DETAIL PROJECT REPORT

A detail project report of

Vishwakarma Yojana:An approach towards Rurbanization(Phase-VIII)

Village: Chapad District: Vadodara

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YEAR:2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad– 382424 Gujarat

DETAIL PROJECT REPORT

ON

VishwakarmaYojana: Phase VIII

AN APPROACH TOWARDS RURBANISATION Chapad Village Vadodara District

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CERTIFICATE

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

Detail Project Report for,

VILLAGE CHAPAD
DISTRICT VADODARA

Under

Vishwakarma Yojana: Phase-VIII

In partial fulfillment to the project of fared by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA

During the academicyear2020-21

This project worth as been carried out by the maunder our supervision and guidance.

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ABSTRACT

VishwakarmaYojana is one of the initiatives towards Rurbanization of villages by Government of Gujarat hand over to GTU. The vision of VishwakarmaYojana is to reduce and remove the rural-urban divide through infusion of urban patterns and services in rural system to ensure provision of quality lifestyle and livelihood options while keeping the basic rural soul intact. By studying the village life with respect to delivery of basic needs, the main aim is to reimagine, redesign, rejuvenate and strengthen the community life. The main objective of the project is to study the present status and to conduct techno-economic survey of all selected villages of the state. It ascertains the existing basic and public amenities, essential commodities and other infrastructure facilities.

As per the criteria given by VY-VIII, we have chosen the Chapad village of Vadodara district. Chapad village is located in Tehsil of Vadodara district in Gujarat, India. It is situated 12km away from Vadodara, connected with SH-87. There are2419 population with the area 459.99 Hectares. Villagers are engaged with agriculture.

As per our actual visit of village we found the current scenario of the village. All the major facilities are available like Gram Panchayat building, Bank, Post office, Hospital, Commercial spaces, Garden, Public toilets, School, Temple, etc. in good condition. Village is connected with local public transport of Vadodara. There is underground drainage system in main localities.

After analyzing all the data, we found that village need some new facilities and some existing facilities need maintenance. We suggest six new designs for village, a Post Office, Bust Stand, Skill Development Centre, Cremation Ground, Rainwater Harvesting and a Public Garden to fulfill the requirement of existing population. Also village need initiative for the approach to various Govt. schemes by local bodies.

After providing the facilities suggested by us, we will try to approach towards smart village concept. With the help of this Yojana and Village governance we will try to make the village smarter by providing E-facilities. Also it is important to maintain the existing facilities rather than new development. We are always looking in future forgetting the past which will keep us as it is in development point of view.

We can only approach to digital facilities and sustainable technology for our village. Because we cannot directly approach to latest technologies, we have to consider its future scope also. Now a day’s awareness is more required rather than technology.

Key Words: Rural development, Ideal village, Smart village, Techno-economic survey, Smart village survey, Gap analysis, SAGY survey, Design provision.

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We are highly indented to **Gujarat Technological University**, Ahmedabad for providing us such opportunity to work under VishwakarmaYojana 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 **Prof. (Dr.) Navin Sheth**, **Hon'ble Vice Chancellor, Gujarat Technological University-Ahmedabad**, for his encouragement and giving us the wonderful project.

We express our sincere thanks to Commissioner of Technical Education, Gujarat State for appreciating and acknowledging our work. Especially thanks to Registrar, Gujarat Technological University and team of Gujarat Technological University for their unconditional support during the project work.

We express our sincere thanks to **DDO, TDO, Sarpanch, Talatiand staff members of Vadodara**District for providing us with requisite data whenever we approached them. Especially our thanks are to all villagers and stake holders for their support during Survey.

We are also thankful to our **Prof**.(**Dr.) D. U. Shah Principal**, faculties of our colleges for their encouragement and support to complete this project work.

An act of gratitude is expressed to our internal guides **H.O.D. (Civil Engineering) – Mr. Mayank Patel and H.O.D. (Electrical Engineering) –Mr. Yatin Patel from college** for their invaluable guidance, constant inspiration and active involvement in our project work.

We are also thankful to all the experts who provided us their valuable guidance during the work. We express our sincere thanks to, **Dr. Jayesh Deshkar, Hon'ble Director of Vishwakarma Yojana project and Principal, V.V.P Engineering College and Core Committee member of Vishwakarma Yojana project Prof(Dr.)JigarSevalia**, Professor, SCET, Surat, **Prof. K.L.Timani,** Associate Professor, VGEC, **Prof.Rena Shukla**, Associate Professor, LD Engineering College, **Prof.Y.B.Bhavsar,** Associate Professor, VGEC, **Prof. Jagruti Shah**, Assistant Professor, BVM Engineering College for providing us technical knowledge of this project work.

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ABBREVIATIONS
1. VY= Vishwakarma Yojana
2. D.D.O. = District development officer
3. T.D.O. = Taluka development officer
4. U.D.P.F.I. = Urban Development Plan. Formulation and Implementation
5. P.H.C. = Primary Healthcare Centre
6. L.P.C.D. = liters per capita per day
7. P.T. = Public Transport
8. D.P.R. = Detailed Project Report
9. NGO = Non-Government Organization
10. GDP = Gross Domestic Product
11. RCC = Reinforced Cement Concrete
12. CHC = community Health Centre
13. NRI = Non-Religion Indian
14. GSRTC = Gujarat State Road Transport Corporation
15. PWD = Public Work Department
16. GWSSB = Gujarat Water Supply & Sewerage Board
17. MGVCL = Madhya Gujarat Vij Company Limited
18. GEB = Gujarat Electricity Board
19. RO = Reverse Osmosis
20. ATM = automated teller machine
21. GEDA = Gujarat Energy Development Agency
22. GPS = Global Positioning Systems
23. GIS = Geographic Information Systems
24. IMMR = International Movement for Monetary Reform
25. IRMR = In situ rock mass rating
26. CCTV = Closed-circuit television
27. LED = Light-emitting diode
28. FIR = First Information Report
29. FMCG = Fast-Moving Consumer Goods
30. Mbps = megabits per second
31. NGO= Non-governmental organization

CHAPTER - 1
IDEAL VILLAGE VISIT OF BIL (VADODARA DIST., GUJARAT)

In this all chapters, we include overall study of ideal village, visit of ideal village for the basic approach to develop ideas for our selected village, case study, literature review of ideal village, and all other information's.

