultra Construction & Engineering Company of South Korea and VSL India in 2004.

Finland-based WSP Group and Germany-based Leonhardt Andra and Partners are the consultants for the project. VCE Consult ZT-GmbH designed the pylons of the bridge. Jochum Andreas Seiltransporte installed the cables for the pylon. AkzoNobel was awarded the painting services contract for the bridge.

AECOM was awarded a contract to provide technical guidance and monitoring services for design and construction works. The scope includes engineering services, proof-checking the project drawings and design, ground engineering, planning and consulting.

Total Cost to Build Chenab Bridge

The bridge, worth Rs 12,000 crore, is being built with 63 mm-thick special blast-proof steel.

Importance of Chenab Bridge for J&K and India

“It’s a bridge that won’t merely connect us with our relatives. It’s a bridge of hope that will narrow the gap between Jammu and the Kashmir Valley,” said a Kashmiri resident.

The 136-km Banihal-Baramulla railway line has always been a target for stone pelters and terrorists. Keeping that in mind, this bridge is terror-proof to be sure. The government of India and the Indian Railways have taken into consideration that the Chenab bridge is located just 60 km from the LoC with Pakistan, so it could be a potential target for terrorists. They even factored in the possibility of aerial attacks.

Chenab bridge is the world's tallest railway line, and it will prove to be a game-changer in the ongoing struggle between the government and rebel forces in Jammu & Kashmir. It will allow Indian army troops to go to the valley from the Jammu region quickly and easily. The bridge will not only be beneficial for Kashmiris but the Indian government as well, as it will allow them to control the region and avoid any clashes with rebellion

If you're planning to travel to Jammu & Kashmir, check the train schedule and train time table and plan your itinerary for a comfortable journey.

Some of the interesting facts about the Chenab bridge are:

- Chenab bridge is the highest rail viaduct in the world.
- It links the Kashmir valley directly to the Jammu region via railways.
- The Chenab bridge has been constructed to withstand 40.4 kilograms of TNT explosion and magnitude 8 earthquake.
- Chenab bridge will be the highest railway bridge in India, once constructed. It will also be the world's highest railway bridge.
- Blasts of very high intensity cannot damage any of the bridge pillars.
- The concrete pillars of the bridge are built to withstand explosions and have a distinctive, 15 years long corrosion-resistant painting.
- AECOM is proof checking the design and drawings as well as providing supervision and technical guidance at the site for design and construction. It is one of the Chenab bridge construction companies.

5.2 Concept (Electrical)

The electrical concept for technical options with case studies is as follows:

5.2.1 Technical Case study of "Programmable Load Shedding"

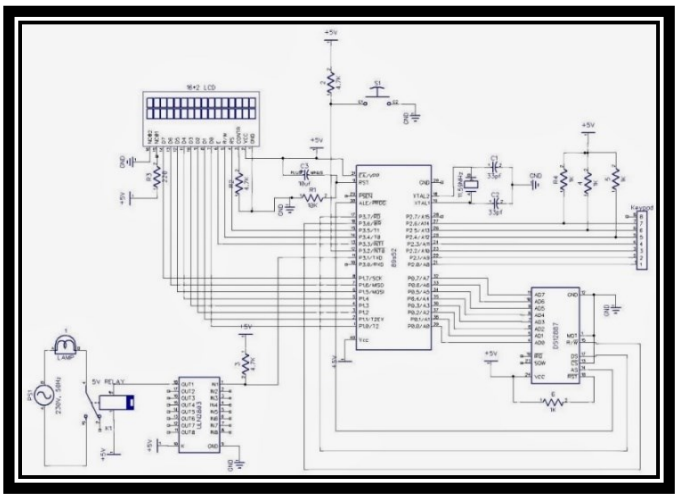


Fig. 5.17 Circuit Diagram

In today's world, there is a continuous need for automatic appliances with the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life. The project is designed to operate an electrical load multiple number of times as per the program. It overcomes the difficulties of switching the load ON/OFF manually. This proposed has an inbuilt real time clock (RTC) to keep tracking the time and thus to switch ON/OFF the load accordingly. Load shedding is what electric utilities do when there is a huge demand for electricity that exceeds the supply. Thus in a distribution system it needs to be precisely controlled for specific period of time. Programmable load shedding time management system is a reliable circuit that takes over the manual task of switch ON/OFF the electrical devices with respect to time. It uses real time clock (RTC) interfaced to a microcontroller of 8051 family. While the set time equals to the real time, then microcontroller gives

command to the corresponding relay to turn ON the load and then another command to switch OFF as per the program. Multiple ON/OFF time entry is the biggest advantage with this project.

Software Implementation:

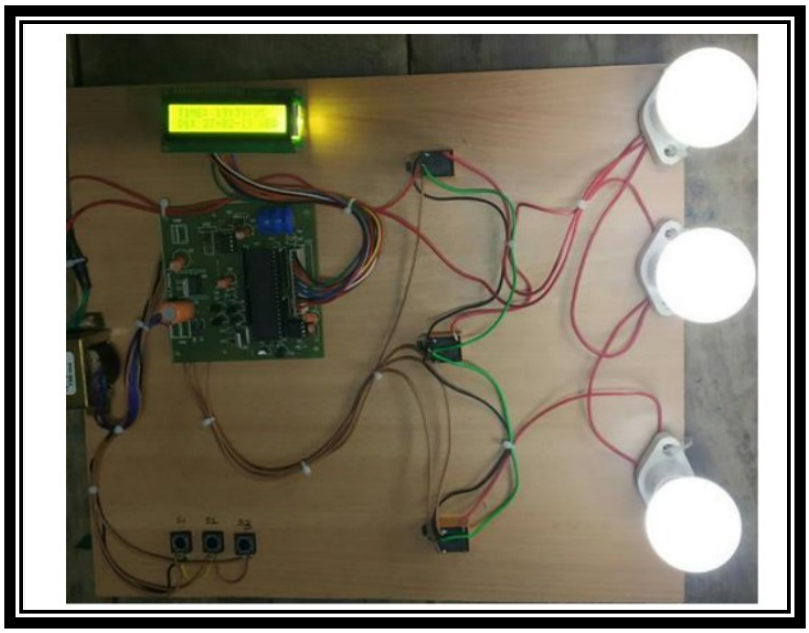


Fig. 5.18 Prototype of Programmable Load

Circuit Operation:

The programmable load shedding time management for utility department circuit consists of an 8592 microcontroller ic,16*2 LCD module,7805 voltage regulator ic,4*3 keypad, DS12887 RTC IC, relay, a Crystal oscillator.

The 7805-voltage regulator converts the input voltage to 5V and is given to the Vcc (pin :40) of the 8952 microcontrollers. This voltage is necessary to enable the microcontroller. A DS12887 RTC interfaces with port0 of the microcontroller i.e., from pins 32 to 39. The rtc shows the rēal time at every instant. Once the RTC is programmed, it will work continuously even though the power goes off in between. The keypad is interfaced with port2 of the microcontroller i.e., from pins 21 to28.The keypad is used to set the real time, the time for load shedding time and the time duration. The 16*2 LCD is interfaced to port1of the microcontroller i.e., from pins 1 to 8. The crystal oscillator helps to provide the working frequency 11.059MHz for the microcontroller.

The microcontroller programmed in such a way that we can set the actual time and load shedding time. Using the program, we can monitor both real time and load shedding time. Program always check the equality and whenever it gets matched output relay turn off. Then it began to check equality with target time and real time, whenever it gets matched relay turns on.

Table 5.1 Estimated Cost of Programmable Load Shedding

Sr No	Component	Specification	No of Unit	Cost (Rs)
1	Microcontroller	8052	1	120
2	Transformer	12 V, 2 A	1	190
3	Bulb	-	3	210
4	Wire	22 AWG 2 m	1	50

5	LCD	14*2	1	160
6	GPB	Standard	1	100
7	Relay	12V DC	3	150
8	Soldering cost	Pb/Sn	1	50
9	Push Button	22 AWG 25m	3	30
10	Capacitors	100 uF	3	120
11	Bulb Holder	standard	3	120
12	Miscellaneous		2	300
				Total = 1480/- Rs

There are many advantages for this circuit. Some of them are:

- Power can be Saved.
- Low cost.
- Easy to use.
- Accuracy in time
- Effective distribution of power
- We can set the time in advance

5.2.2 Railway Security System using IoT

On 26th February 2015, Shri Suresh Prabhu, Minister for Railways presented the Rail Budget in Lok Sabha, which was hailed by the Prime Minister for the technology-driven measures announced. The PM said, "I am particularly delighted that for the first time there is a concrete vision for technology upgradation & modernization of the Railways," The Rail Budget 2015 proposed all-embracing use of Information Technology and e-governance initiatives in Railway functioning, from SMS alert service for passengers, provision for Wi-Fi at Railway Stations, digitized mapping of rail land. Corporate India termed the budget, as 'Technology-Enabled Traveler-Centric'.

Some of the technology initiatives that were announced:

- Open Wi-Fi would be made available at 400 railway stations across the country
- Digitized mapping of Rail land will be initiated to counter encroachment.
- An integrated customer portal is being put in place for customers to access various railway services at one place
- An 'Operation five minutes' will be introduced for issuing unreserved tickets. Under this facility, ticketless passengers can get regular tickets within five minutes of entering station. Unreserved ticket purchase is also expected to be made simpler through smart phones and debit cards
- SMS alert service would be introduced to inform passengers about train arrival and departure
- Mobile charging facility would be made available in all trains and stations. The facility will be extended to general coaches as well.
- Railway helpline number 138 will become operational 24×7. Toll free number 182 will be created for security related complaints.

- CCTVs to be introduced in select trains and suburban trains for women safety
- E-catering will be launched for select meals from an array of choices, ordering food through IRCTC websites at the time of booking tickets.

Indian Railways can have remarkable improvement in asset management using IoT for Rolling Stock like Coaches, Wagons and Locomotives. The optimal use of assets can be facilitated once their exact location is known in real time. Track maintenance can become better and manpower can be effectively utilized. The great pressure that railways is facing due to the whopping wage bill and its severe criticism by experts can be eased once the handheld devices can enable management to optimally deploy staff for maintenance works. The assets will have sensors depicting their health and with use of intelligent monitoring systems, they will reach the right location at the right time. IR today is dependent heavily on supply chain partners. Lot of time and effort is wasted in pursuing the supplies, gaining access to information of vendor. All this can be automated using IoT. The role of purchase department can be limited just to give the purchase order, the balance work can be handled by intelligent systems when the network has information on consignments, stock position etc. IoT is the future, and it has already arrived.

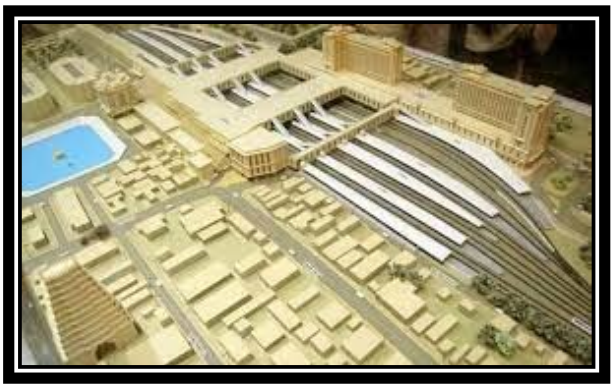


Fig. 5.19 Smart Railway Project Prototype

During July 2014, it was envisaged that the Indian Railways will opt for an enterprise resource planning (ERP) solution, which will integrate freight, passenger, human resources and administrative operations across the country. Features like real-time monitoring of trains, mobile-based wake up call for passengers and destination arrival alerts, and station navigation information system would be taken forward. Thus, the potential for the IT industry to leverage existing strengths in cloud, mobility and **IoT (Internet of Things)** for the Railways.

In the Proposed Investment Plan (2015-2019), Information Technology/Research has been assigned Rs 5,000 crore. There will be an integration of train control and asset management applications.

According to Gartner, by the 2020, there will be 26 billion devices connected to the internet. Gartner further estimates that IoT products and services will generate revenue exceeding $300 billion in 2020. IDC on the other hand has forecast that the worldwide market for IoT solutions will grow to $7.1 trillion in 2020. In a 2012 study by Beecham Research for Oracle, several verticals were identified that would benefit from machine to machine (M2M) device connectivity and create the IoT ecosystem. These were connected smartphones to cars to homes, commercial buildings, retail, industrial, IT facilities, etc.

A “thing” can join in IoT, only when it is tagged as ‘smart’. For becoming ‘smart”, common things or objects, a few action are needed;

- a unique identity is assigned to the object
- it has the ability to communicate or to transmit data wirelessly
- sensing devices must be inbuilt in the object

- it should have capacity to be remote controlled

5.2.3 Management through Energy Harvesting Concept:

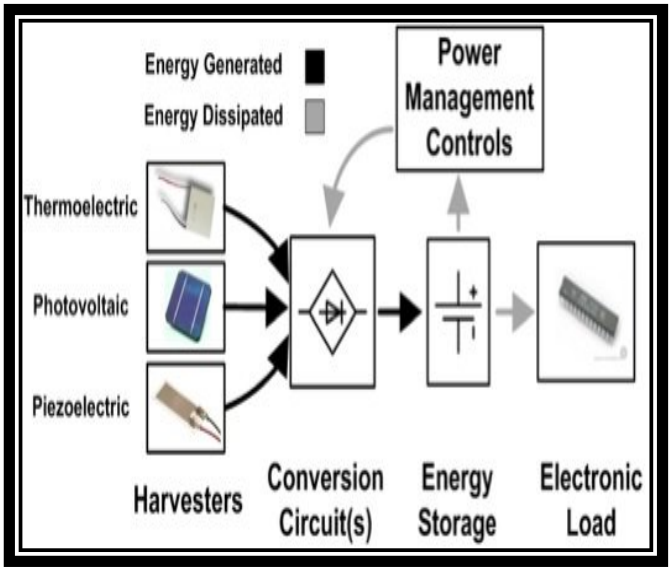


Fig. 5.20 Basic Component of Energy Harvesting

The objective of the **Power Management through Energy Harvesting Concept** has been designed and implemented in the power management through energy harvesting concept which deals with the power saving and optimization.

The overall control is based on sensors of light and temperature. After installing the components, the process becomes automatic.

Operation:

Energy harvesting devices converting ambient energy into electrical energy have attracted much interest in both the military and commercial sectors. Some systems convert motion, such as that of ocean waves, into electricity to be used by oceanographic monitoring sensors for autonomous operation. Future applications may include high power output devices (or arrays of such devices) deployed at remote locations to serve as reliable power stations for large systems. Another application is in wearable electronics, where energy harvesting devices can power or recharge cellphones, mobile computers, radio communication equipment, etc. All of these devices must be sufficiently robust to endure long-term exposure to hostile environments and have a broad range of dynamic sensitivity to exploit the entire spectrum of wave motions.

Accumulating energy:

Energy can also be harvested to power small autonomous sensors such as those developed using MEMS technology. These systems are often very small and require little power, but their applications are limited by the reliance on battery power. Scavenging energy from ambient vibrations, wind, heat or light could enable smart sensors to be functional indefinitely.

Typical power densities available from energy harvesting devices are highly dependent upon the specific application (affecting the generator's size) and the design itself of the harvesting generator. In general, for motion powered devices, typical values are a few $\mu W/cm^3$ for human body powered applications and hundreds of $\mu W/cm^3$ for generators powered from machinery. Most energy scavenging devices for wearable electronics generate very little power.

Storage of power:

In general, energy can be stored in a capacitor, super capacitor, or battery. Capacitors are used when the application needs to provide huge energy spikes. Batteries leak less energy and are therefore used when the device needs to provide a steady flow of energy. Compared to batteries, super capacitors have virtually unlimited charge-discharge cycles and can therefore operate forever enabling a maintenance-free operation in IoT and wireless sensor devices.

Use of the power:

Current interest in low power energy harvesting is for independent sensor networks. In these applications an energy harvesting scheme puts power stored into a capacitor then boosted/regulated to a second storage capacitor or battery for the use in the microprocessor or in the data transmission. The power is usually used in a sensor application and the data stored or is transmitted possibly through a wireless method.

5.2.4 Moisture Monitoring System

Planting a tree in an environment where the seed or the plant would not get water adequately through natural sources like rain or ground water in its initial phases has been always a matter of concern for tree planters. This is where an autonomous moisture monitor for plants system can help.

The system timely monitors the moisture level of the soil. If at the time of monitoring it comes to know that the moisture level of the soil is lower than recommended then it will raise an audio-visual alert.

This alert is then received by the care taker of the plant. When the care taker waters the plant the alarm goes off and the monitoring cycle continues. In this system we use a timer IC to time the monitoring process.

A moisture level sensor is used to detect the moisture level of the soil. An LED is used to give visual alarm and a Buzzer is used to give audio alarm to the care taker of the plant.

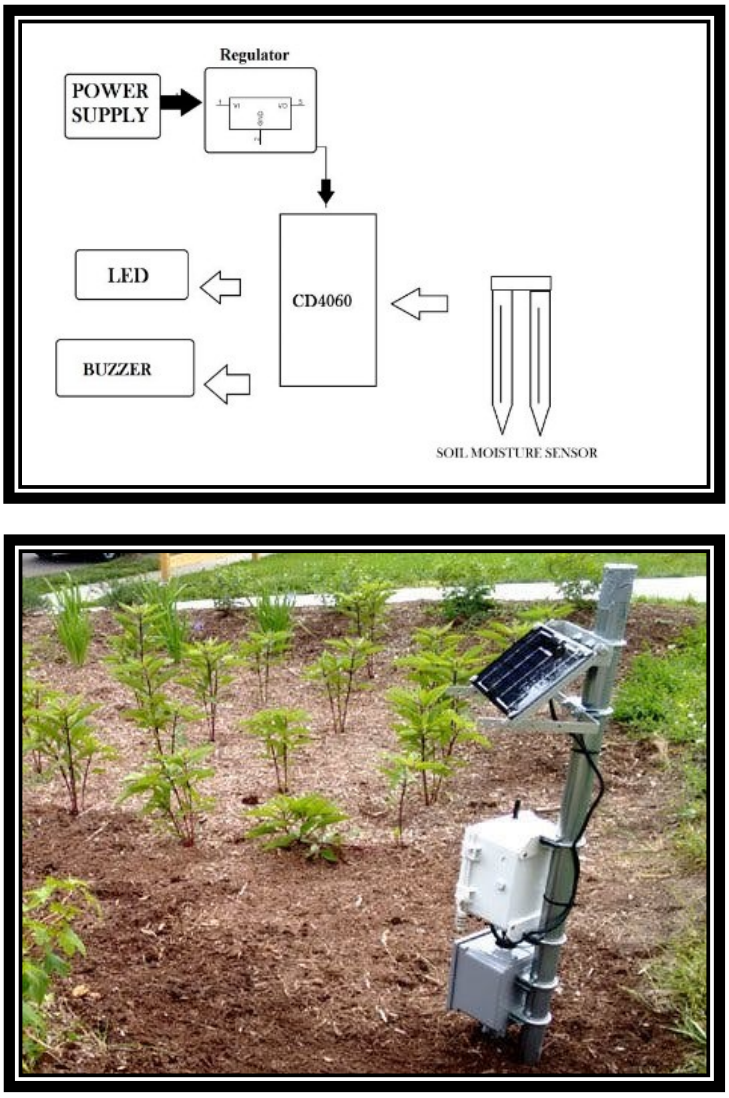


Fig. 5.21 Moisture Monitoring System

Thus, in this project with the help of a simple combinational circuit and a sensor we can help save a plant by maintaining the moisture level of the soil of the plant, thus keeping the plant healthy.

5.2.5 Home Automation using IoT / Any other methodology

Applications of home automation:

Rebuilding consumer expectations, home automation has been projected to target wide array applications for the new digital consumer. Some of the areas where consumers can expect to see home automation led IoT-enabled connectivity are:

- Lighting control
- HVAC
- Lawn/Gardening management
- Smart Home Appliances
- Improved Home safety and security
- Home air quality and water quality monitoring
- Natural Language-based voice assistants
- Better Infotainment delivery
- AI-driven digital experiences
- Smart Switches
- Smart Locks
- Smart Energy Meters

Fig. 5.22 IOT based home automation

5.2.6 PC Based Electrical Load Control

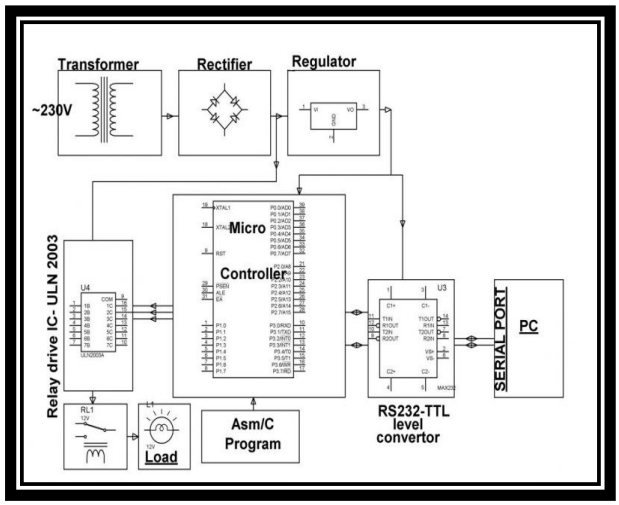


Fig. 5.23 PC Based electrical load control system

Automation system is mostly depending upon the power systems in industrial, residential or commercial, which needs remote controlling and monitoring. By employing wireless technologies, it is more competent to execute a suitable technology depending upon the requirements of the proposed system like speed, cost, and distance.

For distant controlling and monitoring of different loads and by means of efficient power usage through real time power spending with the help of a PC based graphical user interface application. The progress of technology equipment is becoming simpler and easier for us. Automated systems have more benefits over manual system. PC based electrical load-controlled systems are highly reliable, precise and time conserving systems. They give number of features like rapid data storage, transfer data and data securities.

Concept:

The PC based electrical load control system can be built with 8051 series Microcontroller, Level Shifter IC, DB Connector, Relays, Relay Driver, Transformer, Diodes, Capacitors, Resistors, LED, Crystal, Lamps, Keil compiler and Language: Embedded C or Assembly.

Keil an ARM Company makes C compilers, macro assemblers, real-time kernels, debuggers, simulators, integrated environments, evaluation boards, and emulators for ARM7/ARM9/Cortex-M3, XC16x/C16x/ST10, 251, and 8051 MCU families.

Compilers are programs used to convert a High-Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors. i.e the programs written in one of the HLL like 'C' will compile the code to run on the system for a particular processor like x86 (underlying microprocessor in the computer). For example, compilers for Dos platform is different from the Compilers for Unix platform So if one wants to define a compiler then compiler is a program that translates source code into object code.

5.2.7 Electrical Parameters Measurements

Standard Electrical Units of Measure:

Electrical Parameter	Measuring Unit	Symbol	Description
Voltage	Volt	V or E	Unit of Electrical Potential $V = I \times R$
Current	Ampere	I or i	Unit of Electrical Current $I = V \div R$
Resistance	Ohm	R or Ω	Unit of DC Resistance $R = V \div I$
Conductance	Siemen	G or ℧	Reciprocal of Resistance $G = 1 \div R$
Capacitance	Farad	C	Unit of Capacitance $C = Q \div V$
Charge	Coulomb	Q	Unit of Electrical Charge $Q = C \times V$
Inductance	Henry	L or H	Unit of Inductance $V_L = -L(di/dt)$
Power	Watts	W	Unit of Power $P = V \times I$ or $I^2 \times R$
Impedance	Ohm	Z	Unit of AC Resistance $Z^2 = R^2 + X^2$
Frequency	Hertz	Hz	Unit of Frequency $f = 1 \div T$

Table 5.2 Standard Electrical Units of Measure

Multiples and Sub-multiples

Prefix	Symbol	Multiplier	Power of Ten
Terra	T	1,000,000,000,000	10^{12}
Giga	G	1,000,000,000	10^{9}
Mega	M	1,000,000	10^{6}

kilo	k	1,000	10^3
none	none	1	10^0
centi	c	1/100	10^{-2}
milli	m	1/1,000	10^{-3}
micro	μ	1/1,000,000	10^{-6}
nano	n	1/1,000,000,000	10^{-9}
pico	p	1/1,000,000,000,000	10^{-12}

Table 5.3 Multiples and Sub-multiples

The "Standard" electrical units of measure shown above, other units are also used in electrical engineering to denote other values and quantities such as:

- Wh – **The Watt-Hour**, The amount of electrical energy consumed by a circuit over a period of time. Eg, a light bulb consumes one hundred watts of electrical power for one hour. It is commonly used in the form of: **Wh** (watt-hours), **kWh** (Kilowatt-hour) which is 1,000 watt-hours or **MWh** (Megawatt-hour) which is 1,000,000 watt-hours.
- dB – **The Decibel**, The decibel is a one tenth unit of the Bel (symbol B) and is used to represent gain either in voltage, current or power. It is a logarithmic unit expressed in **dB** and is commonly used to represent the ratio of input to output in amplifier, audio circuits or loudspeaker systems.

  For example, the dB ratio of an input voltage (V_{IN}) to an output voltage (V_{OUT}) is expressed as $20\log_{10}$ (Vout/Vin). The value in dB can be either positive (20dB) representing gain or negative (-20dB) representing loss with unity, ie input = output expressed as 0dB.
- θ – **Phase Angle**, The Phase Angle is the difference in degrees between the voltage waveform and the current waveform having the same periodic time. It is a time difference or time shift and depending upon the circuit element can have a "leading" or "lagging" value. The phase angle of a waveform is measured in degrees or radians.
- ω – **Angular Frequency**, Another unit which is mainly used in a.c. circuits to represent the Phasor Relationship between two or more waveforms is called Angular Frequency, symbol **ω**. This is a rotational unit of angular frequency $\mathbf{2\pi f}$ with units in *radians per second*, **rads/s**. The complete revolution of one cycle is 360 degrees or 2π, therefore, half a revolution is given as 180 degrees or π rad.
- τ – **Time Constant**, The Time Constant of an impedance circuit or linear first-order system is the time it takes for the output to reach 63.7% of its maximum or minimum output value when subjected to a Step Response input. It is a measure of reaction time.

CHAPTER 6: Swatchh Bharat Abhiyan (Clean India)

Need of Swatchh Bharat mission:

India is in dire need of a cleanliness drive like Swachh Bharat Abhiyan to eradicate dirtiness. It is important for the overall development of citizens in terms of health and well-being. As the majority of the population of India lives in rural areas, it is a big problem. Generally, in these areas, people do not have proper toilet facilities. They go out in the fields or roads to excrete. This practice creates a lot of hygiene problems for citizens. Therefore, this Clean India mission can be of great help in enhancing the living conditions of these people.

In other words, Swachh Bharat Abhiyan will help in proper waste management as well. When we will dispose of waste properly and recycle waste, it will develop the country. As its main focus is one rural area, the quality of life of the rural citizens will be enhanced through it. Most importantly, it enhances the public health through its objectives. India is one of the dirtiest countries in the world, and this mission can change the scenario. Therefore, India needs a cleanliness drive like Swachh Bharat Abhiyan to achieve this. In short, Swachh Bharat Abhiyan is a great start to make India cleaner and greener. If all the citizens could come together and participate in this drive, India will soon flourish. Moreover, when the hygienic conditions of India will improve, all of us will benefit equally. India will have more tourists visiting it every year and will create a happy and clean environment for the citizens.

6.1 Swatchhta needed in allocated village -Existing Situation with photograph

The village looked clean at its glimpse but when we surveyed its various corner we came to a conclusion that there is need to make people understand the situation prevailing in their village. Like the roads, houses and surrounding appeared clean. But the people used to dump their waste/garbage at a place near by their residence which was actually not visible easily. But from sanitation point of view it was not acceptable. Because in long run and even during rainy season it can give rise to various deadly diseases like malaria, dengue, etc. Also there is no facility of garbage collection.

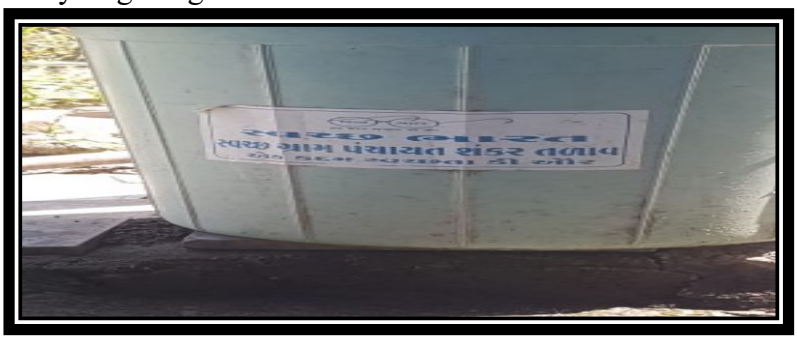


Fig. 6.1 Existing Situation of village

6.2 Guidelines - Implementation in allocated village with Photograph

To achieve "Swatchhta", the main guidelines are as under:

Fig. 6.2 Toilet construction

- Bring about an improvement in the general quality of life in the rural areas, by promoting cleanliness, hygiene and eliminating open defecation
- Accelerate sanitation coverage in rural areas to achieve the vision of Swachh Bharat.
- Motivate communities and Panchayati Raj Institutions to adopt sustainable sanitation practices and facilities through awareness creation and health education.
- Encourage cost effective and appropriate technologies for ecologically safe and sustainable sanitation.
- Develop, wherever required, community managed sanitation systems focusing on scientific Solid & Liquid Waste Management systems for overall cleanliness in the rural areas.
- Create significant positive impact on gender and promote social inclusion by improving sanitation especially in marginalized communities.

6.3 Activities Done by Students for allocated village with Photograph

- To avoid the dampness and their results like breeding of mosquitoes Face to face interaction with the villagers.
- To aware the people about the cleanliness, visit of school and teachers to teach about the swachhta and its benefits.
- To initiate use of biogas by the use of cow dung and its proper like manure to avoid the smell of cow dung breeding of flies also let them know about the renewable energy and benefits of installation.
- Chlorination of drinking water of adequate ppm range.

Fig. 6.3 Swachta Drive

CHAPTER 7: Village condition due to Covid-19

7.1 Taken steps in allocated village related to existing situation with photograph

On interaction with the sarpanch and talati we come to know that various steps were taken by them under the guidance of district collectorate and government of Gujarat such as:

- Establishing quarantine centre and isolation centre in the village.
- Immediate response to the villagers for help.
- Supplying foods packages by means of various NGOs and government body.
- 'Doctor at your door step on call' facility implementation initiated by honourable collector sir.

Fig. 7.1 Vaccination Drive

- House to house surveillance by medical them for Covid-19 awareness and detection.
- Providing free food for NFSA as well as Non-NFSA ration card holders.

7.2 Activities Done by Students for allocated village with Photograph

- Listening the corona (covid-19) word sounded like a curse. Especially for rural people.
- No doubt as per some data analytics rural area are not much affected by covid-19 virus but they were affected/suffered with various other factors resulted due to nationwide lockdown.
- Various people even scared of listening this word.
- So we managed to interact with the sarpanch and have done effort to make people aware of the virus and tried to answer their question related with covid-19 precautions, social distancing, etc. through the sarpanch.

Fig. 7.2 Social work

7.3 Any other steps taken by the students / villagers

After interaction with the sarpanch and talati we come to know that the quarantine and isolation centers built during lockdown were actually various government building, private hospitals, hotels, etc. and the people of the village volunteered themselves for various works like sanitization, cleaning, etc.

Chapter 8: Sustainable Design Planning Proposal (Prototype Design) Part- I (Scenario/ Existing Situation/ Proposed Design in Auto cad/ Recapitulation Sheet/ Measurement Sheet/Abstract Sheet/ Sustainability of Proposal/ Any other software)

8.1 Design Proposals:

Observation and Brief write up about the existing design:

We have visited Shankar Talav village various times and noticed what problems were faced by people. The people are getting various basic facilities, but they are deprived of quality of service due to some reasons. After meeting with the sarpanch we got idea that structure of the Aaganwadi, community hall, etc. needs to be redesigned to match the quality of infrastructure and facility. Also there is no heritage building available. No bus stop, no separate post-office, no library, etc. As per our observation, suggestion of people and sarpanch we decided to design following structure Aaganwadi, R.O. water plant and bus-stop.

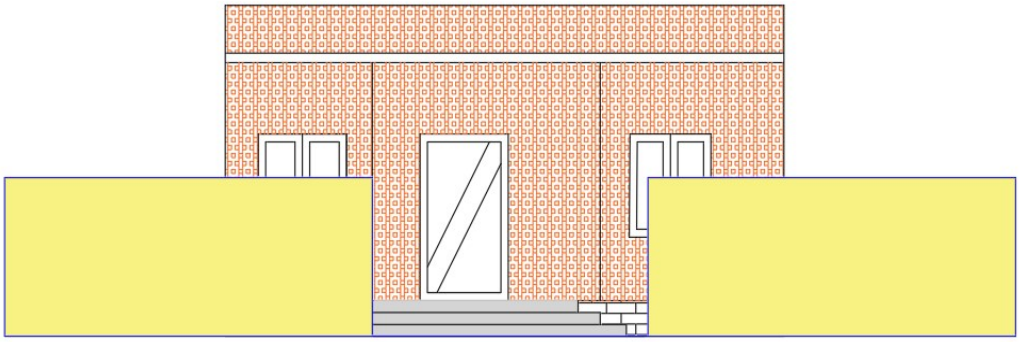
8.1.1 Social design (Civil): Aaganwadi

Aaganwadi centers have very crucial role to play towards reducing fatigue, health problems and stress of the care taker (mothers) by contributing to one of their important responsibilities, nurturing a small child, thus giving them more time towards rest of their daily activities & family duties.

The Ministry of Women Development and Child Welfare has laid down guidelines for the responsibilities of Aaganwadi workers. These guidelines include showing community support and active participation in executing this program, conducting regular quick surveys of all families, organizing pre-school activities, providing health and nutrition education to families, especially pregnant women, motivating families to adopt family planning, educating parents about child growth and development, assisting in the implementation and execution of Kishori Shakti Yojana, educating teenage girls and parents by organizing social awareness programs, and identifying disabilities in children.

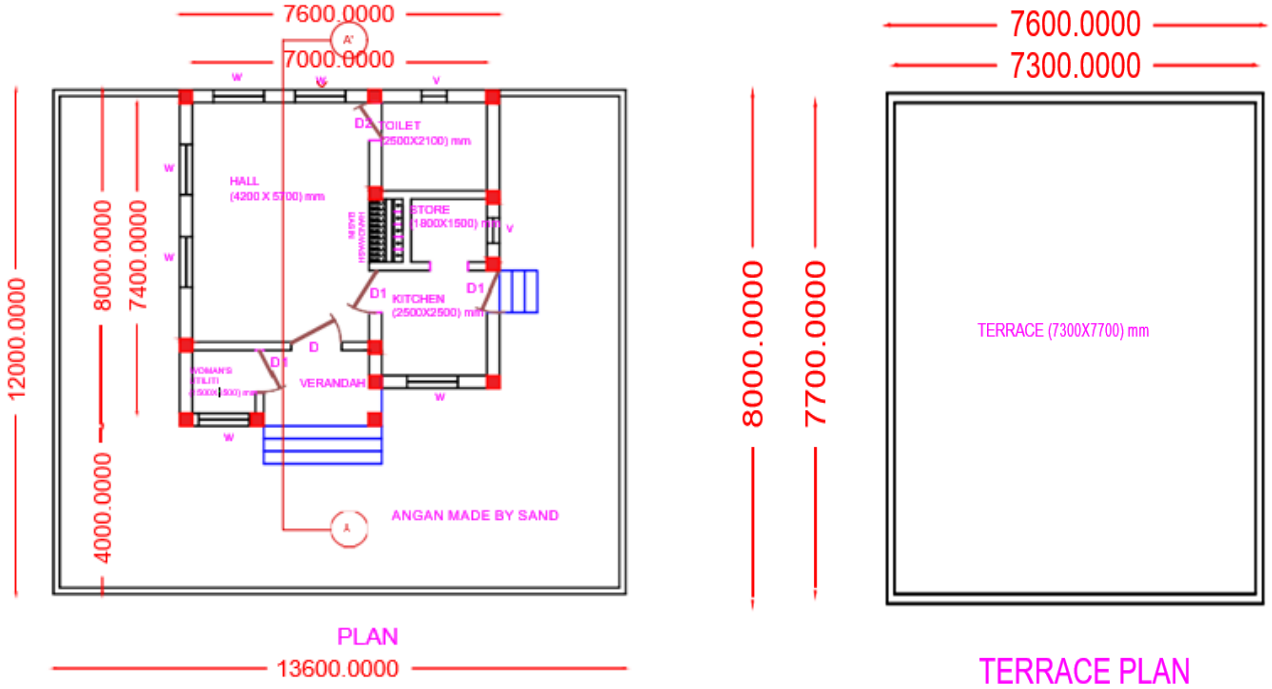
In Shankar Talav village the structure of Aaganwadi is somewhat not up-to the mark. So with the approval of sarpanch we come up with modern design of Aaganwadi. In a major initiative, this design will boost digitization of services being provided by the government by means of Aaganwadi.

Design of Aaganwadi:



ELEVATION

Fig. 8.1 Aaganwadi design



*All dimensions are in millimeter

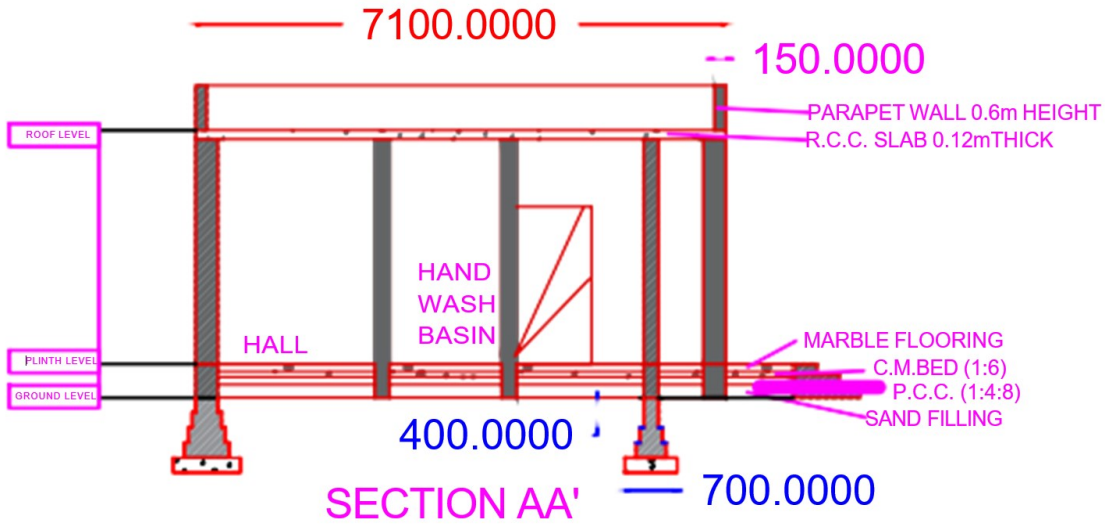


Fig 8.2 3D model of Aaganwadi

*All dimensions are in millimeter

SCHEDULE OF OPENING			
Sr. No.	**Description**	**Size**	**Nos.**
1	Door(D)	(1.2 X 2.1) m	1
2	Door(D1)	(1.0 X 2.1) m	3
3	Door(D2)	(0.9 X 2.1) m	1
4	Window	(1.2 X 1.3) m	6
5	Ventilation	(0.6 X 0.45) m	2
SCALE 1:100			
ALL DIMENSIONS ARE IN MILLIMETER			
AREA STATEMENT			
PLOT AREA=163.2Sq. m..			
BUILT UP AREA=60.8Sq. m..			
DESIGN TYPE AAGANWADI			

Table 8.1 Measurement Sheet of Aaganwadi

Item No.	**Item Description**	**Nos.**	**Length (m)**	**Width (m)**	**Height or Depth (m)**	**Quantity**	**Remark**
1	Excavation						
	300mm thick wall		34	0.9	1	30.6	Cu. m.
	200mm thick wall		7.55	0.7	1	5.285	Cu. m.
	150mm thick wall		28.57	0.6	0.3	5.1426	Cu. m.
						41.02	Cu. m.
2	PCC for foundation						
	300mm thick wall		34	0.9	0.2	6.12	Cu. m.
	200mm thick wall		7.55	0.7	0.2	1.057	Cu. m.
	150mm thick wall		28.57	0.6	0.2	3.248	Cu. m.
						10.417	Cu. m.
3	Brick masonry up-to plinth						
	300 thick-wall						
	(1) 1st step		34.45	0.6	0.2	4.134	Cu. m.
	(2) 2nd step		34.6	0.5	0.2	3.46	Cu. m.
	(3) 3rd step		34.75	0.4	0.2	2.78	Cu. m.
	(4) 4th step		35.05	0.3	0.75	7.95	Cu. m.
						18.324	Cu. m.
	200 thick-wall						

	(1) 1st step		8.3	0.4	0.2	0.664	Cu. m.
	(2) 2nd step		8.55	0.3	0.2	0.513	Cu. m.
	(3) 3rd step up-to 0.2m height		8.8	0.2	0.2	0.352	Cu. m.
	(4) 3rd step up-to plinth		8.9	0.2	0.65	1.157	Cu. m.
						2.686	Cu. m.
4	Brick masonry above plinth up-to slab(1:6)						
	300 thick-wall		34.9	0.3	3	31.41	Cu. m.
	200 thick-wall		8.9	0.3	3	8.055	Cu. m.
						39.465	Cu. m.
5	Deduction						
	D_0	1	1.2	0.3	2.1	0.756	Cu. m.
	D_1	3	1	0.3	2.1	1.89	Cu. m.
	D_2	1	0.9	0.3	2.1	0.561	Cu. m.
	W	6	1.2	0.3	1.3	2.808	Cu. m.
	v	2	0.6	0.3	0.45	0.162	Cu. m.
						6.177	Cu. m.
	Step brick work						
	kitchen						
	Step 1		1	0.3	0.15	0.045	Cu. m.
	Step 2		1	0.6	0.15	0.090	Cu. m.
	Step 3		1	0.9	0.15	0.135	Cu. m.
						0.270	Cu. m.
	Veranda						
	Step 1		2	0.3	0.15	0.09	Cu. m.
	Step 2		2	0.6	0.15	0.18	Cu. m.
	Step 3		2	0.9	0.15	0.27	Cu. m.
						0.54	Cu. m.
	Total brick work		-	-	-	55.108	Cu. m.
6	Plaster work						
	Hall	2	4.2		3	25.2	Sq. m.
		2	5.6		3	33.6	Sq. m.
	Women utility	2	1.5		3	9	Sq. m.

		2	1.5		3	9	Sq. m.
	Store	2	1.5		3	9	Sq. m.
		2	1.8		3	10.8	Sq. m.
	Kitchen	2	2.5		3	15	Sq. m.
		2	2.5		3	15	Sq. m.
	wc	2	2.5		3	15	Sq. m.
		2	2.1		3	12.6	Sq. m.
						154.2	Sq. m.
	Deduction						
	D	1	1.2		2.1	2.52	Sq. m.
	D_1	3	1		2.1	6.3	Sq. m.
	D_2	1	0.9		2.1	1.89	Sq. m.
	W	6	1.2		1.3	9.36	Sq. m.
	V	2	0.6		0.45	0.54	Sq. m.
						20.61	Sq. m.
7	PLASTER WORK OUTER SIDE	2	8	-	3.7	59.2	Sq. m.
		2	7.6	-	3.7	56.24	Sq. m.
						115.44	Sq. m.
8	Celling						
	Hall		4.2	5.6	-	23.52	Sq. m.
	Women utility		1.5	5.5	-	2.25	Sq. m.
	Wc		2.5	2.8	-	5.25	Sq. m.
	Store room		1.8	1.5	-	2.7	Sq. m.
	Kitchen		2.5	2.5	-	6.25	Sq. m.
	otta		2.4	1.5	-	2.6	Sq. m.
						43.57	Sq. m.
	Total plastering work					**270.76**	**Sq. m.**
9	Brick work in parapet wall	2	7.6	0.15	0.6	1.368	Cu. m.
		2	8	0.15	0.6	1.563	Cu. m.
10	Roof slab	1	7.6	8	0.1	6.08	Cu. m.
11	Roof beam						

		1	35.35	0.3	0.5	5.30	Cu. m.
		2	9.6	0.2	0.45	1.728	Cu. m.
						7.028	Cu. m.
12	Lintel beam	1	1.2	0.3	0.15	0.054	Cu. m.
		3	1	0.3	0.15	0.135	Cu. m.
		1	0.9	0.3	0.15	0.162	Cu. m.
		6	1.2	0.3	0.15	0.324	Cu. m.
						0.675	Cu. m.
13	Chajja	1	1.4	0.5	0.1	0.67	Cu. m.
		3	1.2	0.5	0.1	0.15	Cu. m.
		1	1.1	0.5	0.1	0.055	Cu. m.
		6	1.4	0.5	0.1	0.42	Cu. m.
						1.295	Cu. m.
14	Tile's flooring						
	Hall		4.2	5.7	-	23.94	Sq. m.
	Women's utility		2	1.5	-	3	Sq. m.
	Otta		2	1.9	-	3.8	Sq. m.
	kitchen		2.5	2.9	-	7.25	Sq. m.
	Store room		1.8	1.5	-	2.7	Sq. m.
	WC		2.5	2.3	-	5.75	Sq. m.
						46.44	Sq. m.
15	Column						
		10	0.3	0.3	2.6	2.34	Cu. m.
		2	0.2	0.2	2.6	0.208	Cu. m..

Table 8.2 Abstract Sheet of Aaganwadi

Sr. No.	Item Description	Qty.	Rate	Per	Amount (Rs.)
1	Excavation	41.02 Cu. m.	90	Cu. m.	3691
2	PCC	10.417 Cu. m.	3500	Cu. m.	36459
3	Brick work	55.10 Cu. m.	3500	Cu. m.	192878

4	Inside plaster	424.2 Sq. m.	204	Sq. m.	86536
5	Outer plaster	115.44 Sq. m.	197	Sq. m.	22741
6	Roof slab	6.08 Cu. m.	4100	Cu. m.	24928
7	Roof beam	7.03 Cu. m.	4100	Cu. m.	28814
8	Lintel beam	0.68 Cu. m.	4100	Cu. m.	2767
9	Chajja	1.29 Cu. m.	4100	Cu. m.	5309
10	Column	46.44 Cu. m.	4100	Cu. m.	10414
11	Tile's work	2.54 Sq. m.	600	Sq. m.	27864
12	Inside paint work	424.2 Sq. m.	204	Sq. m.	86536
13	Outside paint work	115.44 Sq. m.	197	Sq. m.	22741
				Total Rs.	**551677**
				Add 1.5% water charge	**8275**
				Add 10% contingencies charge	**55167**
				Total estimated cost in Rs.	**615119**

The rates of the respective work provided in the above abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities, labor charges and various other miscellaneous charges.

Total estimated cost = 615119/- Rs.