1.1 Background about Vishwakarma Yojana

- Vishwakarma Yojana is an important and project of Government of Gujarat with aim to prepare Rurban Development of the villages of Gujarat.
- Vishwakarma Yojana is government project for developing various villages. In this project various details of villages like demographical details, geographical details, occupational details, physical infrastructure facilities, social infrastructure facilities etc. various data are collected. And it tries to develop facilities as possible as best. Its main purpose is making village as model or ideal village with maximum facilities.
- The basic need of rural development program has been alleviation of poverty and unemployment through creation of basic social and economic infrastructure, provision of training to rural unemployed youth and providing employment to marginal.
- Through various government departments are involved in various infrastructural development works, an ideal view and modern solution etc. can be provided by this project.
- By this Vishwakarma yojana project government wants technical solution of the problem of village dwellers at the engineering point of view. In this Project common problems of villages are tried to solve by engineering students by giving design proposals.

1.2 Study Area Location/ Ideal Village – Bil Vadodara

We first visit an ideal village Bil of Vadodara district for the purpose of understanding the basic concept of model village. Some important details about location of village are as follow

- **Name of Village: Bil**
- **Population Range: 5204**
- **Name of Taluka: Vadodara**
- **Name of District: Vadodara**
- **Latitude: 22.2537°N**
- **Longitude: 73.1339°E**
- **Humidity: 63%**

1.3 Concept: Ideal Village

According to us ideal village should have all the basic amenities and needs of village people. An ideal village should have the following basic infra-structures:

- **Good Connectivity:**

  Good connectivity is one of the most essential requirements of an ideal village. The village should be well-connected to other parts of the country by roads and also by rails, if possible.

The streets and lanes of the village should also be well maintained so that people can easily commute from one part to another.

- **Houses:**
  The houses should be neat and clean. They should be well-ventilated to allow free flow of light and air. There should be good arrangement for proper sanitation and drainage system.
- **Sufficient sources of potable water:**
  An ideal village should have good supply of clean drinking water. There should be enough wells, tube well sand even submersibles to meet the needs of the villagers. There should also be separate ponds for villagers to take bath and to get water for their cattle.
- **Efficient sources of potable water:**
  An ideal village should have good supply of clean drinking water. There should be enough wells, tube-wells. There should also be separate ponds for villagers to take bath and to get water for their cattle. And 24*7 hours water supply provided for villager.
- **Proper sanitation and drainage facilities:**
  An ideal village should have good system of sanitation and drainage so that used water and waste can be easily drained out. It would help the village keep clean and free from many diseases caused by water. It would also save the villagers from water-logging during the rainy season.
- **Cottage Industries:**
  An ideal village should have well-established small cottage industries so that the artisans and small farmers can utilize their skills and extra time to produce articles necessary for day-to-day use and earn ahead some profit by selling them in the market.
- **Healthcare Centers and hospitals:**
  Besides food, the other most important aspect of human life is health. An ideal village should have proper facilities taking care of the health of the villagers. There should be at least one healthcare canters depending upon the population of the village. A small hospital also adds to the quality of such a village. Besides health centers for the villager. Veterinary dispensaries should also be there take care of their live-stock.
- **Educational facilities**
  An ideal village should have proper education facilities for the children. There should be Primary schools and higher secondary schools so that they don't need to go out of the village for education. Primary education should be free and compulsory for every child. There should also have soft skills training centers.

1.3.1 Objectives

The ideal village has following objectives:

- 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.
- Commodities produced in such villages Contribute towards social empowerment by engaging all sections of the community in the task of village Development.

1.3.2 Live Case Studies of Ideal Village of Gujarat

Ideal Village: Bil, Vadodara

An ideal Indian village will be so constructed as to lend itself to perfect sanitation. It will have cottages with sufficient light and ventilation built of a material obtainable within a radius of five miles of it.

Bil is located in Vadodara Taluka of Gujarat. It is 9.4 km from the Vadodara railway station. It is 3 km away from Chapad village. Bil village is nearest village to Bhayli which is 5.3 km from the Bil village and it is connected with local transportation facilities like auto, CT bus and Government bus etc.

Jaykumar Bhatt Who was the surpanch of Bil village, is the key person for making the Bil village as a model village.

- **Name of Village:Bil**
- **Name of Taluka: Vadodara**
- **Name of District: Vadodara**
- **Latitude: 22.2537°N**
- **Longitude: 73.1339°E**
- **Population Range: 5204**
- **Humidity: 63%**

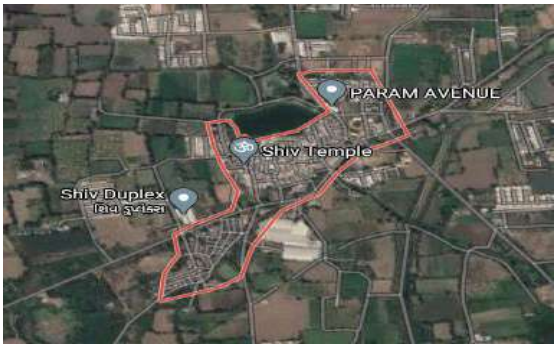


Figure 1Bil Village Map

1.3.3 The Idea of model/Smart Village

- The soul of India lives in its villages," According to the 2011 census of India, 68.84% of Indians (around 833.1 million people) lives in 640,867 different villages. The size of these villages varies considerably. 236,004 Indian villages have a population of fewer than 500, while 3,976 villages have a population of 10,000+. Most of the villages have their own temple, mosque, or church, depending on the local religious’. SansadAdarsh Gram Yojana is a rural development programme broadly focusing upon the development in the villages which includes social development, cultural development and spread motivation among the people on social mobilization of the village community.
- The programme was launched by the Prime Minister of India, NarendraModi on the birth anniversary of Jayaprakash Narayan, on 11 October2014.

- The scheme was implemented in pilot mode in 1000 villages of Assam, Bihar, Himachal Pradesh, Rajasthan and Tamil Nadu, with an allocation of Rs 10 lakh per village. This limit was later raised to Rs 20 lacks per village. The target villages under the scheme were those with more than 50% of the population belonging to Scheduled Castes (SCs) Additionally, State governments have also taken steps in this direction. Himachal Pradesh launched a MukhyaMantriAdarsh Gram Yojana along similar lines in 2011, with the allocation of Rs 10 lakh pervillage.

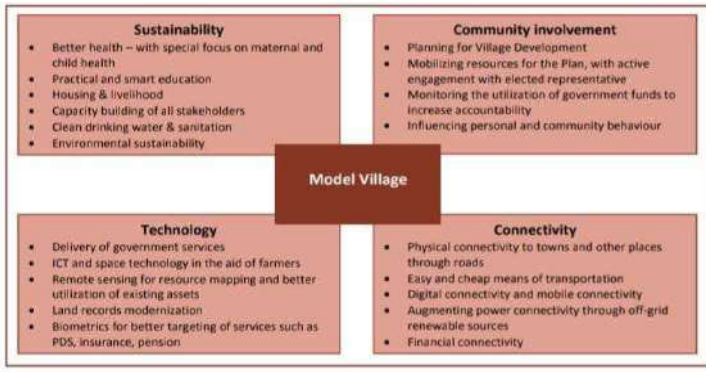


Figure 2: Components of Model Village

1.3.4 Ancient History Civil/ Electrical concept about Indian Village / other Countries Perspective about Village with Photography

Villages in Ancient India:

- In old days the life of village seems to be very tough. There were no facilities like they have no electricity that's why they were not used electric appliances and machineries.
- No washrooms were built even their houses were built of sand and of unfinished bricks. That's why flood wind hurricanes were easily destroyed their houses. People do not feel safe.
- There were no proper schools. Children cannot get proper education. For onward education from 5 grades, they have to go cites which were far from their village. So many difficulties arise for them in getting education or higher education.
- There were no proper roads so their vehicles cannot run properly and chances of accident were high in those days. Farmers also faced difficulties in framing crops.
- It needs plenty of water that's why they had to bring water from streams which were far from fields. That's why agriculture sector was not much progressing in old days.
- Hygienic condition was also not good because there was no proper system of sanitary.
- Children were frequently ill and death rate was high specially children.
- Women have to bring water for house hold from distance which creates difficulty for them. Because of illiteracy litigation rate was also high people were often seen in police stations.


Daily Life


Agricultural


Water Source


House Condotion

Figure 3 Villages in Ancient India

Villages Today:

- Now a day's villages are also modernized with the advance technology. They have electricity and usage of electricity appliances at home and electricity machineries at fields become possible. Because of electricity problem of water is also solved by using tube wells. Water is applied to fields with the help of tube wells. Water is also supplied to homes so women do not have to bring water from far.
- Cools are also built-in villages where children get education and rate of illiteracy is increasing day by day. Now girls can also get education in village. Proper sewerage system is maintained in villages that's why now children are less often became ill and rate of death decrease is also. Hygienic conditions became better now as compared to earlier.
- Roads are built now and there is no problem for transportation. People may easily go from one place to another place. Agriculture sector is also flourishing because transport problem for agriculture products from village to market becomes easy and possible. We can say that present villages are much better than old villages because of their facilities.


Transportation with Rigid Road


Education

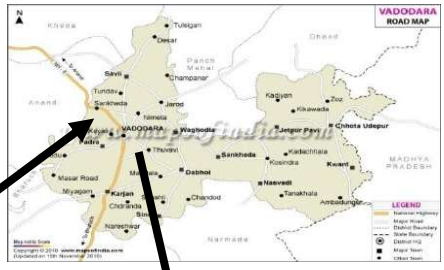
Road Facility with Solar Light

RO Plant for Drinking Water

Figure 4 Villages Today in India

1.3.5 Detail Study of ideal Village / Smart Village with Photography

Name of Village: Bil
Name of Taluka: Vadodara
Name of District: Vadodara



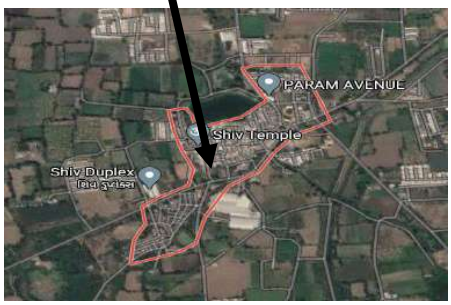


Figure 5Location of Bil Village Map

➢ Physical, Demographical Growth& Infrastructure Details

Table 1: Physical Growth of Bil Village

Source of water	1. 3 nos. of overhead water tank about 500000 liters capacities. 2. 1 hand pump. 3. 4 tube wells**.**
Road network.	1. All road are in good conditions 2. Main approach road is bituminous road.

	3. All internal roads are C.C roads.
Transportation Facility.	1. Nearest railway station 5.4Km (Vadodara). 2. Nearest bus station 5.3Km (Bhayli).Auto, GSRTC available.
Sanitation.	1. 2 nos. public toilet. 2. E-rickshaw is available for collection of solid waste from DTD.
Electricity.	1. Road/streets are provided with street lighting. 2. All government buildings are fully facilitated with good lighting. 3. 24-hour electricity provided
Housing conditions.	1. 90% of roads in village are pucca road. 2. All houses are consisting of lighting, good ventilation and good sanitation. 3. Major houses are pucca houses.
Education facility:	1. 4 no. of Aagnwadi 2. 1 No. of Primary School / Secondary and Higher secondary School available 3. Aura International Pre School 4. Vadodara Design Academy near bil Village

Table2: Demographic Growth of Bil Village

Sr. No.	Census	Population	Male	Female	Total Household
1.	2011	5204	2738	2466	1201

➢ Economic Profile

- In Bil village most of people are connected with agriculture activity.
- Other villagers are mostly self-employed. Through development center.
- And some of are connected with government sector.

➢ Social Scenario

Table3: Literacy Profile of Bil village

Class	Percentage (%)
Male	**94.09**
Female	**85.10**
Total	**89.82**

➢ Facilities available in Bil Village

Entrance of Bil Village

Panchayat Building

Overhead water tank

Overhead water tank

Internal road and house condition

Post office

Milk Dairy

Network Tower

Primary School

Aanganvadi

E cycle for Waste Collection

Garden

Secondary school

Play Ground

Low level area with CC Road

Pond

Community hall

Sarpanch of Bil Village

1.4 SWOT Analysis of Ideal Village

Strength:

- Connectivity to city area or Market Place.
- Good Education facility primary, secondary, higher secondary and ITI College.
- Banking Facility within the village.
- Sanitation of villages and awareness of people.
- Unity of villagers.
- Milk co-operative society.
- High literacy rate of villagers more than Gujarat avg. literacy rate.

Weakness:

- Good internal road facility.
- Villagers have informed about government scheme and various yojana.
- People interest about Gram Sabha.

Opportunity:

- Lake Modification
- Use of renewable energy solar lights, biogas, rain water harvesting.
- Solid waste management and recycling.
- R.O. plant for water purification.

Threats:

- Lack of awareness among Villages
- Political Disruption in development

1.5 Future Prospect

- For future prospect, the village Chapad can use more advanced technologies for agricultural prospect and for other requirements also. They can make the village cleaner and pleasing by growing plants and trees.
- There is one open lake which can be developed to enhance the appearance of the village. Public garden and playground should be made for the villagers. They can also provide biogas plant and other renewable sources of energy in the village. There should be police station in the village for the safety purposes.