8.1.2 Physical design (Civil): R.O. Water Plant

Reverse osmosis helps in improving the quality and safety of water for domestic as well as for industrial use. It is widely used to desalinate the sea water. Reverse osmosis helps in removing many types of suspended and dissolved species from water. It helps in removing bacteria and removes the impurity of the water. In the process of reverse osmosis desalination, pressure is applied to overcome the osmotic pressure which is driven by all the chemical potential solvents. With increasing industrialization pollution has also increased. It can air pollution, water pollution and so on. But the main point we cannot hamper development. Its fact that 'a coin has two sides' so we need to accept that and find some alternatives of these problems. That we need to accept change and change with respect to it, otherwise change will change us. Similarly drinking polluted water is unhygienic and it can cause various diseases. And prolong consumption of polluted water can even cause loss of life. Now Shankar Talav has few major manufacturing industries at its outskirts which has direct or indirect impact on the water quality.

Considering the need and suggestion of people as well as the sarpanch we have following design of R.O. water plant.

Design of R.O. Water Plant:

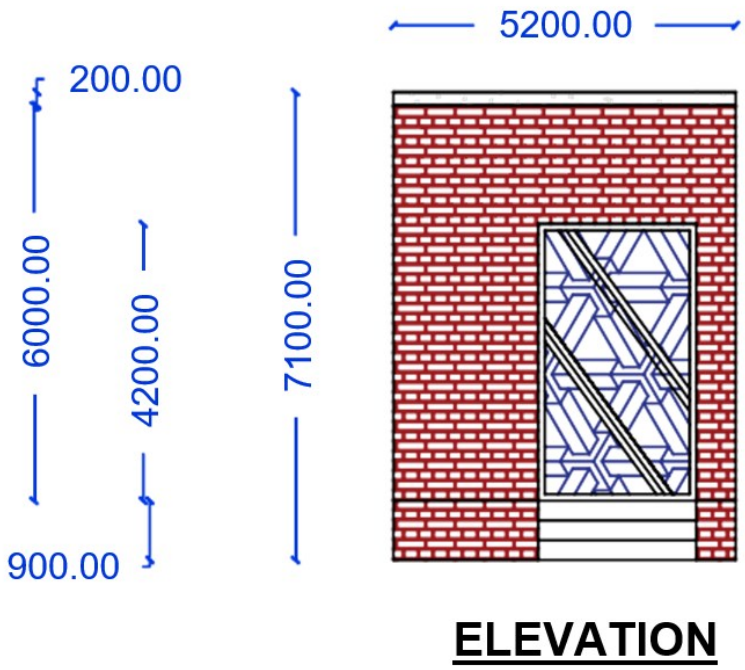
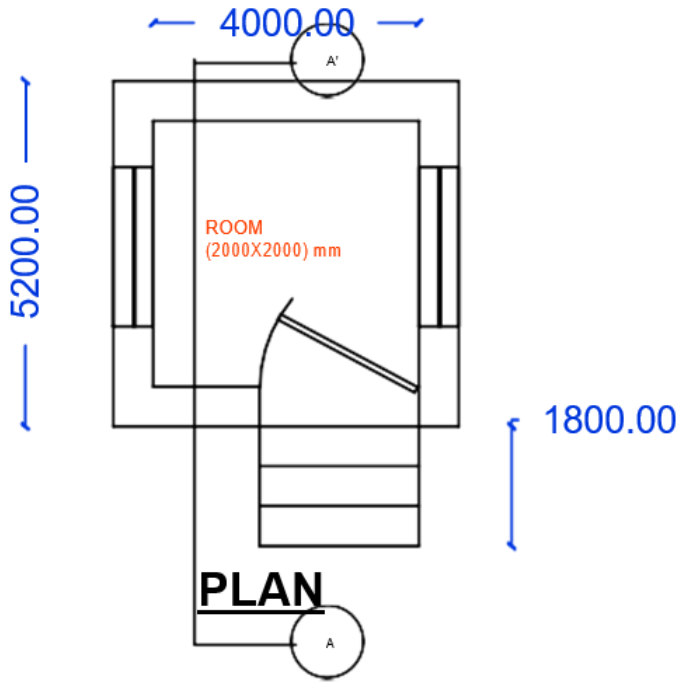
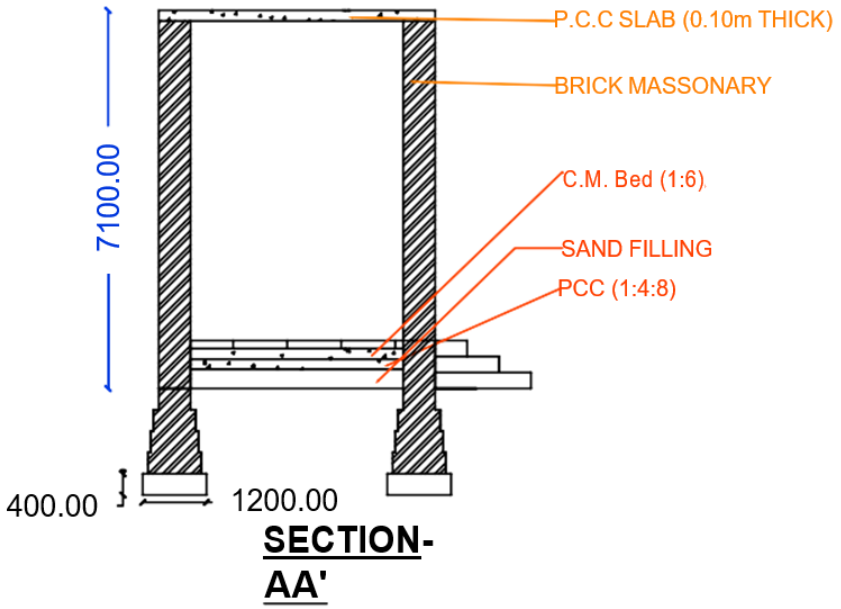


Fig. 8.3 Design of R.O. water plant



*All dimensions are in millimeter



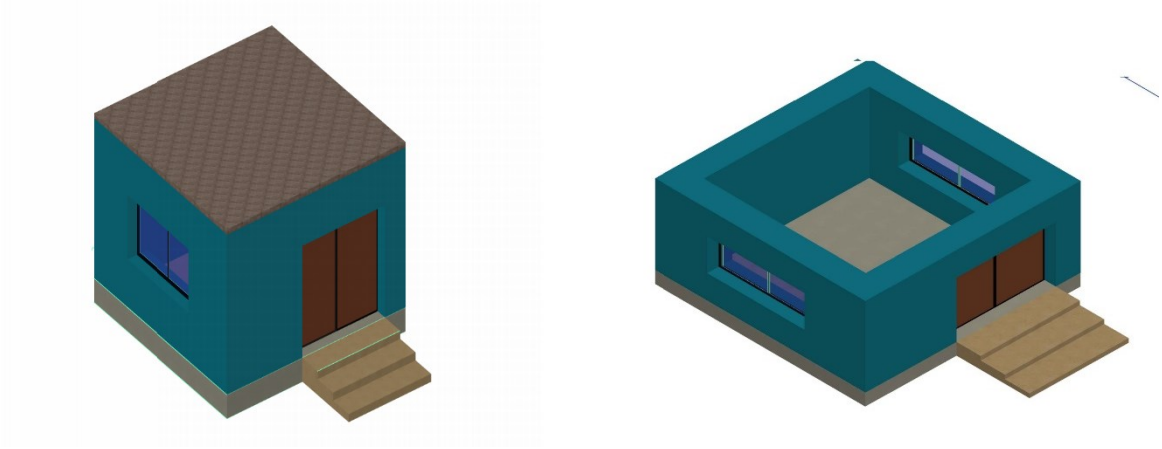


Fig. 8.4 3D model of R.O. water plant

SCHEDULE OF OPENING			
Sr. No.	Description	Size	Nos.
1	Door	(1.2 X 2.1) m	1
1	Window	(1.2 X 1.3) m	2

SCALE 1:2
ALL DIMENSION ARE IN MILLIMETER
AREA STATEMENT

Table 8.3 Measurement Sheet of R. O. water plant

Item No.	Item description	Nos.	Length (m)	Width (m)	Height or Depth (m)	Quantity	Remark
1	Excavation in foundation		4.6	0.9	1	4.143	m^3
2	PCC in footing		4.6	0.9	0.2	0.828	m^3
3	Brick-work up to plinth						
		1	4.6	0.6	0.2	0.516	m^3
		1	4.6	0.5	0.2	0.435	m^3
		1	4.6	0.4	0.2	0.88	m^3
		1	4.6	0.4	0.3	0.4005	m^3
						2.232	m^3
4	Brick work above plinth	1	4.6	0.3	3	4.140	m^3
	Deduction						
	Door	1	0.9	0.3	2.1	0.567	m^3
	Window	2	1.2	0.3	1.3	0.936	m^3
						2.637	m^3
	Steps						
		1	1.2	0.3	0.15	0.054	m^3
		1	1.2	0.6	0.15	0.108	m^3
		1	1.2	0.9	0.15	0.162	m^3
						0.324	m^3
	Total brick work					**4.059**	m^3
5	Tiles flooring in room		2	2		4	m^2
6	RCC work in slab		2.6	2.6	0.10	0.676	m^3
7	Smooth plaster work	2	2	-	3	12	m^2
		2	2	-	3	12	m^2
			2	2		4	m^2
		4	2.6	-	3.1	**32.24**	m^2
						60.24	m^2
	Deduction						
	Door	1	0.9	0.3	2.1	0.567	m^3
	Window	2	1.2	0.3	1.3	0.936	m^3
						57.603	m^2
8	RCC column	4	0.3	0.3	3	1.080	m^3
9	RCC roof beam	4	1.4	0.3	0.15	0.252	m^3
10	Lintel beam	1	0.9	0.3	0.15	0.040	m^3
		2	1.2	0.3	0.15	0.108	m^3
						0.508	m^3
11	chajja	2	1.4	0.5	0.1	0.14	m^3

Table 8.4 Abstract sheet of R.O. water plant

Sr. No.	Item Description	Quantity (m)	Rate	Per	Amount (Rs.)
1	Excavation	4.14 m^3	90	m^3	372
2	PCC	0.828 m^3	3500	m^3	2798
3	Brick work	4.05 m^3	3500	m^3	14206
4	Inside plaster	28 m^2	204	m^2	5712
5	Outer side plaster	32.28 m^2	197	m^2	6351
6	Roof slab	0.67 m^3	4100	m^3	2771
7	Roof beam	0.25 m^3	4100	m^3	1033
8	Lintel beam	0.508 m^3	4100	m^3	2082
9	Chajja	0.14 m^3	4100	m^3	574
10	Tiles flooring	4 m^2	600	m^2	2400
11	Column	1.08 m^3	4100	m^3	4100
12	Inside paint	28 m^2	204	m^2	5712
13	Outer side paint	32.24 m^2	197	m^2	6351
				TOTAL	**54462**
				Add 1.5% water charge	**816**
				Add 10% contingencies charge	**5446**
				Total estimated cost in Rs.	**60724**

*The rates of the respective work provided in the above abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities, labor charges and various other miscellaneous charges.

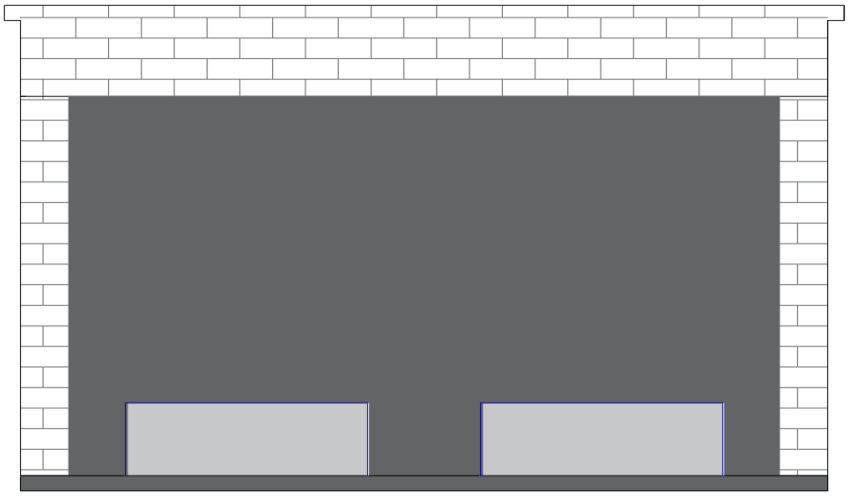
Total estimated cost = 60724/- Rs

8.1.3 Physical design (Civil): Bus-Stop

The bus stop is the first contact point between the passenger and the bus service. The space, the location, the design, and the operation of bus stops significantly influence transit system performance, customer satisfaction and customer safety.

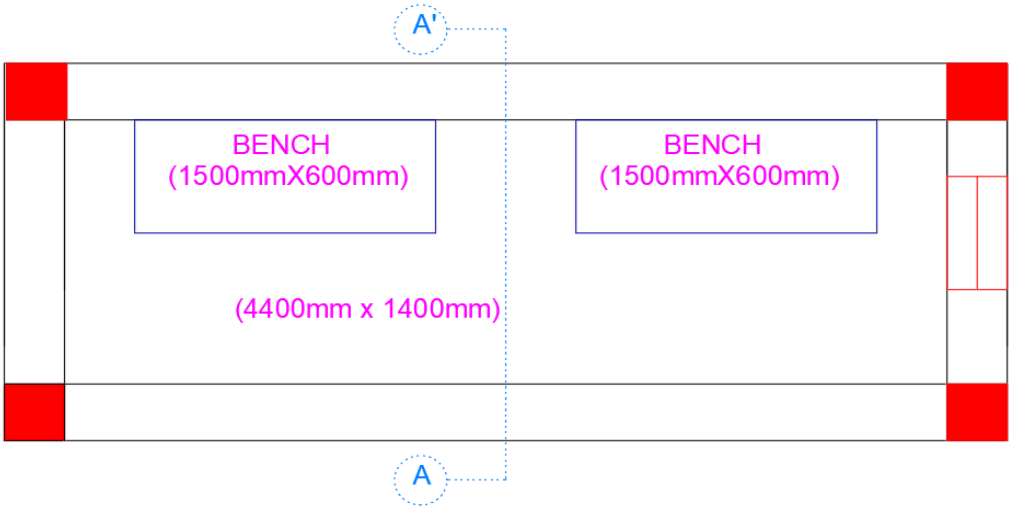
Understanding the problems being faced by regular commuters of the village and their suggestions and after interaction with the sarpanch we have come up with a design of bus-stop which will definitely give boost to the life of the villagers.

Design of Bus-Stop:



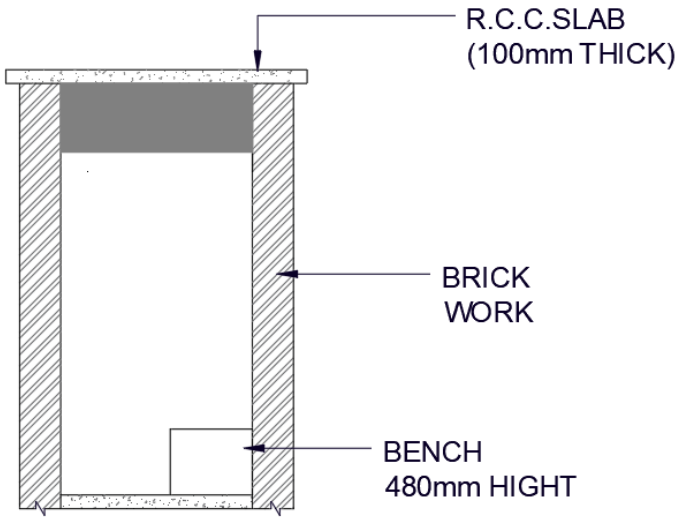
ELEVATION

Fig. 8.5 Design of bus stop



PLAN

*All dimensions are in millimeter



SECTION AA'

Fig. 8.6 3d model of bus stand

PLINTH AREA: 10 sq. m.
SCALE 1:100
DESIGN TYPE: BUS STOP
ALL DIMENSIONS ARE IN MILLIMETER

Table 8.5 Measurement Sheet of bus stand

Item No.	Item Description	Nos.	Length (m)	Width (m)	Height or depth (m)	Quantity	Remark
1	Excavation for foundation	1	12.8	0.6	0.4	3.072	m^3
2	PCC footing	1	12.8	0.6	0.2	1.536	m^3
3	Brick masonry work up to plinth level	1	12.8	0.4	0.2	1.024	m^3
4	Brick masonry work above plinth level	1	12.8	0.3	3	1.152	m^3
	Deduction	1					
	Opening 1	1	2	0.6	0.3	0.36	m^3
	Opening 2	1	2.4	1.4	0.3	1.008	m^3
5	PCC work in plinth	1	5	2	0.1	1	m^3
6	PCC work for slab	1	2.2	5.2	0.10	1.144	m^3
						2.144	m^3
7	RCC column	4	0.3	0.3	3	1.080	m^3
8	12mm inside plaster	1	4.4	-	0.6	2.640	m^2
		2	104	-	2.9	8.120	m^2
		1	4.4	-	2.9	12.760	m^2
						23.520	m^2
9	Outside plaster	2	5	-	3.1	15.5	m^2
		2	2	-	3.1	6.1	m^2
						21.3	m^2
10	RCC beam		4.4	0.3	0.5	0.66	m^3
			1.4	0.2	0.3	0.084	m^3
						0.744	m^3

Table 8.6 Abstract Sheet of bus stand

Sr. No.	Item Description	Quantity (m^3)	Rate	Per	Amount (Rs.)
1	Excavation	3.07	90	m^3	276
2	PCC	3.684	3500	m^3	12894
3	Brick work	2.17	3500	m^3	7616
4	Plaster inside	23.52	204	m^3	5580
5	Plaster works out side	21.3	197	m^3	4196
6	Roof slab	1	4100	m^3	4100
7	Roof beam	0.744	4100	m^3	3050

8	Column	1.08	4100	m^3	4100
9	Bench	0.864	3500	m^3	3024
10	PCC in plinth	1	3500	m^3	3500
				TOTAL	**43036**
				Add 1.5% water charge	**645**
				Add 10% contingencies charge	**4303**
				Total estimated cost in Rs.	**47984**

*The rates of the respective work provided in the above abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities, labor charges and various other miscellaneous charges

Total estimated cost = 47984/- Rs

8.1.4 Automatic Street light bulb holder (Electrical Design 1)

Present condition of the village during the survey (problem no. 1):

During the survey it was noticed that many Street lights were in on condition during the day time and when question was asked to sarpanch and villagers then we came to know that Street lights on time is not behaving properly from last few days. In the temple there was no bulb in the entrance but only the bulb holder was there and the absence of the bulb may lead to injury for old aged people.

Solution designed for improving the prevailing situation (solution no. 1): Automatic intensity control bulb holder

In this project design, we are going to make an automatic street light control electronic bulb holder circuit. In this project design, we did not use any relay or battery for automatic on/off the circuit. We have only used a BT136 or 139 TRIACS as a switch to on and off the Street light Automatically/itself with little or no direct human control. It spontaneously switches ON lights when the light of the sun goes invisible (e.g., in the evening) It automatically switches OFF illumination/lights when Sunlight falls on the LDR sensor used in this circuit.

Components	Ratings
BT136 TRIAC	Vmax-600v, 4A
Resistor	220kΩ
LDR	-
Bulb holder	230V

Introduction:

Street lights are indispensable part of our lives because they light our path during the dark. They make the society better and safer. With depleting fossil fuels, it is high time we switch to energy efficient renewable power sources. And using the non-conventional power sources for lighting the streets is a smart solution to the global energy crisis. In the world of energy crisis, the need for automation of street lights is inevitable. Due to manual errors street lights are not being switched OFF during the day time. According to surveys it was found that 18-38% of the total energy bill is due to the street lights, so if we concerned about saving of energy then street lights is one of the important domains that needs to be considered. Replacing of HID lamps with LED lamps offers around 60% of power saving. It becomes necessary that we automate our street lights and power them up using solar panels to maximize our energy saving output. Moreover, a street light is the viewer to most of the accidents. WHO in its Global Status Report on Road Safety reveals that in India about 130,000 road accident deaths occurs every year. Out of them more than 40% deaths are due to negligence in help to the injured person. So, the use of street lights can be used to locate the exact place of occurrence of accidents. Hence fast medical assistance can be reached to the people and this can be a beginning to reduce the death counts due to negligence in road accidents.

Objective:

The objective of this system is to design a smart street lighting system which is not only energy efficient and economical but also helps the government in minimizing the losses done by the big accidents which results in flame storm. This paper suggests a system in which street lights automatically switches itself OFF during day light and dims itself in the night when no vehicle is in its proximity. There are more than 35 million street lights in India. So this will take a lot of time to check manually the functioning of each street light. But our system provides an automatic fault detector sensor which will detect the faulty street lights and will report to the authority through GSM/GPRS module. III. SYSTEM AND METHODS This paper not only deals with the saving of energy but also to minimize the death due to negligence in big accidents. Energy saving is done by the replacement of HID lamps with the LED, use of sensors like LDR, PIR sensor and use of Solar Voltaic cell. The deaths can be minimized by the help of flame detector and GSM/GPRS module. The maintenance of street lights can be done using LDR and GSM/GPRS module.

LDR Sensor:

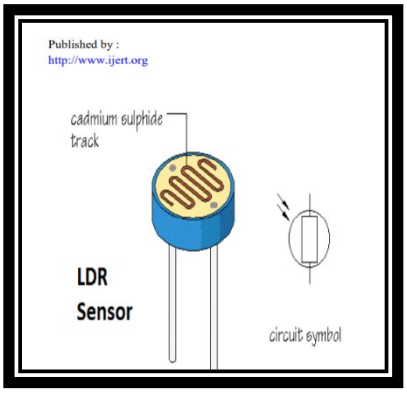


Fig. 8.7 LDR Sensor

The Light Dependent Resistor (LDR) is used as a sensor whose resistance depends upon the amount of electromagnetic radiation falls on them. The resistance of a light dependent resistor will be high if it is kept under dark surrounding. And its resistance will decrease drastically if it is allowed to absorb light of increasing intensity keeping the voltage constant. In this system there are 2 LDR sensor used. First LDR is used to automate the switching of light i.e. it can easily detect the difference between the day and night and so that it switches light ON during night and switches OFF during the day time. The second LDR is used to detect the faulty lamps. This second LDR is placed below the lamp. This LDR continuously sends signals to the microcontroller. When the LDR receives lights, its resistance decreases and allows more current to pass through the microcontroller. Microcontroller compares the signal received

to the threshold value set by the user at the installation time. If the magnitude of signal is less than the threshold value then the microcontroller sends a command to the GSM/GPRS module to send an SMS to the Maintenance Department. The message which will be sent by that particular pole will contain the pole name and area so that the maintenance department can send their men to repair that faulty lamp. This will save the time and energy and the efficiency will be increased drastically.

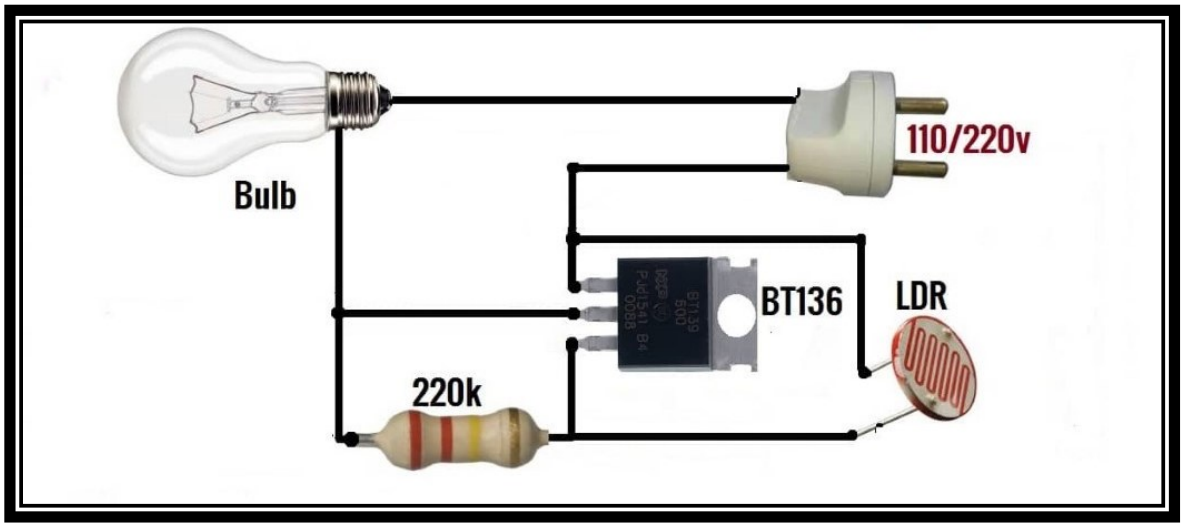


Fig. 8.8 Circuit diagram of automatic street light bulb holder

Components	No. of components	Cost per unit (Rs.)
Holder	1	20
L.D.R.	1	10
Resistor	1	2
Triac	1	15
Miscellaneous	-	3
	Total	50 Rs

Advantages:

- By using this Automatic system for street light controlling, we can reduce energy consumption because the manually operated street lights are not switched off properly even the sunlight comes and also not switched on earlier before sunset.
- In sunny and rainy days, ON and OFF time differ noticeably which is one of the major disadvantages of using timer circuits or manual operation for switching the street light system.

8.1.5 Live energy billing (Electrical Design 2)

Present condition of the village during the survey (problem no. 2):

During the interaction with villagers, it was found that many a times electricity bill amount comes more than expected and many a times it was occurred that villagers were out of house for some

farming work and the employee of distribution company comes and prints the bill without taking readings! And the villagers have to block the money to the distribution company, because the bill is approximated on basis of previous readings, so if usage is less than the previous session, then the amount to be paid is more. Also, there is very high scope of corruption and human error in taking manual readings.

Solution designed for improving the prevailing situation (solution no. 2): Live energy billing system using IoT

To solve this problem an android application is developed which will be installed in villagers' mobile phone, in which! Villagers will be able to see the various readings and live energy billing amount in rupees. On the consumer end, the measurement module and node-MCU will be installed, which will also act as energy meter.

The Main features of IOT based Live Energy Billing design:

- AMR (Automatic Meter Reading)
- Meter Tampering Detection
- Live monitoring of electricity bill
- Live forecasting of future bill as per the current load

Components	No. of components	Cost per unit (Rs.)
Measurement module	1	1200
NodeMcu	1	350
Connecting jumper wires	N.A.	100
Air core current transformer	1	300
Total		1950 Rs

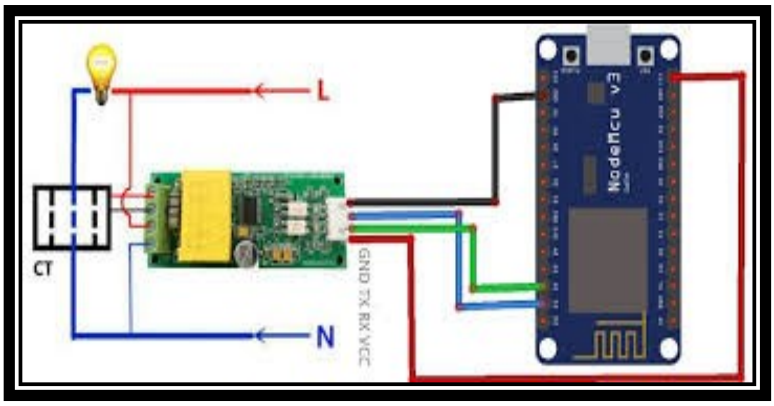


Fig. 8.9 (a) Circuit diagram live energy billing

Connections are as shown in figure, PZEM-004t measurement module is used which measures various parameters like voltage, current, power factor, frequency, etc. and sends data to Node-MCU then the Node-MCU send data to google firebase cloud. The calculation of the electricity bill with respect to the current charges of distribution company per unit is done in the app and as per the program loaded in Node-MCU. And thus, the calculated data from firebase cloud is sent to the android application! Which can be easily viewed by the consumers.

The existing reading system is a time consuming and it needs a number of labors too. The proposed design will eliminate the need for labor and it is a cost efficient. The proposed system gives the information about the energy consumption on real time on IOT dashboard on mobile application and PC, billing through IOT. This smart energy meter protects your home from bad supply, alert the consumer and utility when the energy consumption exceeds above the set limit and the disconnection and reconnection of power through a mobile application when the residential are out of station to prevent the wastage of energy.

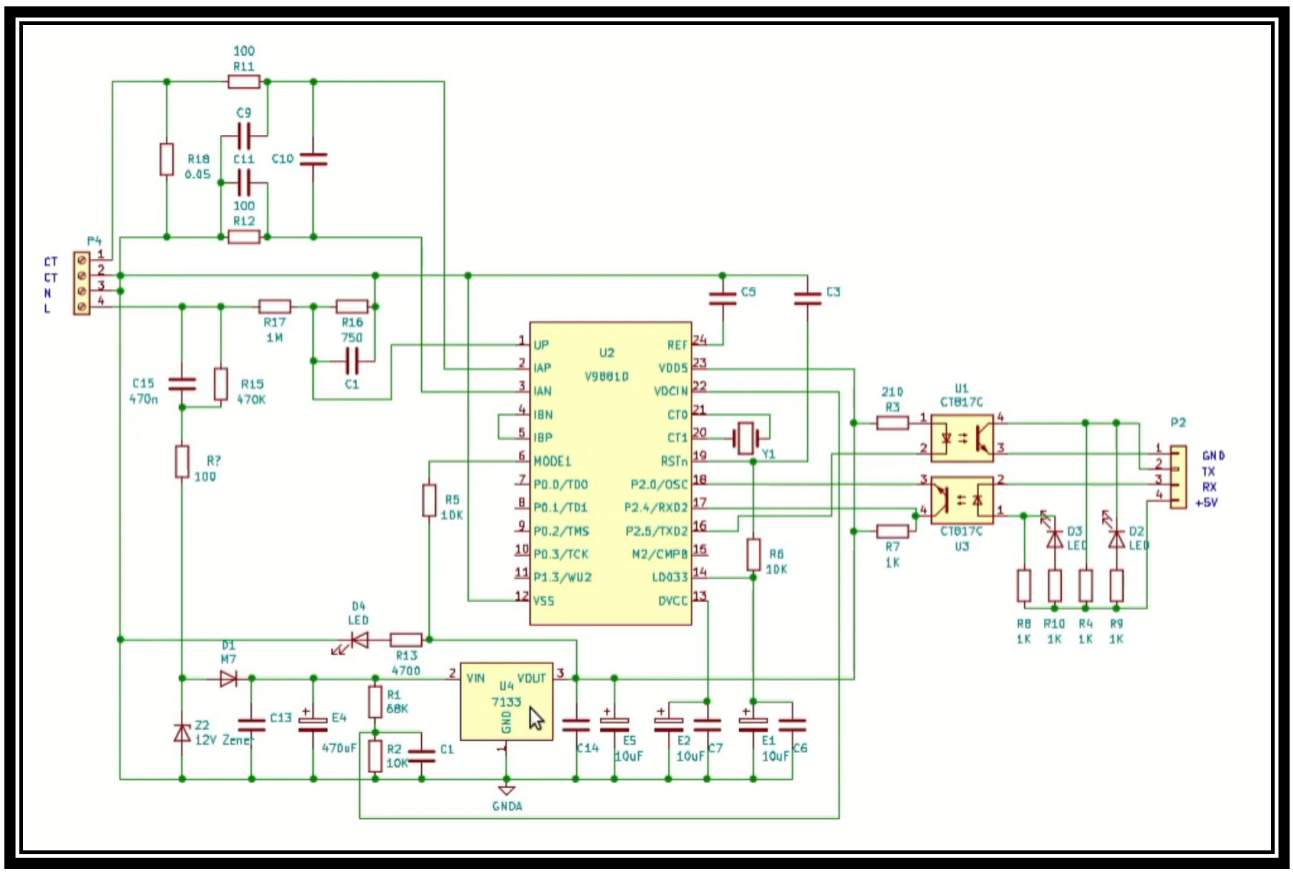


Fig. 8.9 (b) Circuit diagram live energy billing

Mobile Interface Design:

The application starts to work when the user accesses its services by clicking the application icon on the screen. After the application starts it waits for the user response to enter the credentials to access this account. Once the user enters his credentials and clicks the Login button, the application verifies the user info stored in the central database. After authorization, the user gains access to his Dashboard. The Dashboard contains all the details about the user's electric meter. It displays the current day's consumption, current reading, yesterday's reading, and last updated time. The user can choose the Billing menu to view the current billing information. It displays the start date & end date of the bill, Billing date, total consumed units, total amount to be paid and bill status. The application sends and receive data through HTTP POST method. Since internet is used, the Android mobile needs to be connected to the GPRS network. The only disadvantage is that when an android device is connected to the internet, it drains the battery at a faster rate. But, with recent updates of the Android version and the recently introduced long lasting batteries, increase the operating time of the mobile handset.

Advantages Of the Proposed System:

The users can be aware of their electricity consumption. The human work of collecting readings by visiting every home at the end of every month can be avoided by generating Electricity bills automatically. Theft of electricity can be avoided by tamper proof energy meters. The errors in the system can be identified quickly.

8.1.6 Water level indicator with alarm (Electrical Design 3)

Present condition of the village during the survey (problem no. 3):

Water tank overflow is a common problem which leads to the wastage of water. Similarly, this problem was there in the village! Because there was no water level indication or alarm-based system, which can notify that the tank is full.

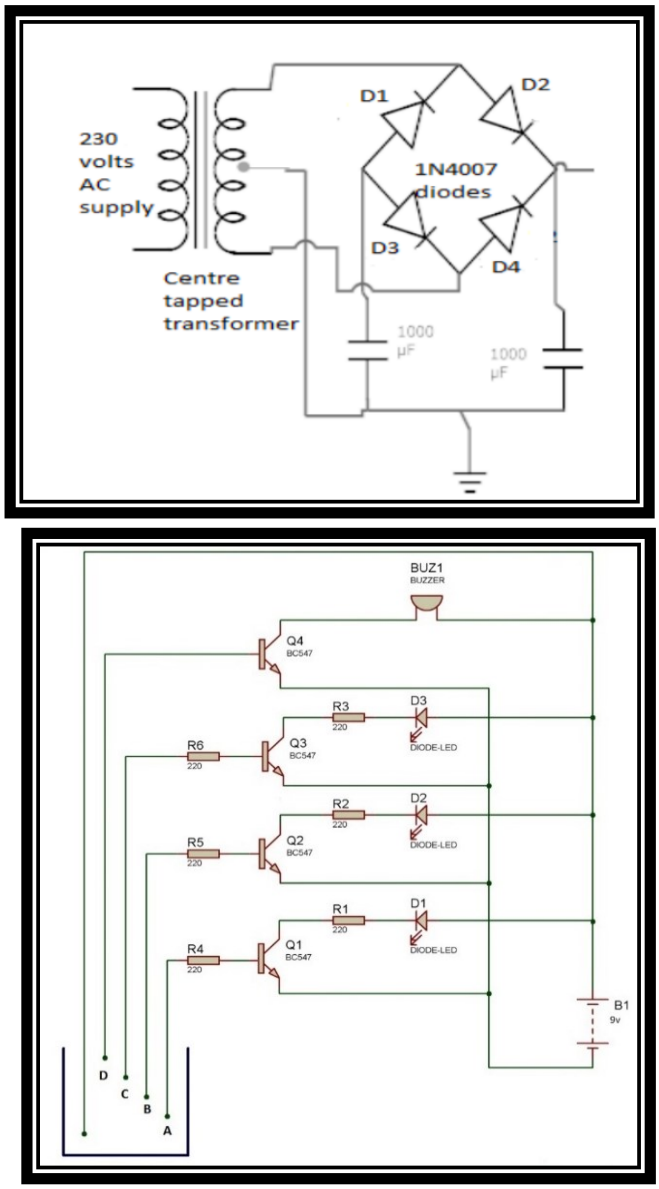


Fig. 8.10 Circuit diagram of water level indicator with alarm

Solution designed for improving the prevailing situation (solution no. 3): Water level indicator with alarm

Though there are many solutions to it like ball valves which automatically stop the water flow once the tank gets full. But being electronics enthusiastic we would like an electronic solution for it! So here is a simple design of water level indicator project which will detect the water level and will raise an alarm upon getting the water tank full or a preset level.

This simple transistor based water level indicator circuit is very useful to indicate the water levels in a tank. Whenever tank gets filled, we get alerts on particular levels. Here we have created 4 levels (low, medium, high and full), we can create alarms for more levels. We have added 3 LEDs to indicate initial three levels (A, B, C), and one Buzzer to indicate FULL level (D). When tanks gets filled completely we get beep sound from Buzzer. Components required are Buzzer, transistor, resistors, leds and battery.

Components	No. of components	Cost per unit (Rs.)
Transistors	4	20
Resistors	4	10
Leds	4	10
Power adaptor	1	50
Miscellaneous	-	10
	Total	100 Rs

Advantages Of Water Level Indicators

There are many advantages of water level controls, also known also water level indicators, including:

Power Saver: Living in an age where we need to be more conscious of the energy that we use, a water level controller is ideal at saving power. Normally, regulating water levels can consume

electricity and wastewater. However, with automatic controllers, the electricity usage is limited as well as less water needed to regulate supply.

Money Saver: A water level controller helps save money by limiting the waste of water and electricity. These devices accurately regulate how much energy is used to protect against any unnecessary water/electricity usage. Over time, the money saved is quite substantial.

Automatic: Another notable advantage with these devices is that they regulate on their own. Eliminating manual operations with a timer switch, the frustrations of manual monitoring water tanks are minimized. Water levels are maintained at the appropriate levels thanks to the automatic operations of these devices.

Water Maximization: On average, water pumps are used more during midday. A water level controller can maximize the water usage provided during midday while automatically lessening the water usage at night. This results in an appropriate level of water at all times being maintained, while providing you with the maximum use of your water at the appropriate times.

8.2 Reason for Students Recommending this Design

- **Aaganwadi:** To improve the standard of service being provided to the beneficiaries.
- **R.O. Water-Plant:** To provide clean and pure drinking water to the villagers.
- **Bus-Stand:** To provide good and fast transportation facility to the population of Shankar Talav
- **Automatic street light bulb holder:** To save electricity and provide affordable and cheap energy billing to the people.
- **Live energy billing:** To reduce the service charge of the company and provide live data of electricity consumption to the consumers.
- **Water level indicator with alarm:** To preserve wastage of water and provide closed loop system so as to detect any fault in the system.

8.3 About designs Suggestions / Benefit of the villagers

Aaganwadi: The aaganwadi needs to be redesigned. Current structure of it is not up to the mark. Aaganwadi centers have very crucial role to play towards reducing fatigue, health problems and stress of the care taker (mothers) by contributing to one of their important responsibilities, nurturing a small child, thus giving them more time towards rest of their daily activities & family duties.

R.O. Water plant: With increasing industrialization pollution has also increased. It can air pollution, water pollution and so on. But the main point we cannot hamper development. Its fact that 'a coin has two sides' so we need to accept that and find some alternatives of these problems. That we need to accept change and change with respect to it, otherwise change will change us. Similarly drinking polluted water is unhygienic and it can cause various diseases. And prolong consumption of polluted water can even cause loss of life. Now Shankar Talav has few major manufacturing industries at its outskirts which has direct or indirect impact on the water quality

Bus-Stand: The bus stop is the first contact point between the passenger and the bus service. The space, the location, the design, and the operation of bus stops significantly influence transit system performance, customer satisfaction and customer safety. Understanding the problems being faced by regular commuters of the village and their suggestions and after interaction with the sarpanch we have come up with a design of bus-stop which will definitely give boost to the life of the villagers.

Automatic street light bulb holder: In this project design, we are going to make an automatic street light control electronic bulb holder circuit. In this project design, we did not use any relay or battery for automatic on/off the circuit. We have only used a BT136 or 139 TRIAC as a switch to on and off the Street light Automatically/itself with little or no direct human control. It aims to save electricity and provide affordable and cheap energy billing to the people.

Live energy billing: Electricity is one of the basic needs of humans, Its commonly used for domestic, industrial and agricultural purposes in day to days life. Most of us know the role of energy meter in electricity grid. Its an fundamental component of distribution grid. Energy meter helps the utility (Electricity distribution company) to account the uses of electricity by consumer on KW per hour basis. To understand this we need to find the drawbacks of current energy meter and biggest problem in electricity metering. It aims to reduce the service charge of the company and provide live data of electricity consumption to the consumers.

Water level indicator with alarm: Water tank overflow is a common problem which leads to the wastage of water. Though there are many solutions to it like ball valves which automatically stop the water flow once the tank gets full. But being an electronic enthusiastic we would like an electronic solution for it! So here is a simple design of water level indicator project which will detect the water level and will raise an alarm upon getting the water tank full or a preset level. This simple transistor based water level indicator circuit is very useful to indicate the water levels in a tank. Whenever tank gets filled, we get alerts on particular levels. Here we have created 4 levels (low, medium, high and full), we can create alarms for more levels. We have added 3 LEDs to indicate initial three levels (A, B, C), and one Buzzer to indicate FULL level (D). When tanks gets filled completely we get beep sound from Buzzer.

Chapter 9: Proposing designs for Future Development of the Village for the PART-II Design

In future for sustainable development of Shankar Talav village we are proposing following designs for Part II in which below points are to be considered.

Post office

Village does not have any separate post office. Which affects postal services. Also they don't get benefit of post payment bank. In order to provide facility of post office from the suggestions of sarpanch we will be providing design for it in part-2.

Library

"When in doubt go to the library**"** it's a good saying but the youth of the village don't have any library to visit. A library is said to be self-development place. Here everyone can explore their talent, etc. Understanding the importance of library and the privilege of having it we have planned to provide design for library in part-2.

Community Hall

Community hall is a public location where members of a community gather for group activities, events, festivals and social purpose. It may sometimes be open for whole community or for a specialized group example Mahila mandal hall. A community hall of village generally consists of a hall, storage or kitchen area and washroom. Current community hall needs to be redesigned with modern infrastructure consisting modern facilities.

Electrical layout of community hall

With redesign community hall will be well equipped with electrical facilities like automatic fan, lights, security system, etc. For that design will be provided by us.

Insect Repellent Circuit for Protecting Crops

We have planned to equip farmers with latest modern technology of insect repellent, so that use of various chemicals can be reduced.

Automatic Irrigation with Arduino

Today, world is moving towards automation. In India villages considered the lifeline of the nation. "So, if automation starts from the root of nation, it will surely prosper the tree." With this mindset we have thought of giving design for automatic irrigation with Arduino.

Chapter 10: Conclusion of the Entire Village Activities of the Project

For India's economy to be strong, the rural economy needs to grow. Rural areas are still plagued by problems of malnourishment, illiteracy, unemployment and lack of basic infrastructure like schools, hospitals, sanitation, etc. Our villages need to grow in tandem with cities and standard of life has to improve, therefore inclusive growth to happen. If rural India is poor, India is poor.

The motive of Vishwakarma Yojana phase - VIII is to uplift the lifestyle of the rural areas to extreme level of an ideal village situated at the nearby location of that particular jurisdiction. It is an effective government scheme to develop the rural areas under economical cost with good workability and efficiency during its usage. The project tends to improve the physical, social as well as socio-cultural aspects of the village by implementing and improvising various infrastructures with regards to lesser or least hindrance to its rural authenticity.

While we have latest services and products available in our cities now, villagers are still coping with age old products.

1. While we have international fully air-conditioned schools in our cities, the schools in villages still don't have benches and chairs, leave alone computers. We have a huge shortage of teachers in rural areas, and the school dropout rate is huge. On serious note we really want to implement "Padhega India Tabhi Badhega India."
2. In cities, we have wide roads, flyovers and underpasses while many villages still don't have proper roads. Urban-rural Road links can play a vital role in rural growth.
3. Employment opportunities are hardly there in villages which forces youth to move to cities creating imbalance in the ecosystem and leaving the villages deprived.
4. While we may have numerous hospitals, nursing homes and medical facilities in cities, villages neither have health awareness nor health facilities. See the condition of major hospitals like AIIMS to know how many villagers have to flock to cities for even basic treatments.

With Gap Analysis, we conclude that some of different Smart Village facilities are required as basic or primary level which still lack in village. So, according to Gap Analysis of Shankar Talav village, we observed condition of existing infrastructure facilities in village such as- Primary school, Water tank, Road network, Drainage network, etc. Smart Village can solve their problem, itself can become a smart village inspiration to another village too. This project is dedicated for the improvement of living standard of the rural inhabitants. The development concept includes urban facilities implemented as per rural requirement. Besides smart cities, it is necessary for us to have smart village for, sustainable and inclusive future of emerging India. "Smart Villages are the need of the hour as development is needed for both rural and urban areas for better livelihood and technology." To convert any village into Smart and Clean Village, use of more and more renewable energy resources is an option.

Chapter 11: References referred for this project

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- GOOGLE MAPS
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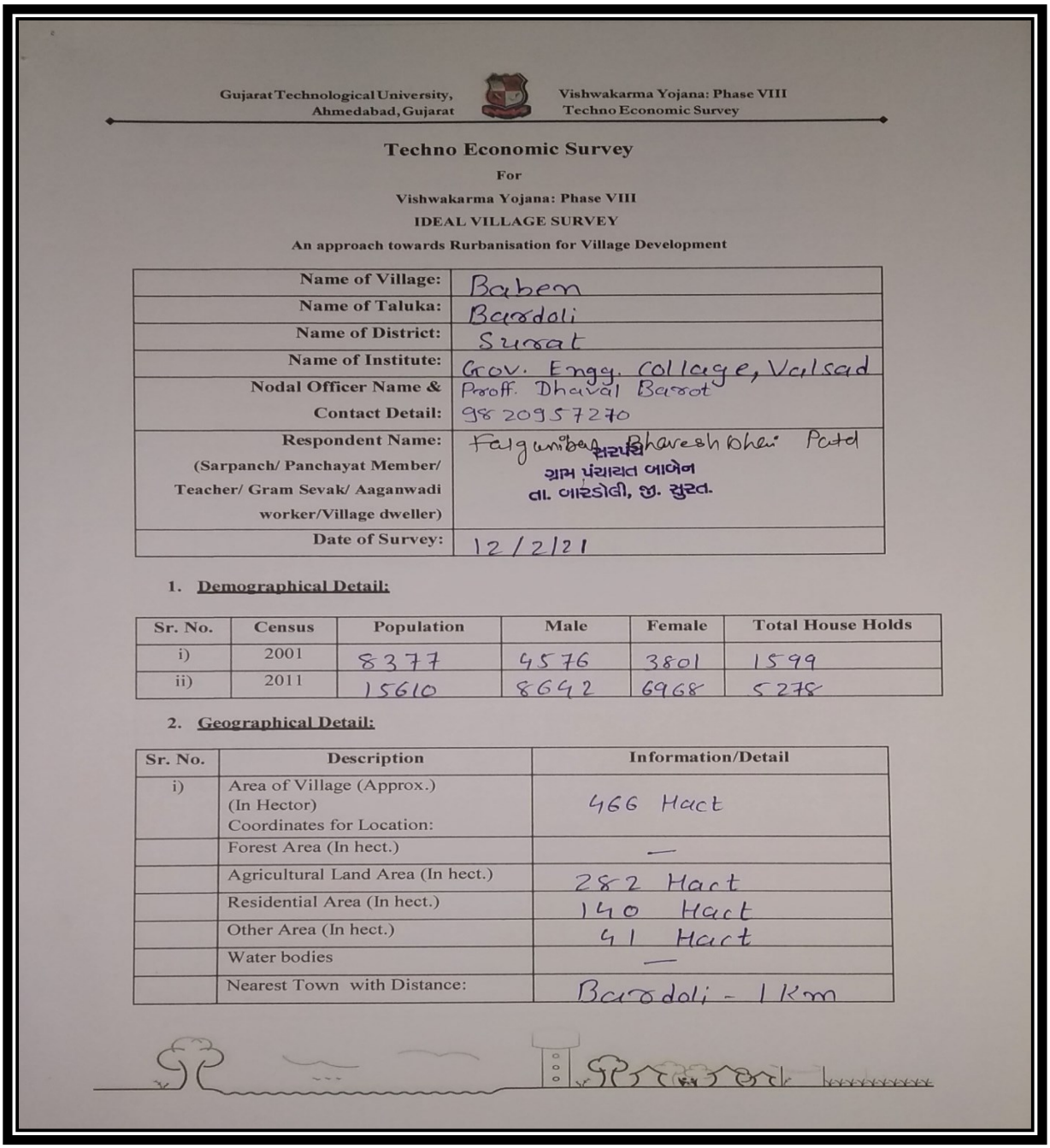
- IS 456:2000 plain and reinforced concrete -code of practice
- Norms for construction of Anganwadi building -ICDS

Chapter 12: Annexure attachment

12.1 Survey form of Ideal Village Scanned copy attachment in the report for Part-I:



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	Babem
Name of Taluka:	Bardoli
Name of District:	Surat
Name of Institute:	Gov. Engg. College, Valsad
Nodal Officer Name & Contact Detail:	Proff. Dhaval Barot 9820957270
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Falgunben Bharesh bhai Patel સરપંચ ગ્રામ પંચાયત બાબેન તા. બારડોલી, જી. સુરત.
Date of Survey:	12/2/21

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	8377	4576	3801	1599
ii)	2011	15610	8642	6968	5278

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	466 Hact
	Forest Area (In hect.)	—
	Agricultural Land Area (In hect.)	282 Hact
	Residential Area (In hect.)	140 Hact
	Other Area (In hect.)	41 Hact
	Water bodies	—
	Nearest Town with Distance:	Bardoli - 1 Km

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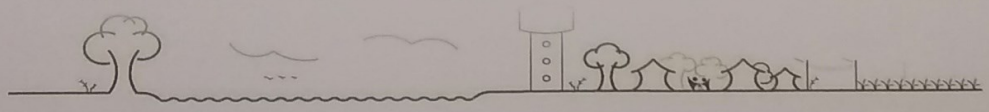
3. Occupational Details:

Name of Three Major Occupation groups in Village	1. Farmer 2. Business 3. Job

4. Physical Infrastructure Facilities:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated) • RO Water	Yes	Yes		Good
	• Well (Covered/ Uncovered) • Hand pumps	NO	–	–	–
	• Tube well/ Borehole	Borehole	–	–	–
	• River/ Canal/ Spring/ Lake/ Pond	Yes	Yes	–	1 Lake
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	40000	80000 Lit	
	Underground Sump	Capacity:	–	–	
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	Yes	Yes	–	Under-ground
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open				
	If Open than Pucca / Kutchcha				
	Whether drain water is discharged directly in to Water bodies/ Sewer plants				
Suggestions if any:					



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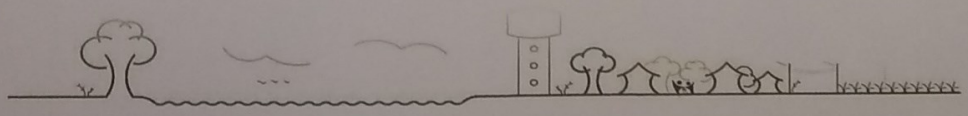
E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	All weather	—	—	All weather
	Main road	Yes	—	—	All weather
	Internal streets	Yes	—	—	All weather
	Nearest NH/SH/MDR/ODR Dist. in kms.	Yes	—	—	NH-53 5 km
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Yes	—	—	1 Km Bardoli
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes	—	—	Baben
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Yes	—	—	Auto/ Private Vechicle
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes	—	—	GOVT 24 Hours DGVCL
	Power supply for Domestic Use	Yes	—	—	24 Hours
	Power supply for Agricultural Use	Yes	—	—	Fixed Hours
	Power supply for Commercial Use	Yes	—	—	24 Hours
	Road/ Street Lights	Yes	—	—	—



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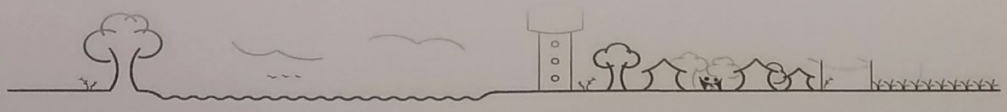
	Electrification in Government Buildings/ Schools/ Hospitals	Yes	–	–	–
	Renewable Energy Source Facilities (Y/ N)	No	–	–	–
	LED Facilities	Yes	–	–	–
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes	–	–	8 Nos
	Location Condition	Good	–	–	–
	Community Toilet (With bath/ without bath facilities)	Yes	–	–	with Bath
	Solid & liquid waste Disposal system available	No	–	–	–
	Any facility for Waste collection from road	Yes	–	–	4 Vehicles
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	Yes	–	–	Private Bore well & From Canal
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Pucca	–	–	minor House has Kutchha

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks



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K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	Yes	-	-	Sub-center PHC
	Private Clinic/Private Hospital/ Nursing Home	Yes	-	-	Private clinic & Hospital
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

L.	**Education Facilities:**				
	Aaganwadi/ Play group	Yes	Yes	-	8 NOS
	Primary School	Yes	Yes	-	1
	Secondary school	Yes	Yes	-	1
	Higher sec. School	Yes	Yes	-	1
	ITI college/ vocational Training Center	-	-	-	-
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	Yes	Yes	-	1 Engineering
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

M.	**Socio- Culture Facilities**				
	Community Hall (With or without TV) Location:	Yes -	Yes -	- -	- -

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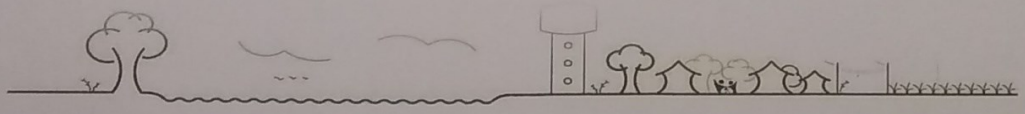
	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	Yes - Good	Yes - -	- - -	- - -
	Public Garden Location: Condition:	Yes 2 Nos Good	- - -	- - -	- - -
	Village Pond Location: Condition:	Yes 1 Nos Good	- - -	- - -	- - -
	Recreation Center Location: Condition:	Yes 4 Good	- - -	- - -	- - -
	Cinema/ Video Hall Location: Condition:	-	-	-	-
	Assembly Polling Station Location: Condition:	-	-	-	-
	Birth & Death Registration Office Location: Condition:	Panchayat - Good	- - -	- - -	- - -

If any of the above Facility is not available in village than approx. distance from village: .....kms.

Suggestions if any:

N.	Other Facilities				
	Post-office				
	Telecommunication Network/ STD booth				



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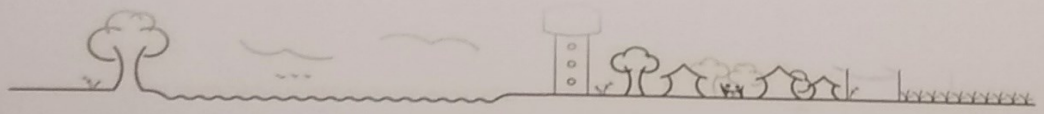
	General Market	Small	Yes	–	–
	Shops (Public Distribution System)	–	–	–	–
	Panchayat Building	Yes	1 Nos	–	Good
	Pharmacy/Medical Shop	Yes	2-3	–	Good
	Bank & ATM Facility	Yes	3-4	–	Good
	Agriculture Co-operative Society	Yes	1 Nos	–	Good
	Milk Co-operative Soc.	–	–	–	–
	Small Scale Industries	–	–	–	–
	Internet Cafes/ Common Service Center/Wi Fi	–	–	–	–
	Other Facility	No	–	–	–
Suggestions if any:					

6. Sustainable /Green Infrastructure Facilities:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
O.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	No	–	–	–
P.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	No	–	–	–
Q.	Any Other	–	–	–	–

7. Data Collection From Village

Village Base Map Available: Hard Copy/Soft Copy	Yes



Recent Projects going on for Development of Village	
Any NGO working for village development	

8. **Additional Information/ Requirement:**

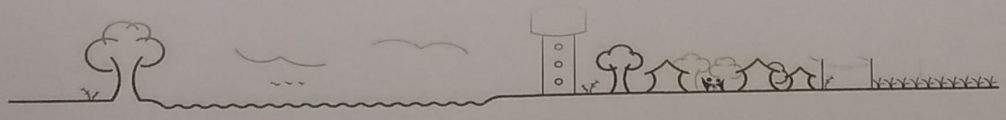
Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities(School Building, Health Center, Panchayat Building, Public Toilets & any other)		
2.	Additional Information/ Requirement	All facilites available	-

9. **Smart Village Proposal Design**

Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section:
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in



12.2 Survey form of Smart Village Scanned copy attachment in the report for Part-I:

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Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards **"Rurbanisation for Village Development"**

Name of District:	Surat
Name of Taluka:	Kamrej
Name of Village:	Kamrej
Name of Institute:	Gov. Engg. Collage, Valsad
Nodal Officer Name & Contact Detail:	Proff. Dhaval Barot 9820957270
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	તલાટી કમ મંત્રી ગ્રામ પંચાયત કામરેજ તા. કામરેજ, જિ. સુરત
Date of Survey:	12/12/21

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	12,746	7265	5481	255
2.	2011	16,076	8327	7751	322

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	406 Hact
2.	Forest Area (In hect.)	-
3.	Agricultural Land Area (In hect.)	262 Hact
4.	Residential Area (In hect.)	140 Hact
5.	Other Area (In hect.)	41 Hact
6.	Distance to the nearest railway station (in kilometers):	18 Km (Surat railway station) 18 Km (Udhna Junction)

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7.	Name of Nearest Town with Distance:	20 km (Surat)
8.	Distance to the nearest bus station (in kilometers):	0 km
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Farmers
	2.	Business
	3.	Job
Major crops grown in the village:	1.	Sugarcane
	2.	Banana
	3.	Cotton

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER**				Yes
	Piped Into Dwelling				
	Piped To Yard/Plot				
	Public Tap/Standpipe	✓			
	Tube Well Or Bore Well				
2.	**DUG WELL**				Yes
	Protected Well				(Protected)
	Un Protected Well				
3.	**WATER FROM SPRING**	✓			
	Protected Spring				
	Unprotected Spring	✓			
	Rainwater	✓			
	Tanker Truck				
	Cart With Small Tank				
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/**				
	Irrigation Channel	✓			
	Bottled Water	✓			
	Hand Pump	✓			
	Other(Specify)**Lake/ Pond**				Lake

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Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	5000	MLD	ENOS
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	Yes	–	–	–
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Yes			Kutchha
	Main road	Yes			All weather
	Internal streets	Yes			WBM
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH (1.5 km)	SH (2.6 km)	MDR (300 m)	ODR (3.6 km)
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	YES			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	YES			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	YES			Auto/ Private Vehicles
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	YES			>6 hrs

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	Power supply for Domestic Use	Yes			> 6 Hrs
	Power supply for Agricultural Use	Yes			> 6 Hrs
	Power supply for Commercial Use	Yes			> 6 Hrs
	Road/ Street Lights	Yes			> 6 Hrs
	Electrification in Government Buildings/ Schools/ Hospitals	Yes			> 6 Hrs
	Renewable Energy Source Facilities (Y/ N)	NO	–	–	–
	LED Facilities				

Suggestions if any:

G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	4 Nos			
	Location Condition	good			
	Community Toilet (With bath/ without bath facilities)	4 Nos			
	Solid & liquid waste Disposal system available	NO			
	Any facility for Waste collection from road	3 Nos			

Suggestions if any:

H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL. OTHER (SPECIFY)	✓ ✓ ✓			

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	30/70			

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	NO. 1			✓
	Sub-Centre				–
	PHC				Yes [Sub Block PHC]
	BLOCK PHC	NO. 1			
	CHC/RH				–
	District/ Govt. Hospital				–
	Govt. Dispensary				–
	Private Clinic				✓
	Private Hospital/				✓
	Nursing Home				–
	AYUSH Health Facility				✓
	sonography /ultrasound facility				–
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	NO. 9	–	–	Yes
	Primary School	NO. 3	–	–	Yes
	Secondary school	NO. 5	–	–	Yes
	Higher sec. School				
	ITI college/ vocational Training Center				
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	NO. 1	–	–	Siddharath law collage.
	If any of the above Facility is not available in village than approx. distance from village: ..20...kms.				

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Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	(without TV)		Yes	
	Public Library (With daily newspaper supply: Y/N)	Good		Yes	
	Public Garden	2 nos		Yes	
	Village Pond	–		~~Yes~~	
	Recreation Center	4 nos		Yes	
	Cinema/ Video Hall	–			
	Assembly Polling Station	–			
	Birth & Death Registration	–			

If any of the above Facility is not available in village than approx. distance from village: .....kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	Good	394180	Yes	–
	Telecommunication Network/ STD booth	–	–	–	NO
	General Market	–	–	–	NO
	Shops (Public Distribution System)				NO
	Panchayat Building			Yes	
	Pharmacy/Medical Shop				NO
	Bank & ATM Facility	Good		Yes	
	Agriculture Co-operative Society	–	–	–	NO
	Milk Co-operative Soc.	–	–	Yes	
	Small Scale Industries	–	–	–	NO
	Internet Cafes/ Common Service Center/Wi Fi	–	–	–	NO
	Youth Club				NO
	Mahila Mandal	good		Yes	

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	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries				
	Other Facility				

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?	Yes			
	2. Are there any beneficiaries in the village from the following programme?	Yes			
	3. Janani Suraksha Yojana				
	4. Kishori Shakti Yojana			✓	
	5. Balika Samriddhi Yojana				
	6. Mid-day Meal Programme			✓	
	7. Intergrated Child Development Scheme (ICDS)				
	8. Mahila Mandal Protsahan Yojana (MMPY)			✓	
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme			✓	✓
	11. Sanitation Programme (SP)				
	12. Rajiv Gandhi National Drinking Water Mission				
	13. Swarnjayanti Gram Swarozgar Yojana				
	14. Minimum Needs Programme (MNP)			✓	
	15. National Rural Employment Programme				
	16. Employee Guarantee Scheme (EGS)				
	17. Prime Minister Rojgar Yojana (PMRY)			✓	
	18. Jawahar Rozgar Yojana (JRY)			✓	
	19. Indira Awas Yaojna (IAY)				
	20. Samagra Awas Yojana (SAY)				
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)				

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Yes	✓	–	–
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	Yes Yes	✓	–	–
3.	Any Other	–	–	–	–

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	Soft copy	–	–	–
2.	Recent Projects going on for Development of Village	–	–	–	NO
3.	Any NGO working for village development	–	–	–	NO
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)	NO	–	–	–

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

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1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	–	–
2.	Additional Information/ Requirement	–	–
3.	During the last six months how many times CLEANING …….. FOGGING…….. Drive was undertaken in the village?	–	–

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	Sustainable Development	Yes

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

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12.3 Survey form of Allocated Village Scanned copy attachment in the report for Part-I:

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ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Name of District:	VALSAD
Name of Taluka:	VALSAD
Name of Village:	SHANKAR TALAV
Name of Institute:	Government Engineering college Valsad
Nodal Officer Name & Contact Detail:	Prof. Dhaval kumar T Barot
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Rakesh Z. Patel (Surpanch)
Date of Survey:	14/12/2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	679	356	323	160

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	173.02 Hector
2.	Forest Area (In hect.)	–
3.	Agricultural Land Area (In hect.)	50.55 Hector 03.47 Hector unirrigated
4.	Residential Area (In hect.)	12.46 Hector
5.	Other Area (In hect.)	–
6.	Distance to the nearest railway station (in kilometers):	12 km Valsad, 1.4 km Dungri

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7.	Name of Nearest Town with Distance:	12 km Valsad
8.	Distance to the nearest bus station (in kilometers):	Dungri 11km
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. Balaji Water Ltd 2. Flair Pens (P) Ltd 3. Sugar and Spice Hotel 4. Kataria Enterprise 5. TATA motor service
Major crops grown in the village:	1. Rice 2. 3.

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER**				
	Piped Into Dwelling				
	Piped To Yard/Plot				
	Public Tap/Standpipe	yes	✓		
	Tube Well Or Bore Well	yes (2)	✓		Underground construction going on
2.	**DUG WELL**				
	Protected Well				
	Un Protected Well				
3.	**WATER FROM SPRING**				
	Protected Spring				
	Unprotected Spring				
	Rainwater				
	Tanker Truck				
	Cart With Small Tank				
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/**				
	Irrigation Channel ✓				
	Bottled Water				
	Hand Pump		✓		
	Other(Specify)Lake/ Pond ✓				

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Suggestions if any: Design of Pond required, R.O. water treatment plant

B.	Water Tank Facility					
	Overhead Tank 02	Capacity:	50,000 Ltr			
	Underground Sump	Capacity:	1 Lac Ltr			

Suggestions if any: One water tank redesign required

C.	The Type of Drainage Facility				
	A. UNDERGROUND DRAINAGE ✓ 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	Close	✓		

Suggestions if any:

D.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	1 km	✓		
	Main road		✓		3-pblock road.
	Internal streets		✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH 48 1 km	✓		

Suggestions if any: Road Redesign required [village approach road]

E.	Transport Facility				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	No			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto			

Suggestions if any: Bus stand design required.

F.	Electricity Distribution				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes	✓		

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	Power supply for Domestic Use	Yes	✓		
	Power supply for Agricultural Use	Yes	✓		
	Power supply for Commercial Use	Yes	✓		
	Road/ Street Lights	Yes	✓		LED Required.
	Electrification in Government Buildings/ Schools/ Hospitals	Yes in Panchayat office	✓		
	Renewable Energy Source Facilities (Y/ N)	No			
	LED Facilities	No			

Suggestions if any:

G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	No			
	Location Condition	-			
	Community Toilet (With bath/ without bath facilities)	No			
	Solid & liquid waste Disposal system available	No			
	Any facility for Waste collection from road	No			

Suggestions if any:

H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL. ✓ OTHER (SPECIFY)	Yes.			

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	-			- Most house are Pucca - Awas Yojna - Kutchha

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi) Sub-Centre PHC BLOCK PHC CHC/RH District/ Govt. Hospital Govt. Dispensary Private Clinic Private Hospital/ Nursing Home AYUSH Health Facility sonography /ultrasound facility	N No			
	If any of the above Facility is not available in village than approx. distance from village: ..02..kms. Dungri				
	Suggestions if any:				
K.	**Education Facilities:**				
	Aaganwadi/ Play group	01		✓	Redesign
	Primary School	01		✓	Redesign
	Secondary school	–			
	Higher sec. School	–			
	ITI college/ vocational Training Center	-			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	-			
	If any of the above Facility is not available in village than approx. distance from village: .....kms. Anganvadi Redising & Primary school redision				

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Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	01 without TV			
	Public Library (With daily newspaper supply: Y/N)				NO
	Public Garden				NO
	Village Pond 1	1		YES	1
	Recreation Center				NO
	Cinema/ Video Hall				NO
	Assembly Polling Station	In school		YES	
	Birth & Death Registration	Panchayat office.		YES	

If any of the above Facility is not available in village than approx. distance from village: .....kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office - NO				NO
	Telecommunication Network/ STD booth		In Panchayat office	YES	
	General Market				NO
	Shops (Public Distribution System)				NO
	Panchayat Building			YES	
	Pharmacy/Medical Shop				NO
	Bank & ATM Facility				NO
	Agriculture Co-operative Society				NO
	Milk Co-operative Soc.				NO
	Small Scale Industries		Balaji Plastic	YES	
	Internet Cafes/ Common Service Center/Wi Fi				NO
	Youth Club				
	Mahila Mandal				

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	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries				—
	Other Facility				

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?				—
	2. Are there any beneficiaries in the village from the following programme?				—
	3. Janani Suraksha Yojana				
	4. Kishori Shakti Yojana				
	5. Balika Samriddhi Yojana				
	6. Mid-day Meal Programme	Yes		Yes.	
	7. Intergrated Child Development Scheme (ICDS)				
	8. Mahila Mandal Protsahan Yojana (MMPY)				
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme				
	11. Sanitation Programme (SP)				
	12. Rajiv Gandhi National Drinking Water Mission				
	13. Swarnjayanti Gram Swarozgar Yojana				
	14. Minimum Needs Programme (MNP)				
	15. National Rural Employment Programme				
	16. Employee Guarantee Scheme (EGS)				
	17. Prime Minister Rojgar Yojana (PMRY)				
	18. Jawahar Rozgar Yojana (JRY)				
	19. Indira Awas Yaojna (IAY)				
	20. Samagra Awas Yojana (SAY)				
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)				

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	—			
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	—			
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	—			
2.	Recent Projects going on for Development of Village	-			
3.	Any NGO working for village development	—			
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)	—			

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information / Detail	Remarks

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1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	School, Panchayat Community hall Redesign required	
2.	Additional Information/ Requirement	1. Shankartalav to Navnagar Road 2. Under pass road near crossing	
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?		

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	(1) Shankar talav to Navanagar approach road required. (2) Underpass road near crossing required redesign	

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

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12.4 Gap Analysis of the Allocated Village

Table 12.1 Village Gap Analysis

Village Facilities	Planning Commission/ UDPFI Norms	Village Name:	Shankar Talav		
		Population:			679
		Existing	Required as per Norms	Smart Vilage/ Cities / Heritage Future Projection Design	Gap
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	2	1		0
Primary School	Each Per 2500 population	1	1		0
Secondary School	Per 7,500 population				
Higher Secondary School	Per 15,000 Population				
College	Per 125,000 Population				
Tech.Training Institute	Per 100000 Population				
Agriculture Research Centre	Per 100000 Population				
Skill Development Center	Per 100000 Population				
Health Facility					
Govt/ Panchyat Dispensary or Sub PHC or Health Centre	Each Village	0	1		1
Primary Health & Child Health Center	Per 20,000 population				
Child Welfare and Maternity Home	Per 10,000 population				
Multispeciality Hospital	Per 100000 Population				

Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	1		1
Physical Infrastructure Facilities					
Transportation		**Adequate/ Inadequate**			
Pucca Village Approach Road	Each village		Adequate		
Bus/ Auto Stand provision	All Villages connected by PT (ST Bus or Auto)		Inadequate (ST Bus)		
Drinking Water (Minimum 70l pcd)		**Adequate/ Inadequate**			
Over Head Tank	1/3 of Total Demand		Adequate		
U/G Sump	2/3 of Total Demand		Adequate		
Drainage Network-Open		**Adequate/ Inadequate**	Adequate		
Drainage Network-Cover					
Waste Management System		**Adequate/ Inadequate**	Inadequate		
Socio-Cultural Infrastructure Facilities					

Community Hall	Per 10000 Population	No	Adequate		1
community Hall and Public Library	Per 15000 Population	No	Required		
Cremation Ground	Per 20,000 population	No	Notrequired		
Post Office	Per 10,000 population	1	Required		1
Gram Panchayat Building	Each individual/ group panchayat	0	Adequate		
APMC	Per 100000 Population	0	Inadequate		
Fire Station	Per 100000 Population	No			
Public Garden	Per village	No			
Police post	Per 40,000 Population	No	Not required		
Shopping Mall					
Electrical Design					
Electricity Network		**Adequate/ Inadequate**			
Any Smart Village Facility					
Technology					
		ESR cap	0		
		Sump cap	0		
		Lat	0		

12.5 Summary Details of All the Villages Designs in Table form as Part-I and Part-II:

Table 12.2 Summary details of all the villages

Sr. No.	Village Name	Discipline	Part-I	Part-II
1.	Shankar Talav	Civil	Aaganwadi	Post Office
			R.O. Water Plant	Library
			Bus-Stop	Community Hall
		Electrical	Automatic Street Light Bulb Holder	Electrical Layout of Community Hall
			Live Energy Billing	Insect Repellent Circuit for Protecting Crops
			Water Level Indicator with Alarm	Automatic Irrigation with Arduino
2.	Bhagod	Civil	Bus Stop	Hospital
			Community Hall / Meeting Room	Village Gate
			Primary School Toilet	Medical Shop
		Electrical	Smart Irrigation	Roof top Solar Panel
			Smart Dustbin	Electrical Layout of Hospital
			Home Automation	Three phase motor starter controller
3.	Bhadeli jagalala	Civil	Anganwadi	Community hall
			Gram panchayat	Design of street light points near existing pond
			Primary health center	Crematorium
		Electrical	IR based hand sanitizer dispenser	Electrical wiring layout of Gram Panchayat
			Automatic Solar panel cleaning machine	Ultra-Violet sanitizer
			Live energy monitoring	Automatic water level controller
4.	Kewada	Civil	Anganwadi	Panchayat office
			Bus stop	Public toilet
			Pond	Library

		Electrical	Single phase to three phase converters	Electrical layout of Panchayat office
			Smart irrigation system	Piezoelectric speed breaker electricity generator
			Solar street lights	Solar irrigation system
5.	Chichwada	Civil	Public Toilet	Primary School
			Village Gate	PHC Center
			Community Hall	Bus Stop
		Electrical	Automatic Water Level Controller	Solar panel Cleaning machine
			Motion Activated Street Light	Off grid Solar System
			Roof Top Solar Panel	Primary School Wring

12.6 Drawings (If, required, A1, A2, A3 design is not visible then Only)

*All the drawings and images are attached in the respective chapters. There is no requirement of designs here since all the designs are clearly visible.

12.7 Summary of Good Photographs in Table Format (village visits, Ideal, Smart Village or any other)

Summary of Photographs allotted village- Shankar Talav

Fig. 12.1 (a) Summary of photographs of allotted village

Fig. 12.1 (b) Summary of photographs of allotted village

Summary of Photographs Smart & Ideal village- Kamrej & Baben

Fig. 12.2 (a) Summary of photographs of smart & ideal village

Fig. 12.2 (b) Summary of photographs of smart & ideal village

12.8 Village Interaction with sarpanch Report

Letter of Interaction with Village Sarpanch

Vishwakarma Yojana project phase VIII

Shanker Talav Village, Valsad Taluka, Valsad District,

Pin Code: 396375

Date:

Subject: Interaction of Students with Sarpanch (Shanker Talav Village)

I sarpanch of Shanker Talav Village, undersigned had an interaction with the students (Rana Foram H. (170190106054), Yadav Ankit L.(170190109060) of Government Engineering College, Valsad) for Vishwakarma Yojana phase VIII.

Sign:

સરપંચ
શંકરતળાવ ગ્રા. પં.
તા. જી. વલસાડ

12.9 Sarpanch Letter giving information about the village development

Approval Letter for Proposed Design

Vishwakarma Yojana project phase VIII

Shanker Talav Village, Valsad Taluka, Valsad District,

Pin Code: 396375

Date:

Subject: Approval Letter for Proposed Design Shanker Talav Village.

I Sarpanch of Shanker Talav village, undersigned gives approval for the following designs as proposed by the students (Rana Foram H. (170190106054), Yadav Ankit L. (170190109060) of Government Engineering College, Valsad) for Vishwakarma Yojana phase VIII.

Approved Designs For Part 1:

Civil

1. Aaganwadi
2. R.O water plant
3. Bus Stop

Electrical

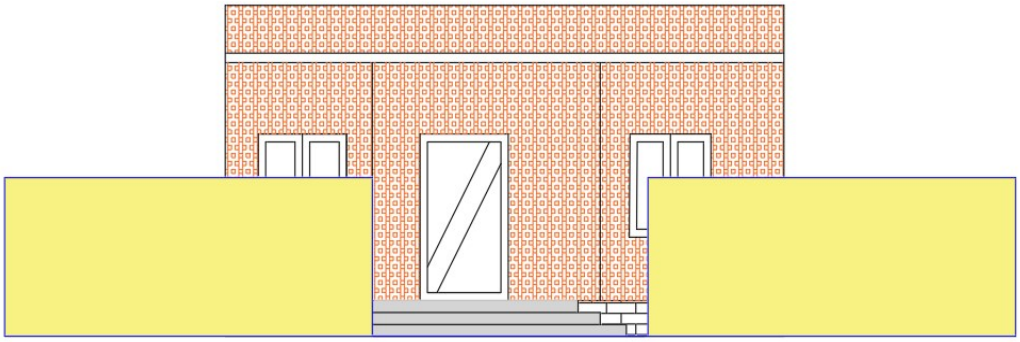
1. Automatic Street Light Bulb holder
2. Live Energy Monitoring and Billing
3. Water level Indicator with alarm

SIGN:

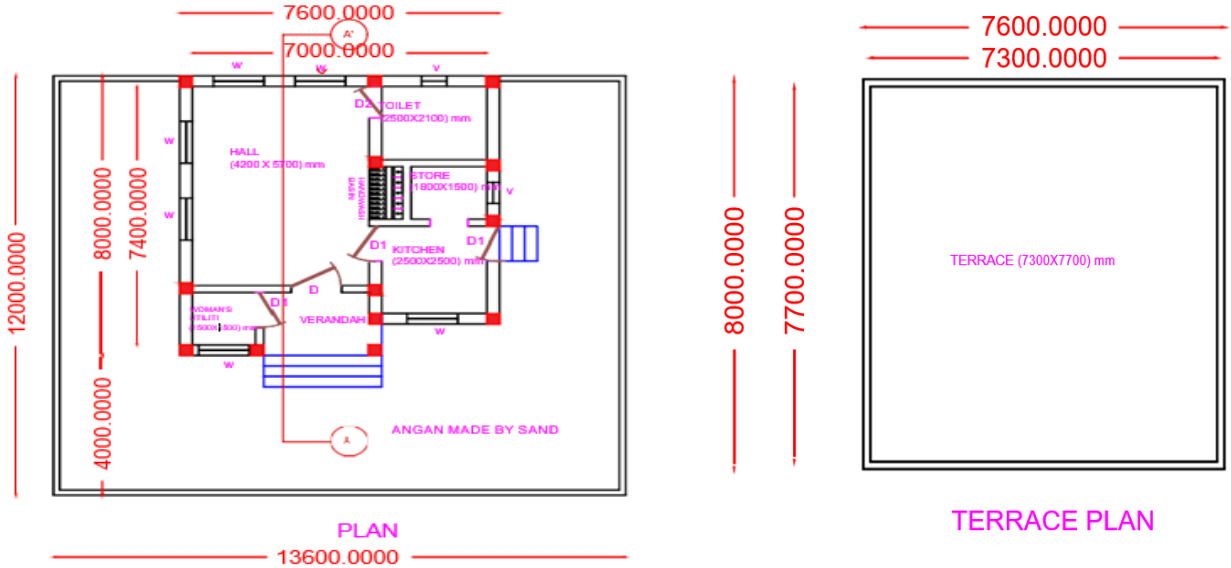
સરપંચ
શંકરતળાવ ગ્રા. પં
તા. જી. વલસાડ

12.10 Comprehensive report preparation as per format

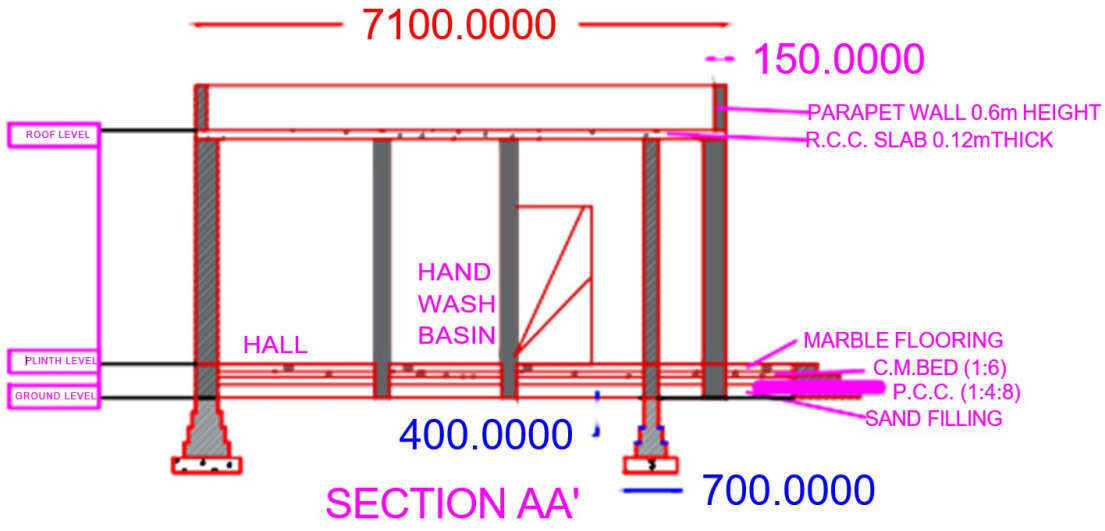
Design of Aaganwadi:



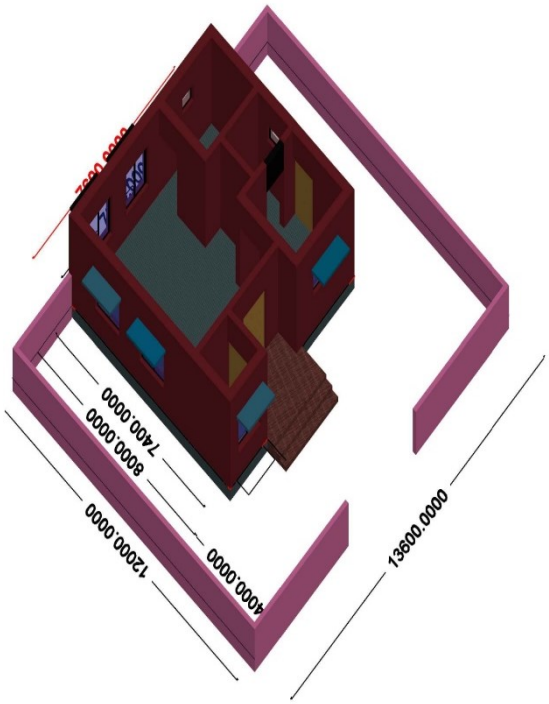
ELEVATION



*All dimensions are in millimeter

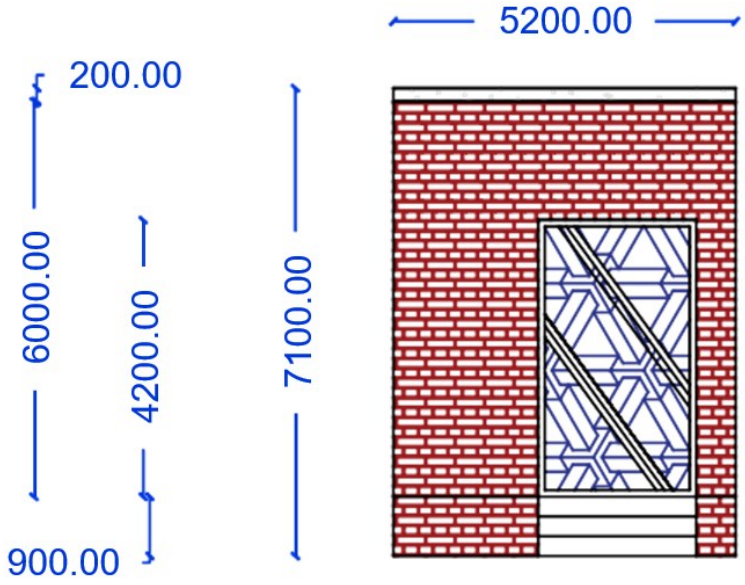


3D Model of Aaganwadi

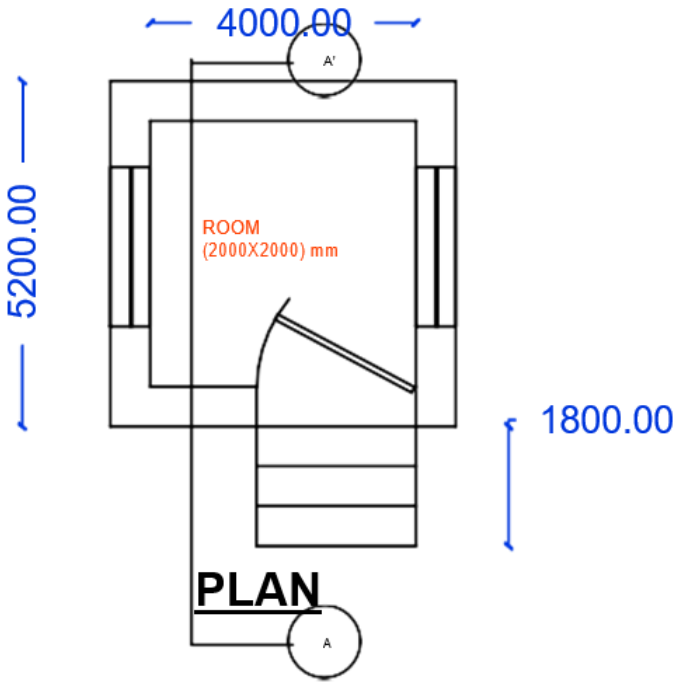


*All dimensions are in millimeter

Design of R.O. Water Plant:

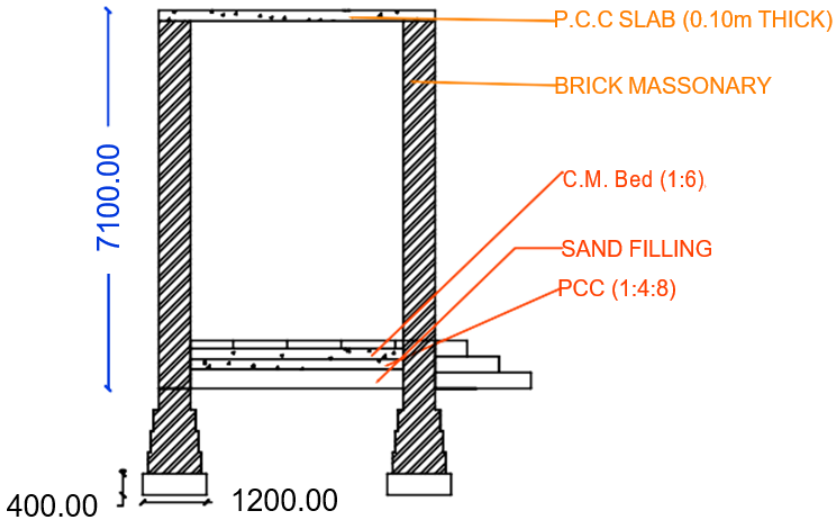


ELEVATION



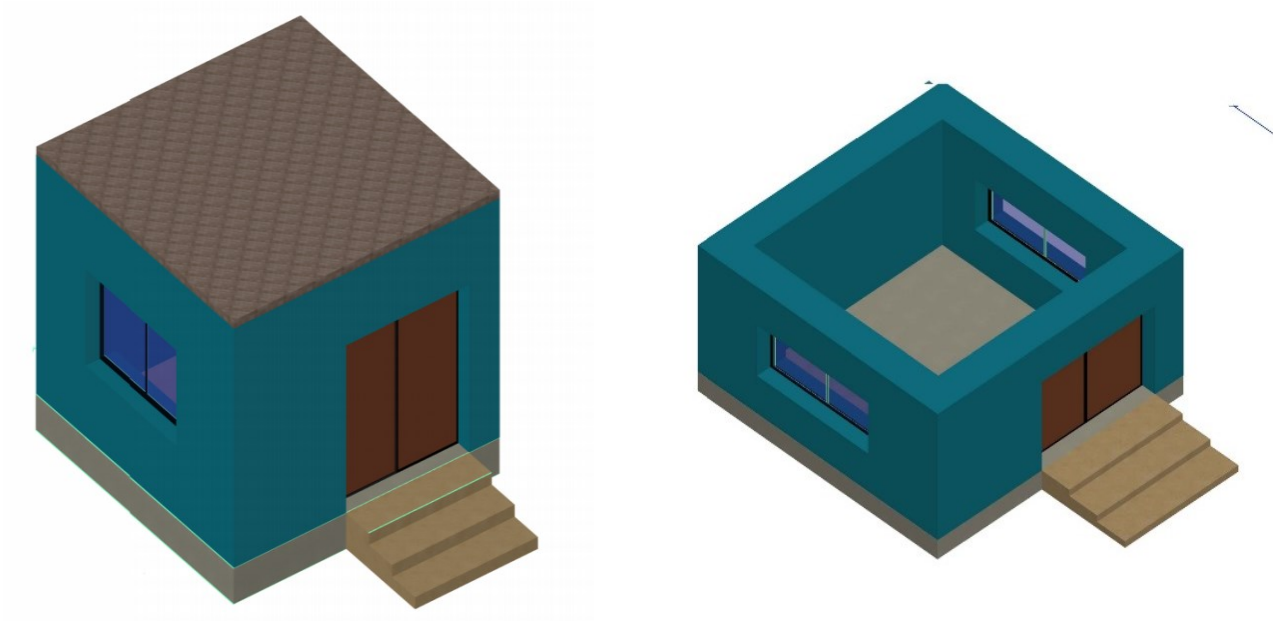
PLAN

*All dimensions are in millimeter



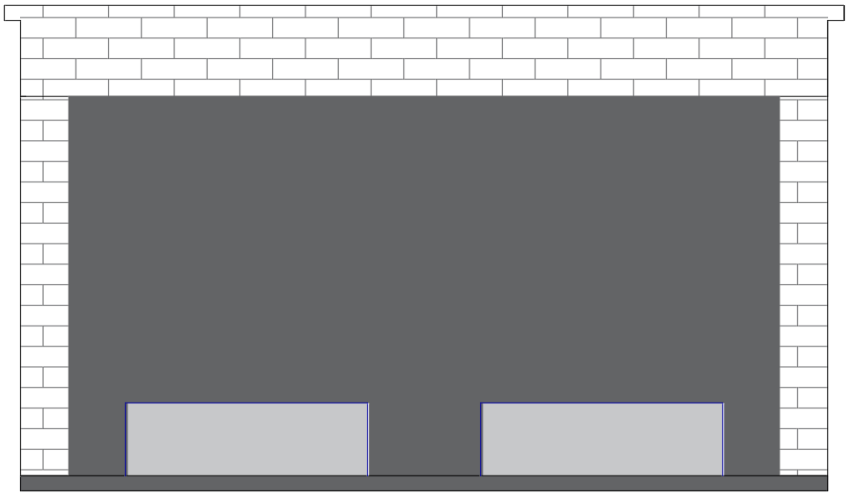
SECTION-AA'

3D Model Of R.O. Water Plant

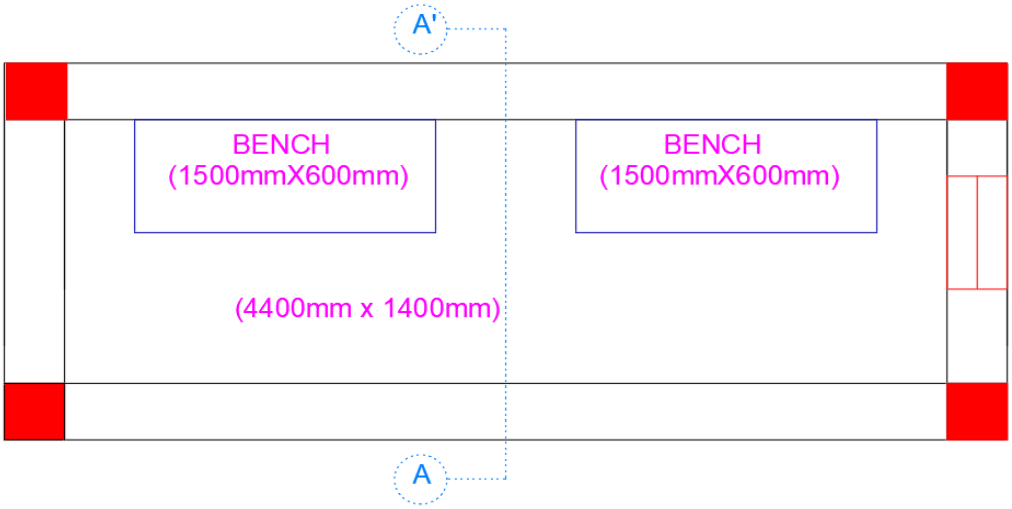


*All dimensions are in millimeter

Design of Bus-Stop:

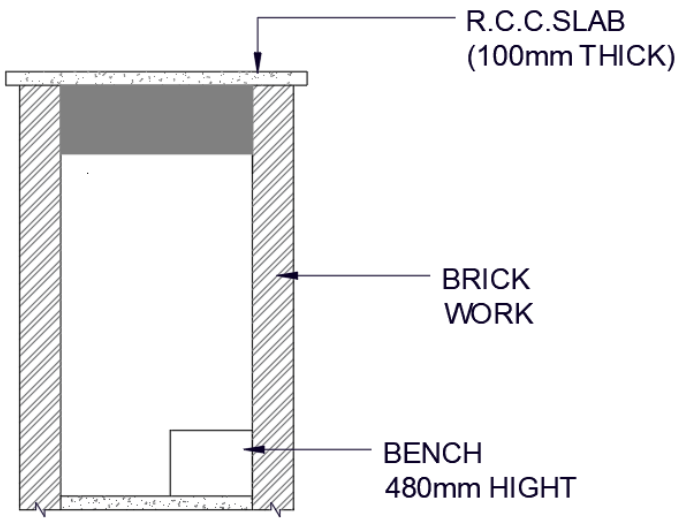


ELEVATION



PLAN

*All dimensions are in millimeter

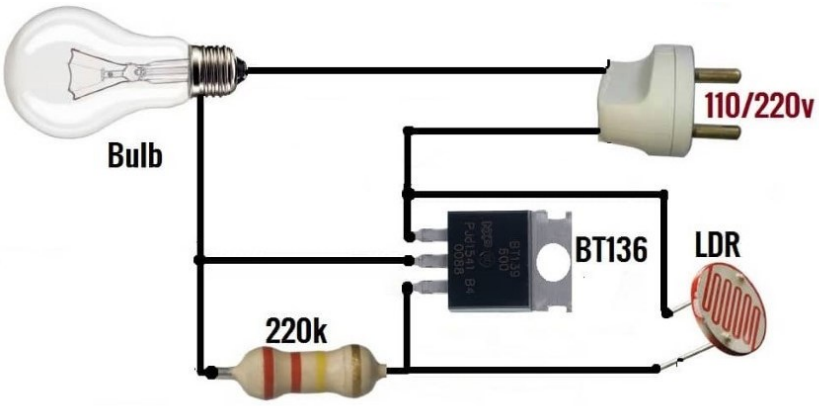


SECTION AA'

3D Model Of Bus Stand

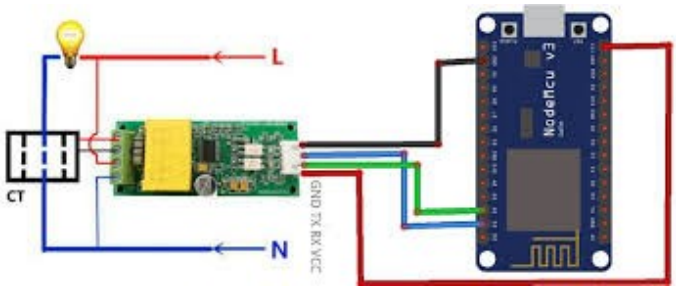
*All dimensions are in millimeter

Automatic street light bulb holder:



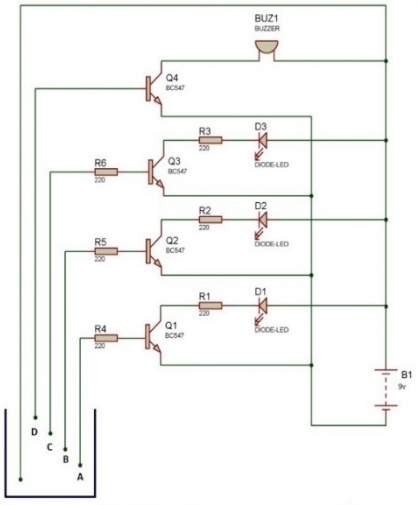
Circuit Diagram

Live Energy Billing:



Circuit Diagram

Water level indicator with alarm



Circuit Diagram

Chapter 13: From the Chapter- 9 future designs of the aspects (Feasibility, Construction, Operation and maintenance of various design options in Rural Areas along with cost with AutoCAD designs / planning with any software)

13.1 Design Proposals

As mentioned in chapter 9 future designs of the aspects are as follows

13.1.1 Civil Design: Community Hall

Community centres or community halls are public locations where members of a community tend to gather for group activities, social support, public information, and other purposes. They may sometimes be open for the whole community or for a specialized group within the greater community. Community centres can be religious in nature, such as Christian, Islamic, or Jewish community centres, or can be secular, such as youth clubs.