1.6 Benefits of the visits of Ideal village / Smart Village

- To know the strength of village and weakness of villages
- To get idea about facilities provided to the villagers and culture of village
- To acknowledge the socio-economic profile of villagers
- To know the lifestyle of the ideal village

CHAPTER - 2
PUNSARI -LITERATURE REVIEW (CIVIL & ELECTRICAL CONCEPT)

2.1 Introduction: Urban & Rural

Urban:

Urban is that area where the population density is more and new facilities are provided to the people. Urban areas are the region surrounding a city. Most of inhabitants of urban areas have non-agricultural jobs. Urban areas have municipality, corporation, cantonment board or notified town area committee etc. According to census 2011, there are 7,935 towns, 4,041 statutory town and 3,894 census towns.

Rural:

All the area which is not characterized as urban area is called rural area. In which the population is very low compared to urban areas. Mainly they depend on agricultural activities. According to census 2011, there are 6, 40,867 villages in India. The area where more than 75% of male population is associated with agricultural activity is known as rural area.

2.2 Importance of Rural Development

- Rural development is important not only for the majority of the population residing in an area but the growth of rural activities is necessary to stimulate the speed of overall economic expansion of the nation.
- Rural development is pretended to be noticeable importance in the country today than in the olden days in the process of the evolution of the nation. It is a strategy trying to obtain improved rural creation and productivity higher socio-economic equality and ambition, stability in social and economic development.
- The primitive task is to decrease the famine roughly about 70 percent of the rural population, implement sufficient and healthy food. Later, serve fair equipment of clothing and footwear, a clean environment and house, medical attention, recreational provision, education, transport and communication.

2.3 Ancient village / different definitions of rural areas village:

- Rural areas are also known as the „countryside‟ or a „village‟ in India. It has a very low population density. In rural areas, agriculture is the chief source of livelihood along with fishing, cottage industries, pottery etc.

2.4 Scenario: Rural/Urban India: Gujarat as per Census 2011 and latest population.

- As per details from census 2011, Gujarat has population of 6.04 crore, an increase from figure of 5.07 crore in 2001 census.
- Total population of Gujarat as per 2011 census is 60,439,692 of which male and female are 31,491,260 and 28,948,432 respectively.
- In 2001, total population was 50,671,017 in which males were 26.385,577 while females were 24,285,440. The total population growth in this decade was 19.28 percent while in previous decade it was 22.48 percent.
- The population of Gujarat forms 4.99 percent of India in 2011. In 2001, the figure was 4.93 percent. Gujarat census data, 83.92% houses are owned while 13.54% were rented.

❖ Gujarat Census:

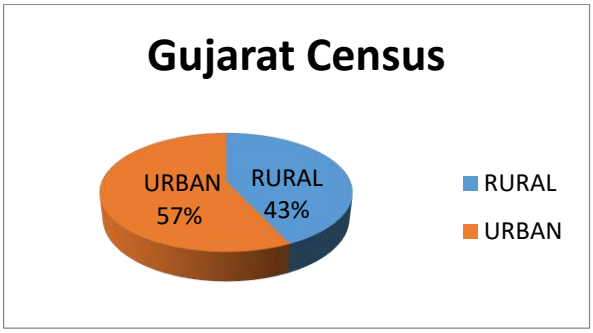


Figure 6 Chart of Male Female ratio

❖ Gujarat population as per census:

Table4 Gujarat population as per census

Description	2001	2011
Actual population	60,439,692	50,671,071
Male	31,491,260	26,385,577
Female	28,948,432	24,285,440
Population growth	19.28%	22.48%
Percentage of population	4.99%	4.93%
Sex ratio	919	920
Child sex ratio	890	883

❖ Literacy Rates (in %)

Table 5 Literacy Rates (in %)

	GUJARAT	INDIA
Female	**69.58%**	**64.63%**
Male	**85.75%**	**80.885**
Total	**78.03%**	**72.98%**

❖ Percentage increase in literacy rate

Table 6 Percentage increase in literacy rate

Year	Rural			Urban		
	Female	**Male**	**Total**	**Female**	**Male**	**Total**
1951	4.87	19.02	12.1	22.33	45.6	34.59
1961	10.1	34.3	22.5	22.5	66	54.4
1971	15.5	48.6	27.9	48.8	69.8	60.2
1981	21.7	48.6	36	56.3	76.7	67.2
1991	30.17	56.96	36	64.05	81.09	67.2
2001	46.7	71.4	59.4	73.2	86.7	80.3
2011	59.73	77.15	66.77	79.11	88.76	84.11
%increase in	24%	8%	12%	8%	2%	5%

2.5 Rural Issues & Concerns

- Rural areas face a lot of problems regarding cleaning, sanitation, environmental degradation and many more. Following are the problems faced by ruralareas.

❖ SANITAION:

Because of the illiteracy and poverty of the people in rural area, they do not know the importance of sanitation and hygiene. Such an ignorance causes environmental pollution leading to the break out of a number of epidemics like cholera, typhoid and many more.

Conversion of farm land into housing land.

- To provide shelter to the increased population in rural areas, more and more agricultural lands are being utilized for housing purposes by rural peoples. This results in decreased per capita availability of cultivated land which ultimately induces over cultivation.
- Lack of drainage facilities.

- Lack of drainage facilities and open defecation make the rural areas Filthy and unhygienic which directly or indirectly help in spreading of a number of diseases.
- Indiscriminate use of Pesticides and fertilizers.To increase the crop productivity for providing food to increased population, the illiterate rural farmers used a number of pesticides and fertilizers, not in proper amount.
- Salivation, Desertification and degradation ofland.The over cultivation of farm lands in rural area and misuse of water meant for irrigation lead to salivation, desertification and land degradation.

2.6 Various measures for rural Development

Rural development is the process of improving the quality of life and economic as well as financial well-being of people living in rural areas, often relatively isolated and sparsely populated areas from the modern activities and modern lifestyle of cities. Following are the measures taken:

- To develop the standard of living of people.
- To educate the youngsters of the rural areas and aware them about the modern facilities and rights.
- To provide basic amenities such as education, transportation, communication facilities, electricity and drinking water to the rural people.
- To provide irrigation facilities to the farmers and motivate them to adopt new methods of soil conservation.
- To spread awareness to the farmers to restore uncultivated land.
- Develop agricultural areas in rural mass.
- To develop the institutional infrastructure of the rural mass, such as banks, cooperatives, andpanchayat.
- To uplift the artisan, the rural area such as to improve their economy.
- Small scale industries to be setup in the rural areas.
- Provide financial assistance to small scale industries, cottage industries and other economic operations in this sector by the development of skilled handicrafts.
- To uplift the SC and STpeople.
- To develop the growth of housing facilities of the rural mass.
- Various infrastructure & amp: Guidelines/ Norms for villages for the provisions of different infrastructure facilities:
- This topic is covered in further coming chapter of Gap Analysis.