Uses and Activities

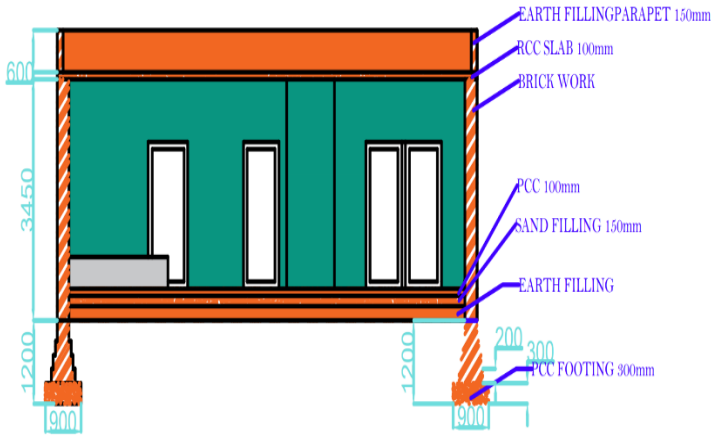
Community centres generally perform many of the following functions in their communities:

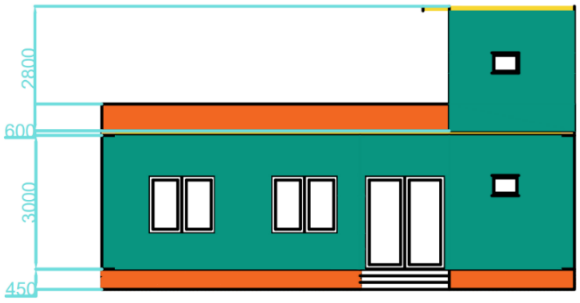
- As the place for all-community celebrations at various occasions and traditions.
- As the place for public meetings of the citizens on various issues.
- As the place where politicians or other official leaders come to meet the citizens and ask for their opinions, support or votes ("election campaigning" in democracies, other kinds of requests in non-democracies).
- As a place where community members meet each other socially.
- As a place housing local clubs and volunteer activities.
- As a place that community members (and sometimes others), can rent cheaply when a private family function or party is too big for their own home. For instance the non-religious parts of weddings, funerals, etc.
- As a place that passes on and retells local history.
- As a place where local non-government activities are organised.
- As a community venue for entertainment.
- As a place of relief in instances of community tragedies

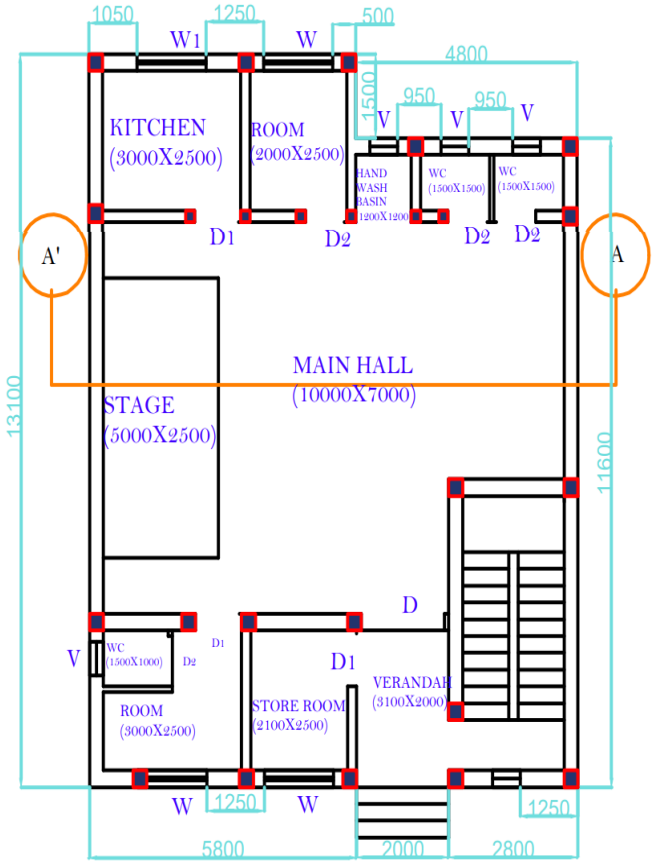
In Shankar Talav village the structure of Community Hall is somewhat not up-to the mark. So, with the approval of sarpanch we come up with modern design of Community Hall. In a major initiative, this design will boost digitization of services being provided by the government by means of Community Hall.

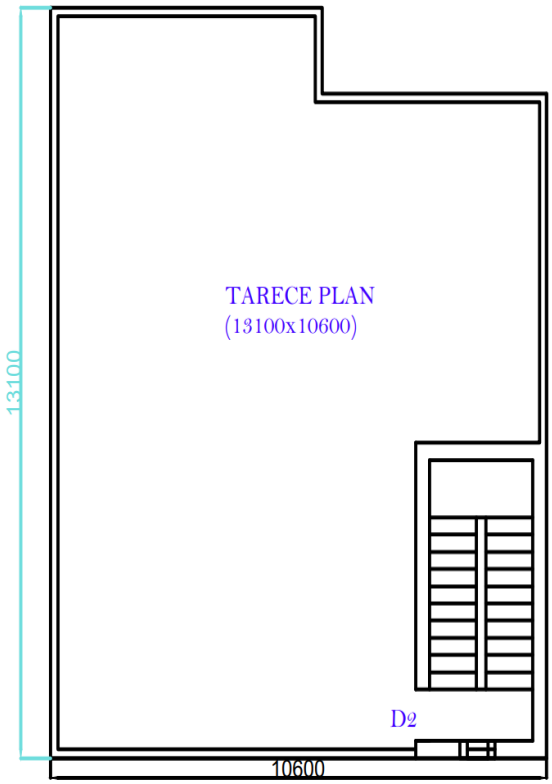
Design of Community Hall

Fig. 13.1 Community Hall Design

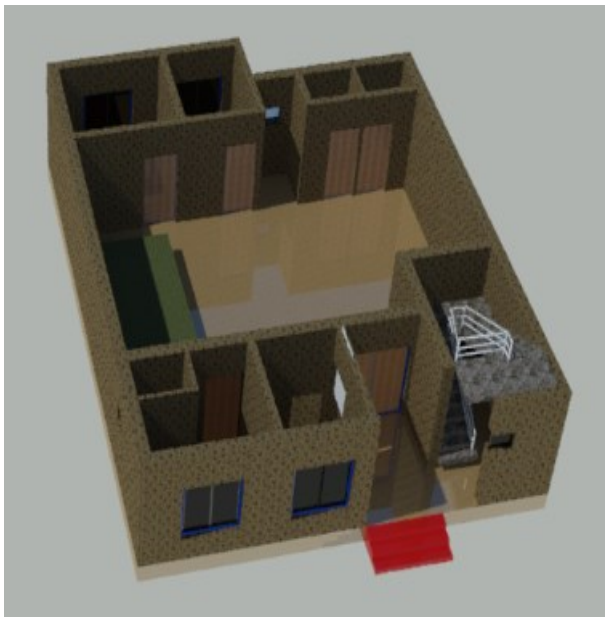








*All dimensions are in millimeter



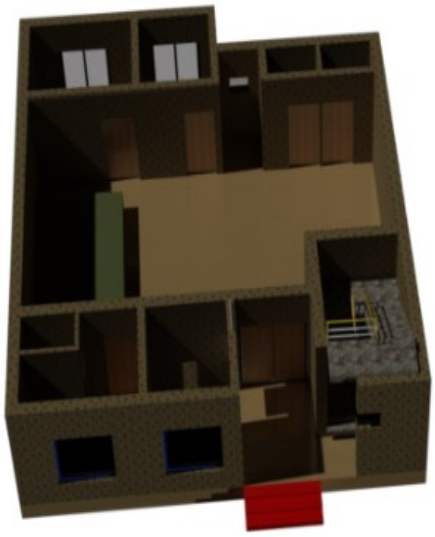


Fig. 13.2 3D Model of Community Hall

SCHEDULE OF OPENING			
Sr. No.	Description	Size	Nos.
1	D	(1.8 x 2.1)	1
2	D1	(1 x 2.1)	3
3	D2	(0.9 x 2.1)	5
4	W	(1.5 x 1.2)	3
5	W1	(1.5 x 0.9)	1
6	V	(0.6 x 0.45)	6
SCALE 1:100			
All Dimensions are in millimetre unless and until stated			
Height of all partition wall are till slab bottom.			
Grade of Concrete and Steel are M25 and fe415 respectively as per IS:456-2000.			
Height of parapet wall is 600mm.			

Table 13.1 Measurement Sheet of Community Hall

Sr. No.	Item Description	Nos.	Length (m)	Width (m)	Height or Depth (m)	Quantity	Remark
1	Excavation						
	300 thick walls		49.4	0.9	1.2	53.35	Cu.m
	200 thick walls		19.5	0.7	1.2	16.38	Cu.m
					Total	69.73	Cu.m
2	PCC for foundation						
	300 thick walls		49.4	0.9	0.3	13.34	Cu.m
	200 thick walls		19.5	0.7	0.2	4.1	Cu.m
					Total	17.44	Cu.m
3	Brick masonry up to plinth						
	300 thick walls						
	(1) 1st step		49.85	0.6	0.2	5.982	Cu.m
	(2) 2nd step		50	0.5	0.2	5	Cu.m
	(3) 3rd step		50.15	0.4	0.2	4.012	Cu.m
	(4) 4th step		50.25	0.3	0.75	11.3	Cu.m
					Total	26.29	Cu.m
	200 thick walls						
	(1) 1st step		20.75	0.4	0.2	1.66	Cu.m
	(2) 2nd step		21.15	0.3	0.2	1.269	Cu.m
	(3) 3rd step up to 0.2m height		21.55	0.2	0.2	0.865	Cu.m

	(4) 3rd step up to plinth		21.9	0.2	0.75	3.28	Cu.m
					Total	7.07	Cu.m
4	Brick masonry above plinth up to slab (1:6)						
	300 thick walls		50.25	0.3	3	45.22	Cu.m
	200 thick walls		21.9	0.2	3	13.14	Cu.m
	100 thick walls		3.85	0.1	3	1.55	Cu.m.
					Total	59.52	Cu.m
	Brick work in steps						
			3.1	0.3	0.15	0.14	Cu.m.
			3.1	0.6	0.15	0.28	Cu.m.
			3.1	0.9	0.15	0.42	Cu.m.
					Total	0.84	Cu.m.
	Inside steps	10	1	0.3	0.15	0.45	Cu.m.
					Total	1.29	Cu.m.
5	Brick work in parapet wall		19.9	0.15	0.6	1.79	Cu.m.
	Deduction						
	D_0	1	1.8	0.3	2.1	1.13	Cu.m
	D_1	3	1	0.3	2.1	1.85	Cu.m
	D_2	5	0.9	0.3	2.1	2.84	Cu.m
	W	3	1.5	0.3	1.2	1.62	Cu.m
	W_1	1	1.5	0.3	0.9	0.41	Cu.m.
	V	6	0.6	0.3	0.45	0.49	Cu.m
					Total	8.34	Cu.m
					Total Brick Work	87.62	Cu.m.
6	Inside Plaster work						
	Kitchen	2	3	-	3	18	Sq.m
		2	2.5	-	3	15	Sq.m
	Hand basin	2	1.2	-	3	7.2	Sq.m
		2	1.2	-	3	7.2	Sq.m
	Room	2	2.5	-	3	12	Sq.m
		2	2	-	3	12	Sq.m
	WC	4	1.5	-	3	18	Sq.m
		4	1.5	-	3	18	Sq.m
	Hall	2	10	-	3	60	Sq.m
		2	7	-	3	42	Sq.m
	WC	2	1.5	-	3	9	Sq.m.

		2	1	-	3	6	Sq.m.
	Store room	2	2.1	-	3	12.6	Sq.m.
		2	2.5	-	3	15	Sq.m
					Total	288	Sq.m.
	Deduction						
	D	1	1.8	-	2.1	3.78	Sq.m
	D_1	3	1	-	2.1	6.3	Sq.m
	D_2	5	0.9	-	2.1	9.45	Sq.m
	W	3	1.5	-	1.2	5.4	Sq.m
	W_1	1	1.5	-	0.9	1.35	Sq.m.
	V	6	0.6	-	0.45	1.62	Sq.m
					Total	27.9	Sq.m
7	Plaster Work Outer Side	2	14	-	3.7	103.6	Sq.m
		2	10.6	-	3.7	78.44	Sq.m
					Total	182.04	Sq.m
8	Celling						
	Kitchen	1	3	2.5	-	7.5	Sq.m
	Room	1	2	2.5	-	5	Sq.m
	Hand basin	1	1.2	1.2	-	1.44	Sq.m
	WC	1	1.5	1.5	-	2.25	Sq.m
	WC	1	1.5	1.5	-	2.25	Sq.m
	Hall	1	10	7	-	70	Sq.m
	Room	1	3	2.5	-	7.5	Sq.m.
	WC	1	1.5	1	-	1.5	Sq.m.
	Store room	1	2.1	2.5	-	5.25	Sq.m.
					Total	102.09	Sq.m
					Total Inside Plastering Work	362.94	Sq.m
10	Roof slab	1	14	10.6	0.1	14.84	Cu.m
11	Roof beam	1	2.5	0.3	0.5	0.38	Cu.m.
		1	50.65	0.3	0.5	7.6	Cu.m
		1	23.05	0.2	0.45	2.07	Cu.m
					Total	10.05	Cu.m
12	Lintel beam	1	1.8	0.3	0.15	0.08	Cu.m
		3	1	0.3	0.15	0.135	Cu.m
		5	0.9	0.3	0.15	5.04	Cu.m
		3	1.5	0.3	0.15	0.2	Cu.m
		1	1.5	0.3	0.15	0.07	Cu.m.
		6	0.6	0.3	0.15	0.16	Cu.m.

					Total	5.69	Cu.m
13	Chajja	3	1.7	0.5	0.1	0.26	Cu.m
		1	1.7	0.5	0.1	2.3	Cu.m
		3	0.8	0.5	0.1	0.24	Cu.m
					Total	2.8	Cu.m
14	Tile's flooring	-	-	-	-	102.09	Sq.m.
					Total	102.09	Sq.m
15	Column						
		8	0.2	0.2	3	0.96	Cu.m
		21	0.3	0.3	3	5.67	Cu.m.
					Total	6.63	Cu.m.

Table 13.2 Abstract Sheet of Community Hall

Sr. No.	Item Description	Qty.	Rate	Per	Amount ()
1	Excavation of foundation	69.73 Cu.m.	90	Cu.m.	6275
2	PCC work in foundation	17.44 Cu.m.	3500	Cu.m	61040
3	Brick work in foundation and super structure	87.62 Cu.m.	3500	Cu.m	306670
4	Inside plaster	362.94 Sq.m	204	Sq.m	74039
5	Outer plaster	182.04 Sq.m	197	Sq.m	35861
6	Roof slab	14.84 Cu.m.	4100	Cu.m	60844
7	Roof beam	10.05 Cu.m.	4100	Cu.m	41205
8	Lintel beam	5.69 Cu.m.	4100	Cu.m	23329
9	Chajja	2.8 Cu.m.	4100	Cu.m	11480
10	Column	6.63 Cu.m.	4100	Cu.m	27183
11	Tiles work	102.69 Sq.m	600	Sq.m	61614
12	Inside paint work	362.94 Sq.m	204	Sq.m	74039
13	Outside paint work	182.04 Sq.m	197	Sq.m	35861
				Total Rs.	706710
				Add 1.5% water charge Rs.	10600
				Add 10% contingencies charge Rs.	70671
				Total estimated cost in Rs.	**787981**

*The rates of the respective work provided in the above abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities, labor charges and various other miscellaneous charges.

Total estimated cost = 787981/- Rs.

13.1.2 Civil Design: Post Office

A post office is a public facility that provides mail services, such as accepting letters and parcels, providing post office boxes, and selling postage stamps, packaging, and stationery. Post offices may offer additional services, which vary by country. These include providing and accepting government forms (such as passport applications), and processing government services and fees (such as road tax, postal savings, or bank fees). The chief administrator of a post office is called a postmaster. A post office is headed by a Post Master who looks after the working of the postal) department of the area. Working under him are several Postal Assistants who deal will the functions of the post office like:

1. Selling stamps and envelopes
2. Sending and receiving telegrams
3. Sending and receiving money orders
4. Administrative duties in the efficient running of the post office.

Considering the need and suggestion of people as well as the sarpanch we have following design of Post Office.

Post Office

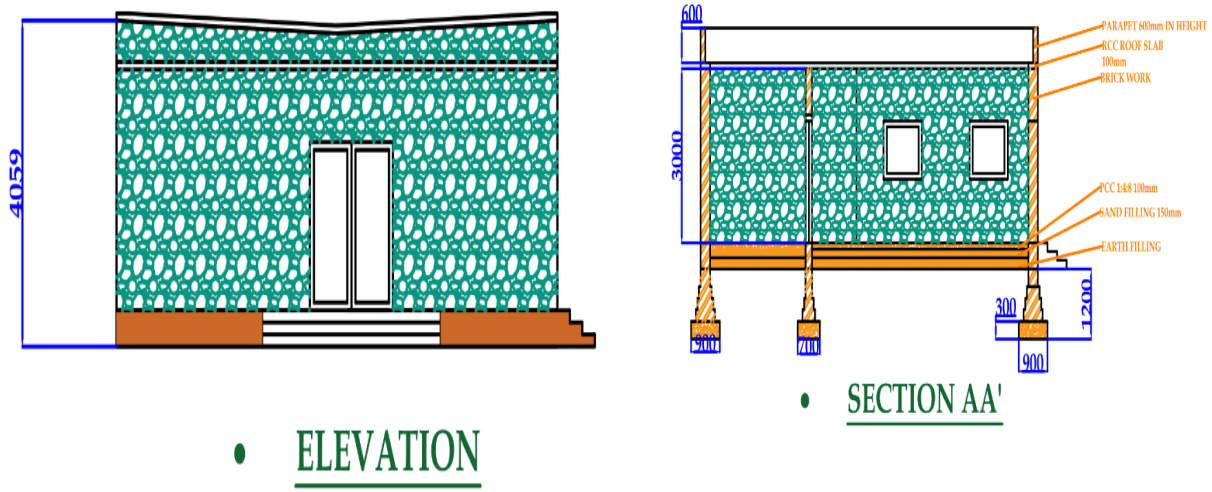
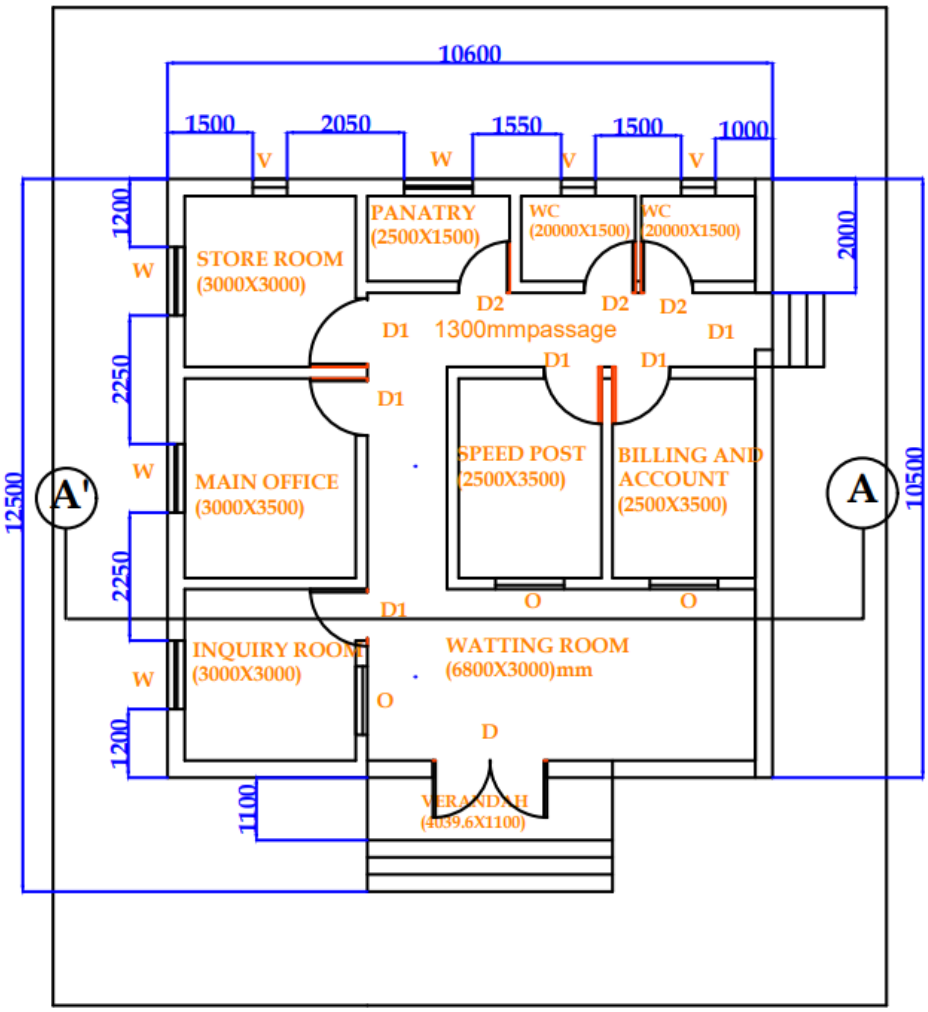


Fig. 13.3 Post Office Design

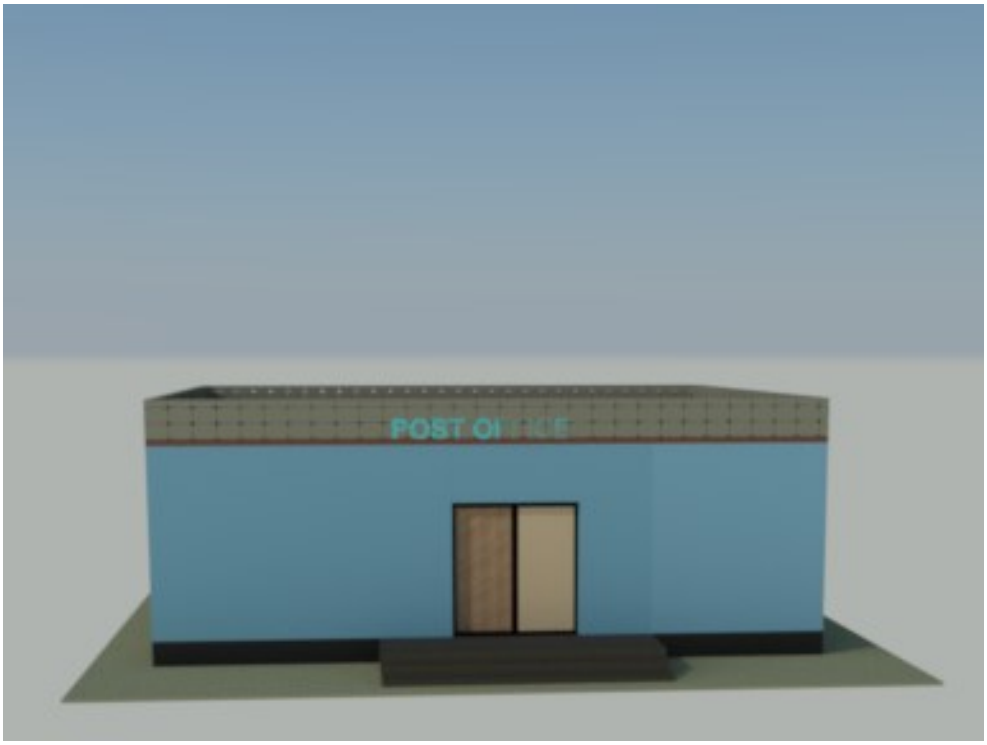
*All dimensions are in millimeter

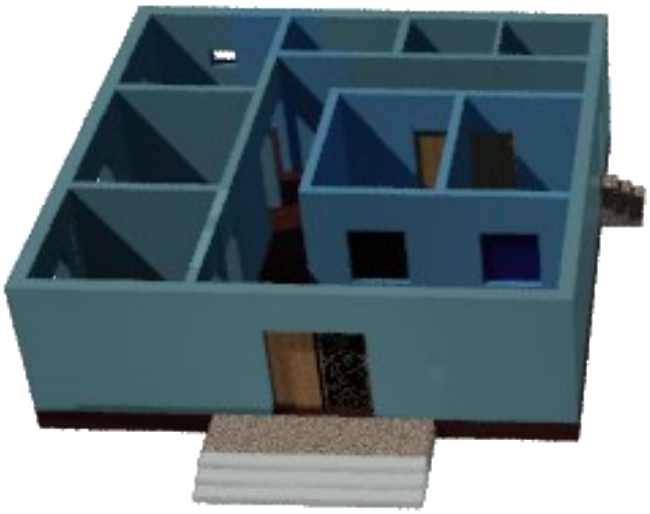


- **PLAN**

*All dimensions are in millimeter

Fig. 13.4 3D Model of Post Office





SCHEDULE OF OPENING			
Sr. No.	Description	Size	Nos.
1	D	(2.5 x 2.1)	1

2	D1	(1 x 2.1)	6
3	D2	(0.9 x 2.1)	2
4	W	(1.2 x 1.3)	3
5	V	(0.6 x 0.45)	3
6	O	(1.2 x 1.3)	3

SCALE 1:100
Built-up Area 132.5 Sq. meter
All Dimensions are in millimetre unless and until stated
Do not scale the drawing only written dimension scale be followed.
Unless otherwise specified all concrete should be mixed in proportion of M-20 grid as per IS:456-2000.
All load bearing brick masonry wall in cement motare in proportion of same grade.

Table 13.3 Measurement Sheet of Post Office

Sr. No.	Item Description	Nos.	Length (m)	Width (m)	Height or Depth (m)	Quantity	Remark
1	Excavation						
	300 thick wall		38.35	0.9	1.2	41.42	Cu.m
	200 thick wall		43.8	0.2	1.2	47.3	Cu.m
					Total	88.72	Cu.m
2	PCC for foundation						
	300 thick wall		38.35	0.9	0.3	10.35	Cu.m
	200 thick wall		43.7	0.7	0.2	11.8	Cu.m
					Total	22.15	Cu.m
3	Brick masonary upto plinth						
	300 thick wall						
	(1) 1st step		39.45	0.6	0.2	4.73	Cu.m
	(2) 2nd step		39.75	0.5	0.2	3.98	Cu.m
	(3) 3rd step		40.05	0.4	0.2	3.2	Cu.m
	(4) 4th step		40.25	0.3	0.75	9.05	Cu.m
					Total	20.97	Cu.m
	200 thick wall						
	(1) 1st step		44.85	0.4	0.2	3.59	Cu.m
	(2) 2nd step		45.2	0.3	0.2	2.71	Cu.m
	(3) 3rd step upto 0.2m height		45.55	0.2	0.2	1.82	Cu.m
	(4) 3rd step upto plinth		45.85	0.2	0.65	6.88	Cu.m

					Total	15	Cu.m
4	Brick masonry above plinth up to slab (1:6)						
	300 thick walls		40.25	0.3	3	36.23	Cu.m
	200 thick wall		45.85	0.3	3	27.51	Cu.m
	100 thick wall		1.5	0.1	3	0.45	Cu.m.
					Total	64.19	Cu.m
	Brick work in steps						
	At verandah		4	0.3	0.15	0.18	Cu.m.
			4	0.6	0.15	0.36	Cu.m.
			4	0.9	0.15	0.54	Cu.m.
	At back side		1.3	0.3	0.15	0.06	Cu.m.
			1.3	0.6	0.15	0.12	Cu.m.
			1.3	0.9	0.15	0.18	Cu.m.
					Total	1.44	Cu.m.
5	Brick work in parapet wall		21.1	0.15	0.6	1.9	Cu.m.
	Deduction						
	D_0	1	2.5	0.3	2.1	1.58	Cu.m
	D_1	6	1	0.3	2.1	3.78	Cu.m
	D_2	2	0.9	0.3	2.1	1.13	Cu.m
	W	3	1.2	0.3	1.3	1.4	Cu.m
	V	3	0.6	0.3	0.45	0.24	Cu.m.
	O	3	1.2	0.2	1.3	0.94	Cu.m.
					Total	9.07	Cu.m
					Total Brick Work	94.43	Cu.m.
6	Inside Plaster work						
	Store room	2	3	-	3	18	Sq.m
		2	3	-	3	18	Sq.m
	Panatary	2	2.5	-	3	15	Sq.m
		2	1.5	-	3	9	Sq.m
	WC	2	2	-	3	12	Sq.m
		2	1.5	-	3	9	Sq.m
	Office	2	3	-	3	18	Sq.m
		2	3.5	-	3	21	Sq.m
	Inquiry room	2	3	-	3	18	Sq.m
		2	3	-	3	18	Sq.m
	Watting room	2	6.8	-	3	40.8	Sq.m.
		2	3	-	3	18	Sq.m.
	Speed post	2	2.5	-	3	15	Sq.m.

		2	3.5	-	3	21	Sq.m.
	Billing room	2	2.5	-	3	15	Sq.m.
		2	3.5	-	3	21	Sq.m.
					Total	286.8	Sq.m.
	Deduction						
	D	1	2.5	-	2.1	5.25	Sq.m
	D_1	6	1	-	2.1	12.6	Sq.m
	D_2	2	0.9	-	2.1	3.78	Sq.m
	W	3	1.2	-	1.3	4.68	Sq.m
	V	3	0.6	-	0.45	0.81	Sq.m.
	O	3	1.2	-	1.3	4.68	Sq.m.
					Total	31.8	Sq.m
7	Plaster Work Outer Side	2	10.6	-	3.7	63.6	Sq.m
		2	10.5	-	3.7	63	Sq.m
					Total	126.6	Sq.m
8	Celling						
	Store room	1	3	3	-	9	Sq.m
	Panatary	1	2.5	1.5	-	3.75	Sq.m
	WC	2	2	1.5	-	6	Sq.m
	Office room	1	3	3.5	-	10.5	Sq.m
	Inquiry room	1	3	3	-	9	Sq.m
	Watting room	1	6.8	3	-	20.4	Sq.m
	Speed post room	2	2.5	3.5	-	17.5	Sq.m.
					Total	76.15	Sq.m
					Total Inside Plastering Work	331.15	Sq.m
10	Roof slab	1	10.5	10.6	0.1	11.3	Cu.m
11	Roof beam						
		1	41.05	0.3	0.5	6.16	Cu.m
		1	46.85	0.2	0.45	4.222	Cu.m
					Total	10.38	Cu.m
12	Lintel beam	1	2.5	0.3	0.15	0.11	Cu.m
		6	1	0.3	0.15	0.27	Cu.m
		2	0.9	0.3	0.15	0.08	Cu.m
		3	1.2	0.3	0.15	0.16	Cu.m
		3	0.6	0.3	0.15	0.08	Cu.m.
					Total	0.7	Cu.m
13	Chajja	2	1.4	0.5	0.1	0.14	Cu.m
		3	0.8	0.5	0.1	0.12	Cu.m
					Total	0.26	Cu.m

14	Tiles flooring	-	-	-	-	76.15	Sq.m.
15	Column						
		14	0.3	0.3	3	3.78	Cu.m
		16	0.2	0.2	3	1.92	Cu.m.
					Total	5.7	Cu.m.

Table 13.4 Abstract Sheet of Post Office

Sr. No.	Item Description	Qty.	Rate	Per	Amount (Rs)
1	Excavation of foundation	88.72 Cu.m	90	Cu.m	7984
2	PCC work in foundation	22.15 Cu.m	3500	Cu.m	77525
3	Brick work in foundation and super structure	94.43 Cu.m	3500	Cu.m	330505
4	Inside plaster	331.15 Sq.m	204	Sq.m	67554
5	Outer plaster	126.6 Sq.m	197	Sq.m.	24940
6	Roof slab	11.13 Cu.m	4100	Cu.m	45633
7	Roof beam	10.38 Cu.m	4100	Cu.m.	42558
8	Lintel beam	0.7 Cu.m	4100	Cu.m.	2870
9	Chajja	0.26 Cu.m	4100	Cu.m	1066
10	Column	5.7 Cu.m	4100	Cu.m	23370
11	Tiles work	76.15 Sq.m	600	Sq.m	45690
12	Inside paint work	331.15 Sq.m	204	Sq.m	67554
13	Outside paint work	126.6 Sq.m	197	Sq.m	24940
				Total Rs.	649061
				Add 1.5% water charge	9735
				Add 10% contingencies charge	64906
				Total estimated cost in Rs.	**723702**

*The rates of the respective work provided in the above abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities, labor charges and various other miscellaneous charges.

Total estimated cost = 723702/- Rs.

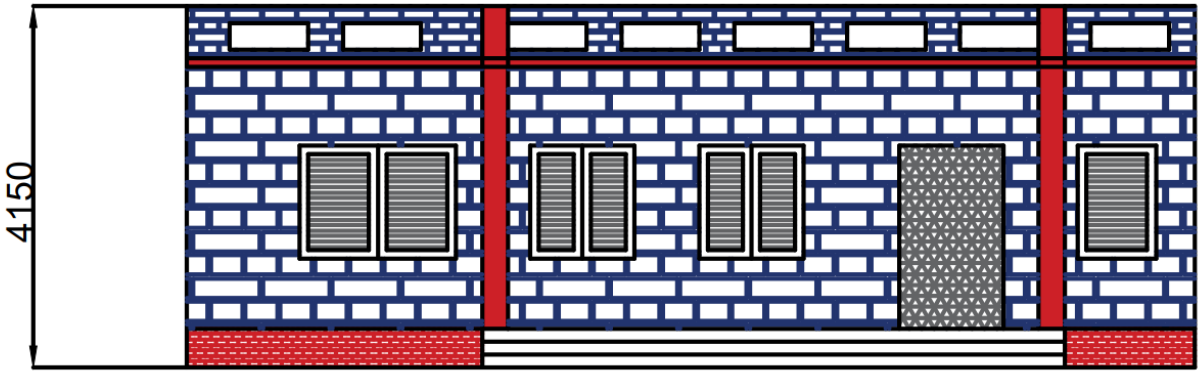
13.1.3 Civil Design: Library

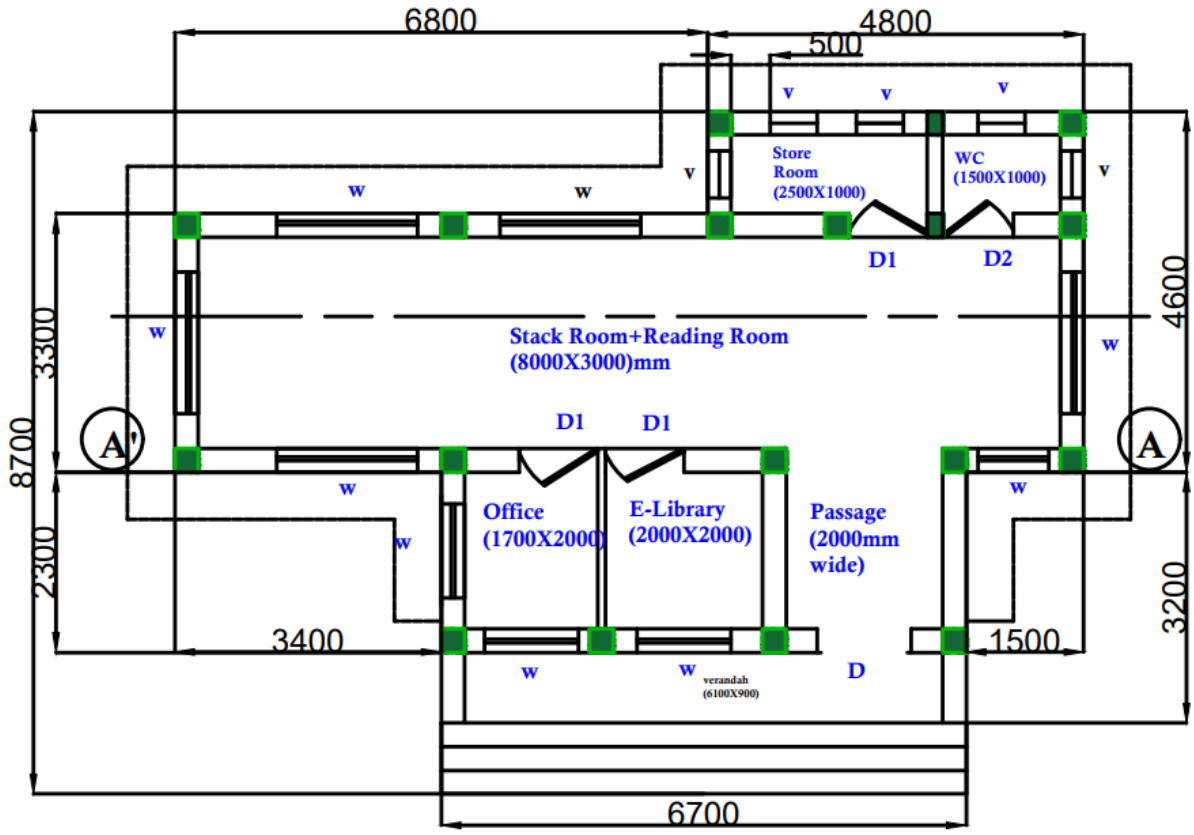
A library is a collection of materials, books or media that are easily accessible for use and not just for display purposes. It is responsible for housing updated information in order to meet the user's needs on a daily basis. A Library provides physical (hard copies documents) or digital access (soft copies) materials, and may be a physical location or a virtual space, or both. A library's collection can include printed materials and other physical resources in many formats such as DVDs, CDs and Cassette as well as access to information, music or other content held on bibliographic databases.

Considering the need and suggestion of people as well as the sarpanch we have following design of Library.

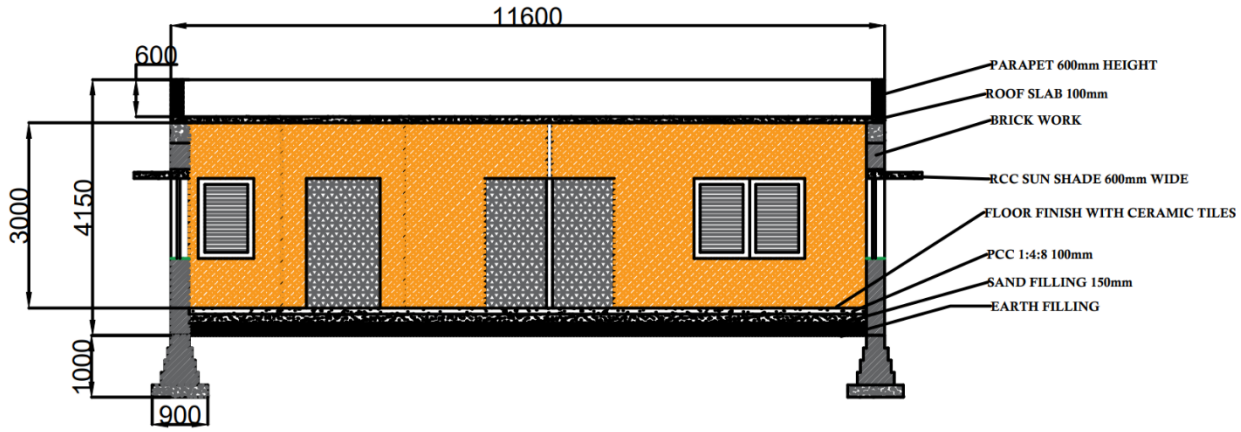
Library

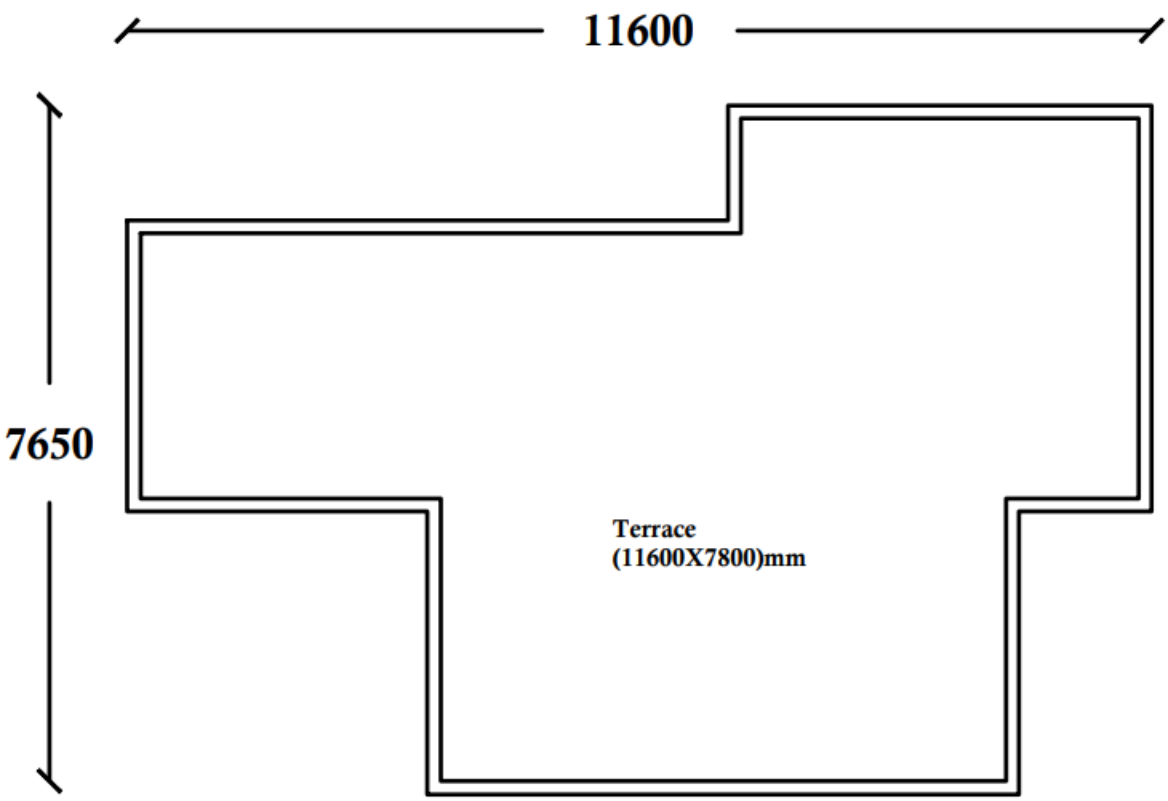
Fig. 13.5 Library Design





*All dimensions are in millimeter

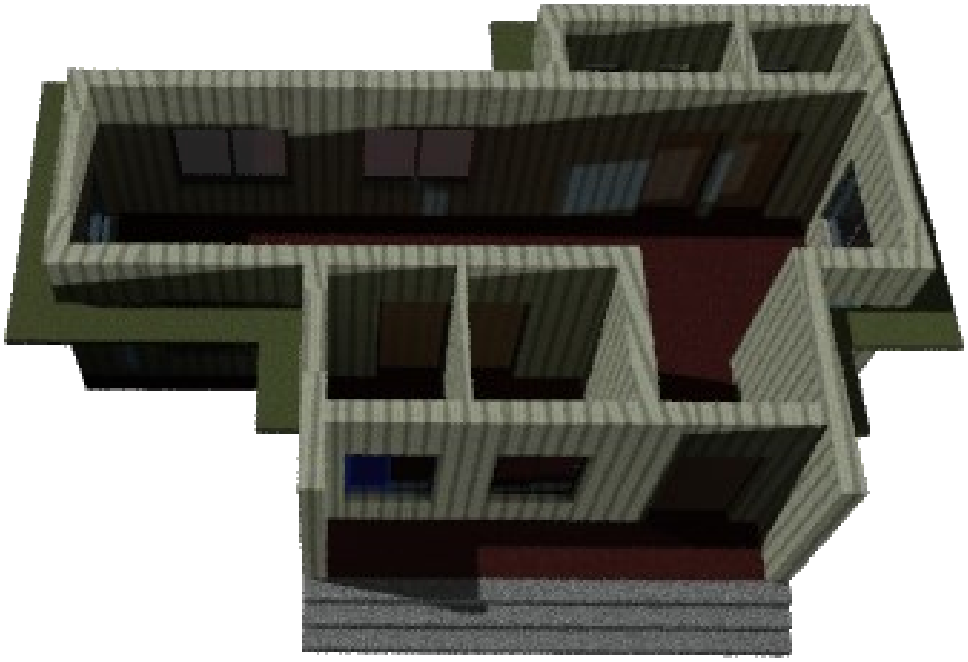


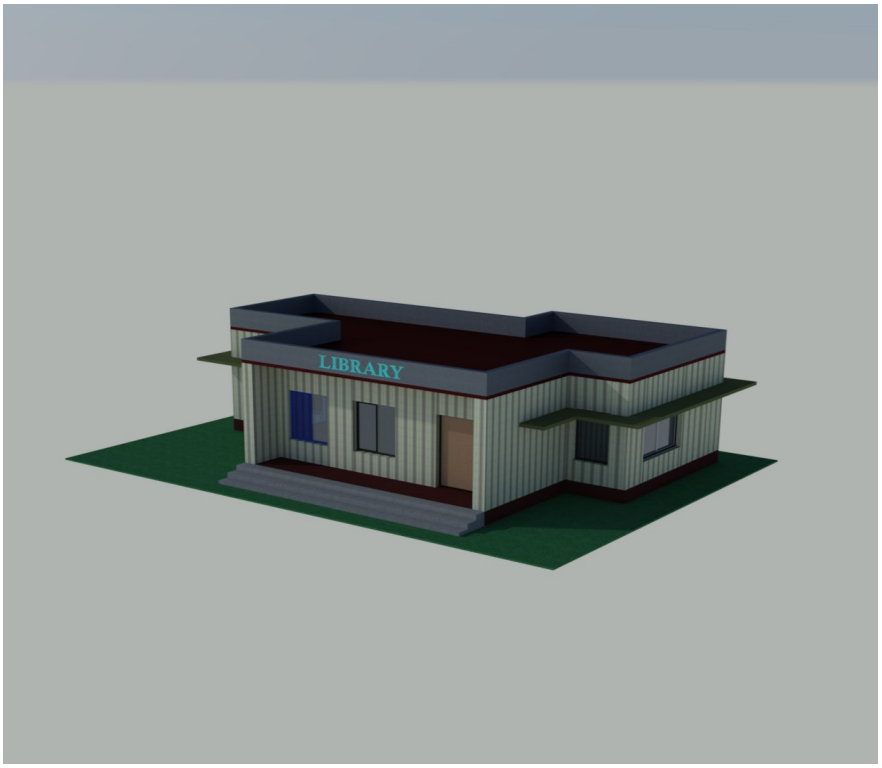


- **TARECE PLAN**

*All dimensions are in millimeter

Fig. 13.6 3D Model of Library





SCHEDULE OF OPENING			
Sr. No.	Description	Size	Nos.
1	D	(1.2 x 2.1)	1
2	D1	(1 x 2.1)	3
3	D2	(0.9 x 2.1)	1
4	W	(1.8 x 1.2)	5
5	W1	(1.2 x 1.2)	3
6	W2	(0.9 x 1.2)	1
7	V	(0.6 x 0.45)	5

SCALE 1:100
Built-up Area 100.922 Sq. meter
All Dimensions are in millimetre unless and until stated
Do not scale the drawing only written dimension scale be followed.
Height of parapet wall is 600mm and thickness is 150mm
Unless otherwise specified all concrete should be mixed in proportion of M-20 grid as per IS:456-2000.