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

Table7 Villages for the provisions of different infrastructure facilities

Facilities	Planning Commission/UDPFI Norms	Required as per Norms
Education		
Aganwadi	Each Village	1
Primary School	Each Village	1
Secondary School	Per 7,500 Population	2
Higher Secondary School	Per 15,000 Population	1
College	Per 125,000Population	1
Tech. Training Institute	Per 100,000 Population	1
Agriculture Research Centre	Per 100,000 Population	1
Medical Facility		
Gov./Panchayat Dispensary or Sub PHC or Health Centre	Each Village 1	1
PHC & CHC	Per 20,000 Population	1
Child Welfare and Maternity Home	Per 10,000 Population	1
Hospital	Per 1,00,000 Population	1
Transportation		
Pucca Village Approach Road	Each Village	
Bus/Auto Stand Provision	All Villages connected by PT (ST Bus or Auto)	1
Drinking Water		
Water Facilities		
Over Head Tank	1/3 of Total Demand	1.6 lakh cap.
U/G Sump	2/3 of Total Demand	3.2 lakh cap.
Other Facilities		
Public Latrines	Each Village	60
Cremation Ground	Per 20,000 Population	1
Post Office	Per 10,000 Population	1
Gram Panchayat Building	Each individual/group Panchayat	1
APMC	Per 100,000 Population	0
Fire Station	Per 100,000 Population	0
Police Station	Per 15,000 Population	0

2.8 Sustainable Village Development Concept

- Rural Development is a process of changes carried out deliberately for the uplift of the Rural People.
- It is generally referring to the process of improving the quality of life and economic well-being of people living in relatively isolated and sparsely populated areas.
- Changes in global production networks and increased urbanization have changed the character of rural areas.
- Increasingly tourism, niche manufacturers, and recreation have replaced resource extraction and agriculture as dominant economic drivers.
- The sector accounts for 18 per cent of India's gross domestic product (GDP) and employs just a little less than 50 per cent of the country's workforce.
- This sector has made considerable progress in the last few decades with its large resources of land, water and sunshine.
- Sustainable agriculture, in terms of food security, rural employment, and environmentally sustainable technologies such as soil conservation, sustainable natural resource management and biodiversity protection, are essential for holistic rural development.
- Education, entrepreneurship, physical infrastructure, and social infrastructure all play an important role in developing agricultural regions.
- Preventing and Protecting the Wildlife, Natural Landscape and Cultural Resources.
- Ensuring universal access to food with a sustainable farming production.
- Improving millions of people 's welfare that live in the country nearly half of the world population), thus reducing the rural-urban gap, stamping out poverty and preventing city migration.

2.9 Principles of Sustainable Village Development Concept

- Promote high quality life of action.
- Preserve our environment.
- Strengthen local economy.
- Conserve energy, water and other natural resources.

2.10 Other Projects/ Schemes

Following are the schemes that are running or on board for the rural development by Indian Government:

- MGNREGA (MAHATMA GANDHI NATIONAL RURAL EMPLOYMENT GURANTEE ACT)
- PMGSY (PRADHANMANTRI GRAM SADAK YOJANA)
- IAY (INDIRA AVAS YOJANA)
- NSAP (The National Social Assistance Programme)

- Aajeevika (NRLM) / MIS
- DDU – GKY (DEEN DAYAL UPADHYAYA GRAMEEN KAUSHALYA YOJANA)
- PMRDF (PRIME MINISTER RURAL DEVELOPMENT FELLOWS)
- GREENING RD (GREENING RURAL DEVELOPMENT PROGRAMME)

1) MGNREGA (MAHATMA GANDHI NATIONAL RURAL EMPLOYMENT GURANTEE ACT)

- NREGA Launched on 2nd February 2006 as a momentous initiative towards pro-poor growth.
- For the first time, rural communities have been given not just a development programmed but also a regime of rights.
- The National Rural Employment Guarantee Act, 2005 (NREGA) guarantees 100 days of employment in a financial year to any rural household whose adult members are willing to do unskilled manual work.

2) PMGSY (PRADHANMANTRI GRAM SADAK YOJANA)

- Pradhan Mantri Gram SadakYojana (PMGSY) was launched on 25th December 2000 as a fully funded Centrally Sponsored Scheme to provide all weather road connectivity in rural areas of the country.
- The programme envisages connecting all habitations with a population of 500 persons and above in the plain areas and 250 persons and above in hill States, the tribal and the desert areas.

3) IAY (INDIRA AVAS YOJANA)

- Housing is one of the basic requirements for human survival. For a shelter less person, possession of a house brings about a profound change in his existence, endowing him with an identity, thus integrating him with his immediate social milieu.
- With a view to meeting the housing needs of the rural poor, Indira AwaasYojana (IAY) was launched in May 1985 as a sub-scheme of JawaharRozgarYojana.
- It is being implemented as an independent scheme since 1 January 1996.
- The Indira AwaasYojana aims at helping rural people below the poverty-line (BPL) belonging to SCs/STs, freed bonded labourers and non-SC/ST categories in construction of dwelling units and up gradation of existing unserviceable kutcha houses by providing assistance in the form of full grant.

4) NSAP (The National Social Assistance Programme)

- The National Social Assistance Programme (NSAP) which came into effect from 15th August, 1995 represents a significant step towards the fulfillment of the Directive Principles in Article 41 of the Constitution.

- The programme introduced a National Policy for Social Assistance for the poor and aims at ensuring minimum national standard for social assistance in addition to the benefits that states are currently providing or might provide in future.

5) Aajeevika (NRLM) / MIS

- Aajeevika - National Rural Livelihoods Mission (NRLM) was launched by the Ministry of Rural Development (MoRD), Government of India in June 2011.
- Aided in part through investment support by the World Bank, the Mission aims at creating efficient and effective institutional platforms of the rural poor enabling them to increase household income through sustainable livelihood enhancements and improved access to financial services.

6) DDU – GKY (DEEN DAYAL UPADHYAYA GRAMEEN KAUSHALYA YOJANA)

- DeenDayalUpadhyayaGrameenKaushalyaYojana (DDU-GKY) is the skilling and placement initiative of the Ministry of Rural Development (MoRD), Government of India.
- DDU-GKY has its origins in the Aajeevika Skills programme and the 'Special Projects' component of the Swarnajayanti Gram SwarozgarYojana (SGSY).
- The scheme focuses on catering to the occupational aspirations of rural youth and enhancing their skills for wage employment.

7) PMRDF (PRIME MINISTER RURAL DEVELOPMENT FELLOWS)

- PMRD Fellows Scheme is an initiative of Ministry of Rural Development (MoRD), Government of India (GoI) in collaboration with State Governments.
- The Fellowship has the twin objective of engaging young professionals to work with District Collectors in improving the development programme as well as to build them as a cadre of development facilitators, who will be available as a ready resource for rural development activities over a long term.

8) GREENING RD (GREENING RURAL DEVELOPMENT PROGRAMME)

- The Government of India's 12th Five Year Plan for the first time has set for itself the goal of faster, sustainable and more inclusive growth. Sustainability has been mainstreamed as a core objective of India's development strategy.
- This is hugely important paradigm shift in how we look at development.
- For the people in rural areas, particularly the marginalized communities, healthy ecosystems support sustainable agriculture-based livelihoods and essential services such as drinking water, sanitation and health care.
- Investing in natural resources also strengthens adaptation and resilience of communities towards climate change and natural disasters.

CHAPTER - 3
SMART CITY AND VILLAGE CONCEPT

3.1 Introduction

- In Smart Villages access to sustainable energy services 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
- Smart village means all the necessaries facilities is developed in the village and no need to moves in city for any kind of requirement.

❖ AnkodiyaVillage visit:

- It comes in name under the list of Smart villages. It is in Vadodara Tehsil of Vadodara District, Gujarat. When we visited the village, we were amazed by their surrounding which were so cleaned.
- The village has CCTV cameras at every street light pole. As there are solar street lights at every pole. The village was greeted by an award of the cleanest village.

Figure 7Ankodiya Village

- They have provided E-Rickshaw collecting solid wastes door-to-door. All houses were constructed on basis of latest method. There were many small private clinics as well as a Primary Health Centre for the peoples.

❖ Concept:

A “smart city” or a “smart village” is a part of urban or rural area that facilitate with advanced infrastructure facility, communication, sustainable market, where information technology is principal infrastructure of the city and that incorporates information & communication technologies (ICTT). It contains all the basis amenities and vitalities required for a person in a case of emergency or for recreation.

Figure 8 Speakers installed for announcement

❖ **Definition (Civil):**

Civil engineering plays vital role in development of smart city. Construction of new infrastructure and maintenance of existing structure, construction of bridges, road network, drainage network, water distribution, high rise building, traffic management and everywhere it requires.

❖ **Definition (Electrical):**

Electrical engineers design, develop, and test electrical devices and equipment, including communications systems, power generators, motors and navigation systems, and electrical systems for automobiles and aircraft. They also oversee the manufacture of these devices, systems, and equipment.

❖ **Practices:**

- Renewable energy or green solution: one of the essential requirements of smart city is minimum 10% of the total city's electricity is supply through solar energy.
- Transit development and sustainable transport Options: some cities are focused on improvement of transportation facility by construction of bicycle track, construction of BRTS and metro, auto-rickshaws replaced by electrical rickshaw.
- Improved Infrastructure and Housing: improve "livability" of people by providence of good infrastructure facility and better housing.
- Smart villages will be connected to towns and cities through information and communication technologies (ICT) enabled by access to energy.
- Key enablers of these development benefits in smart villages are sustainable electricity supplies and the availability of clean and efficient appliances for cooking.

Figure 9 Yojana of Ankodiya Village

3.2 Smart cities Bench Mark:

Some of the bench marks which shows the detailed needs of smart city as below:

- Smart traffic management
- Smart meters
- Building automation and control solutions (security, fire safety, alarms, lighting, gas and smoke detection).
- Smart energy management (Smart grid, smart water meters, smart solar energy solutions, smart electricity meters).
- Free public Wi-Fi network.
- GHG emissions tracking
- Applying smart solutions to infrastructure and service in area-based development.

3.3 Smart Cities Standards:

Standardized indicators within standards benefit smart cities in the following ways:

- Effective governance and efficient delivery of services
- International and Local targets, benchmarking and planning.
- Informed decision making and policy formulation.
- Leverage for funding and recognition in international entities.
- Transparency and open data for investment attractiveness.
- A reliable foundation for use of big data and the information explosion to assist cities in building core knowledge for city decision-making, and enable comparative insight.

3.4 Smart Cities Performance Measurement Indicators:

Table8 Smart Cities Performance Measurement Indicators

No.	Indicators	No.	Indicators
1.	Energy	**2.**	Education
3.	Economy	**4.**	Environment
5.	Finance	**6.**	Governance
7.	Health	**8.**	Recreation
9.	Solid Waste	**10.**	Telecommunication and Internet
11.	Water Management	**12.**	Waste Water
13.	Transportation	**14.**	Water and Sanitation

3.5 Technological options smart Villages: Civil& Electrical related technology

Table9 Technological options smart Villages

Civil	Electrical
Smart Sewage management system and sanitation	Solar powered bore well
Smart and efficiency Public transport system	Online Library and E-Education
Water Harvesting System	Renewable Energy Sources and Solar Energy
Smart Agriculture	Wi-Fi Connection
biogas plant	Solar Street Light

3.6 Road Map and Safe Guards

- Smart cities face many risks as digital and physical infrastructure converge. To help address this challenge, cities should embed cyber security and privacy principles in each stage of their development.

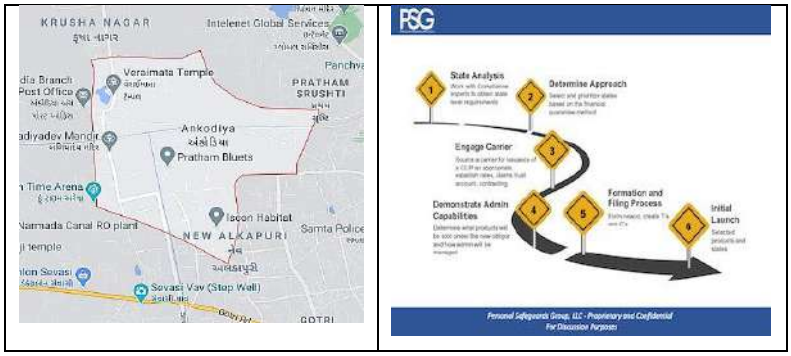


Figure 10Ankodiya Smart Village Road Map

❖ Safe Guards:

Smart cities face many risks as digital and physical infrastructure converge. To help address this challenge, cities should embed cyber security and privacy principles in each stage of their development.