Table 13.5 Measurement Sheet of Library

Sr. No.	Item Description	Nos.	Length (m)	Width (m)	Height or Depth (m)	Quantity	Remark
1	Excavation						
	300 thick wall		40.1	0.9	1	36.09	Cu.m
	200 thick wall		0.4	0.7	1	0.28	Cu.m
					Total	64.09	Cu.m
2	PCC for foundation						
	300 thick wall		40.1	0.9	0.2	7.22	Cu.m
	200 thick wall		0.4	0.7	0.2	0.06	Cu.m
					Total	7.28	Cu.m
3	Brick masonary upto plinth						
	300 thick wall						
	(1) 1st step		41.3	0.6	0.2	4.956	Cu.m
	(2) 2nd step		41.7	0.5	0.2	4.17	Cu.m
	(3) 3rd step		42.1	0.4	0.2	3.36	Cu.m
	(4) 4th step		42.35	0.3	0.75	8.26	Cu.m
					Total	20.75	Cu.m
	200 thick wall						

	(1) 1st step		7	0.4	0.2	0.056	Cu.m
	(2) 2nd step		0.8	0.3	0.2	0.048	Cu.m
	(3) 3rd step upto 0.2m height		0.9	0.2	0.2	0.036	Cu.m
	(4) 3rd step upto plinth		1	0.2	0.65	0.13	Cu.m
					Total	0.27	Cu.m
4	Brick masonary above plinth upto slab (1:6)						
	300 thick wall		42.35	0.3	3	38.115	Cu.m
	200 thick wall		1	0.3	3	0.6	Cu.m
	100 thick wall		2.14	0.1	3	0.642	Cu.m.
					Total	39.36	Cu.m
	Brick work in steps						
			6.1	0.3	0.15	0.274	Cu.m.
			6.1	0.6	0.15	0.549	Cu.m.
			6.1	0.9	0.15	0.823	Cu.m.
					Total	1.65	Cu.m.
5	Brick work in parapet wall		38.8	0.15	0.6	3.492	Cu.m.
	Deduction						
	D_0	1	1.2	0.3	2.1	0.76	Cu.m
	D_1	3	1	0.3	2.1	1.89	Cu.m
	D_2	1	0.9	0.3	2.1	0.561	Cu.m
	W	5	1.8	0.3	1.2	3.25	Cu.m
	W_1	3	1.2	0.3	1.2	1.29	Cu.m.
	W_2	1	0.9	0.3	1.2	0.32	Cu.m.
	V	5	0.6	0.3	0.45	0.4	Cu.m
					Total	8.48	Cu.m
					Total Brick Work	57.042	Cu.m.
6	Inside Plaster work						
	Hall	2	8	-	3	48	Sq.m
		2	3	-	3	18	Sq.m
	Store room	2	2.5	-	3	15	Sq.m
		2	1	-	3	6	Sq.m
	WC	2	1.5	-	3	9	Sq.m
		2	1	-	3	6	Sq.m
	Office	2	1.7	-	3	10.2	Sq.m
		2	2	-	3	12	Sq.m
	E-Library	2	2	-	3	12	Sq.m

		2	2	-	3	12	Sq.m
	Passage	1	2	-	3	6	Sq.m.
		2	2	-	3	12	Sq.m.
					Total	166.2	Sq.m.
	Deduction						
	D	1	1.2	-	2.1	2.52	Sq.m
	D_1	3	1	-	2.1	6.3	Sq.m
	D_2	1	0.9	-	2.1	1.89	Sq.m
	W	5	1.8	-	1.2	10.8	Sq.m
	W_1	3	1.2	-	1.2	4.32	Sq.m.
	W_2	1	0.9	-	1.2	1.08	Sq.m.
	V	5	0.6	-	0.45	1.35	Sq.m
					Total	28.26	Sq.m
7	Plaster Work Outer Side	2	11.6	-	3.7	85.84	Sq.m
		2	7.8	-	3.7	57.72	Sq.m
					Total	143.56	Sq.m
8	Celling						
	Hall	1	8	3	-	24	Sq.m
	Store Room	1	2.5	1	-	2.5	Sq.m
	WC	1	1.5	1	-	1.5	Sq.m
	Officee room	1	1.7	2	-	3.4	Sq.m
	E-Libraryn	1	2	2	-	4	Sq.m
	Passage	1	2	2	-	4	Sq.m
					Total	39.4	Sq.m
					Total Inside Plastering Work	177.34	Sq.m
10	Roof slab	1	11.6	7.8	0.1	9.05	Cu.m
11	Roof beam						
		1	43.4	0.3	0.5	6.51	Cu.m
		1	1.3	0.2	0.45	0.12	Cu.m
					Total	6.63	Cu.m
12	Lintel beam	1	1.2	0.3	0.15	0.054	Cu.m
		3	1	0.3	0.15	0.135	Cu.m
		1	0.9	0.3	0.15	0.04	Cu.m
		5	1.8	0.3	0.15	0.41	Cu.m
		3	1.2	0.3	0.15	0.16	Cu.m.
		1	0.9	0.3	0.15	0.04	Cu.m.
		5	0.6	0.3	0.15	0.14	Cu.m.
					Total	0.98	Cu.m
13	Chajja	5	2	0.5	0.1	0.5	Cu.m

		3	1.4	0.5	0.1	0.21	Cu.m
		1	1	0.5	0.1	0.05	Cu.m
		5	0.8	0.5	0.1	0.2	Cu.m
					Total	0.96	Cu.m
14	Tiles flooring						
	Hall		8	3	-	24	Sq.m
	Stre room		2.5	1	-	2.5	Sq.m
	WC		1.5	1	-	1.5	Sq.m
	Office		1.7	2	-	3.4	Sq.m
	E-Library		2	2	-	4	Sq.m
	Passage		2	2	-	4	Sq.m
					Total	39.4	Sq.m
15	Column						
		2	0.3	0.2	3	0.36	Cu.m
		20	0.3	0.3	3	5.4	Cu.m.
					Total	5.76	Cu.m.

Table 13.6 Abstract Sheet of Library

Sr. No.	Item Description	Qty.	Rate	Per	Amount (Rs)
1	Excavation of foundation	64.09 Cu.m	90	Cu.m	5768
2	PCC work in foundation	7.28 Cu.m	3500	Cu.m	3507
3	Brick work in foundation and super structure	57.04 Cu.m	3500	Cu.m	1999640
4	Inside plaster	177.36 Sq.m	204	Sq.m	36181
5	Outer plaster	143.56 Sq.m	197	Sq.m	28281
6	Roof slab	9.05 Cu.m	4100	Cu.m	37105
7	Roof beam	6.63 Cu.m	4100	Cu.m	27183
8	Lintel beam	0.98 Cu.m	4100	Cu.m	4018
9	Chajja	0.96 Cu.m	4100	Cu.m	3936
10	Column	5.76 Cu.m	4100	Cu.m	23616
11	Tiles work	39.4 Sq.m	600	Sq.m	23640
12	Inside paint work	177.36 Sq.m	204	Sq.m	36181
13	Outside paint work	143.56 Sq.m	197	Sq.m	28281
				Total Rs.	391555
				Add 1.5% water charge	5873
				Add 10% contingencies charge	39155
				Total estimated cost in Rs.	**436583**

*The rates of the respective work provided in the above abstract sheet along with quantities are inclusive of water charges, contractor's profit, contingencies, utilities, labor charges and various other miscellaneous charges.

Total estimated cost = 436583/- Rs.

13.1.4 Electrical Design: Electrical Layout of Community Hall

Present Condition of Electrical wiring at Community Hall

The wiring is not done as per requirement. There is no wiring for proper lighting, fan, etc. Also the existing wiring is damaged.

Solution designed for improving the prevailing situation: Electrical Layout of Community Hall

With new design of community hall with latest facility, modern equipments we are proposing new wiring layout which consist points for various specific appliances.

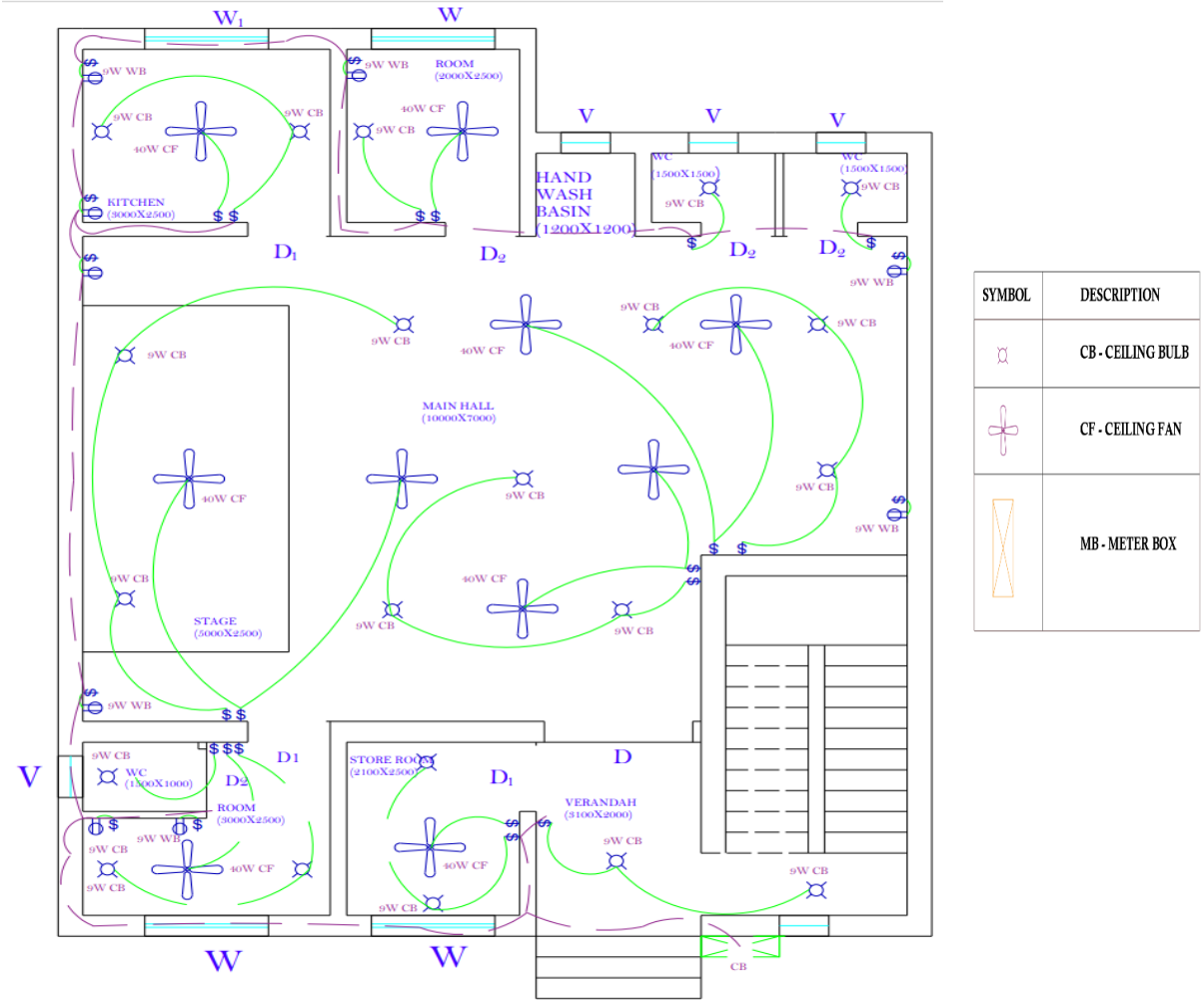


Fig. 13.7 Electrical Layout of Community Hall

Table 13.7 Overall calculation, Size and length of conduit and wires			
Name of Load	No. of Load	Watt per unit	Total
LED lamp	21	9W	189W
Fan (48'')	10	50W	500W
5 Amp socket	20	100W	2000W
16 Amp socket	5	1000W	5000W
Net Load = 7,689 ≅ 7,700 W			
Total peak load current = 33.5 Ampere			
PVC coated copper wire of 1 mm², 1.5 mm² and 4 mm² is finalized			
Number of sub-circuits will be 6			
Number of power circuit will be 3			
Switch gear selected is 32A RCCB			
Selected size of Earth wire is 4mm²			
Total length of PVC conduit required is 130 meters			
Total length of copper wire required is 400 meters(1^2mm+1.5^2mm+4^2mm)			

Table 13.8 Net cost estimation				
Sr. No.	Item name with specification	Quantity required	Cost/Unit	Total Cost in Rs
1	MCB 6A DP	6	390	2,340
2	RCCB 32A	1	1,900	1,900
3	8 Modular D.B Board	1	1,000	1,000
4	Batten holder	21	40	840
5	3 pin socket 5A	20	33	660
6	3 pin socket 16A	5	70	350
7	Single pole modular switch 5A	51	20	1,020
8	Single pole modular switch 16A	5	65	325
9	Fan Regulator	10	150	1,500
10	¾ PVC conduit	130 Meter	12	1,560
11	1mm² PVC coated single core copper wire	280 Meter	10	2,800
12	1.5mm² PVC coated single core copper wire	50 Meter	15	750
13	4mm² PVC coated single core copper wire	70 Meter	35	2,450
14	2 modular Switch plate with wooden housing	12	40	480
15	3 modular Switch plate with wooden housing	2	50	100
16	4 modular Switch plate with wooden housing	2	55	110
17	6 modular Switch plate with wooden housing	2	78	156

18	Fan (48'')	10	1,550	15,500
19	9W LED lamp	21	90	1,890
20	Earthling Kit	1	5,000	5,000
			Miscellaneous charges	4,269
			Labor charges (including Earthing)	14,760
			Overhead charges	5,976
			Net Cost of Electrification	**₹ 65,736/-**

13.1.5 Electrical Design: Insect Repellent Circuit for Protecting Crops

Present Condition

Currently farmers have been completely dependent on chemicals for protecting their crops against insects, pests, etc. This causes chemical injection in crops and ultimately spoils its properties and benefits to some extent.

Design for improving the prevailing situation

We have planned to build ultrasonic insect repellent circuit which can be installed in farms and used by the farmers for driving away all sorts of insects, bugs, grasshoppers etc. in order to protect the crops from these potentially harmful pests.

Working of circuit: The proposed solar insect repellent is based on an ultrasonic wave generator circuit which works by influencing the normal behavior of insects, ultimately driving them away from the area. The device functions by generating a high frequency at ultrasonic level (above 20kHz), with short pulses. The frequency of the pulses range from 5kHz to 40kHz, selected randomly and transmitted in the environment through special piezo transducers or high power tweeter speakers. Referring to the above diagram, the design depicts an ultrasonic frequency generator circuit which features a random frequency selector stage. The idea may be understood with the help of the following explanation: The IC 555 stages on the left and on the right side are both configured as astable multivibrators for generating the respective frequencies across their output pin#3.

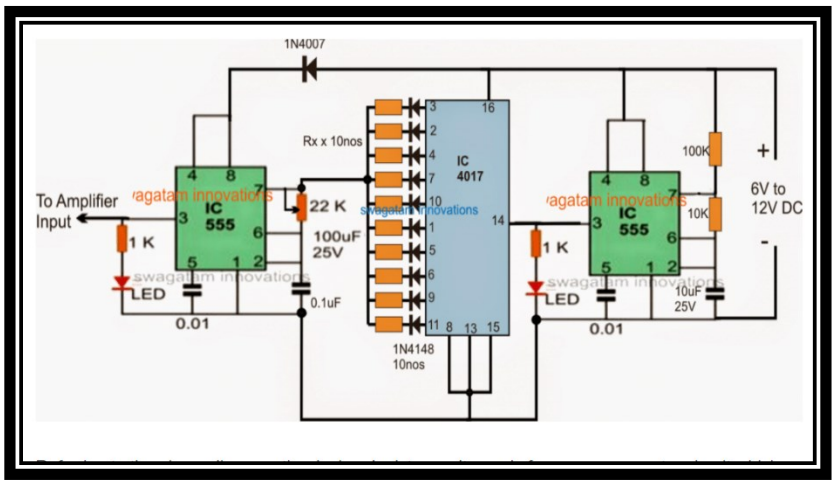


Fig. 13.8 Circuit Diagram

IC 555 Timer: The left side IC 555 actually generates the ultrasonic pulses whose frequency is determined by the instantaneous high available across one of the associated sequencing pinouts of the IC 4017. The shifting or sequencing high logic produced across the 10 outputs of the IC 4017 connects the particular resistor in the array such that this resistor allows the calculated amount of voltage to pin#7 of the IC, and becomes responsible for determining a particular ultrasonic frequency for the left IC 555 stage.

IC 4017: This enables the production of a randomly changing ultrasonic output at the pin#3 of the left IC 555. These randomly changing frequency ranges can be appropriately fixed by assigning calculated resistors across the indicated outputs of the IC 4017. The speed at which the random selection is implemented depends on the frequency of the clocks applied at pin#14 of the IC 4017 via the right side IC 555 astable stage. This speed can be altered by either changing the pin#7 upper resistor or the value of the 10uF capacitor of the right IC 555.

The 22k pot associated with the left IC 555 is used for adjusting the pulse width of the ultrasonic waves, the best response may be achieved by some experimentation and by some trial and error. Since the generated ultrasonic waves needs to powerful enough to reach the entire field, the emission impact needs to be extremely powerful.

This is ensured by feeding the pin#3 output from the left IC 555 to the input of a 100-watt amplifier. This amplifier may be built at home by using a suitable circuit design such as a TDA7294 IC or by procuring a readymade unit from the market. Once all the above procedures are executed, a high-power transducer or a tweeter may be connected with the output of the amplifier for initiating the intended ultrasonic insect repelling actions.

Salient Feature of Electronic Pest Repellent

Electronic pest repellent has many advantages over a chemical repellent. Some of the salient features are as follows:

- **Power Efficient:** The device operates on a very small voltage equivalent to 5 volt and consumes less power and there is no need to modify the circuit for extra separate power supply.
- **Cost:** The cost of the electronic device is less low so that every individual and family can buy and use it.
- **Compactness:** The device uses few IC's and other electronic components and can be packed compactly so that its size becomes small and can be kept anywhere.
- **Power Indication:** An led on the device show the power indication which help the user to easily identify whether the device is working or not.
- **Simple and Elegant Circuit Design:** The circuit can be simply made so that mass production can be easily done. Also, in case of damage the device can be repaired easily.
- **No Harm and No Toxicity:** It doesn't produce any smoke, gases and radiation and even the sound is not audible to human ear. So, it is totally harmless and produces no toxicity at all.

Table 13.9 Estimated Cost of Insect Repellent Circuit

Sr No	Component	Specification	No of Unit	Cost (Rs)
1	IC 4017	DIP	1	80
2	Speaker	50 Ohm	1	150
3	IC 555 timer	DIP	2	60
4	Wire	22 AWG 1m	1	25

5	Battery	Lead acid 12 volt	1	300
6	GPB	Standard	1	100
8	Soldering cost	Pb/Sn	1	50
10	Capacitors	0.001 uF	3	60
11	LED	Red	2	10
12	Solar charge controller	2 A 12 volt	1	400
13	Diode	2 A	5	15
14	Resistors	1k,2k,220R,10k	10	20
15	Box	30*10*20 cm	1	200
12	Miscellaneous			200
				Total= 1,670/- Rs

13.1.6 Electrical Design: Automatic Irrigation with Arduino

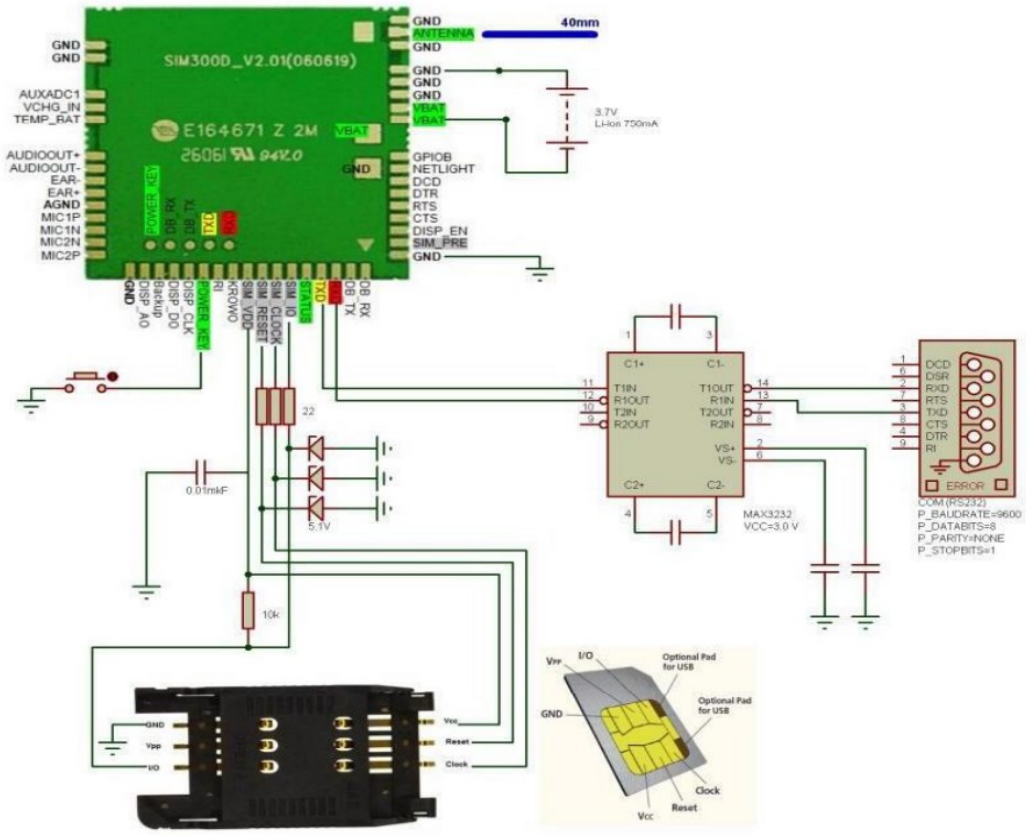


Fig. 13.9 Automatic irrigation with Arduino

Present Condition of Irrigation

Currently farmers have been using old methods of irrigation. Which are not efficient enough to supply water to every crop. Considering the requirement of modern irrigation system we have following solution.

Solution designed for improving the prevailing situation: Automatic Irrigation with Arduino

With new system of irrigation farmers will be easily able to do irrigation that too automatically. It will save their time and they can prosper.

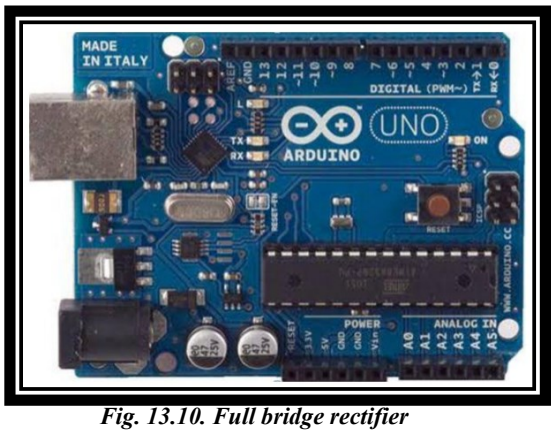


Fig. 13.10. Full bridge rectifier

Arduino Uno:

Arduino is open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. Arduino Uno shown in the Fig. 3 can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators. An Arduino board consists of an Atmel 8- bit AVR microcontroller with complementary components to facilitate programming and incorporation into other circuits.

An Arduino microcontroller is also preprogrammed with a boot loader that simplifies uploading of programs to the on-chip ash memory, compared with other devices that typically need an external programmer. The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with AC-to-DC adapter or battery to get started.

DHT11 Temperature Humidity Sensor:

DHT11 Temperature and Humidity Sensor in the Fig. 5 features a calibrated digital signal output with the temperature and humidity sensor complex. Its technology ensures the high reliability and excellent stability. This sensor includes a resistive element and a sense of wet NTC temperature measuring devices. It has excellent quality, fast response, anti-interference ability and high-cost performance advantages. For measuring humidity, the humidity sensing component is used which has two electrodes with moisture holding substrate between them. So as the humidity changes, the conductivity of the substrate changes or the resistance between these electrodes' changes.

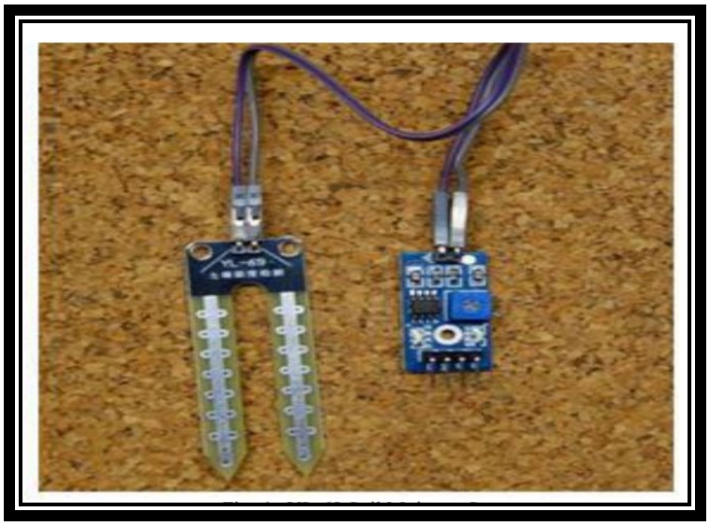


Fig. 13.11 Temperature Humidity Sensor

This change in resistance is measured and processed by the Integrated Chip which makes it ready to be read by a microcontroller. For measuring temperature these sensors use a NTC temperature sensor or a thermistor. A thermistor is actually a variable resistor that changes its resistance with change of the temperature. These sensors are made by sintering of semi conductive materials such as ceramics or polymers in order to provide larger changes in the resistance with just small changes in temperature. The term "NTC" means "Negative Temperature Coefficient", which means that the resistance decreases with increase of the temperature.

The Benefits of Automated Irrigation Systems

Lower your water bill: Water is distributed efficiently through the nozzles. Only areas that need water, receive it. (Your sidewalk does not need watering) Your lawn is watered during the ideal times by installing a timer. For instance, watering early in the morning prevents much of the evaporation and distribution by air. All of the above adds to significant savings on your water bill over the years.

Prevents uneven watering: When we install irrigation systems, we spend a good amount of time planning the layout so that the radius of each nozzle distributes the water where it needs to go and does so evenly, preventing over or under-watering. While designing such a layout, we take into account any slopes, along with other factors, which may cause water to flow and not get properly absorbed into the soil.

Table 13.10 Cost Estimation of Automatic irrigation with Arduino

Sr. No.	Components	Remarks	Cost Of Component (Rs)
1	Arduino	-	800
2	Relay Driver	8 channels	700
3	Battery	3Ah Approx.	1000
4	Supply Sensor	Single Phase/Three Phase	300
5	Diesel Generator	6000 VA Supply for 1 phase 12.5 VA for 3 phase approx. price	70000
6	AC to DC Convertor	12v convertor for dc supply	400
7	Display Module	16x2 LCD display	200
8	Solenoid Valve	1300 each	10000
9	Contactor	for supply mains	800
		Total	84200

*The cost of this system can go up to maximum ₹25000-₹30000 depending on other unavoidable factors like using of high-end Arduino or high-end valve, etc. excluding the generator cost. Moreover, the power consumption is minimum as only the major power consumption device is the solenoid valve and is too low in comparison to the power consumption of the motor-pump combination.

Overall, if calculated then the power consumption only increases by 5-12% of the old setup. Therefore, this setup can benefit the crop production in farmland and give the farmer less stress and comfort due to its remote operation.

13.2 Reason for Students Recommending this Design

Post office: To Provide good medium for sending and getting letters and saving money. As in technological survey and gap analysis it was noticed that this facility is much needed.

Library: To provide books suited to the interests and aptitude of students and to different age group of people, magazines, periodicals, newspapers and with its calm and tranquil atmosphere. This will surely enhance the upcoming stakeholders of the nation.

Community hall: To providing a place for the community to connect and socialise. They are multi-purpose hubs that offer different things for different people.

Electrical layout of community hall: Community Hall will be well equipped with electrical facilities like automatic fan, lights, security system, etc. This will include modern electrical facilities.

Insect Repellent Circuit for Protecting Crops: Currently farmers have been completely dependent on chemicals for protecting their crops against insects, pests, etc. This causes chemical injection in crops and ultimately spoils its properties and benefits to some extent.

Automatic Irrigation with Arduino: To promote modern irrigation system it is necessary use them. When they will use this system, it will surely help them to save their time. Ultimately, they can give more time to their other business. It will help them to prosper overall.

13.3 About designs Suggestions / Benefit of the villagers

Library: The library plays an important role in our academic and social lives. Library is an organized collection of information resources made accessible to a defined community for reference or borrowing and this collection of information may be in the form of books, newspapers, CD's, journals and research papers etc. Libraries play a fundamental role in enhancing the learning experience, providing students with all the materials and services they need to improve their knowledge.

The library occupies a very important place in village. With its books suited to the interests and aptitude of students and different age group of people, with its magazines, periodicals, newspapers and with its calm and tranquil atmosphere it has a special call to the students who go there and quench their thirst for reading the material which cannot be provided to them in the class room. Here they find an environment which is conductive to the building up of habit of self-learning. The library is the center of the intellectual and social activities of village.

Post office: Post-office is very helpful to us. It helps us in many ways. Through post office we send and get our letters. The post office is an important medium for sending and getting "letters and saving money, etc. The role of post office has increased day by day. The Government of India has declared some saving schemes for the sick and the retired person. There are so many mediums

of saving money in post office. The postal department has allowed the post office to deal with the money saved by public. So, the post office plays a vital role in village.

The post office is placed in a suitable place for better convenience. There is a post box hanging in front of the post office. The public insert their letters into this box. The post peon. collects the letters from the box and packs it. Then this package is sent to the head office of postal department. There, the letters are separated according to the place they are to be sent. There are post tickets, money order forms, etc. sold in the post office. People also save their money in post office. Thus post office serves a great.

Community hall: Community Hall is public location where members of a community tend to gather for group activities, social support, public information, and other purposes. They may sometimes be open for the whole community or for a specialized group within the greater community. Community centres can be religious in nature, such as Christian, Islamic, or Jewish community centres, or can be secular, such as youth clubs.

Electrical layout of community hall: With redesign community hall will be well equipped with electrical facilities like automatic fan, lights, security system, etc. For that design will be provided by us.

Insect Repellent Circuit for Protecting Crops: We have planned to build ultrasonic insect repellent circuit which can be installed in farms and used by the farmers for driving away all sorts of insects, bugs, grasshoppers etc. in order to protect the crops from these potentially harmful pests.

Automatic Irrigation with Arduino: Today, world is moving towards automation. In India villages considered the lifeline of the nation. "So, if automation starts from the root of nation, it will surely prosper the tree." With this mindset we have thought of giving design for automatic irrigation with Arduino.

Its benefits are as follows:

1. **Lower your water bill:** Water is distributed efficiently through the nozzles. Only areas that need water, receive it. (Your sidewalk does not need watering) Your lawn is watered during the ideal times by installing a timer. For instance, watering early in the morning prevents much of the evaporation and distribution by air. All of the above adds to significant savings on your water bill over the years.
2. **Prevents uneven watering:** When we install irrigation systems, we spend a good amount of time planning the layout so that the radius of each nozzle distributes the water where it needs to go and does so evenly, preventing over or under-watering. While designing such a layout, we take into account any slopes, along with other factors, which may cause water to flow and not get properly absorbed into the soil.

Chapter 14: Technical Options with Case Studies

14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistant

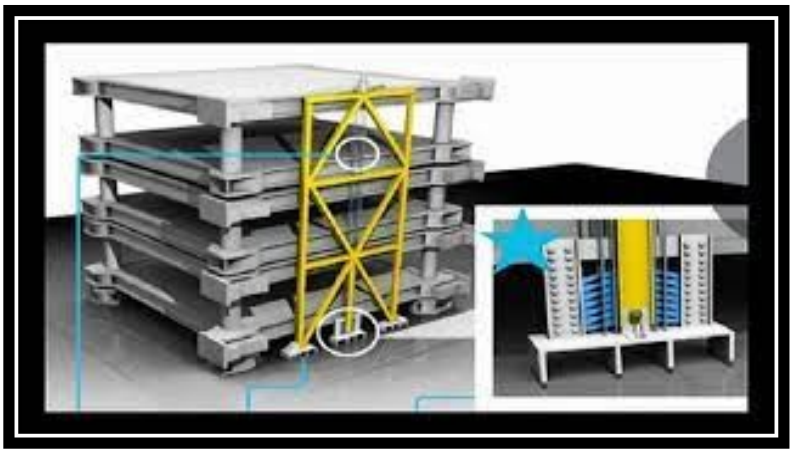


Fig. 14.1 Advanced Earthquake Resistant Structure

Earthquake-resistant structures are structures designed to protect buildings from earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake-resistant construction is to erect structures that fare better during seismic activity than their conventional counterparts. According to building codes, earthquake-resistant structures are intended to withstand the largest earthquake of a certain probability that is likely to occur at their location.Currently, there are several design philosophies in earthquake engineering, making use of experimental results, computer simulations and observations from past earthquakes to offer the required performance for the seismic threat at the site of interest.

These range from appropriately sizing the structure to be strong and ductile enough to survive the shaking with an acceptable damage. The conventional approach to earthquake resistant design of buildings depends upon providing the building with strength, stiffness and inelastic deformation capacity which are great enough to withstand a given level of earthquake-generated force. This is generally accomplished through the selection of an appropriate structural configuration and the careful detailing of structural members, such as beams and columns, and the connections between them. But more advanced techniques for earthquake resistance is not to strengthen the building, but to reduce the earthquake-generated forces acting upon it.
Among the most important advanced techniques of earthquake resistant design and construction are:

1. Base Isolation:
2. Energy Dissipation Devices:

1. Base Isolation:
A base isolated structure is supported by a series of bearing pads which are placed between the building and the building's foundation. A variety of different types of base isolation bearing pads have now been developed. The bearing is very stiff and strong in the vertical direction, but flexible in the horizontal direction.

To get a basic idea of how base isolation works, examine Figure. This shows an earthquake acting on both a base isolated building and a conventional, fixed-base, building. As a result of an earthquake, the ground beneath each building begins to move. In Figure, it is shown moving to the left. Each building responds with movement which tends toward the right. The building undergoes displacement towards the right. The building's displacement in the direction opposite the ground motion is actually due to inertia. The inertial forces acting on a building are the most important of all those generated during an earthquake. It is important to know that the inertial forces which the building undergoes are proportional to the building's acceleration during ground motion. It is also important to realize that buildings don't actually shift in only one direction. Because of the complex nature of earthquake ground motion, the building actually tends to vibrate back and forth in varying directions. By contrast, even though it too displacing, the base-isolated building retains its original, rectangular shape. It is the lead-rubber bearings supporting the building that are deformed.

The base-isolated building itself escapes the deformation and damage, which implies that the inertial forces acting on the base-isolated building have been reduced. Experiments and observations of base-isolated buildings in earthquakes have been shown to reduce building accelerations to as little as 1/4 of the acceleration of comparable fixed-base buildings, which each building undergoes as a percentage of gravity. As we noted above, inertial forces increase, and decrease, proportionally as acceleration increases or decreases. Acceleration is decreased because the base isolation system lengthens a building's period of vibration, the time it takes for the building to rock back and forth and then back again. And in general, structures with longer periods of vibration tend to reduce acceleration, while those with shorter periods tend to increase or amplify acceleration. Finally, since they are highly elastic, the rubber isolation bearings don't suffer any damage. But the lead plug in the middle of our example bearing experiences the same deformation as the rubber. However, it generates heat.

2. Energy Dissipation Devices:

The second of the major new techniques for improving the earthquake resistance of buildings also relies upon damping and energy dissipation, but it greatly extends the damping and energy dissipation provided by lead-rubber bearings. As we've said, a certain amount of vibration energy is transferred to the building by earthquake ground motion. Buildings themselves do possess an inherent ability to dissipate, or damp, this energy. However, the capacity of buildings to dissipate energy before they begin to suffer deformation and damage is quite limited. The building will dissipate energy either by undergoing large scale movement or sustaining increased internal strains in elements such as the building's columns and beams. Both of these eventually result in varying degrees of damage. So, by equipping a building with additional devices which have high damping capacity, we can greatly decrease the seismic energy entering the building, and thus decrease building damage. Accordingly, a wide range of energy dissipation devices have been developed and are now being installed in real buildings. Energy dissipation devices are also often called damping devices. The large number of damping devices that have been developed can be grouped into three broad categories: Friction Dampers: these utilize frictional forces to dissipate energy Metallic Dampers: utilize the deformation of metal elements within the damper Viscoelastic Dampers: utilize the controlled shearing of solids Viscous Dampers: utilized the forced movement (orificing) of fluids within the damp.

14.1.2 Technical Case Study "Seismic Retrofitting of Buildings"

Seismic retrofitting:
Seismic retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. With better understanding of seismic demand on structures and with our recent experiences with large earthquakes near urban centers, the need of seismic retrofitting is well acknowledged. Prior to the introduction of modern seismic codes in the late 1960s for developed countries (US, Japan etc.) and late 1970s for many other parts of the world (Turkey, China etc.),[1] many structures were designed without adequate detailing and reinforcement for seismic protection. In view of the imminent problem, various research work has been carried out. State-of-the-art technical guidelines for seismic assessment, retrofit and rehabilitation have been published around the world – such as the ASCE-SEI 41[2] and the New Zealand Society for Earthquake Engineering (NZSEE)'s guidelines. These codes must be regularly updated; the 1994 Northridge earthquake brought to light the brittleness of welded steel frames, for example.

The retrofit techniques outlined here are also applicable for other natural hazards such as tropical cyclones, tornadoes, and severe winds from thunderstorms. Whilst current practice of seismic retrofitting is predominantly concerned with structural improvements to reduce the seismic hazard of using the structures, it is similarly essential to reduce the hazards and losses from non-structural elements. It is also important to keep in mind that there is no such thing as an earthquake-proof structure, although seismic performance can be greatly enhanced through proper initial design or subsequent modifications.

Performance objectives:
In the past, seismic retrofit was primarily applied to achieve public safety, with engineering solutions limited by economic and political considerations. However, with the development of Performance-based earthquake engineering (PBEE), several levels of performance objectives are gradually recognized:

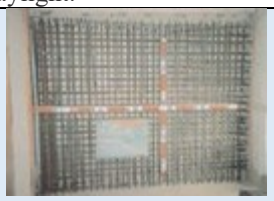
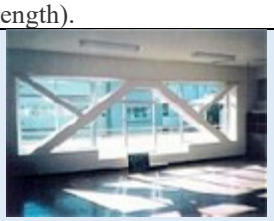
Public safety only: The goal is to protect human life, ensuring that the structure will not collapse upon its occupants or passersby, and that the structure can be safely exited. Under severe seismic conditions the structure may be a total economic write-off, requiring tear-down and replacement.

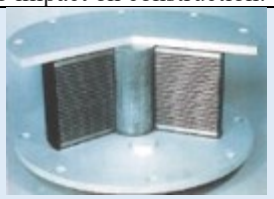
Structure survivability: The goal is that the structure, while remaining safe for exit, may require extensive repair (but not replacement) before it is generally useful or considered safe for occupation. This is typically the lowest level of retrofit applied to bridges.

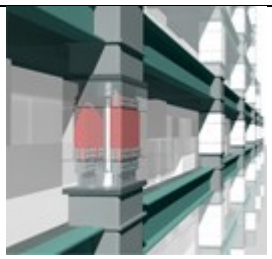
Structure functionality: Primary structure undamaged and the structure is undiminished in utility for its primary application. A high level of retrofit, this ensures that any required repairs are only "cosmetic" – for example, minor cracks in plaster, drywall and stucco. This is the minimum acceptable level of retrofit for hospitals.

Structure unaffected: This level of retrofit is preferred for historic structures of high cultural significance.

Table 14.1 List of Seismic Retrofitting Technologies			
Method	Structural Element	Name of Technology	Outline
Seismic Strengthening	Columns	Carbon Fiber Reinforcement	 This is a reinforcement method where carbon fiber is affixed to columns. Carbon fiber is a flexible and tough material used in golf club shafts, fishing poles and aircraft. Carbon fiber reinforcement allows for the reinforcement work to be performed in tight working spaces.
		Aramid Fiber Reinforcement	 This is a reinforcement method where aramid fiber is affixed to columns. Aramid fiber is a tough material used in flak jackets and the like. It exhibits characteristics similar to carbon fiber.
		Steel Plate Winding Reinforcement	 This is a reinforcement method where steel plates are wound around columns. Compared with fiber-based methods such as the carbon fiber reinforcement method, there is a greater increase in cross-section after reinforcement (increase in thickness).
		Additional RC Column Pouring	 This is a reinforcement method where new concrete is poured over existing columns. There is a greater increase in cross-section (increase in thickness) after reinforcement compared with other methods. As weight increases due to the reinforcement, the weight load on the building foundations increases.

	Frame (Walls)	Steel Brace Reinforcement	 This is a reinforcement method where X-type steel braces are inserted inside a frame surrounded by columns and beams. This involves a lighter weight compared with the addition of earthquake resisting walls, and since openings can be formed it is favorable in terms of daylight.
		Addition of RC Earthquake Resisting Walls (Addition of Side Walls)	 Reinforcement method for constructing RC earthquake-proof walls in openings. Its advantage is that not many walls need to be constructed, given the significant load resistance and rigidity of each wall. However, the more walls that are constructed, the heavier the reinforcement becomes. As a result, the load on the building base increases.
		Structural Slits	 This is a reinforcement method where the borders of columns and walls are cut to prevent shear failure (dangerous breakage) in short columns. As the side walls are not installed in structural bodies such as steel or walls, there is no improvement in bearing strength, but it does produce the effect of improved toughness (lasting strength).
	External (Attached to Exterior)	External Steel Brace Reinforcement	 This is a reinforcement method where X-type steel braces are placed on the sides of column or beam frames. As there is virtually no interference with indoor areas or windows, the reinforcement work can be performed while the building is still being used.

	Ceiling	Seismically Engineered Ceiling Clip Method	 This method seeks to prevent ceiling collapses with the one-touch mounting of earthquake-resistance clips to the clip parts of existing ceiling base materials. While conventional methods to improve the earthquake resistance of ceiling materials involve high costs, since the seismically engineered ceiling clip method involves simply attaching seismically engineered ceiling clips just like conventional ceiling construction techniques to improve earthquake resistance, there is little increase in cost and no impact on construction.
Seismic Isolation	Foundations/InterimFloors	Seismic Isolation System (Seismic Retrofitting)	 Seismic isolating devices are provided using dampers containing laminations of rubber and/or lead.These devices reduce the structure's vibration level between one third and one fifth during earthquakes.
	Floors	Seismic Floor Isolation System	 This is a method to seismically isolate only specific rooms (spaces) inside a building.
Damping	Brace / Walls	Damping System	 This is a technology where swaying is controlled with the installation of dampers, which soften expansion and contraction with the effects of materials such as oil, on each floor of a building (or on select floors). The technology reduces the swaying of buildings due to wind or earthquakes.

	Structure	BiD Frame Construction Method	 This is a vibration suppression strengthening technique that integrates a damping system into the columns of a building's outer frame and features excellent openness without brace reinforcement.This method was developed by collaboration between Nishimatsu Construction and KOZO KEIKAKU ENGINEERING Inc.

Prototype

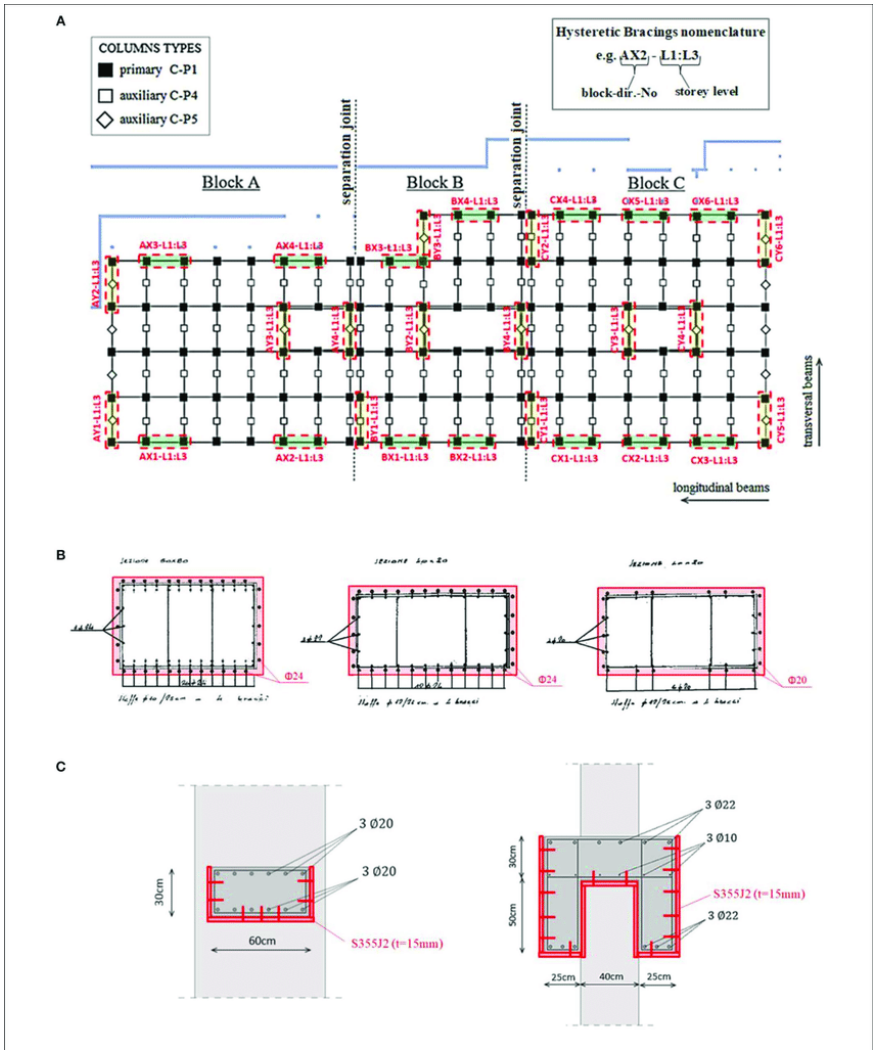


Fig. 14.2 Prototype 1

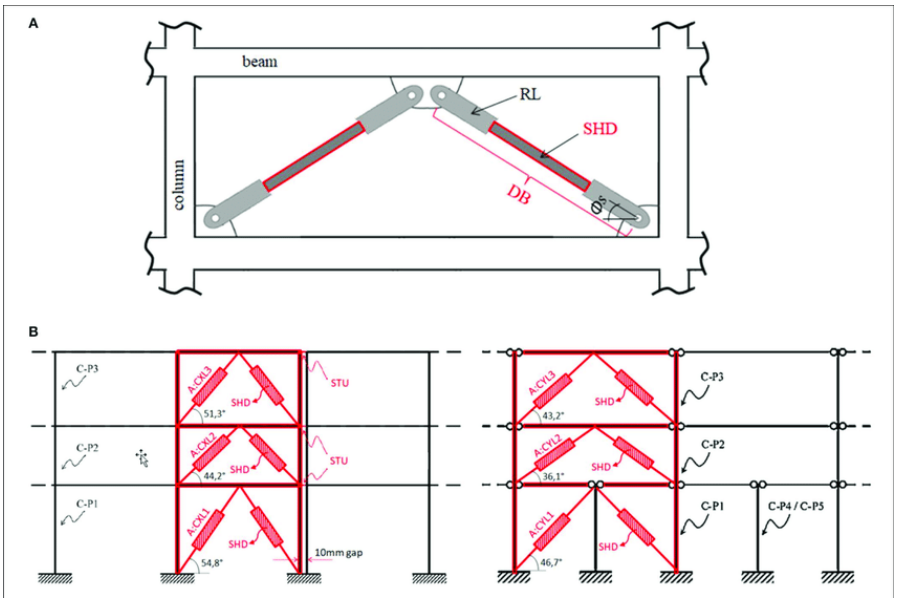


Fig. 14.3 Prototype 2

Cost of Seismic Retrofitting

Level	Activity	ID	Measurement unit	Dimensions				Quantity [m^2]	Price	
				Length [m]	Thickness [m]	Height [m]	Openings [m^2]		Unitary [Euro]	Total [Euro]
	Scaffolding	Second level	m^2	45.63	-	5.50	-	500	17.62	8810.00
		Third level		10.98	-	7.55	-	166		2924.92
1	Reinforced plaster	Wall P1	m^2	11.70	0.55	2.50	0.16	2 × 29.09	68.51	3985.91
		Wall P2		10.60	0.55	2.50	2.40	2 × 24.10		3302.18
		Wall P3		6.15	0.55	2.50	-	2 × 15.38		2106.68
		Wall P5		6.70	0.55	2.50	-	2 × 16.75		2295.09
		Wall P6		5.00	0.55	2.50	-	2 × 12.50		1712.75
		Wall P7		16.60	0.55	2.50	12.74	2 × 28.76		3940.70
		Wall P8		4.80	0.55	2.50	7.20	2 × 4.80		657.70
		Wall P9		3.80	0.55	2.50	2.40	2 × 7.10		972.84
		Wall P10		5.80	0.55	2.50	2.40	2 × 12.10		1657.94
		Wall P11		5.60	0.55	2.50	1.12	2 × 12.88		1764.82
		Wall P12		7.20	0.55	2.50	1.12	2 × 16.88		2312.90
2		Wall P1		11.70	0.40	3.00	1.12	2 × 33.98		4655.94
		Wall P2		10.90	0.40	3.00	1.80	2 × 30.90		4233.92
		Wall P3		6.30	0.40	3.00	1.80	2 × 17.10		2343.04
		Wall P4		4.20	0.40	3.00	–	2 × 12.60		1726.45
		Wall P5		6.70	0.40	3.00	–	2 × 20.10		2754.10
		Wall P6		5.00	0.40	3.00	4.40	2 × 10.60		1452.41
		Wall P7		16.60	0.40	3.00	6.16	2 × 43.64		5979.55
		Wall P8		4.95	0.40	3.00	1.80	2 × 13.05		1788.11
		Wall P9		4.10	0.40	3.00	1.80	2 × 10.50		1438.71
		Wall P10		5.95	0.40	3.00	1.80	2 × 16.05		2199.17
		Wall P11		5.55	0.40	3.00	3.08	2 × 13.57		1859.36
		Wall P12		7.25	0.40	3.00	7.14	2 × 14.61		2001.86
3		Wall P8		4.95	0.40	3.60	1.80	2 × 16.02		2195.06
		Wall P10		5.95	0.40	3.60	1.80	2 × 19.62		2688.33
		Wall P12		7.25	0.40	2.05	3.64	2 × 11.22		1537.71
									TOTAL	75298.16

TABLE 6 | Costs of the insulation of walls.

Activity	Measurement unit	Dimensions				Quantity [m^2]	Price	
		Length [m]	Thickness [m]	Height [m]	Openings [m^2]		Unitary [Euro]	Total [Euro]
Scaffolding	m^2	56.60	-	7.55	-	427.33	17.62	7529.55
Aluminium profiles	m	56.60	0.12	-	-	56.60	11.79	667.31
EPS sheets	m^2	56.60	0.08	7.55	49.24	378.09	50.18	18972.56
Plaster	m^2	56.60	0.02	7.55	49.24	378.09	18.09	6839.65
Stucco	m^2	56.60	0.04	7.55	49.24	378.09	26.07	9856.81
							TOTAL	43865.88

14.1.3 Advance Practices in Construction field in Modern Material, Techniques and Equipment's

Fig. 14.4 Example of Modern technique of Construction

What are Modern Techniques and materials of Construction?

Modern construction techniques are techniques that are developed in construction industry with proper planning and design so that each project reduces the construction time, cost and maintain overall sustainability.

There are many methods followed and constructed in the present scenario widespread. Most famous and highly applied methods of modern construction are listed and explained below.

Types of Modern technique of Construction:

The different technique used in construction field includes:

- Precast Flat Panel System
- 3D Volumetric Modules
- Flat Slab Construction
- Precast Cladding Panels
- Concrete Wall and Floors
- Twin Wall Technology
- Precast Concrete Foundation
- Concrete Formwork Insulation

Fig. 14.5 Precast flat panel system

1. Precast Flat Panel System:

This method of construction involves the procedure of making floor and wall units off site. For this, separate factory outlets and facilities is required. Once the panel units are made as per the design specification and requirements, they are brought to the site and placed. This method is best suited for repetitive construction project activities.

The panels manufactured has the services of windows, doors and the finishes. This method also brings building envelope panels which are provided with insulation and decorative cladding that is fitted by the factory which can also be used as load – bearing elements.

Fig. 14.6 Volumetric Construction

2. 3D Volumetric Construction:

As the name implies, the 3D volumetric construction involves the manufacture of 3D units in the form of modules in off site. At the time of installation, they are brought to the site and assembled module by module. Each modular unit manufactured are 3D units, hence this construction is called as 3D volumetric construction or modular construction.

Fig. 14.7 Flat slab Construction

The transportation of the modules can be carried out in various forms or methods. This can involve the transportation of the basic structure or a completed unit with all the internal and external finishes, services installed within it, that the only part remaining is the assembly. The factory construction brings different unit of same product maintaining their quality throughout. Hence this method is best suited for repetitive projects so that rapid assembly of the products is possible.

3.Flat Slab Construction:

The flat slabs are structural elements that are highly versatile in nature. This is this versatility that it is used widely in construction. The flat slab provides minimum depth and faster construction. The system also provides column grids that are flexible.

Wherever it is necessary to seal the partitions to the slab soffit as a reason of acoustic and fire concerns, the flat slabs

are a desirable solution. When compared with other forms of construction, the flat slabs are faster and more economic in nature. The construction of flat slabs can be completed with good surface finish for the soffit, this enables to utilize he exposed soffits. The flat slab construction is also a means of increasing the energy efficiency as this allows the exploitation of building thermal mass in the design of ventilation, heating and the cooling requirements.

4.Precast Concrete Foundations

Fig. 14.8 Precast Concrete Foundation

For the rapid construction of foundation, the precast concrete system can be employed. This method is more suited for a bespoke design. Here, the elements required for the construction of foundation are constructed separately in the factory (off site) and brought to the site and assembled. The manufactured product must have the assured quality as specified by the designer. The foundation assembled is mainly supported by concrete piles. During assembling, both the systems are connected together. These foundation systems helps in increasing the productivity, increase quality, decrease the soil excavation quantity. This is best suited for extreme and adverse weather conditions. When the construction is dealt on a highly contaminated ground, this system of construction is a best choice.

5.Concrete Walls and Floors:

Concrete walls are mainly applied for seat walls, retaining wall, decorative exterior, and interior finishes. The concrete is also used a flooring material. As per the latest technology, the concrete floors can be provided with good finish to provide smooth and attractive flooring. When compared with any other material, the concrete floors provide a wide variety of material for applications like acid-stained painted, radiant floors, overlays, and micro toppings. The concrete flooring can also be called as cement flooring. When compared with other flooring types, concrete flooring is affordable and maintenance is easy. Proper sealing of concrete flooring can be cleaned by a dust mop.

Fig. 14.9 Twin Wall Technology

6.Twin Wall Technology:

The twin wall technology is a hybrid solution of wall system that combines the qualities of erection speed and precast concrete with the structural integrity of in-situ concrete. This type of wall system guarantees structural integrity and waterproof reliability for the structure.

The twin wall system has two walls slabs that are separated as shown in the figure.The two slabs are separated by a cast in lattice girders. The procedure involves:

- The wall units are placed in the site.
- The twin units are propped temporarily.
- The wall units are later joined by means of reinforcing.
- The gap between the wall units are filled by means of concrete.
- This system of construction is faster than normal construction methods and economical. The twin wall system is mainly employed in association with the construction of precast floors.

Fig. 14.10 Insulating Concrete Formwork

7. Insulating Concrete Formwork

The system of insulating concrete formwork (ICF) has twin walled panels that are either polystyrene panels or blocks are employed. These are built quickly to create the formwork as the wall of the buildings. The formwork that is made is filled with concrete. This concrete is factory produced that have quality assurance so that a ready – mixed concrete. Mostly the mix is ready mix concrete. Higher level of thermal insulation is provided by expanded polystyrene blocks. The concrete core will provide good robustness and better sound insulation.

Fig. 14.11 Precast Cladding Panels

8.Precast Cladding Panels

The cladding system is the installation of a material over another that finally act as a skin or a layer. This system of layer is not only intended for aesthetics, but it can help in controlling the infiltration of the weather elements.

No kind of waterproof condition is provided by the cladding. Instead, the cladding is a control measure against water penetration. This safely help in directing the water or the wind so that there is control of the runoff. This helps to prevent the infiltration into the building structure.

14.1.4 Engineering Aspects of Soil mechanics – Environmental Impact Assessment

Definition of EIA:

A systematic identification and evaluation of the potential impacts of proposed projects, plans, programs, or legislative action relative to physical-chemical, biological, cultural and socioeconomic components of environment is called Environmental Impact Assessment. OR

The process of predicting, identifying, evaluating and mitigating the biological, social and other relevant effects of developmental proposals prior to major decision being taken and commitment made. It is an important procedure for ensuring that the likely effects of new developmental activities on the environment are fully understood and taken into account before the development is allowed to go ahead.

Environmental impact Assessment is an event or effect, which results from a prior event. It can be described as the change in an environmental parameter, over a specific period and within a defined area, resulting from a particular activity compared with the situation which would have occurred had the activity not been initiated.

Objectives of Environmental Impact Assessment (EIA):

- To ensure that Environmental considerations are addressed properly and incorporated into decision making process.
- To avoid, minimize or balance the adverse significant bio-physical, social and other relevant effects of developmental projects.
- To protect the productivity and capacity of natural system and ecological processes with maintain their function.
- To promote development that is sustainable and optimize resources use and management opportunities.

Characteristics of Environmental Impact Assessment

An ideal EIA should have the following characteristics:

- Apply to all activities that have significant environmental impact and address all the impacts that are expected to be significant.
- Compare alternatives to a proposed project (including the possibility of not developing the site), management, techniques and mitigation measures.
- Clear EIS mentioning importance of impacts and their specific characteristics to experts as well as to non-expert in the field.
- Public participation and stringent administrative review procedure
- Be on time so as to provide information for decision making and be enforceable.
- Including monitoring and feedback procedures.

Benefits of Environmental Impact Assessment

The main benefits of EIA process are:

- Improved project design / siting
- More informed decision making with improved opportunities for public involvement in decision making.
- More environmentally sensitive decisions.
- Increased accountability and transparency during the development process.
- Improved integration of projects into their environmental and social setting.
- Reduced environmental damage.

- More effective projects in terms of meeting their financial and/or socio-economic objectives.
- A positive contribution towards achieving sustainability.

The study of EIA effectiveness shows a number of difficulties and constraints, generally, although not universally applicable, that continue to prevent and hinder EIA from consistently delivering these advantages and benefits.

Scope of EIA: Small scale projects not included in most environmental impact assessment systems although their cumulative impacts may be significant over time.

Problems in Environmental Impact Assessment

- Difficulties in ensuring adequate and useful public involvement (or participation);
- Insufficient integration of EIA work at key decision points in relation to feasibility and similar studies in the project life-cycle; with some major decisions being made even before EIAs are completed;
- Lack of consistency in selection of developments requiring specific environmental impact assessment studies;
- Inadequate understanding of the relative roles of baseline description and impact prediction;
- Poor integration of biophysical environmental impacts with social, economic and health effects also add to the Problems in Environmental Impact Assessment;
- Production of EIA reports which are not easily understood by decision makers and the public because of their length and technical complexity;
- Lack of mechanisms to ensure that EIA reports are considered in decision-making;
- Weak linkages between environmental impact assessment report recommendations on mitigation and monitoring and project implementation and operation; and
- Limited technical and managerial capacities in many countries to implement EIAs result in Problems in carrying out Environmental Impact Assessment.

14.1.5 Water Supply-Sewerage System-Waste Water- Sustainable development techniques

Water supply system: **Water supply system**, infrastructure for the collection, transmission, treatment, storage, and distribution of water for homes, commercial establishments, industry, and irrigation, as well as for such public needs as firefighting and street flushing. Of all municipal services, provision of potable water is perhaps the most vital. People depend on water for drinking, cooking, washing, carrying away wastes, and other domestic needs. Water supply systems must also meet requirements for public, commercial, and industrial activities. In all cases, the water must fulfill both quality and quantity requirements.

Wastewater:

Wastewater is any water that has been contaminated by human use. Wastewater is "used water from any combination of domestic, industrial, commercial or agricultural activities, surface runoff or stormwater, and any sewer inflow or sewer infiltration".[1] Therefore, wastewater is a byproduct of domestic, industrial, commercial or agricultural activities. The characteristics of wastewater vary depending on the source. Types of wastewater include: domestic wastewater from households, municipal wastewater from communities (also called sewage) and industrial wastewater. Wastewater can contain physical, chemical and biological pollutants.

Households may produce wastewater from flush toilets, sinks, dishwashers, washing machines, bath tubs, and showers. Households that use dry toilets produce less wastewater than those that use flush toilets.

Wastewater may be conveyed in a sanitary sewer that conveys only sewage. Alternatively, wastewater can be transported in a combined sewer that conveys both stormwater runoff and sewage, and possibly also industrial wastewater. After treatment at a wastewater treatment plant, treated wastewater (also called effluent) is discharged to a receiving water body. The terms "wastewater reuse" and "water reclamation" apply if the treated waste is used for another purpose. Wastewater that is discharged to the environment without suitable treatment can cause water pollution.

In developing countries and in rural areas with low population densities, wastewater is often treated by various on-site sanitation systems and not conveyed in sewers. These systems include septic tanks connected to drain fields, on-site sewage systems (OSS), vermifilter systems and many more.

Why is wastewater resource recovery important?

Wastewater is a complex blend of metals, nutrients, and specialized chemicals. Recovery of these valuable materials can help to offset a community's growing demands for natural resources. Resource recovery concepts are evolving, and researchers are investigating and developing numerous technologies. Reclamation and reuse of treated water for irrigation, groundwater recharge, or recreational purposes are particular areas of focus.

Sewerage

Sewerage is the infrastructure that conveys sewage or surface runoff (stormwater, meltwater, rainwater) using sewers. It encompasses components such as receiving drains, manholes, pumping stations, storm overflows, and screening chambers of the combined sewer or sanitary sewer. Sewerage ends at the entry to a sewage treatment plant or at the point of discharge into the environment. It is the system of pipes, chambers, manholes, etc. that conveys the sewage or storm water.

Sewerage systems

A sewage system, or wastewater collection system, is a network of pipes, pumping stations, and appurtenances that convey sewage from its points of origin to a point of treatment and disposal.

Water and sustainable development:

Water is at the core of sustainable development and is critical for socio-economic development, healthy ecosystems and for human survival itself. It is vital for reducing the global burden of disease and improving the health, welfare and productivity of populations. It is central to the production and preservation of a host of benefits and services for people. Water is also at the heart of adaptation to climate change, serving as the crucial link between the climate system, human society and the environment.

Water is a finite and irreplaceable resource that is fundamental to human well-being. It is only renewable if well managed. Today, more than 1.7 billion people live in river basins where depletion through use exceeds natural recharge, a trend that will see two-thirds of the world's population living in water-stressed countries by 2025. Water can pose a serious challenge to sustainable development but managed efficiently and equitably, water can play a key enabling role in strengthening the resilience of social, economic and environmental systems in the light of rapid and unpredictable changes.

What is "sustainable development"?

Sustainable development was explicitly popularized and contextualized by the Brundtland Commission in the document **"Our Common Future"** where it was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (UN, 1987). The Brundtland Commission focused on three pillars of human well-being: economic, socio-political and ecological/environmental conditions. The basic concept endorses putting in place strong measures to spur economic and social development, particularly for people in developing countries, while ensuring that environmental integrity is sustained for future generations.

Water, sustainable development, the MDGs and the SDGs

The Millennium Development Goals (MDGs):

The Millennium Development Goals (MDGs), agreed in 2000, aim to halve the proportion of people without sustainable access to safe drinking water and basic sanitation between 1990 and 2015.

A total of **748 million** people still do not have access to an **improved drinking water source** and existing indicators do not address the safety and reliability of water supplies. To reach the requirements of the right to access to safe drinking water requires real improvements for several billions of people.

In July 2010, the General Assembly adopted a resolution, which "recognized the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights".

The MDG target for **sanitation** is an even more pressing challenge, with **2.5 billion** people currently lacking access to improved sanitation and over one billion still practicing open defecation. At current rates of progress, the sanitation target will be missed by over half a billion people.

These global aggregates also mask large disparities between nations and regions, rich and poor, between rural and urban populations, as well as between disadvantaged groups and the general population.

There is currently no global target to improve **hygiene**, despite this being one of the single most cost-effective public health interventions.

Sustainable Development Goals (SDGs) on Water:

As the time limit for the MDGs draws to a close in 2015, the global community is taking stock of how it can move towards a sustainable future. The MDG framework did not address the full water and development agenda, nor fully recognize its synergies with other areas and concerns. Emphasis on 'Sustainability' was not included and human rights and inequalities were also largely ignored in the MDG framework. Subsequently, member states have agreed that human rights, equality and sustainability should form the core of the development agenda and be recognized as critical for true development.

UN-Water's overarching goal is "Securing Sustainable Water for All". The water goal and targets directly address the development aims of societies, promote human dignity and ensure achievements are sustainable over the long-term leading to the following development outcomes, amongst others.

Sustainable development, water, and…

Agriculture is by far the thirstiest consumer of water globally, accounting for 70% of water withdrawals worldwide, although this figure varies considerably across countries. Rainfed agriculture is the predominant agricultural production system around the world, and its current productivity is, on average, little more than half the potential obtainable under optimal agricultural management. By 2050, world agriculture will need to produce 60% more food globally, and 100% more in developing countries.

Industry and energy together account for 20% of water demand. More-developed countries have a much larger proportion of freshwater withdrawals for industry than less-developed countries, where agriculture dominates. Balancing the requirements of sustainability against the conventional view of industrial mass production creates a number of conundrums for industry. One of the biggest is globalization and how to spread the benefits of industrialization worldwide and without unsustainable impacts on water and other natural resources.

Domestic sector accounts for 10% of total water use. And yet, worldwide, an estimated 748 million people remain without access to an improved source of water and 2.5 billion remain without access to improved sanitation.

Cities. More than half the world already lives in urban areas and by 2050, it is expected that more than two-thirds of the global population of 9 billion will be living in cities. Furthermore, most of this growth will happen in developing countries, which have limited capacity to deal with this rapid change, and the growth will also lead to increase in the number of people living in slums, which often have very poor living conditions, including inadequate water and sanitation facilities. Therefore, the development of water resources for economic growth, social equity and environmental sustainability will be closely linked with the sustainable development of cities.

Ecosystems. Perhaps the most important challenge to sustainable development to have arisen in the last decades is the unfolding global ecological crisis that is becoming a barrier to further human development. From an ecological perspective, the sustainable development efforts have not been successful. Global environmental degradation has reached a critical level with major ecosystems approaching thresholds that could trigger massive collapse. The growing understanding of global planetary boundaries, which must be respected to protect Earth's life support systems, needs to be the very basis of the future sustainable development framework.

Did you know?

- Over **1.7 billion** people are currently living in river basins where water use exceeds recharge, leading to the desiccation of rivers, depletion of groundwater and the degradation of ecosystems and the services they provide.
- As countries develop and populations grow, global water demand (in terms of withdrawals) is projected to increase **by 55% by 2050**. Already by 2025, two thirds of the world's population could be living in water-stressed countries if current consumption patterns continue.
- The economic loss from the inadequate delivery of water and sanitation was estimated to amount to **1.5 % of gross domestic product** of the countries included in a WHO study on meeting the MDGs.
- According to some estimates, over **80% of wastewater** is discharged without treatment.
- Water-related disasters are the most economically and socially destructive of all-natural disasters. Since the original Rio Earth Summit in 1992 floods, droughts and storms have affected **4.2 billion people** (95% of all people affected by disasters) and caused **USD 1.3 trillion** of damage (63% of all damage).

14.1.5.1 Decentralized Wastewater Treatment (DWWT)

What is decentralized wastewater treatment system?

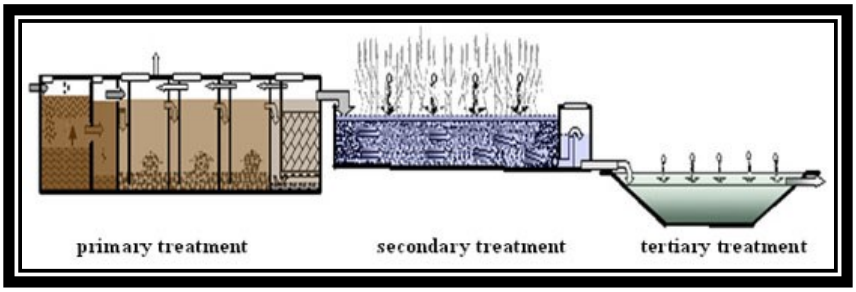


Fig. 14.12 Decentralized Wastewater Treatment system

There are several kinds of wastewater treatment systems which are in use. They range from conventional low-cost options and decentralized small systems to large, expensive, centralized systems.

Decentralized systems are small, individual or cluster type wastewater facilities to provide wastewater treatment services to residents. In the decentralized wastewater treatment systems, wastewater can be treated onsite through aerobic and anaerobic techniques. The anaerobic modules comprise of settlers, baffle reactors and anaerobic filters. The aerobic modules have horizontal planted gravel filters and polishing ponds. This approach is based on different natural treatment techniques, put together in different combinations according to need. It is used for recycling both "grey" and "black" domestic wastewater. These systems include:

Primary treatment, which includes pre-treatment and sedimentation in settlement tank or septic tank; Secondary anaerobic treatment in baffled reactors; Tertiary aerobic/anaerobic treatment in reed bed system; and polishing in Ponds.

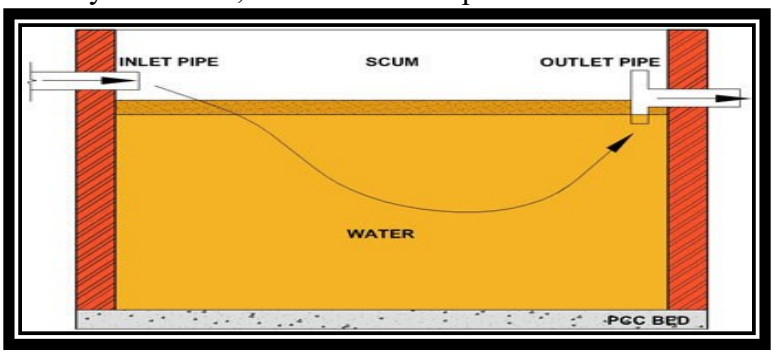


Fig. 14.13 Separation of floating oil & grease in a grease

Primary Treatment

Pre-treatment is used for the screening and separation of the floating oil and grease in a grease trap. Primary treatment takes place in a settler or a septic tank in which the liquid part is separated from the solid matter through sedimentation process. The settled sludge is stabilised by anaerobic digestion.

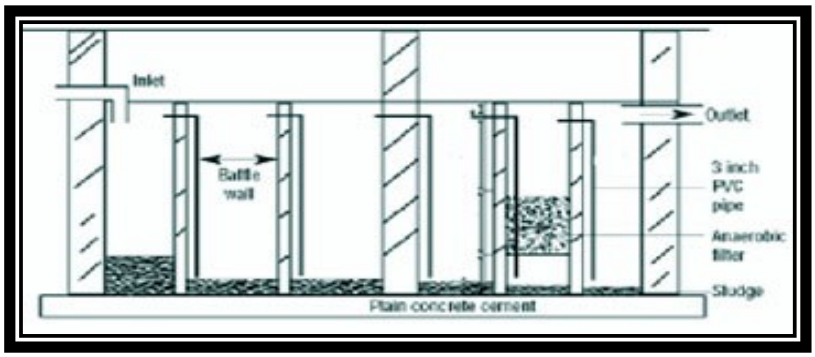


Fig. 14.14 Anaerobic baffled reactor for secondary treatment

Secondary Treatment

Secondary treatment of the wastewater takes place in the Baffled Reactors which consist of a series of chambers, in which the wastewater flows up-stream. On the bottom of each chamber activated sludge is retained. During inflow into the chamber wastewater is intensively mixed up with the sludge whereby it is inoculated with wastewater organisms, which decompose the contained pollutants.

Tertiary treatment

Tertiary treatment takes place in the planted Gravel Filter through rootzone system. . The main removal mechanisms are biological conversion, physical filtration and chemical adsorption. The treated water at this stage meets the requirement for recycling and reuse of water for horticulture/irrigation purposes.

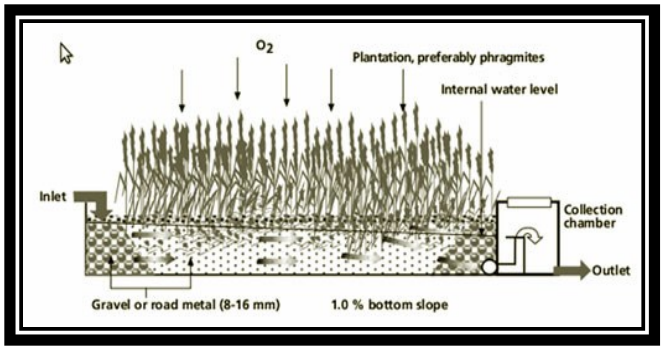


Fig. 14.15 Rootzone treatment system for tertiary treatment

Polishing Ponds

Here, both aerobic degradation and pathogen removal takes place. It is simple in construction, reliable in performance if properly designed, high pathogen removal, can be used to create an almost natural environment, fish farming s possible in large and low-loaded polishing ponds.

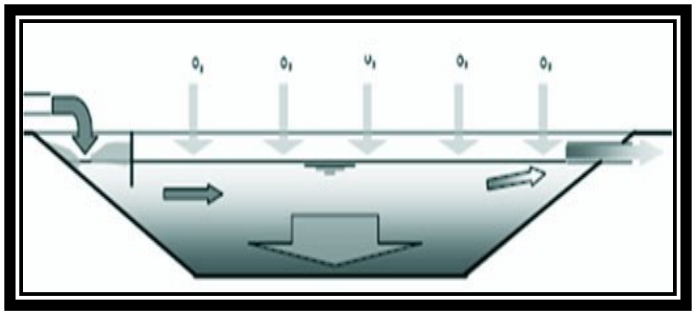


Fig. 14.16 Polishing Pond for post treatment

Cost estimation for planning and designing of decentralized wastewater treatment system

Decentralized wastewater treatment plant is a site-specific system. The different components of the system settler, anaerobic baffled reactor, planted filter and polishing pond are planned and designed according to the treatment requirement of the wastewater generated. Average water consumption for domestic usage in India is 135 Lpcd. 80% of the water which is used or consumed for domestic purposes comes out as a wastewater. An on-site wastewater treatment plant like DWWT can be installed to treat and recycle this wastewater in order to close the loop. The capacity of the system may vary from 1KLD to 100 KLD.

Broadly, planning and designing, implementation and operation & maintenance activities comprise of 25%, 60% and 15% respectively of the total cost incurred. Parameters which are to be considered while planning and designing DWWT system are land requirement, installation and operation & maintenance.

Land requirement

Depending on the total volume, total area of the land required to install different units of DWWT can be calculated. This is influenced by the nature of wastewater and depth of the unit tanks.

Settler: 0.5 m2/m3 daily flow
Anaerobic baffled reactor: 1 m2/m3 daily flow
Constructed wetland: 30 m2/m3 daily flow
Anaerobic ponds: 4 m2/m3 daily flow
Facultative aerobic ponds: 25 m2/m3 daily flow

These figures are approximate values, also the area requirement increases with the strength of the wastewater. Structures like settler and improved septic tank or anaerobic baffled reactor are underground hence leading to no wastage of open area.

Installation

This includes activities like excavation, plastering, brick work, plumbing, flooring etc. along with the cost of construction material. The different items which are required for construction are walls of solid cement blocks with outside and inside plastering for water tightness, PCC base, PVC pipes, baffle walls, gravel filter media, RCC slab, perforated slabs, vent pipes and plants/reeds like canal, cattails, bulrushes etc. The cost component pertaining to the construction and installation varies from cities to cities. Typically, for installation of a plant of 8-10 KLD capacity would cost around Rs. 2.5-3 lakhs.

Operation & maintenance

Decentralized wastewater treatment systems are low-cost on-site treatment approach but continuous operation and maintenance is necessary for the sustainability and to maintain the desirable performance of the plant. The annual operation and maintenance cost for the plant is generally in the range of Rs. 3000-5000. Regular de-sludging of the settler and baffled reactor is required in the span of 1-3 years in order to meet the effluent standards. Replacement of filter media is also necessary when treatment efficiency goes down. The normal period of cleaning the gravel filter media is in the interval of 8 – 10 years.

As the capacity increases, up-to some level DEWATS is effective but for larger capacity multi-units of DWWT system is recommended of smaller manageable sizes limited to 100kld. Average cost of construction is Rs. 25,000-30,000 per KL flow per day (approximately).

Cost summary of DWWT components for 1 KLD plant is *

Table 14.2 Cost Estimation percentage

Components	Surface area requirement(sqm/KL)	Capacity (cum/KL)	% Of Total cost (approx)
Settler	0.5	1	10
Reactor	1	1.73 (inner);3 (outer)	40
Planted filter	5	4	30
Storage sump	-	1	10
Polishing pond	1	0.88	5
Misc			5

*Indicative only, the dimensions and rate may vary as per the inlet water quality and cities respectively. Current rates have to be taken for actual cost estimation.

14.2 Electrical Engineering

14.2.1 Design of power electronic converter

Power electronic technology deals with processing and controlling the flow of electrical energy in order to supply voltages and currents in a form that optimally suited for end user's requirements. A power electronic converter uses power electronic components such as SCRs, TRIACs, IGBTs, etc. to control and convert the electric power. The main aim of the converter is to produce conditioning power with respect to a certain application.

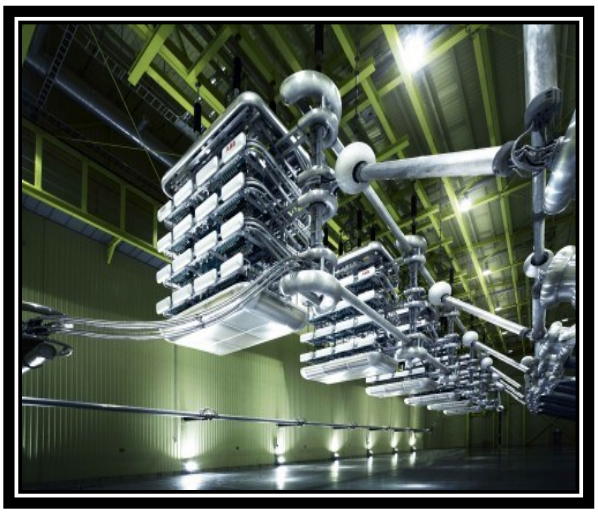


Fig. 14.17 Electronic Power Converter

What is a Power Electronic Converter?

The block diagram of a power electronic converter is shown in figure above. It consists of an electrical energy source, power electronic circuit, a control circuit and an electric load. This converter changes one form of electrical energy to other form of electrical energy.

The power electronic circuit consists of both power part and control part. Power part transfers the energy from source to load and it consists of power electronic switches (SCR or TRIAC), transformers, electric choke, capacitors, fuses and sometimes resistors.

The control circuit or block regulates the elements in the power part of the converter. This block is built with a complex low power electronic circuit that consists of either analog or digital circuit assembly.

Power electronic converters perform various basic power conversion functions. This converter is a single power conversion stage that can perform any of the functions in AC and DC power conversion systems.

Depending on the type of function performed, power electronic converters are categorized into following types.

AC to DC = Rectifier: It converts AC to unipolar (DC) current

DC to AC = Inverter: It converts DC to AC of desired frequency and voltage

DC to DC = Chopper: It converts constant to variable DC or variable DC to constant DC

AC to AC = Cycloconverter, Matrix converter: It converts AC of desired frequency and/or desired voltage magnitude from a line AC supply.

14.2.2. Technical Case Study "Electronic soft starter 1/3 phase induction motor for agriculture"

The project is designed to provide a soft and smooth start to a 3-phase induction motor. The three-phase induction motor during the initial starting condition draws up much higher current than its capacity and the motor instantly reaches the full speed. This results in a mechanical jerk and high electrical stress on the windings of the motor. Sometimes the windings may get burnt. The induction motor should start smoothly and gradually catch up the speed for a safer operation. This project is designed to give a soft start to the induction motor based on the SCR firing triggered by heavily delayed firing angle during starting and then gradually reducing the delay till it reaches zero voltage triggering. This results in low voltage during start and then gradually to full voltage. Thus, the motor starts slowly and then slowly picks up to full speed [1]. This project consists of a six anti-parallel SCRs, two for each phase, the output of which is connected to a set of lamps representing the coils of a 3-phase induction motor. The charging and discharging of capacitors is interfaced to comparators resulting in delayed firing pulses during start and then gradually reducing the delay till the motor runs at full speed. Output from the comparators is fed through opto-isolators to trigger the SCRs. Further the project can be enhanced by using IGBTs in place of

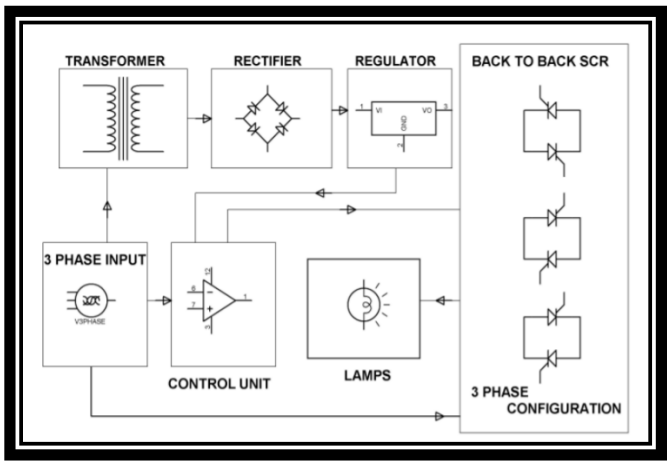


Fig. 14.18 Block Diagram of Soft Starter

SCRs with PWM control to reduce harmonic distortions often encountered in SCR triggering mechanism.

Soft Starters: A soft starter is another form of reduced voltage starter for A.C. induction motors. The soft starter is similar to a primary resistance or primary reactance starter in that it is in series with the supply to the motor. The current into the starter equals the current out. The soft starter employs solid state devices to control the current flow and therefore the voltage applied to the motor. In theory, soft starters can be connected in series with the line voltage applied to the motor, or can be connected inside the delta loop of a delta connected motor, controlling the voltage applied to each winding. Figure 1: Block diagram for soft starting of induction motor There is the block diagram shown in the fig 1 in this voltage is controlled by SCRs.

Voltage Control: Voltage control is achieved by means of solid state A.C. switches in series with one or more phases. These switches comprise either as shown in fig 2. These Solid-State Switches are phase controlled in a similar manner to a light dimmer, in that they are turned on for conduction angle will increase the average output voltage. Controlling the average output voltage by means of solid-state switches has a number of advantages, one of the major advantages being the vast improvement in efficiency relative to the primary resistance starter, due to the low on state voltage of the solid-state switches. A part of each cycle. The average voltage is controlled by varying the conduction angle of the switches. Typically, the power dissipation in the starter, during start, will be less than 1% of the power dissipated in a primary resistance starter during start. Another major advantage of the solid-state starter is that the average voltage can be easily altered to suit the required starting conditions. By variation of the conduction angle, the output voltage can be increased or reduced, and this can be achieved automatically by the control electronics. ramp generation and level generation for one phase and the same thing is applied for rest 2 phases. For generating level voltage, a p-n-p BC 558 transistor is used whose emitter is connected to the +12v supply and base is connected to a ceramic capacitor 0.4uf and the collector is connected to an electrolytic capacitor 2.2uf via 10k resistor.

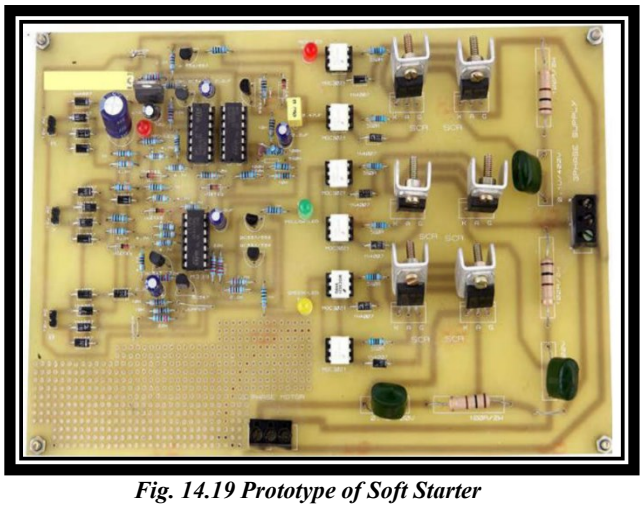


Fig. 14.19 Prototype of Soft Starter

The ac motor starters are increasingly becoming popular due to its controlled soft-starting capability. The ac motor starter provides limited starting current and hence conventional electromagnetic line starters and reduced-voltage starters are replaced with ac motor starters.

Thyristor-based soft starters have many desirable properties and provide a viable solution to starting problems in three phase induction motors. These power semiconductor-based starters are cheap, simple, and reliable and occupies less volume. The power density of these soft starters is also very high. A three-phase induction motor produces electromagnetic torque on its shaft but initial switching instants of all three phases to the supply produces pulsations on the electromechanical torque when it is controlled by a direct- online starter. These severe pulsations in electromagnetic torque might cause shocks to the shaft and hence to the driven equipment. These pulsations might damage mechanical system components, such as shafts, couplings and gears etc.

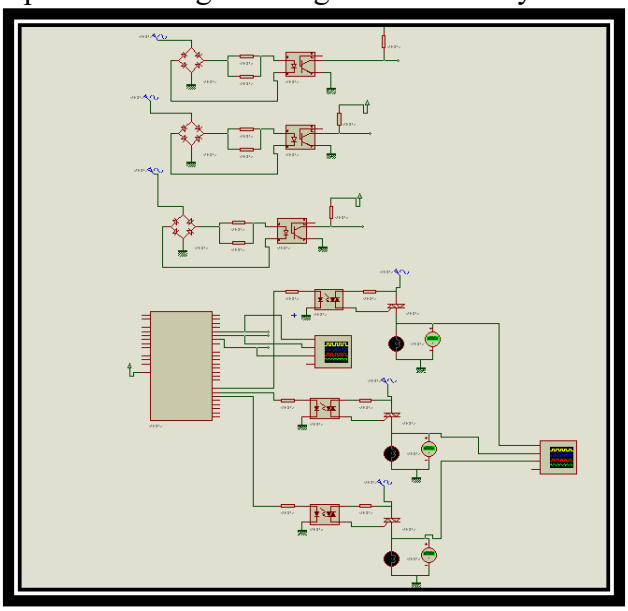


Fig. 14.20 Electrical soft starter 1/3 phase induction motor for agriculture

The electromagnetic torque pulsations also cause long term effects on various mechanical system components if the strength of materials is exceeded which might lead to fatigue also. The reduced voltage starting by soft starters eliminates stress from the electrical supply and it also reduces the possibility of voltage dip and brown out conditions. Soft and smooth starters provide smooth acceleration of rotor of three phase induction motor. Reduced voltage starting reduces high amount of starting torque applied on the shaft and therefore eliminates the shock on the driven load. An instantaneous high amount of starting torque can cause a jolt on the conveyor which can damage products, pump cavitation's and water hammer in pipes.

Therefore, a soft starter ramps up the voltage applied to the motor from the initial voltage to the full voltage. The voltage is initially kept low to avoid sudden jerks during the start. The voltage and torque increase gradually so that the induction motor starts to accelerate. This ramp up voltage provides sufficient torque for the load to accelerate gradually and hence mechanical and electrical shocks are minimized from the system, The voltage supplied to stator windings are adjustable and it has ramp characteristics.

Table 14.3 Estimated Cost of Electronic Soft Starter

Sr No	Component	Specification	No of Unit	Cost (Rs)
1	Resistors	560R 6 1K 7 2.2K 3 3.3K 3 4.7K 9 10K 6 22K 6 27K 1 100K 3 2.2M 2 100R/2W	11	20
2	Capacitors	470uF/35V , 10uF/63V 1 2.2uF/25V 4 0.47uF (470nF) Polyester 2 0.1uF/400V Polyester	6	300
3	Diodes	1N4007, IN4148	26	130

4	IC	7812, LM339	2	50
5	IC base	14pin,6 pin	2	50
6	Transistors	BC558/BC557 4 BC547	3	90
7	PCB	-	1	150
8	Wire	2m	1	30
9	Soldering Cost			100
10	Miscellaneous	-	2	300
				Total = 1220/- Rs

14.2.3. Wireless power transfer system

First demonstrated by Nicholas Tesla in the 1890s, wireless power transfer is an innovative technology that has permeated major areas in the consumer and industrial electronic market. The various forms of WPT include solar energy, microwaves, and magnetic energy. In this article, we will focus on wireless power transfer using magnetism and induction coils. The following offers an insight into the working principle, features, and applications.

Fig. 14.21 Wireless power transfer system

Working principle:

Wireless power transfer works on the inductive power transfer principle, as found in the conventional transformers. The only difference is that while in the transformer the two coils are in very close proximity and contain a ferrite material to increase the coupling, inductive chargers have an air gap between the two coils.

The process follows the following procedure:

- The mains voltage is converted into alternating current, preferably, high-frequency AC
- This current (the high-frequency AC) is transferred to the coil via transmitter circuit. This AC induces a magnetic field in the transmitter coil.
- The induced magnetic field generates a current in the adjacent receiver coil.

Wireless power transfer:

However, in the earlier applications, the designers faced a challenge; the strength of a magnetic field decreases with distance. The decrease in strength is proportional to the square of the distance from the source. This made it difficult to regulate power and reduced energy efficiency.

To solve this, the designers introduced resonance. You acquire resonance by multiplying the capacitance of the plates attached to the ends of the coil with the coil inductance.

Wireless power transfer 2:

The introduction of resonators with the same frequency in the sources and receiver coil respectively ensures that the two systems couple magnetically, thus allowing for higher energy transfer efficiency. This means that the power transfer happens over an air gap without the need for metal or other material connection.

For this to happen, both the transmitter and the receiving coil must resonate at the same frequency. The generated AC is converted into direct current for charging the battery.

However, in cases where the two objects are far apart, power transfer can still be achieved through resonating the two coils at the same frequency. This eliminates the need for perfect alignment.

Greater power transfer distances can be achieved by introducing resonant repeaters between the two components.

Fig. 14.22 Industrial Temperature Controller

Advantages of wireless power transfer system.

- Allows for charging of multiple devices. This is achieved by changing the coil geometry, as well as allocating large charging surface areas such as table tops and charging benches.
- High charging speeds: though at the moment wireless charging offers a slower charging rate than the wired option, advances in resonance and induction technology promises an increased charging rate and improved efficiency in the future
- Wireless power transfer allows for greater spatial freedom between the power source and the device. This means that the two do not have to be precisely aligned for power transfer.
- Eliminating charging cords enables engineers to make compact and watertight devices, thus maximizing on safety, and varied use such as in deep-sea applications.
- Prevents corrosion and sparking by eliminating mechanical connectors and wired contacts
- Reduces costs associated with maintaining and replacing mechanical connectors

14.2.4. Industrial temperature controller

For accurate control of the process temperature without constant operator involvement all industrial thermal process relay upon a controller. The controller gets is inputs from contact temperature sensors like thermocouple, RTD or from a non-contact temperature sensor like an infrared temperature sensor. The controller transmits an electrical signal (current or voltage) to a power switch device which can be a simple relay, a solid-state relay or a SCR (Silicone Controlled Rectifier).

Remember: The temperature controller is just one part of the entire control system, so it must be selected accordingly.

The basic types of temperature controllers are:

On / Off control This units turns the power on and off when the setpoint is crossed. This type of controller is adequate when the process temperature is not very critical and/or larger masses need to be heated. (like immersion tanks)

Microprocessor control (PID control) This is a generic term for a control feedback mechanism widely used in thermal control systems. A PID controller attempts to correct the error between a measured process temperature and a desired setpoint by calculating and then outputting a corrective action that can adjust the process accordingly. A widely used PID controller is Ogden's ETR 9090.

14.2.5. Accident alert in modern traffic system with camera system.

Fig. 14.23 Modern traffic System

Nowadays the main cause of death due to road accidents is not because of the effect of the accident on the person but because of the lack of care and sudden action after the event. This paper is meant to overcome this problem. Accident detector is a device which is meant to detect the presence of accident or shake over a limit that may occur to a vehicle during its motion. The system used in this paper is mainly a micro controller-based system in which the functioning of all the components is controlled by a microcontroller.

Here an accelerometer sensor the change in acceleration caused by the shake or tilt. The detection of accident is done by the microcontroller after checking the output of accelerometer. When the accident is detected, the location is decoded from the output of a GPS module and this data is send as a message to an emergency call center by using a GSM module.