3.7 Issues and Challenges

Here is a huge requirement for smart technology to be used in these smart villages. There is a need of proper financial resources and a market to create these smart technologies. But as of now there are a lot of constraints to get the ecosystem ready for financial resources as well as for proper marketization.

❖ Ecosystem of a smart village

- **Budget Constraints**

  There is a huge issue of budget constraints, which essentially has limited innovative thinking and created obstacles for many other initiatives.

- **Smart Technology**

  It is considered that smart technology for these smart villages is still in the pre commercial or in some cases the conceptual stage. And since the technology is in the pre-mature or conceptual stage, it generates uncertainties regarding return on investment as far as financial parameters are concerned.

  This also results in apprehension of a long payback period, and investors are unwilling to invest, which contributes to financial uncertainties for smart technology initiatives.

- **Lack of Knowledge**

  The other challenges related to smart village initiatives in India is the lack of knowledge of the people using modern technology. The citizens' experience of these smart technology initiatives has largely not been good for several reasons, one of which is due to the paucity of knowledge of the common people as to how to use modern digital technologies, Internet and other modern technology, and also the fact that there are very few people, especially in rural areas of India, as with other parts of the developing world, who know how to efficiently use and apply modern digital technologies, such as "smart meters" (Bra knell Forest Homes). There are other constraints that, though not so vital, also deserve mention, such as lack of technology-related skills, constraints on integration, and limited understanding and influence over the basic available services.

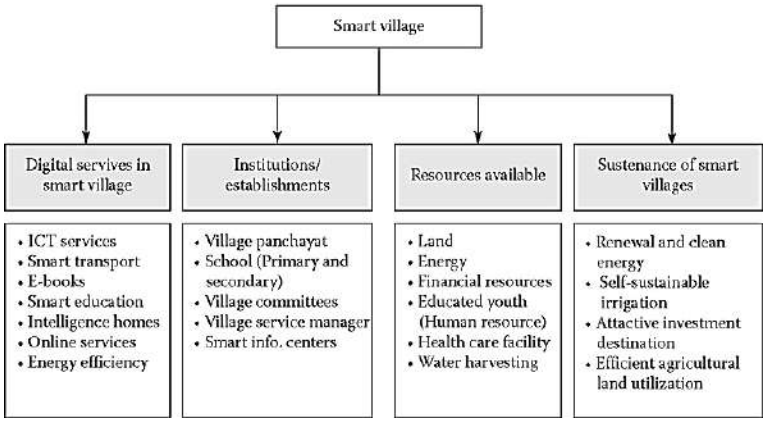


Figure 11 Issues and Challenges

3.8 Smart Infrastructure

The main features obtained by upgrading the nation towards smarts leads to:

- Sufficient and assured Electricity supply
- Digitalized Education
- Upgraded Health Technologies
- Requisite Water Supply
- Robust IT Connectivity and Digitalization
- Sustained and Green Environment

3.9 Cyber Security

- The village has CCTV Cameras at every street light pole. In various places in Ankodia village, a network of 26 CCTV cameras has been set up by the Gram Panchayat.
- This has been done to take care of security and vigilance against theft. But now the same setup helps them to keep a watch on violations of Covid guidelines.

Figure 12 CCTV Cameras

3.10 Strategic Options in Fast Development

- The effective rural developments strategies that must be followed are
- The Provision of support to the farmer Groups and the associations in order to build their capacity and supporting the farmer unions.
- By adopting the localized way of distributing the agricultural products.
- The water management for agricultural production by the utilisation of sprinklers and drips.
- Involvement of private sector companies for processing & marketing.
- By proper and effective communication & quality maintenance.
- Enhancing and improving rural micro finance services & provision for subsidisation for crops.
- Strategies for the provision of utilisation of technology by farmers.
- Liberalization of the Markets and the Pricing Structures.
- All weather roads to the rural habitations.
- Improved economic utilization of agricultural residues, by-products&the recycling of wastes by the establishment of separate recycler plants at the village levels by the support of government and local gram panchayats.
- Enhancement of linkages and tie-ups of the farmer groups with processors and the buyers for increasing the profits to the farmers.
- Pests and disease control with the utilisation of improved seeds, Bio Fertilizers, Herbicides, and Bio Pesticides.

- Usage of advanced equipment and machineries that constitutes the technology for the plantation and for the harvesting of the crops that leads to decrease in the labour cost and expenses.
- Enhancement of the agricultural productivity.

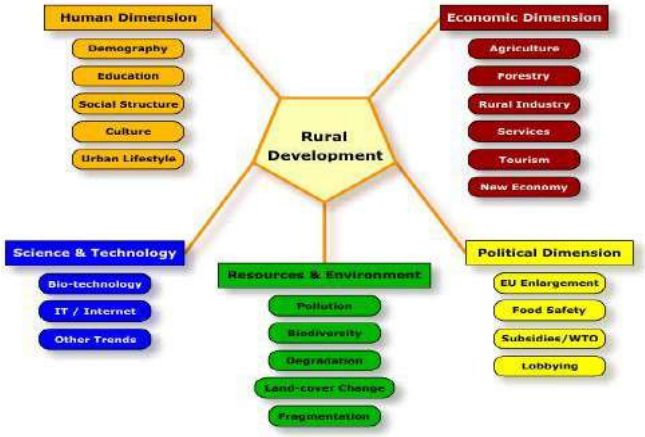


Figure 13 Rural development

- Research & Development of the agro processing technologies for the crops.
- Provision of Support to agriculture related industries.
- Establishment of farmer care and guidance centers.
- Analysis of complete Agricultural trade and statistics including Tree crops, consumption data, diseases and disease control data, statistics on agricultural products processing & marketing etc.
- Increasing utilization of the organic farming Because of in use of pesticides and fertilizers by the farmers, scientists have been advising the organic products. The
- Agricultural products are those products that are produced through organic farming termed as organic products. In today's world market these organic products are having high demand day to date.

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

❖ Urban Water and Sanitation Challenges

- India has made progress in supplying water to everyone and also provides sanitation facilities. This all was possible due to the efforts made by the dislike levels of government and the communities at improving coverage.
- The level of investment in water and sanitation has been increased in size during 2000. As a specimen, there was 1% of estimation in 1980 for the rural sanitation coverage which reached to 95% in 2018. Also, only two Cities of India were having continuous water supply and the estimate which was done in 2018 shows that 8% of Indians still lack in access to improvised sanitation facilities.