The tremendous rise in number of vehicles that appear on the roads have increased so much that it creates blocks and chaos everywhere. The ambulances running on emergency could not always make it in time due to inappropriate traffic conditions and signals. The paper is meant to overcome this problem. The ambulance is provided with an RF transmitter which continuously transmits RF signals. Once the ambulance approaches the junction, the receiver which is placed some 50 meters away from traffic signal post captures the RF signals which are transmitted by the transmitter. Upon receiving signals, the traffic signals are controlled for the unhindered passage of ambulance. The light goes green to all directions to the easy flow of traffic in the lane where the ambulance is. The light at all other lane will go red to avoid traffic blocks. This control sustains for a predetermined period until the receiver is in the range of signal availability. After the ambulance passes, the traffic control then fails to the normal sequential flow.

Chapter 15: Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society. (For Allocated village development, villager's happiness, comfortable and for enhancement of the village)

15.1 IMMEDIATELY

After implication of these all design which are provide some basic facilities like transportation study, environment, good community, gathering etc. It will have sufficient light and ventilation in all structure.

Library: It will offer better environment for student, old people and any age or group of people. It also gives facility to the people for fill any gov. or privet from. It will have sufficient lights and ventilation built of material obtained within a radius of five mile of it.

Bus stop: It will offer better transportation facilities to people. villagers will be able to access the bus stop directly after completion.

Anganwadi: Anganwadi provide good facility to children and women. special women's utility room is provided in our design which is help to give some special treatment to pregnant women children's are play games to the again.

Community hall: Villager are easily do any function or gathering at the hall. Any villager and it will also use for school function.

Post office: Post office will provide some special policy or facility of money saving or speed post. So, people can save their money to the post office.

RO plant: After implement RO plant in village pure water is easily available.

Automatic street light bulb holder: After installation it will save electricity and provide affordable and cheap energy billing to the people.

Live energy billing: After installation it will reduce the service charge of the company and provide live data of electricity consumption to the consumers.

Water level indicator with alarm: After installation it will preserve wastage of water and provide closed loop system so as to detect any fault in the system.

Electrical layout of community hall: After completion Community Hall will be well equipped with electrical facilities like automatic fan, lights, security system, etc. This will include modern electrical facilities.

Insect Repellent Circuit for Protecting Crops: After completion it will equip farmers with latest modern technology of insect repellent, so that use of various chemicals can be reduced.

Automatic Irrigation with Arduino: After implementation it will promote modern irrigation system necessary. It will surely save time. Ultimately, Farmers will give more time to their other business. It will help them to prosper overall.

15.1.1 Within 1-year

There might be need to inspect the all structure and also prefer routine maintenance e.g., cleaning of floor, cleaning door/Windows, cleaning w.c./bathroom. There is no need to any other maintenance of building due to wear and tear within a year.

People are aware these all facilities and they use more and by using this facility some small problems are solved.

Such as, they can aware about post office policy and their facility speed post, many saving insurance people win use their facility easily.

After implementing of all those designs, it will be increase in their utilization within one year. due to maintain an element of building, electrical element water facilities etc.

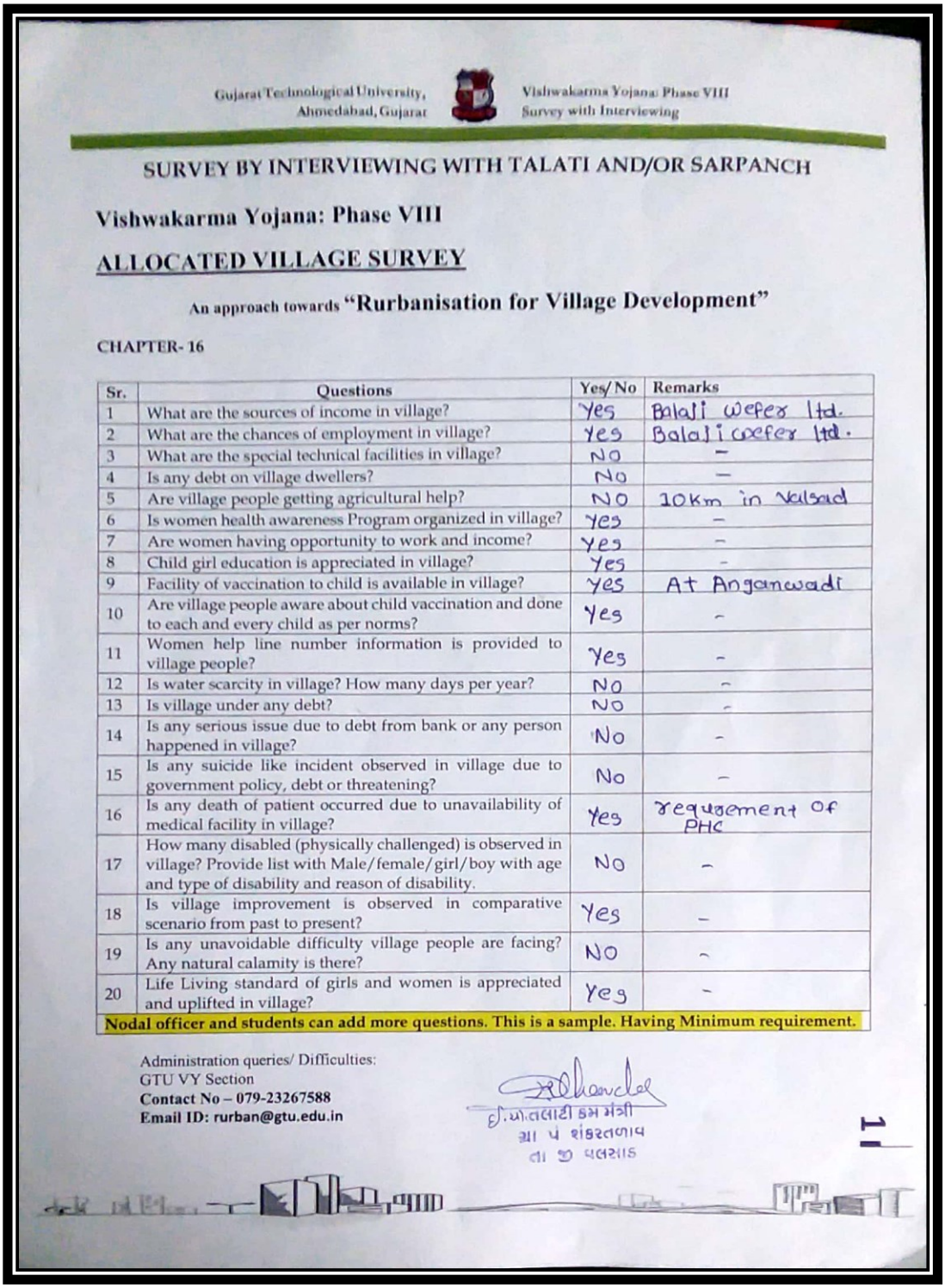
The total cleaning of every structure is required after a year. Anganwadi will also give a better experience because people will be very much award with anganwadi so the people will also be able to access anganwadi very easily.

15.1.2 After 3-5 year

After passing long term (3-5 year) the cost of maintenance of building may increase, by increase in utilization of building.
Like if there is an anganwadi then the utilization of that will be same but the maintenance cost will also be there like due to damage of some elements of building, any electrical elements etc. maintenance of building at some regular time interval e.g., washing of building, painting of door and Windows etc., and pre and post monsoon maintenance is also increase in cost.

Based on point of utilization the wear and tear of structure will increase so there might have slightly more maintenance cost then before as per passing time

Chapter 16: Survey by Interviewing with Talati and/ Or Sarpanch



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Survey with Interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards **"Rurbanisation for Village Development"**

CHAPTER- 16

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?	Yes	Balaji Wefer ltd.
2	What are the chances of employment in village?	Yes	Balaji wefer ltd.
3	What are the special technical facilities in village?	No	-
4	Is any debt on village dwellers?	No	-
5	Are village people getting agricultural help?	No	10km in Valsad
6	Is women health awareness Program organized in village?	Yes	-
7	Are women having opportunity to work and income?	Yes	-
8	Child girl education is appreciated in village?	Yes	-
9	Facility of vaccination to child is available in village?	Yes	At Anganwadi
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	-
11	Women help line number information is provided to village people?	Yes	-
12	Is water scarcity in village? How many days per year?	No	-
13	Is village under any debt?	No	-
14	Is any serious issue due to debt from bank or any person happened in village?	No	-
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	No	-
16	Is any death of patient occurred due to unavailability of medical facility in village?	Yes	requirement of PHC
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	No	-
18	Is village improvement is observed in comparative scenario from past to present?	Yes	-
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	No	-
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	-

Nodal officer and students can add more questions. This is a sample. Having Minimum requirement.

Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

ક્લાર્ક
ઈ.ચા.તલાટી કમ મંત્રી
ગ્રા પં શંકરતળાવ
તા જી વલસાડ

17

16.1 Letter of Interaction with Village Sarpanch

Letter of Interaction with Village Sarpanch

Vishwakarma Yojana project phase VIII

Shankar Talav Village, Valsad Taluka, Valsad District,

Pin Code: 396375

Date:

Subject: Interaction of Students with Sarpanch (Shankar Talav Village)

I sarpanch of Shankar Talav Village, undersigned had an interaction with the students (Rana Foram H. (170190106054), Yadav Ankit L. (170190109060) of Government Engineering College, Valsad) for Vishwakarma Yojana phase VIII Part-2

Sign:

સરપંચ,
ગ્રામ પંચાયત શંકરતળાવ
તા. જિ. વલસાડ.

16.2 Approval letter for proposed design

Approval Letter for Proposed Design

Vishwakarma Yojana project phase VIII

Shankar Talav Village, Valsad Taluka, Valsad District,

Pin Code: 396375

Date:

Subject: Approval Letter for Proposed Design Shankar Talav Village.

I Sarpanch of Shankar Talav village, undersigned gives approval for the following designs as proposed by the students (Rana Foram H. (170190106054), Yadav Ankit L. (170190109060) of Government Engineering College, Valsad) for Vishwakarma Yojana phase VIII.

Approved Designs For Part 2:

Civil

1. Post office
2. Library
3. Community Hall

Electrical

4. Electrical layout of community hall
5. Insect Repellent Circuit for Protecting Crops
6. Automatic Irrigation with Arduino

SIGN:

સરપંચ,
ગ્રામ પંચાયત શંકરતલાવ
તા. જિ. વલસાડ.

Chapter 17: Irrigation / Agriculture Activities and Agroindustry, Alternate Technics and Solution

17.1 Agricultural Activities

Agricultural activities means agricultural uses and practices including, but not limited to: Producing, breeding, or increasing agricultural products; rotating and changing agricultural crops; allowing land used for agricultural activities to lie fallow in which it is plowed and tilled but left unseeded; allowing land used for agricultural activities to lie dormant as a result of adverse agricultural market conditions; allowing land used for agricultural activities to lie dormant because the land is enrolled in a local, state, or federal conservation program, or the land is subject to a conservation easement; conducting agricultural operations; maintaining, repairing, and replacing agricultural equipment; maintaining, repairing, and replacing agricultural facilities, provided that the replacement facility is no closer to the shoreline than the original facility; and maintaining agricultural lands under production or cultivation.

Examples of Agricultural activities

Agricultural activities involving tillage of soil greater than forty thousand (40,000) square feet in surface area, within the shoreland zone shall require a Conservation Plan to be filed with the Planning Board.

The Area Plan and Area Rules apply to all agricultural activities on non-federal and non-Tribal Trust land within this Management Area including:

- Farms and ranches
- Rural residential properties grazing a few animals or raising crops.
- Agricultural lands that lay idle or on which management has been deferred.
- Agricultural activities in urban areas.
- Agricultural activities on land subject to the Forest Practices Act (ORS 527.610).
- Agricultural activities conducted in accordance with the Vermont Department of Agriculture's Accepted Agricultural Practices (AAP).
- Agricultural activities consume 70-80% of the ground water resource.
- Agricultural activities are subject to the provisions of the Food Security Act of 1985 and the Food, Agriculture, Conservation and Trade Act of 1990 (Public Law 101-624) and 15A NCAC 2H .0217).

Agroindustry:

Agroindustry's are the enterprises, activities and institutions that deliver material inputs to the farming sector and transform, distribute and otherwise add value to agricultural and food products targeting an identified market demand. Benefits of agro-industries include providing employment in off-farm activities such as processing. Agro-industries also add value to, and increase demand for, farmers' products, thereby reducing poverty and food insecurity and stimulating economic growth.

Agriculture Technology

Indoor Vertical Farming

Fig. 17.1 Indoor Vertical Farming

Indoor vertical farming can increase crop yields, overcome limited land area, and even reduce farming's impact on the environment by cutting down distance travelled in the supply chain. Indoor vertical farming can be defined as the practice of growing produce stacked one above another in a closed and controlled environment. By using growing shelves mounted vertically, it significantly reduces the amount of land space needed to grow plants compared to traditional farming methods. This type of growing is often associated with city and urban farming because of its ability to thrive in limited space. Vertical farms are unique in that some setups don't require soil for plants to grow. Most are either hydroponic, where vegetables are grown in a nutrient-dense bowl of water, or aeroponic, where the plant roots are systematically sprayed with water and nutrients. In lieu of natural sunlight, artificial grow lights are used.

Vertical farms use up to 70% less water than traditional farms

From sustainable urban growth to maximizing crop yield with reduced labour costs, the advantages of indoor vertical farming are apparent. Vertical farming can control variables such as light, humidity, and water to precisely measure year-round, increasing food production with reliable harvests. The reduced water and energy usage optimizes energy conservation -- vertical farms use up to 70% less water than traditional farms. Labour is also greatly reduced by using robots to handle harvesting, planting, and logistics, solving the challenge farms face from the current labour shortage in the agriculture industry.

17.2 Farm Automation

Fig. 17.2 Farm Automation Machine

Farm automation, often associated with "smart farming", is technology that makes farms more efficient and automates the crop or livestock production cycle. An increasing number of companies are working on robotics innovation to develop drones, autonomous tractors, robotic harvesters, automatic watering, and seeding robots. Although these technologies are fairly new, the industry has seen an increasing number of traditional agriculture companies adopt farm automation into their processes.

New advancements in technologies ranging from robotics and drones to computer vision software have completely transformed modern agriculture. The primary goal of farm automation technology is to cover easier, mundane tasks. Some major technologies that are most commonly being utilized by farms include: harvest automation, autonomous tractors, seeding and weeding, and drones. Farm automation technology addresses major issues like a rising global population, farm labour shortages, and changing consumer preferences. The benefits of automating traditional farming processes are monumental by tackling issues from consumer preferences, labour shortages, and the environmental footprint of farming.

17.2.2 Modern Greenhouses

In recent decades, the Greenhouse industry has been transforming from small scale facilities used primarily for research and aesthetic purposes (i.e., botanic gardens) to significantly more large-scale facilities that compete directly with land-based conventional food production. Combined, the entire global greenhouse market currently produces nearly US $350 billion in vegetables annually, of which U.S. production comprises less than one percent.

Fig. 17.3 Modern Greenhouse

Nowadays, in large part due to the tremendous recent improvements in growing technology, the industry is witnessing a blossoming like no time before. Greenhouses today are increasingly emerging that are large-scale, capital-infused, and urban-centred.

The entire global greenhouse market currently produces nearly US $350 billion in vegetables annually.

As the market has grown dramatically, it has also experienced clear trends in recent years. Modern greenhouses are becoming increasingly tech-heavy, using LED lights and automated control systems to perfectly tailor the growing environment. Successful greenhouse companies are scaling significantly and located their growing facilities near urban hubs to capitalize on the ever-increasing demand for local food, no matter the season. To accomplish these feats, the greenhouse industry is also becoming increasingly capital-infused, using venture funding and other sources to build out the infrastructure necessary to compete in the current market.

17.2.3 Precision Agriculture

Fig. 17.4 Precision Agriculture

Agriculture is undergoing an evolution - technology is becoming an indispensable part of every commercial farm. New precision agriculture companies are developing technologies that allow farmers to maximize yields by controlling every variable of crop farming such as moisture levels, pest stress, soil conditions, and micro-climates. By providing more accurate techniques for planting and growing crops, precision agriculture enables farmers to increase efficiency and manage costs.

17.2.1 Livestock Farming Technology

The traditional livestock industry is a sector that is widely overlooked and under-serviced, although it is arguably the most vital. Livestock provides much needed renewable, natural resources that we rely on every day. Livestock management has traditionally been known as running the business of poultry farms, dairy farms, cattle ranches, or other livestock-related agribusinesses. Livestock managers must keep accurate financial records, supervise workers, and ensure proper care and feeding of animals. However, recent trends have proven that technology is revolutionizing the world of livestock management. New developments in the past 8-10 years have made huge improvements to the industry that make tracking and managing

livestock much easier and data-driven. This technology can come in the form of nutritional technologies, genetics, digital technology, and more.

Livestock technology can enhance or improve the productivity capacity, welfare, or management of animals and livestock.

Fig. 17.5 Livestock Technology

Livestock technology can enhance or improve the productivity capacity, welfare, or management of animals and livestock. The concept of the 'connected cow' is a result of more and more dairy herds being fitted with sensors to monitor health and increase productivity. Putting individual wearable sensors on cattle can keep track of daily activity and health-related issues while providing data-driven insights for the entire herd. All this data generated is also being turned into meaningful, actionable insights where producers can look quickly and easily to make quick management decisions.

Animal genomics can be defined as the study of looking at the entire gene landscape of a living animal and how they interact with each other to influence the animal's growth and development. Genomics help livestock producers understand the genetic risk of their herds and determine the future profitability of their livestock. By being strategic with animal selection and breeding decisions, cattle genomics allows producers to optimize profitability and yields of livestock herds.

Sensor and data technologies have huge benefits for the current livestock industry. It can improve the productivity and welfare of livestock by detecting sick animals and intelligently recognizing room for improvement. Computer vision allows us to have all sorts of unbiased data that will get summarized into meaningful, actionable insights. Data-driven decision-making leads to better, more efficient, and timely decisions that will advance the productivity of livestock herds.

17.2.4 Blockchain

Fig. 17.6 Blockchain

Blockchain's capability of tracking ownership records and tamper-resistance can be used to solve urgent issues such as food fraud, safety recalls, supply chain inefficiency and food traceability in the current food system. Blockchain's unique decentralized structure ensures verified products and practices to create a market for premium products with transparency.

Food traceability has been at the centre of recent food safety discussions, particularly with new advancements in blockchain applications. Due to the nature of perishable food, the food industry at whole is extremely vulnerable to making mistakes that would ultimately affect human lives. When foodborne diseases threaten

public health, the first step to root-cause analysis is to track down the source of contamination and there is no tolerance for uncertainty.

Blockchain can be used to solve urgent issues such as food fraud, safety recalls, supply chain inefficiency and food traceability in the current food system.

Consequently, traceability is critical for the food supply chain. The current communication framework within the food ecosystem makes traceability a time-consuming task since some involved parties are still tracking information on paper. The structure of blockchain ensures that each player along the food value chain would generate and securely share data points to create an accountable and traceable system. Vast data points with labels that clarify ownership can be recorded promptly without any alteration. As a result, the record of a food item's journey, from farm to table, is available to monitor in real-time.

The use cases of blockchain in food go beyond ensuring food safety. It also adds value to the current market by establishing a ledger in the network and balancing market pricing. The traditional price mechanism for buying and selling relies on judgments of the involved players, rather than the information provided by the entire value chain. Giving access to data would create a holistic picture of the supply and demand. The blockchain application for trades might revolutionize traditional commodity trading and hedging as well. Blockchain enables verified transactions to be securely shared with every player in the food supply chain, creating a marketplace with immense transparency.

17.2.5 Artificial Intelligence

Fig. 17.7 AI Agriculture

The rise of digital agriculture and its related technologies has opened a wealth of new data opportunities. Remote sensors, satellites, and UAVs can gather information 24 hours per day over an entire field. These can monitor plant health, soil condition, temperature, humidity, etc. The amount of data these sensors can generate is overwhelming, and the significance of the numbers is hidden in the avalanche of that data.

The idea is to allow farmers to gain a better understanding of the situation on the ground through advanced technology (such as remote sensing) that can tell them more about their situation than they can see with the naked eye. And not just more accurately but also more quickly than seeing it walking or driving through the fields.

Remote sensors enable algorithms to interpret a field's environment as statistical data that can be understood and useful to farmers for decision-making. Algorithms process the data, adapting and learning based on the data received. The more inputs and statistical information collected, the better the algorithm will be at predicting a range of outcomes. And the aim is that farmers can use this artificial intelligence to achieve their goal of a better harvest through making better decisions in the field.

Chapter 18: Social Activities – Any Activates Planned by Students

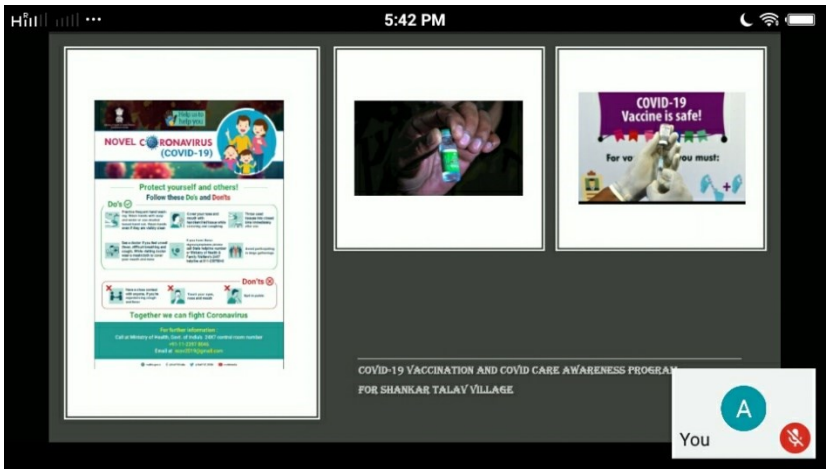


Fig. 18.1 Screenshot of Awarness Drive Session

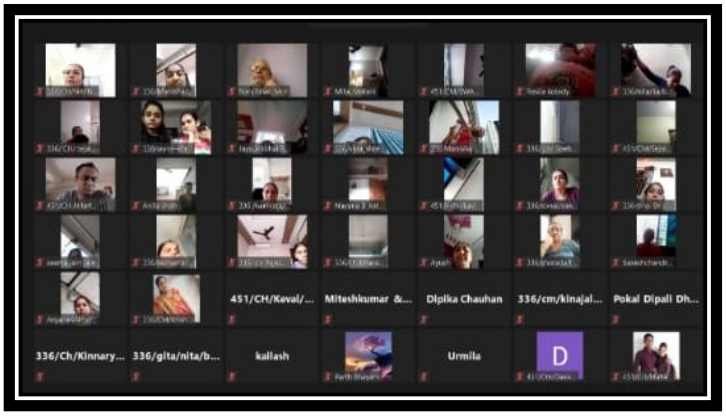


Fig. 18.2 Session Attendees Screenshot

As we all know due to corona virus there is restriction-based lockdown and we all are locked in a room only allowed to move out for some important permissible work. Government has started vaccination. Various Campaigns are being under taken by people of various fraternity. People were still confused and were being mis guided by means of some fake posts, articles, whats app forwards, etc. This can be seen in villages in large quantity. So, we thought of doing some awareness program in relation with **"Covid Vaccination Awareness and Covid Care".** For that we took help of online video conferencing tools and managed to host an awareness drive specially for the people of Shankar Talav.

We took help of one of our friends residing in the village and circulated the awareness drive link among village people. This helps us to gather a good number of audiences. And we successfully conducted the seminar and spread the awareness.

After completion of the seminar, we got good response from the attendees and also had Q&A session so that we clear their query.

Chapter 19: Shankar Talav SAGY Questionnaire Survey form with the Sarpanch Signature

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Shankar talav Gram Panchayat: Shankar talav Ward No. -

Block: Valsad District: Valsad

State: Gujarat L S Constituency: Valsad Parlament

1. Family Identity and Size

Name of Head of Household	RAKESHKUMAR ZINABHAI PATEL						Male/ Female	M
SECC Survey ID:		Family Size	2	Over 18	—	6 to 18	✓	Under 6	—

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]		Life Insurance	1. All Adults ✓ 2. Some Adults 3. None	AABY	1. Yes 2. No	Kisan Credit Card	Yes / No
Poverty Status Year[2]:	1. BPL 2. APL	Health Insurance	1. All Adults 2. Some Adults 3. None	RSBY	1. Yes 2. No	MGNREGS Job Card Number	
PDS (If NFSA is not implemented)	Annapurna	Antyodaya	BPL	APL	Is any woman in the family member of an SHG? Yes / No		
PDS (If NFSA is implemented)	Annapurna	Antyodaya	Priority	Other			

2. Adults (above 18 years)

Name	Age	Sex M/F/O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/N)	Bank A/C (Y/N)	Social Security Pension[5]
Rakeshbhai Z. Patel	34	M	N	Unmarried	8th pass	Yes	Yes	—
Savitaben Z. Patel	73	F	N	married		Yes	Yes	—

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
Nil								

4. Children below 6 years

Name	Age	Sex M/F/O	Disability Yes/No	Going to School (Y/N)	Going to AWC Y/N	De-worming Done	Fully Immu-nised Y/N	Mother's Age at the time of Child's Birth
Nil								

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4 ST

[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011) BPL families - 94

[3] *Marital Status: Not Married – 1, Married – 2, Widowed – 3, Divorced/Separated – 4*

[4] *Level of Education: Not Literate – 01, Literate – 02, Completed Class 5 - 03, Class 8th – 04, Class 10th-05, Class 12th-06, ITI Diploma-07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)*

[5] No Pension – 0, Old Age Pension – 1, Widow Pension – 2, Disability Pension – 3, Other Pension – 4 (mention)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

	Always		Sometimes		Never
After use of Toilet	Soap ✓	Other	Soap	Other	
Before Eating	Soap ✓	Other	Soap	Other	

6. Use of Mosquito Net
Children: Yes / No Adults: Yes / No

7. Do members take Regular Physical Exercise

	Yoga	Games	Other Exercises
Adults	Yes / No	Yes / No	Yes / No
Children	Yes / No	Yes / No	Yes / No

8. Consumption of Tobacco

	Smoking	Chewing
Adults	✓	✓
Children	—	—

9. House & Homestead Data

Own House: Yes / No	No. of Rooms: 05
Type: Kutcha / Semi Pucca / Pucca	
Toilet: Private / Community / Open Defecation	
Drainage linked to House: Covered / Open / None	
Waste Collection System	Door Step / Common Point / No Collection System
Homestead Land: Yes / No	Kitchen Garden : Yes / No
Compost Pit: Individual/ Group/ None	Biogas Plant: Individual/ Group/ None

10. Source of Water (Distance from source in KMs)

Source of Water		Distance
Piped Water at Home	Yes / No	
Community Water Tap	Yes / No	
Hand Pump (Public / Private)	Yes / No	
Open Well(Public / Private)	Yes / No	
Other (mention): Cannel		

11. Source of Lighting and Power

Electricity Connection to Household: Yes / No
Lighting: Electricity/Kerosene/Solar Power
Mention if Any Other: _____
Cooking: LPG/Biogas/Kerosene/Wood/Electricity
Mention if Any Other: _____
If cooking in Chullah: Normal/ Smokeless

12. Landholding (Acres)

1. Total		2. Cultivable Area	
3. Irrigated Area		4. Uncultivable Area	

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	
Sharecropping /Farming Leased Land	
Animal Husbandry	
Pisciculture	
Fishing	
Skilled Wage Worker	
Unskilled Wage Worker	
Salaried Employment in Government	
Salaried Employment - Private Sector	
Weaving	
Other Artisan(mention)	
Other Trade & Business (mention)	

14. Migration Status
Does any member of the household migrate for Work: Yes / No. If Yes Entire Year / Seasonal
Does anyone below 18 years migrate for work: Y/N

15. Agriculture Inputs

Do you use Chemical Fertilisers	Yes/No
Do you use Chemical Insecticides	Yes/No
Do you use Chemical Weedicide	Yes/No
Do you have Soil Health Card	Yes/No
Irrigation: None/ Canal/ Tank/ Borewell/Other	
Drip or Sprinkler Irrigation: Drip /Sprinkler / None	

16. Agricultural Produce in a normal year (Top 3)

Name	Unit	Quantity
Rice		90%
mango		80%

17. Livestock Numbers

Cows: 70	Bullocks: —	Calves: 25
Female Buffalo: 31	Male Buffalo: 18	Buffalo Calves: 08
Goats/ Sheep: —	Poultry/ Ducks: 304	Pigs: —
Any other: Type _____		No. _____
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): 100 Lit.		

18. What games do Children Play

19. Do children play musical instrument (mention)

Schedule Filled By: Fozam Rana
Principal Respondent: Rakesh kumar Z. Patel
Date of Survey:

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

I. Basic Information

a. Gram Panchayat: Shankar talav

b. Block: Valsad

c. District: Valsad

d. State: Gujarat

e. Lok Sabha Constituency: Valsad Parlament

f. Number of Wards in the Gram Panchayat: 08

g. Number of Villages in the Gram Panchayat: 01

h. Names of Villages: Shankar talav

Demographic Information

Number of Households 160 Total Population 679 Male 356 Female 323

SC HHs 08 ST HHs 65 OBC HHs 87 Other HHs —

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	No	3 Km દૂરાસણા
b.	Nearest Primary Health Centre (PHC)	No	3 Km કુંગારી
c.	Nearest Community Health Centre (CHC)	No	3 Km કુંગારી
d.	Nearest Post Office	Yes	—
e.	Nearest Bank Branch (Any)	No	3 Km કુંગારી
f.	Nearest Bank with CBS Facility	No	3 Km કુંગારી
g.	Nearest ATM	No	3 Km કુંગારી
h.	Nearest Primary School	Yes	—
i.	Nearest Middle School	No	3 Km કુંગારી
j.	Nearest Secondary School	No	3 Km કુંગારી
k.	Nearest Higher Secondary School / +2 College	No	10 Km વલસાડ
l.	Nearest Graduate College	No	10 Km Valsad
m	Nearest ITI / Polytechnic Centre	No	6 Km તિથલ રોડ
n	Kisan Seva Kendra	No	10 Km વલસાડ

1

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
o	Agriculture Credit Cooperative Society	No	3Km દૂરથી
p	Nearest Agro Service Centre	No	3Km દૂરથી
p	MSP based Government Procurement Centre	NO	3 Km દૂરથી
q	Milk Cooperative /Collection Centre	NO	3km દૂરથી
r	Veterinary Care Centre	NO	3km દૂરથી
s	Ayurveda Centre	No	—
t	E – Seva Kendra	Yes	—
u	Bus Stop	Yes	—
v	Railway Station	No	3Km દૂરથી
w	Library	No	3 km દૂરથી
x	Common Service Centre	No	3 km દૂરથી

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 2 Public 2 Private —

b. Mini Stadium : NO Yes(Y) /No (N) *(Playground with equipment and sitting arrangement)*

V. Education, ICDS

a. Number of Angan Wadi Centres: 1

b. Number of villages without Angan Wadi Centres —

Names of such villages: —

c. Schools (Number)

Primary Private: — Primary Govt.: 1

Middle Private: — Middle Govt.: —

Secondary Private: — Secondary Govt.: —

Higher Secondary Private: — Higher Secondary Govt: —

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention)	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)						NO	Dungri
b.	Kerosene						NO	Dungri
c.	Other (mention)						NO	Dungri

2

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

VII. Coverage of Villages under different Facilities & Services

	Parameter	Villages Status[1]	Names of Villages Covered	Names of Villages not Covered
a.	Piped Water Supply Coverage to Villages	Covered ✓ / Not Covered	Shankartalav	–
b.	Hand Pump Coverage in Villages:	Covered ✓ / Not Covered	Shankar talav	–
c.	Coverage under Covered Drains:	Covered ✓ / Not Covered	Shankar talav (80%)	Shanker talav (20%)
d.	Coverage under Open Drains:	Covered ✓ / Not Covered	Shanker talav	–
e.	Villages with Household Electricity Connection (Numbers)	Connected ✓ / Not Connected	Shankar talav	–

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	331.11	d.	Pasture / Grazing Land	–	g.	Check Dam	2
b.	Irrigated Land	124.93	e.	Forests/ Plantations	Nil	h.	Wells/Bore Wells	48
c.	Un-irrigated Land	206.25	f.	Other Common Land		i	Tanks /Ponds	2

[1] Mention the number of Villages Covered and Not Covered

3

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	39
b)	Number of Households receiving pension (old age, widow, disability)	39
c)	Number of eligible Households who are not receiving pension	–
d)	Number of Households eligible for Ration Card	160
e)	Number of eligible HHs having ration cards	154
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	–
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	54
h)	Number of active Job Card holders under MGNREGA	170
i)	Number of Job Card holders who completed 100 days of work during 2013-14	–
j)	Number of shops selling alcohol	–
k)	Number of BPL families	99
l)	Number of landless households	46
m)	Number of IAY beneficiaries	–
n)	Number of FRA[2] beneficiaries	–
o)	Number of Community Sanitary Complexes	–
p)	Number of Households headed by single women	09
q)	Number of Households headed by physically handicapped persons	01
r)	Total number of Persons with Disability in the village	01
s)	Number of SHGs	04
t)	Number of active SHGs	04
u)	Number of SHG Federations	04
v)	Number of Youth Clubs	01
w)	Number of Bharat Nirman Volunteers	–

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey
Ankit L. Yadav Fosam H. Rana F.H.Rana	સરપંચ, ગ્રામ પંચાયત શંકરતળાવ તા. જિ. વલસાડ.	તલાટી કમ મંત્રી, ગ્રા. પં. શંકરતળાવ તા. જિ. વલસાડ.	24-05-2021

[2] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

4

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

This questionnaire should be filled for each of the villages in the selected Gram Panchayat[1]

I. Basic Information

a. Village: Shankartalav
b. Ward Number: 08
c. Gram Panchayat: Shankartalav
d. Block: Valsad
e. District: valsad
f. State: Gujarat
g. Lok Sabha Constituency: Valsad Parliament
h. Number of Habitations / Hamlets in the Gram Panchayat: 01
i. Names of Habitations / Hamlets: Shanker talav

Demographic Information

Number of Households 160 Total Population 679 Male 356 Female 323

SC HHs 08 ST HHs 65 OBC HHs 87 Other HHs -

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	Yes	-
b.	Nearest Middle School	No	3 Km Dungri
c.	Nearest Secondary School	No	-
d.	Kisan Seva Kendra	No	10 Km Valsad
e.	Milk Cooperative /Collection Centre	No	3 Km Dungri
g.	Health Sub Centre	No	3 Km Dungri
h.	Bank	No	3 Km Dungri
i.	ATM	No	3 Km Dungri
j.	Bus Stop	Yes	-
k.	Railway Station	No	3 km Dungri

[1] While filling this the surveyor must collect the information from the Ward Member/s and relevant government officials

1

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	N	–
m	Common Service Centre	N	–
n	Veterinary Care Centre	N	–

ii. Road Connectivity

a. Habitations connected by All-weather Roads (1-All 2-None 3-Some)

If 3 mention the name of the habitations where not available: _____

iii. Drinking Water Facilities

a. Piped Water Supply Coverage to Habitations: 1 (1-All 2-None 3-Some)

If 3 mention the name of the habitations not covered: _____

b. Hand Pump Coverage in Habitations: 3 (1-All 2-None 3-Some)

If 3 mention the name of the habitations not covered: _____

iv. Coverage of Habitations under Waste Management System

a. Coverage under Covered Drains: 3 (1-All 2-None 3-Some)

If 3 mention the name of the habitations not covered: 80%

b. Coverage under Open Drains: 3 (1-All 2-None 3-Some)

If 3 mention the name of the habitations not covered: 20%

c. Coverage under Doorstep Waste Collection: (1-All 2-None 3-Some)

If 3 mention the name of the habitations not covered: _____

v. Coverage of Habitations under Electrification

a. Coverage under Household Connections: (1-All 2-None 3-Some)

If 3 mention the name of the habitations not covered: _____

b. Coverage under Street Lighting: All(1-All 2-None 3-Some)

If 3 mention the name of the habitations not covered: _____

vi. Sports Facilities in the Village

a. Number of Play Grounds in the Village (minimum size 200 square meters): 02

b. Mini Stadium : NO Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 01

c. Schools (Number)

Primary Private: ___ Primary Govt.: 01

Middle Private: – Middle Govt.: –

Secondary Private: – Secondary Govt.: –

Higher Secondary Private: – Higher Secondary Govt: –

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	331.11	d.	Pasture / Grazing Land	-	g.	Check Dam	2
b.	Irrigated Land	124.93	e.	Forests/ Plnatations	Nil	h.	Wells/Bore Wells	48
c.	Un-irrigated Land	206.25	f.	Other Common Land		i	Tanks /Ponds	2

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	170 ~~17 0~~
2	Number of active Job Card holders who have completed 100 days of work	-
3	Number of shops selling alcohol	-
4	Number of BPL families	99
5	Number of landless households	46
6	Number of IAY beneficiaries	-
7	Number of FRA beneficiaries	-
8	Number of common sanitation complexes	-
9	Number of SHGs	04
10	Number of active SHGs	04
11	Existence of SHG Federation in the Village (Yes / No)	
12	Number of Youth Clubs	01
13	Number of Bharat Nirman Volunteers	-

Name and Signature of Surveyor and Respondent'

Ankit L. Yadav Faram H. Rana F.H.Rana Surveyor	Patel. સરપંચ, ગ્રામ પંચાયત શંકરતળાવ તા. જિ. વલસાડ. PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	તલાટી કમ મંત્રી, ગ્રા. પં. શંકરતળાવ તા. જિ. વલસાડ. Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	14-05-2021 Date of Survey

3

Chapter 20: TDO-DDO-Collector email sending soft copy attachment in the report

Gmail

ANKIT YADAV <ankit83.ay9086@gmail.com>

Development scenario of Shankar Talav, Valsad_Under Vishwakarma Yojana Phase-VIII

2 messages

ANKIT YADAV <ankit83.ay9086@gmail.com> 25 June 2021 at 13:29
To: collector-val@gujarat.gov.in, ddo-val@gujarat.gov.in, tdovalsad@gujarat.gov.in
Cc: Vishwakarma Yojana <rurban@gtu.edu.in>, dtbarot@gecv.ac.in

Respected Sir/Madam

We are the students of Government Engineering College, Valsad affiliated to Gujarat Technological University-GTU. GTU has been assigned to Vishwakarma Yojana-VY in which students survey the various village and design various amenities to deliver it to them making them ideal for living a better life as per requirements & village problem statements.

As a part of Vishwakarma Yojana's guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about Shankar Talav Village profile of issues for development and our design work for them which is as below.

Village: Shankar Talav		**Population: 679 (As of Census 2011)**
Key issue	**Remark**	**Design Given**
Education facility	Village have Aanganwadi but its structure is not in good condition so we provide a redesign of it.	Aanganwadi
Water treatment	The village has one RO plant but it is not sufficient.	RO plant
Transportation facility	The village does not have a bus stop.	Bus stop
Socio-Cultural facility	People faced difficulty organizing events.	Community Hall
		Electrical Layout Of community hall
Public facility	To provide better living standards to villagers.	Post office Library Electrical Layout of library
Electricity and Electrical Advancements	Save electricity and provide affordable and cheap energy billing to the people.	Automatic Street Light Bulb Holder
	Reduce the service charge of the company and provide live data of electricity consumption to the consumers.	Live Energy Billing
	Wastage of Water	Water Level Indicator with Alarm
	Irrigation with conventional methods	Automatic Irrigation with Arduino

Sr. No.	Design Name	Period (months)	Amount expenses (Rs)	Benefits
1	Aanganwadi	3	6,15,119	Provide education facility
2	RO Plant	1	60,724	Water treatment
3	Bus stop	1	47,984	Transportation
4	Community hall	3	7,87,981	Provide a place for organizing events
5	Post office	04	7,23,702	Easily save money
6	Library	04	4,36,583	Public facility
7	Automatic Street Light Bulb Holder	1.2	50 (*excluding Labor charges)	Better visibility
8	Live Energy Billing	3	1950 (*excluding Labor charges)	Affordable and cheap energy
9	Water Level Indicator with Alarm	1	100 (*excluding Labor charges)	Save water
10	Electrical Layout of Community Hall	3	65,736	The electrical facility in the community hall
11	Electrical Layout of Library	4	62,844	The electrical facility in Library
12	Automatic irrigation with Arduino	2-3	84,200	Better irrigation service

Please find herewith attached,

1. Detailed Project Report of Shankar Talav Village.

SHANKAR TALAV

Best Regards,

Foram Rana U.G., Civil Engineering

Ankit Yadav U.G., Electrical Engineering

Government Engineering College, Valsad

Gujarat Technological University, Chandkheda- Ahmedabad

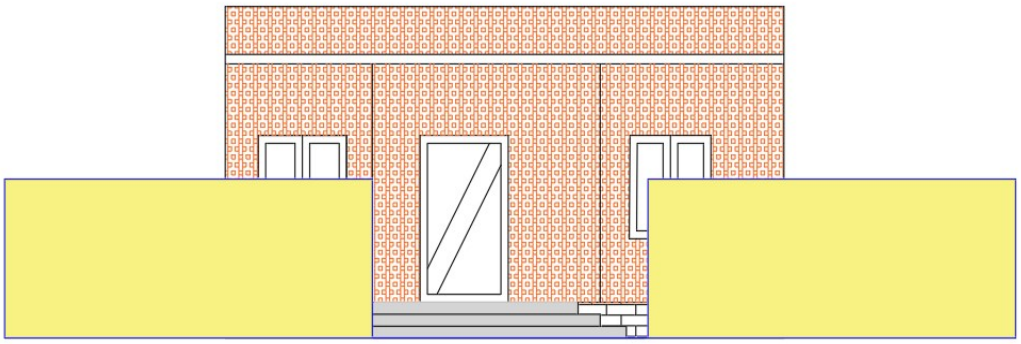
Mail: foramrana0302@gmail.com

Mail: ankit83.ay9086@gmail.com

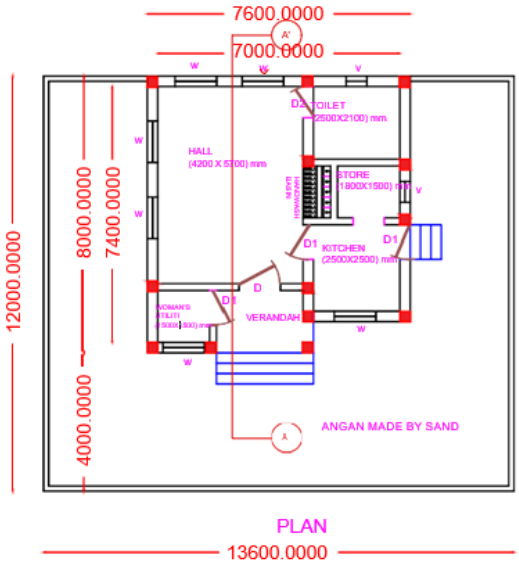
25 June 2021 at 13:29

Chapter 21: Comprehensive report for the entire village

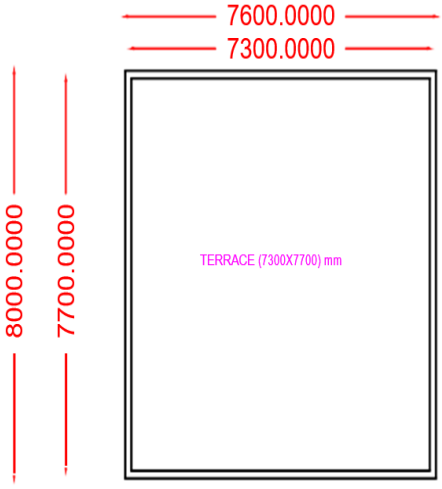
Design Infrastructure: Aaganwadi
Village: Shankar Talav
District: Valsad



ELEVATION

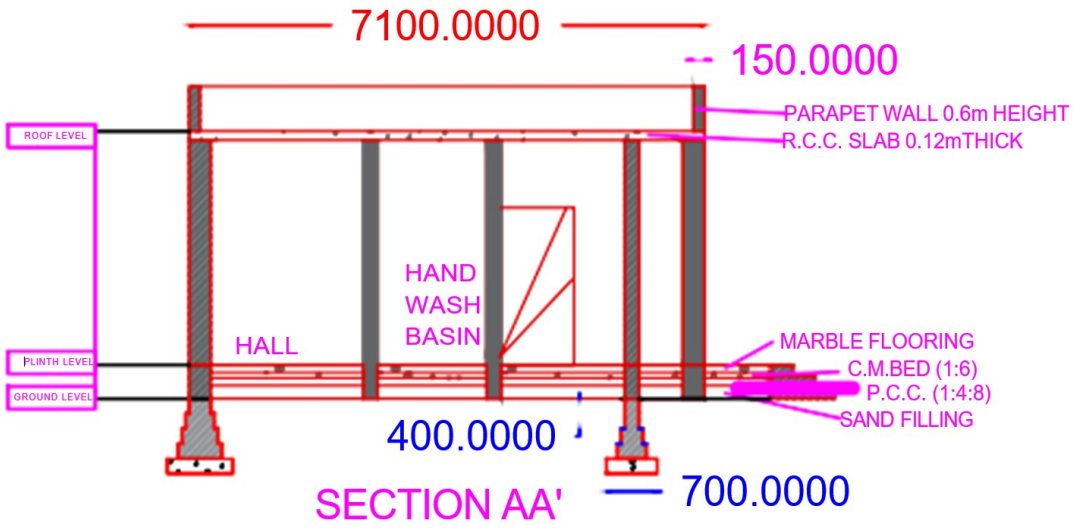


PLAN

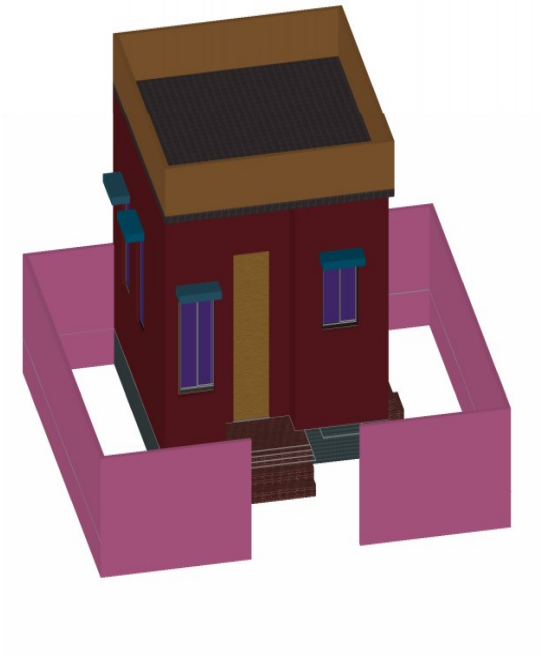


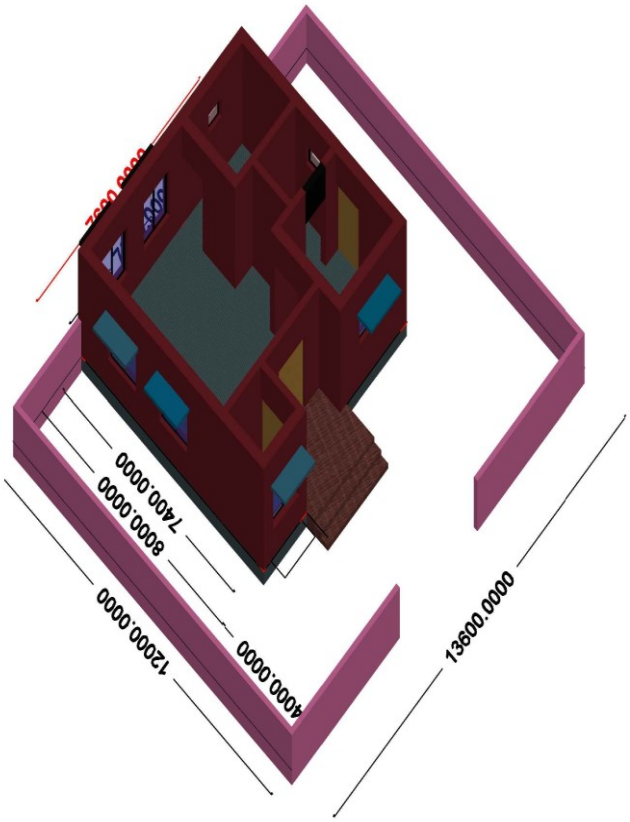
TERRACE PLAN

*All dimensions are in millimeter



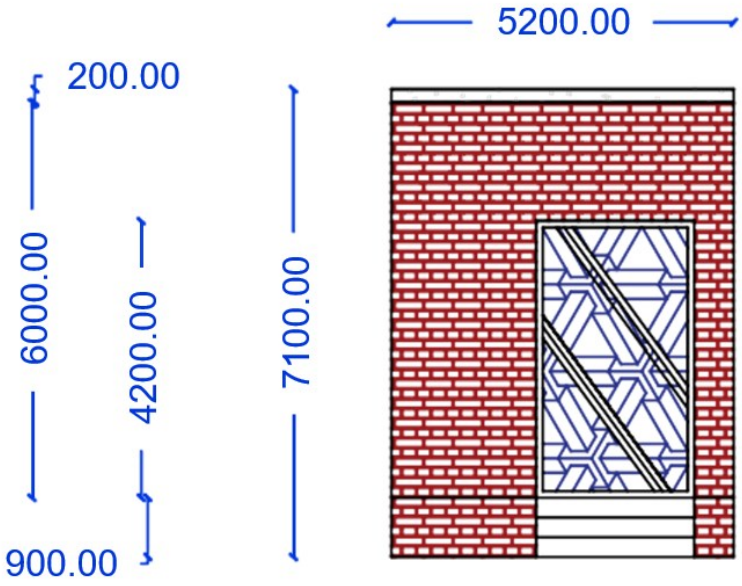
3D Model of Aaganwadi



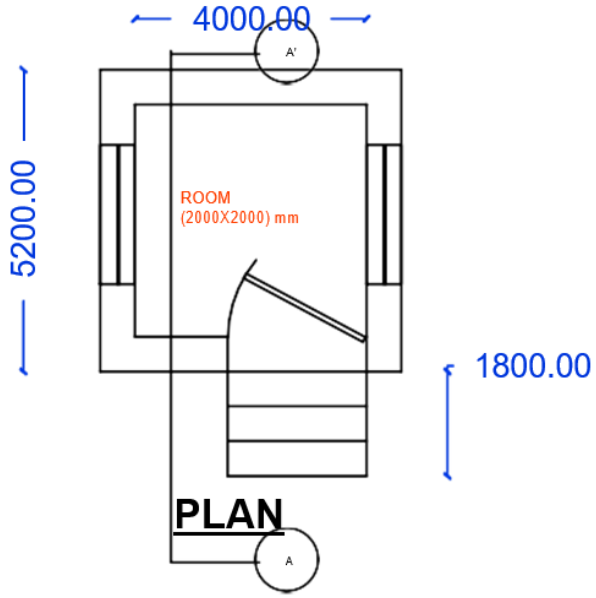


*All dimensions are in millimeter

Design Infrastructure: R.O. Water Plant
Village: Shankar Talav
District: Valsad

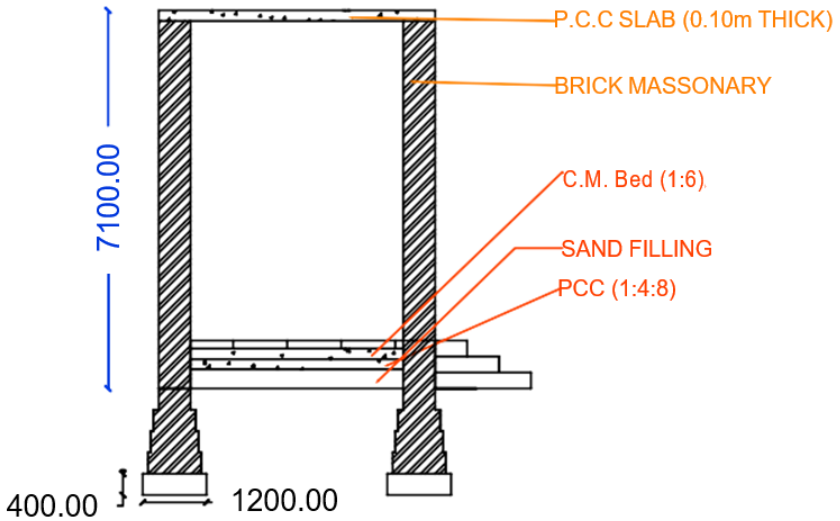


ELEVATION



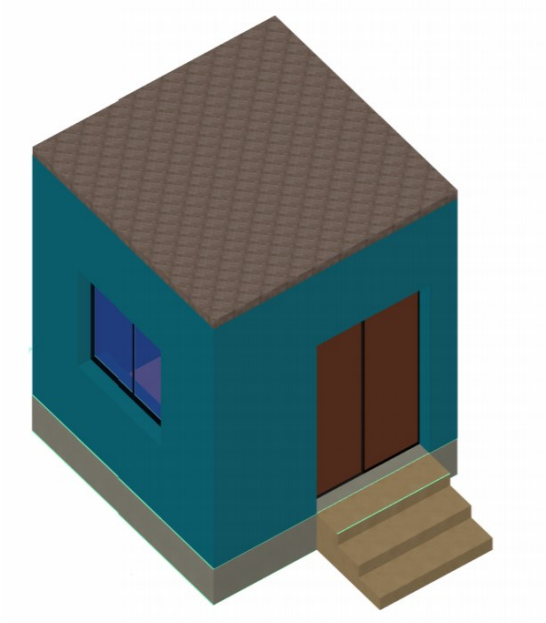
PLAN

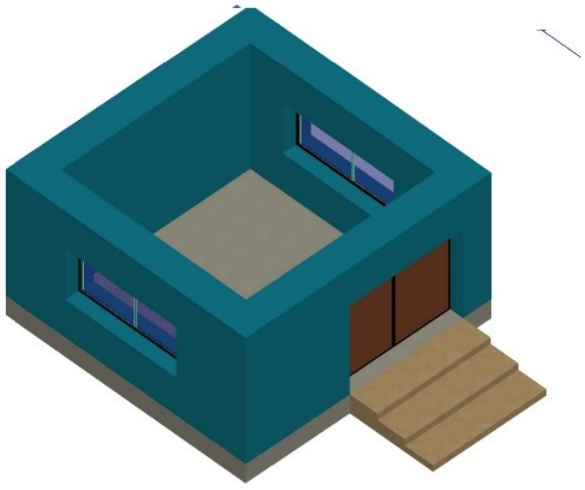
*All dimensions are in millimeter



SECTION-AA'

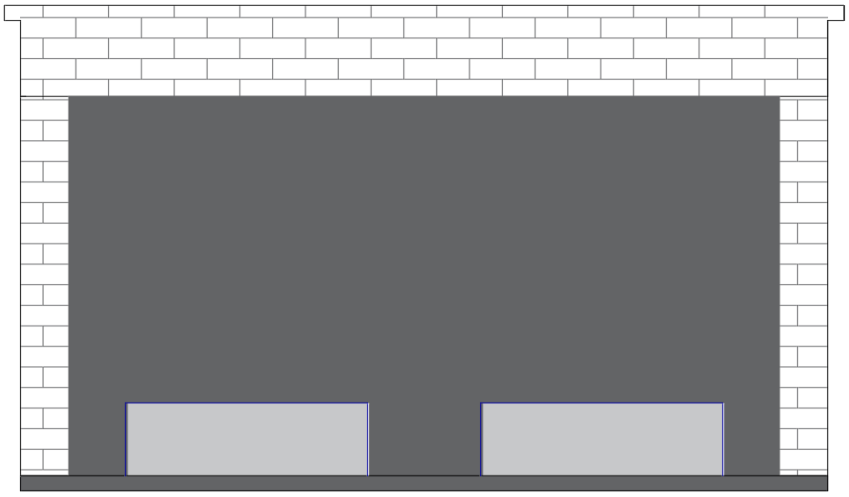
3D Model of R.O. Water Plant



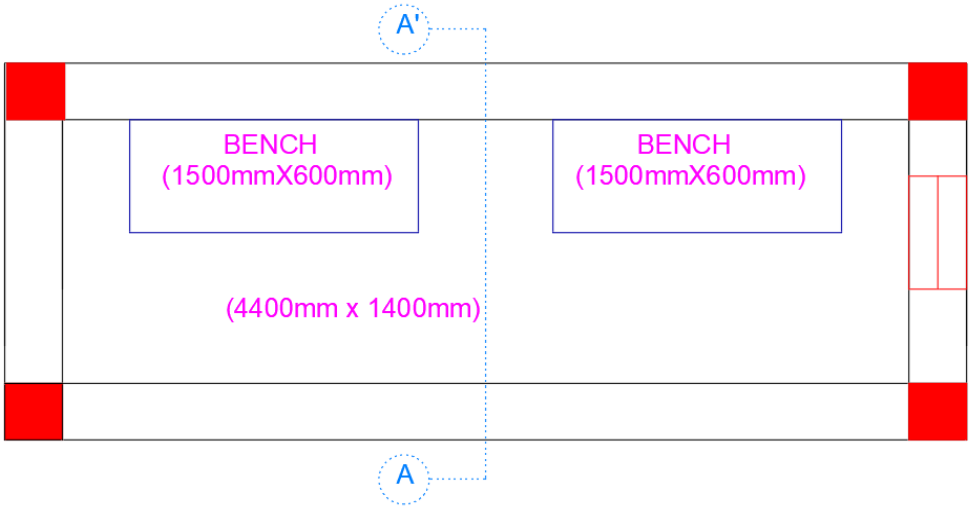


*All dimensions are in millimeter

Design Infrastructure: Bus-Stop
Village: Shankar Talav
District: Valsad

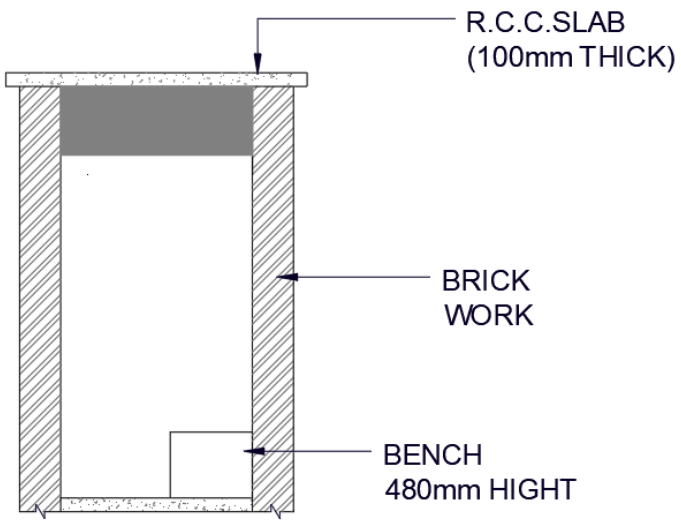


ELEVATION



PLAN

*All dimensions are in millimeter

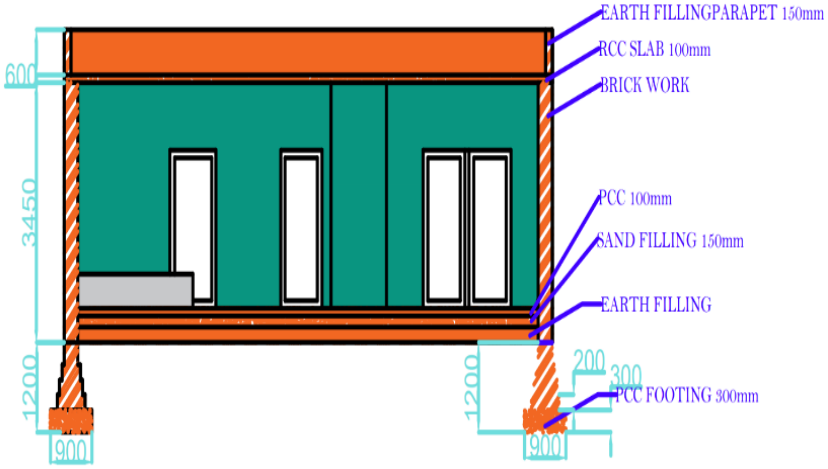


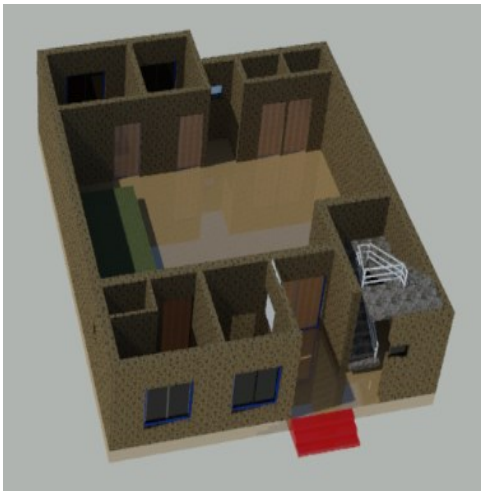
SECTION AA'

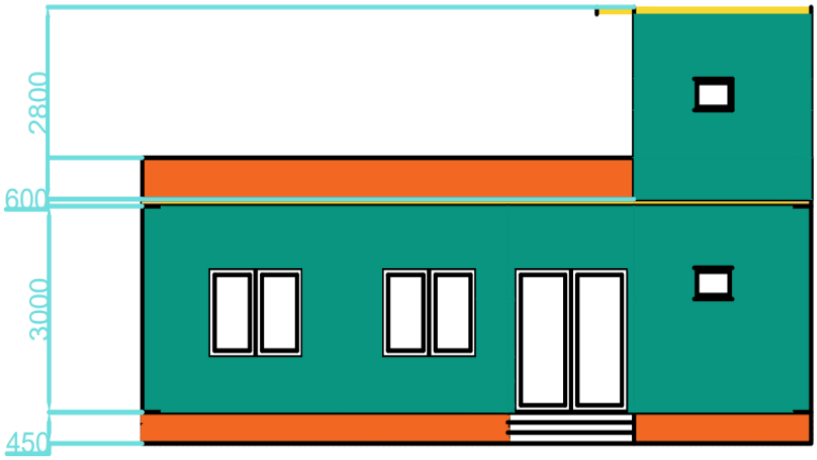
3D Model of Bus Stand

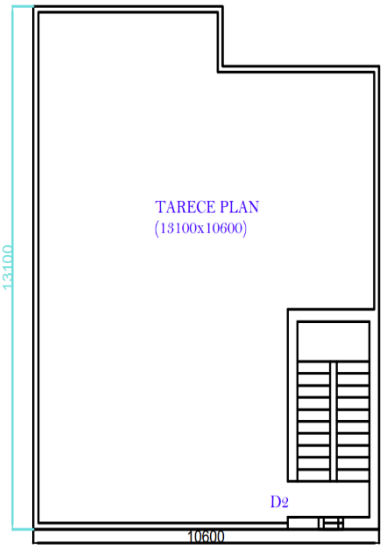
*All dimensions are in millimeter

Design Infrastructure: Community Hall
Village: Shankar Talav
District: Valsad

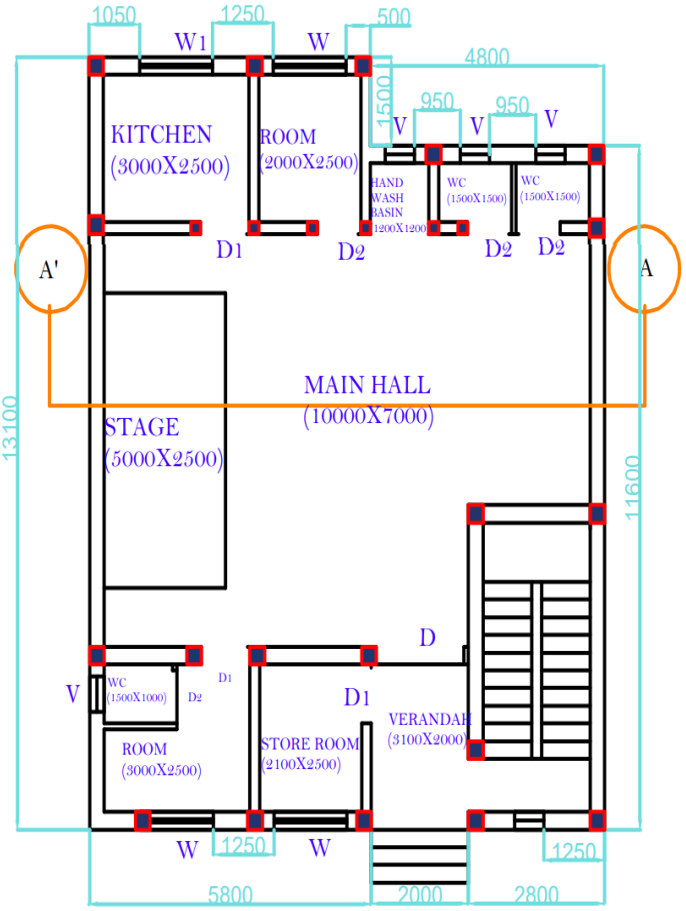




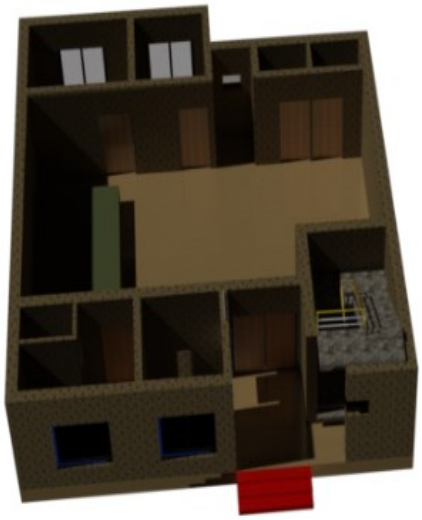




*All dimensions are in millimeter

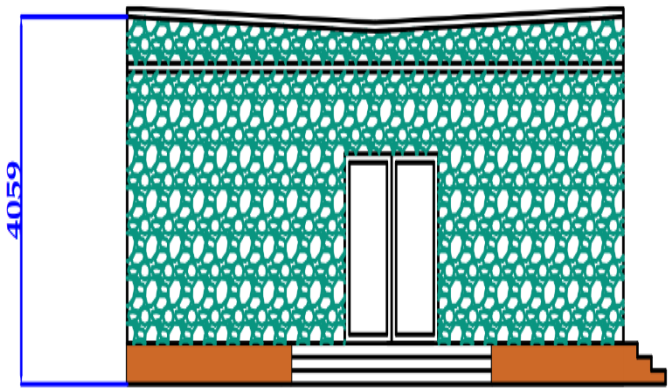


3D Model of Community Hall

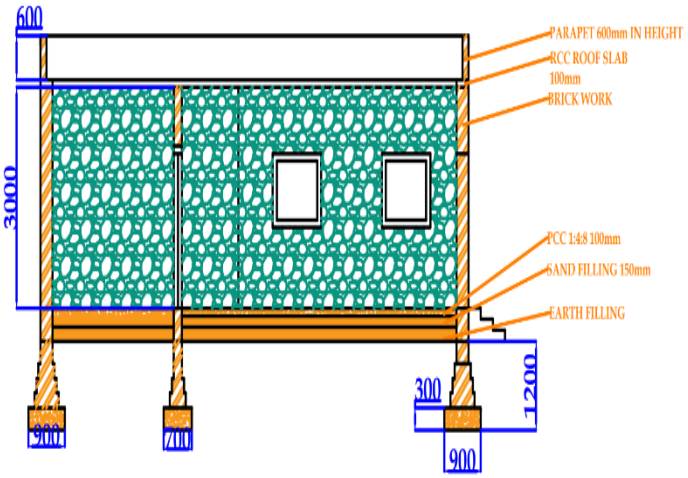


*All dimensions are in millimeter

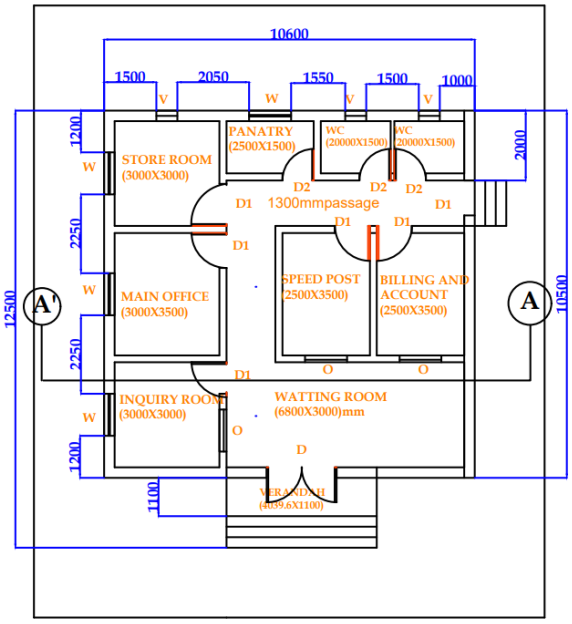
Design Infrastructure: Post Office
Village: Shankar Talav
District: Valsad



- ELEVATION



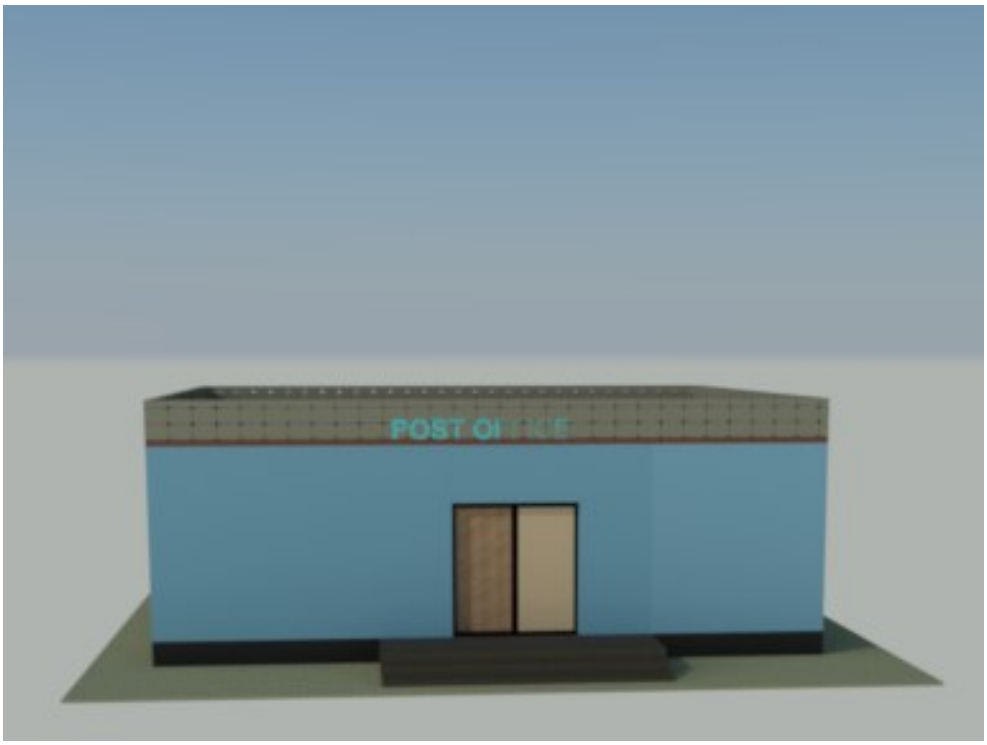
- SECTION AA'

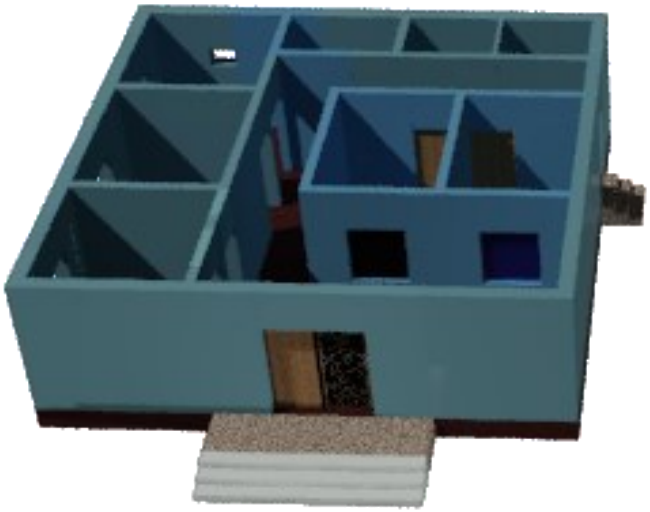


- PLAN

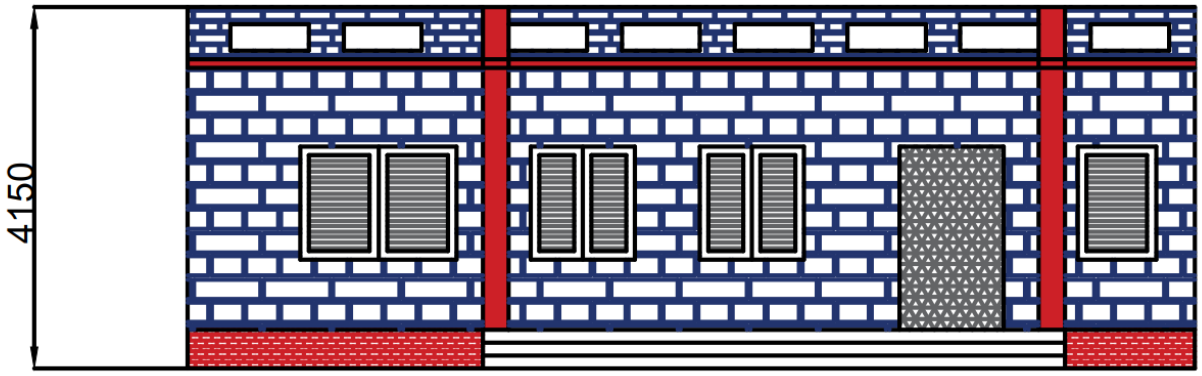
*All dimensions are in millimeter

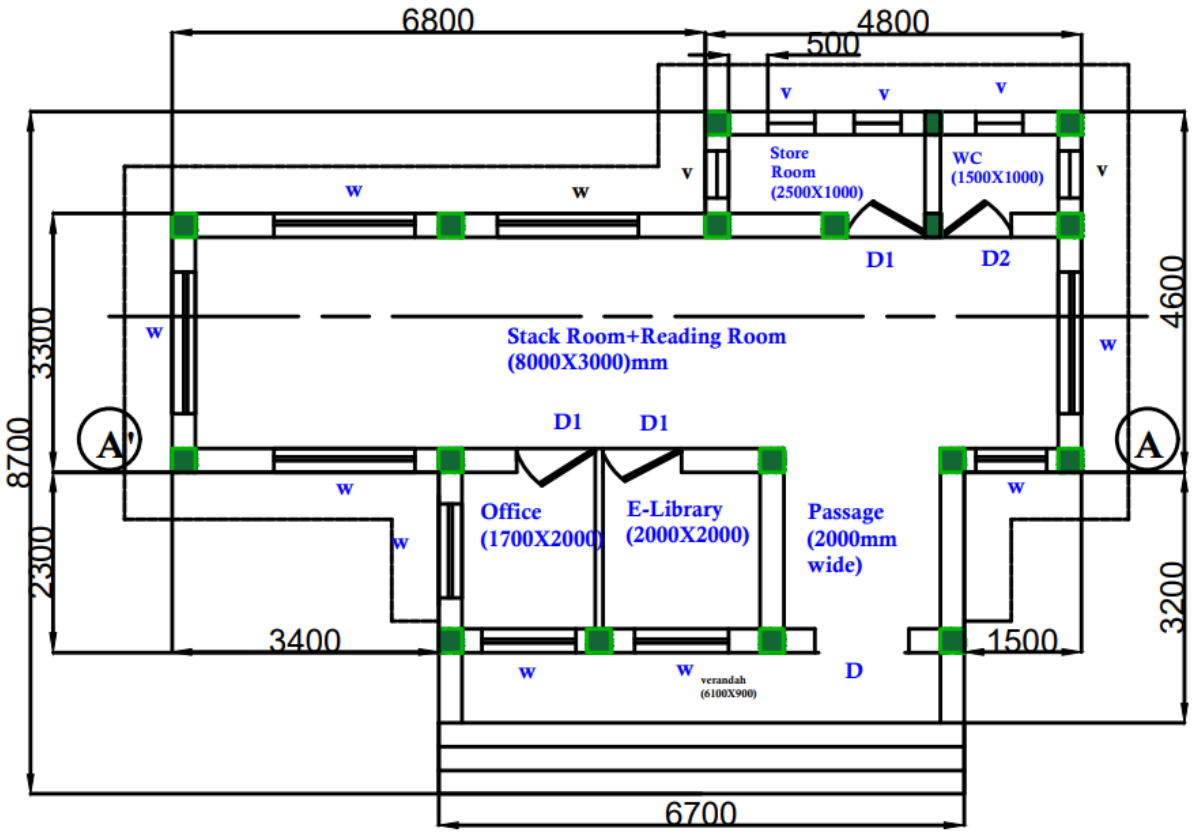
3D Model of Post Office



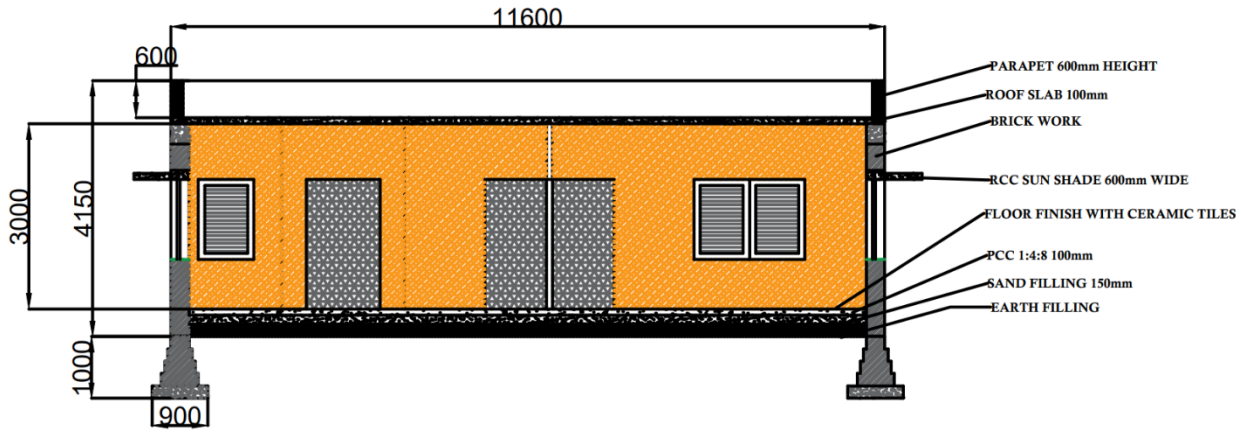


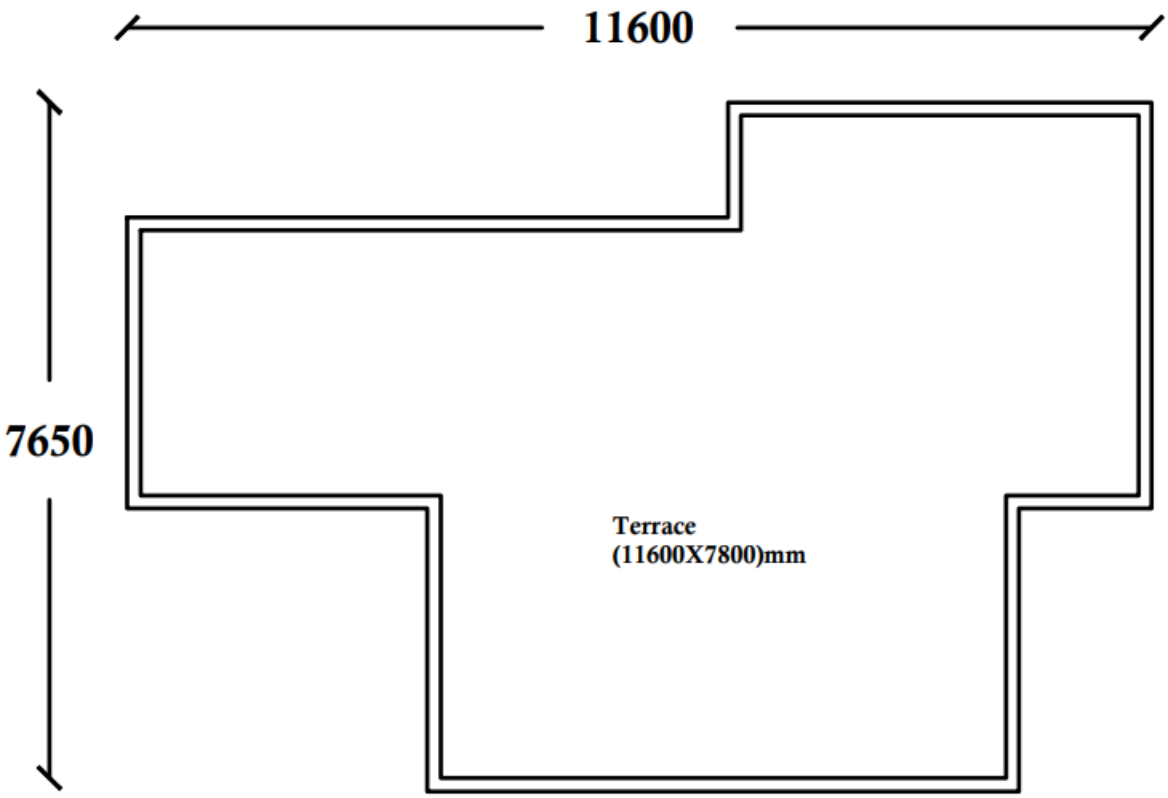
Design Infrastructure: Library
Village: Shankar Talav
District: Valsad





*All dimensions are in millimeter

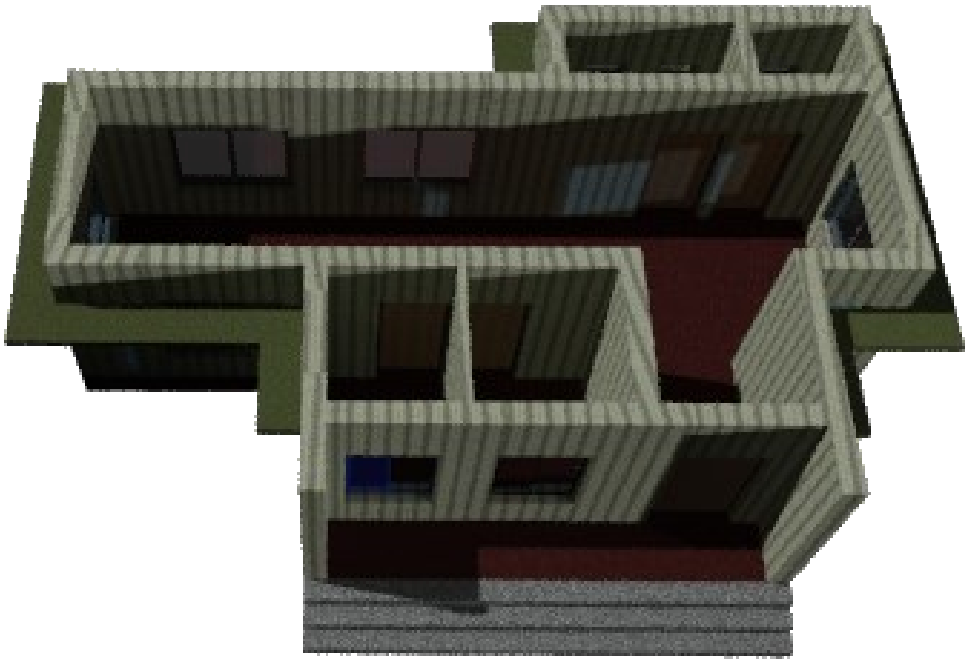


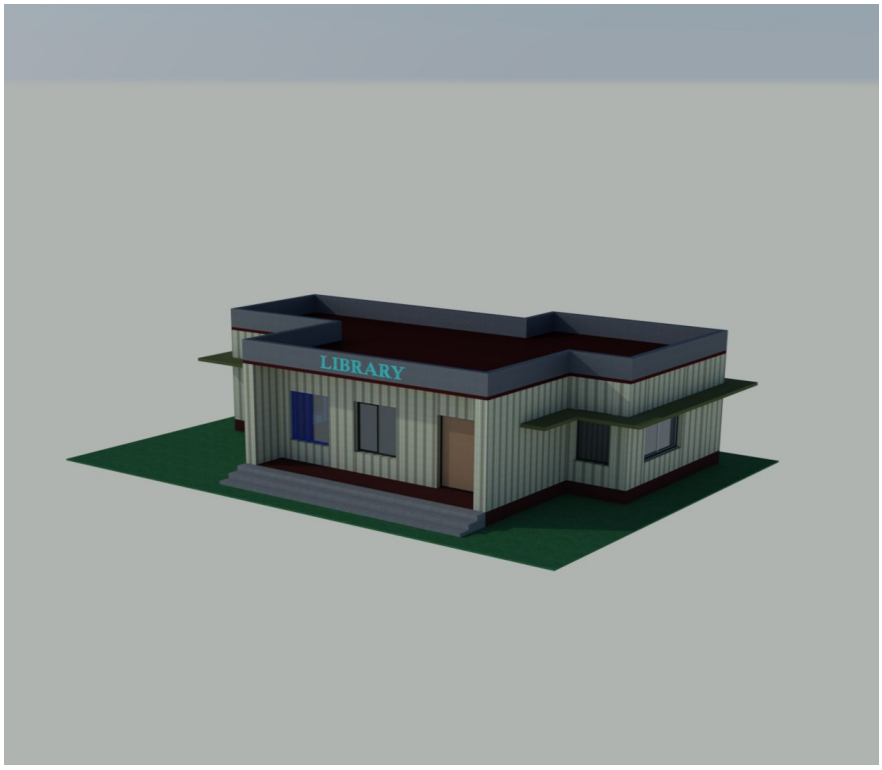


- **TARECE PLAN**

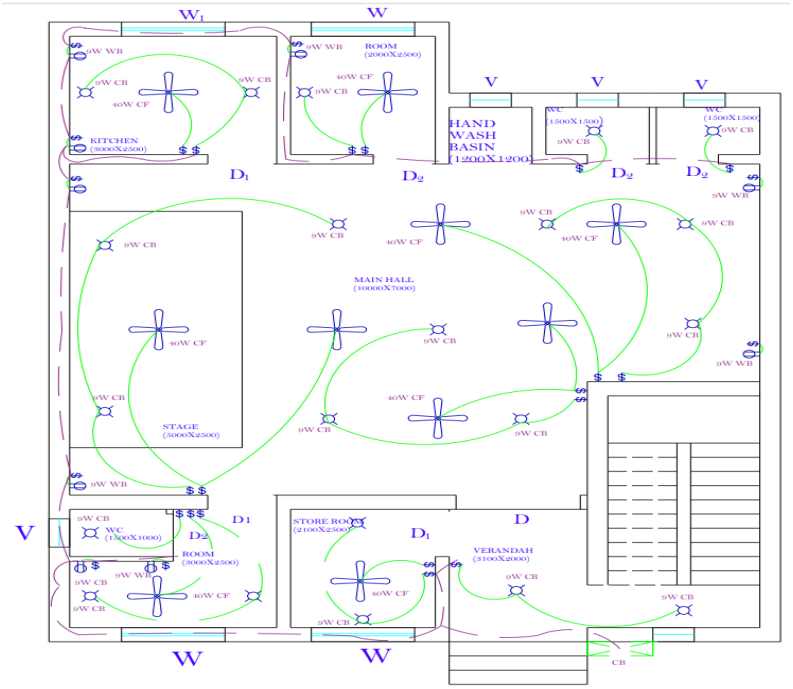
*All dimensions are in millimeter

3D Model of Library



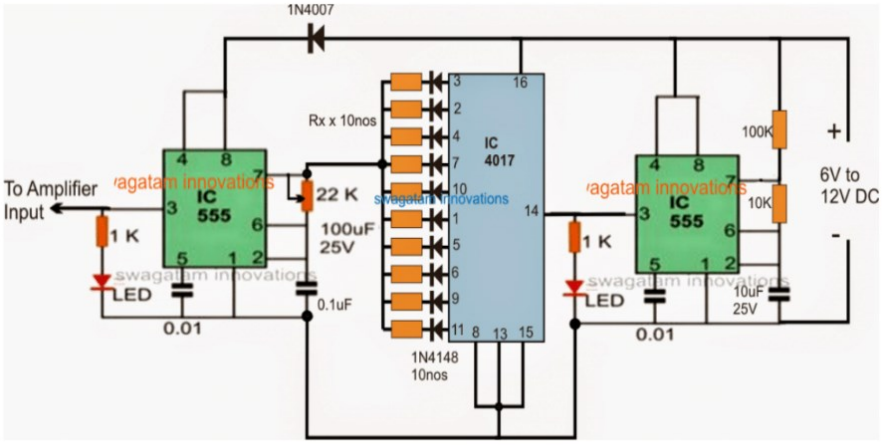


Design Infrastructure: Electrical Layout of Community Hall
Village: Shankar Talav
District: Valsad

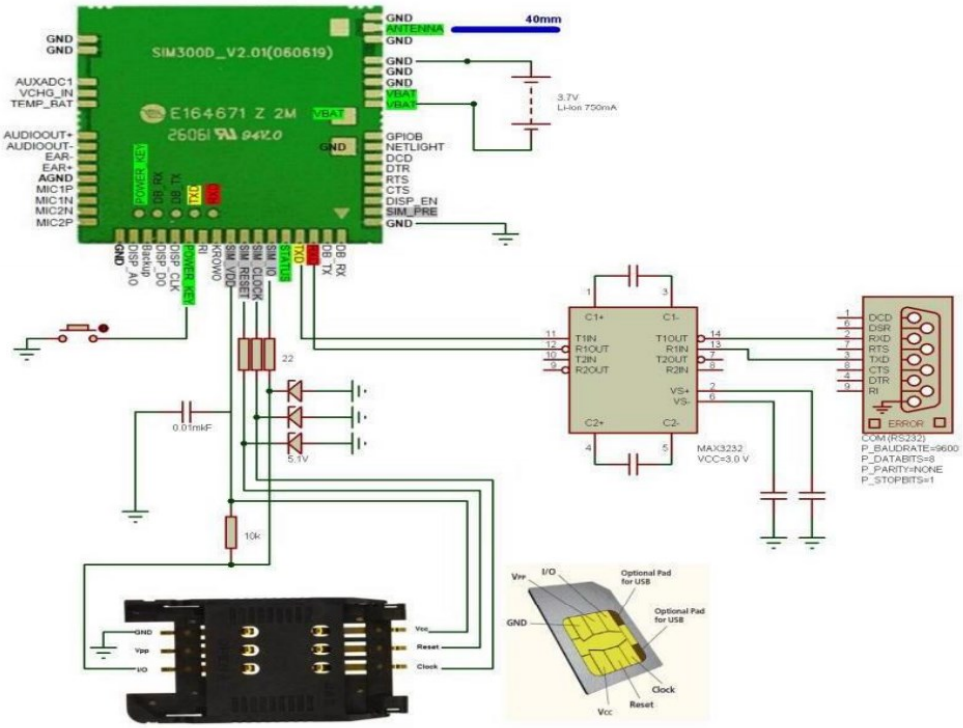


SYMBOL	DESCRIPTION
	CB - CEILING BULB
	CF - CEILING FAN
	MB - METER BOX

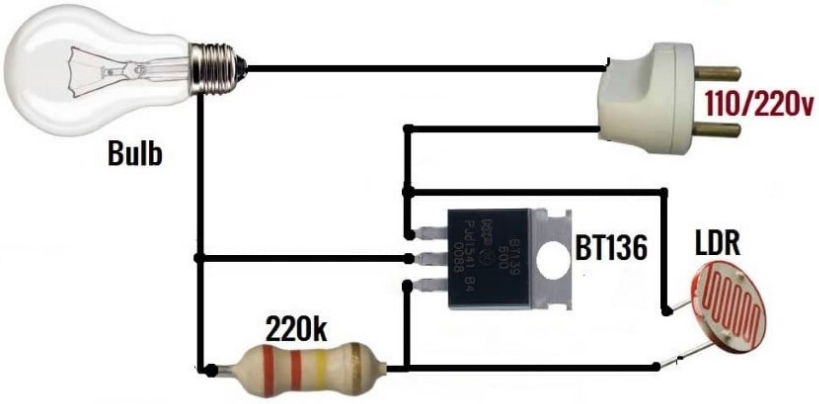
Design Infrastructure: Insect Repellent Circuit for Protecting Crops
Village: Shankar Talav
District: Valsad



Design Infrastructure: Automatic Irrigation with Arduino
Village: Shankar Talav
District: Valsad

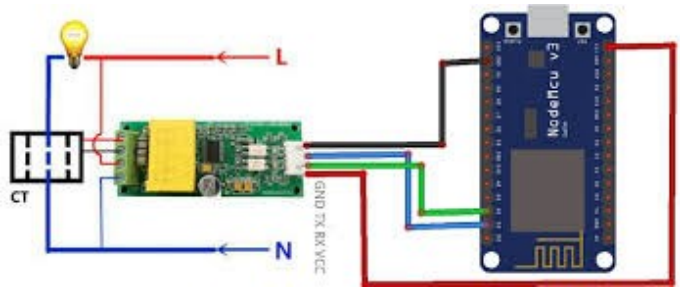


Design Infrastructure: Automatic Street light bulb holder
Village: Shankar Talav
District: Valsad



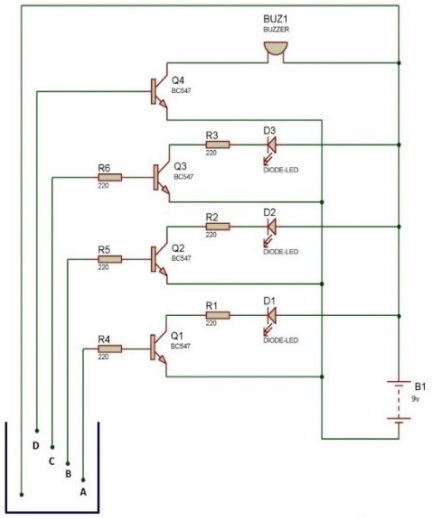
Circuit Diagram

Design Infrastructure: Live Energy Billing
Village: Shankar Talav
District: Valsad



Circuit Diagram

Design Infrastructure: Water level indicator with alarm
Village: Shankar Talav
District: Valsad



Circuit Diagram