❖ Urban Water

- As of 2010, only two cities in India — Thiruvananthapuram and Kota — get continuous water supply. In 2005 none of the 35 Indian cities with a population of more than one million distributed water for more than a few hours per day, despite generally sufficient infrastructure.
- Owing to inadequate pressure people struggle to collect water even when it is available. According to the World Bank, none have performance indicators that compare with average international standards.
- A 2007 study by the Asian Development Bank showed that in 20 cities the average duration of supply was only 4.3 hours per day. None of the 20 cities had continuous supply. The longest duration of supply was 12 hours per day in Chandigarh, and the lowest was 0.3 hours per day in Rajkot.
- In Delhi residents receive water only a few hours per day because of inadequate management of the distribution system.

❖ Sanitation

- The dependency of rural people for sanitation is on-site sanitation as in khaadkuvva or pit latrines. In rural areas, Government has promoted Total Sanitation Campaign which has some success rates.
- In urban areas, a good practice example is the Slum Sanitation Program in Mumbai that has provided access to sanitation for a quarter million slum dwellers. The sewerage network has lacked in maintenance in Delhi over the years and the problem of overflow in raw sewerage is common in open drains, due to the blockage settlements and inadequate pumping capacities.
- A specific Indian problem is also the (officially prohibited) "manual scavenging" which is connected to the officially banned caste system, and relates to unsafe and undignified emptying of toilets and pits, as well as handling of raw, untreated human excreta.

❖ Initiatives in village development by local self-government

- Town Panchayat and city corporations require regular energy audit supports. Technical support staff needs to be strengthened in each Urban Local Bodies and a dedicated Energy Conservation Unit need to place at least in bigger urban local bodies. The ULBs are the competent authorities to enforce all energy saving measures in their jurisdiction; they need an enforcement unit with statutory powers. DPCs can initiate more proactive measures in energy conservation.

3.12 Smart Initiatives by District Municipal Corporation

Mission & Vision

- To provide a clean, hygienic and aesthetically pleasing environment for the citizens through achieving the best civic standards in the country, preserve the historical character of the city and make it an attractive destination for tourists.

Services

Figure 14 Mission & Vision

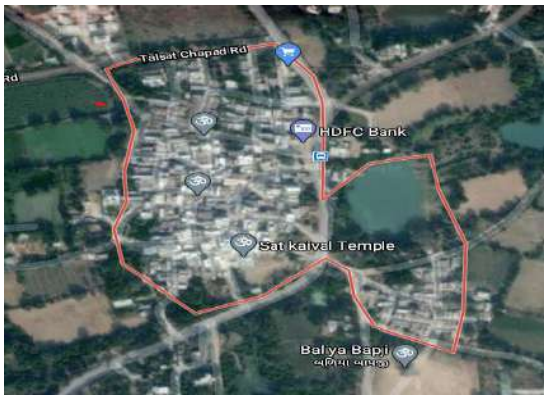
CHAPTER 4
ABOUT CHAPAD VILLAGE

4.1 Introduction

4.1.1 Introduction about Chapad Village

- Chapad is located 12 km away from Vadodara. Chapad village is one of village amongst 102 villages of Vadodara district and located nearby Padra,Bil and Bhaili villages. The State Highway-06 (Bhoj-Padra Vadodara Road) near to the ChapadVillage. Primary topographical and geographical detail are described in

Figure 15 Chapad village



- Name of Village: Chapad
- Name of District: Vadodara

4.1.2 Justification/need of the study

- The VishwakarmaYojana Project focuses on technical results of the problems that villagers go through from the engineer ‘s point of view. The hurdles that are mainstream to the village are solved by the engineering students.
- It is an initiator program leading the villages towards Rurbanization, held by the Government of Gujarat handed over to the prime developers of GTU that are students.
- The students allocated as engineers and the Faculty Members as a guide/ Nodal Officer meet all the stakeholders of the villages to conduct survey on the existing features. After that, engineers re-think upon the present facilities and according to that they give the new designs for the needs.
- The basic need of rural maturity program has been improvement of poverty and unemployment through creation of basic social and economic infrastructure, provision of training to rural unemployed youth and providing employment to marginal farmers/labors to discourage seasonal and permanent exodus to urban areas.
- Though various government sectors are involved in different infrastructural works, a holistic view and modern remedies can be provided by new engineers under Vishwakarma Yojana. The scrutinizing of villages is done by the students with this view.

4.1.3 Study Area

Table 10 Chapad Village Overview

Gram Panchayat	**Chapad**
Block/ Tehsil	Vadodara
District	Vadodara
State	Gujarat
Pin code	391410
Area	495.99 hectares
Population	2419
Households	530
Nearest Town	Padra (7 km)

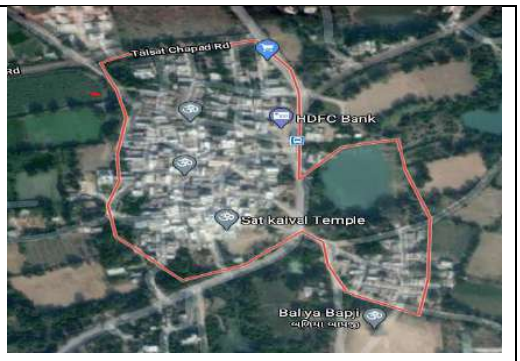


Figure 16 Chapad village

4.1.4 Objectives of the study

- To study the existing growth, characteristics and development of villages.
- To analyses all feasibility parameters and relevant factors for sustainable development of villages.
- Creation of infrastructures likes civic and social infrastructure along with provision of alternative.
- The designing of new infrastructures, re-design, re-use or optimization of existing infrastructures, which is consistent with the principles of sustainable development of the villages.

4.1.5 Scope of the Study:

- There is an aim that sticks behind this VishwakarmaYojana Program which includes development of the rural sectors along with the urban regions.
- As India, is an agro-based country, the maximized source of income depends on farming in rural areas. Due to this, the living standards of rural people are not at that leveled as of the urban people.
- Such amenities lies in basic categories such as Physical Infrastructure (Sources of drinking Water, Water Tanks, Proper Drainage Facilities, R.C.C Road Networks, Transport Facilities, Sanitation Facilities, irrigation Facilities, R.C.C Houses), Social Infrastructures (Anganwadi, Public Health Centre(PHC), Private Clinic, Private Hospitals Primary School, Secondary School, Higher Sec. School, Colleges, Community Hall, Public Library, public garden, Recreation center, Other Facilities), Sustainable Infrastructure (Renewable Energy, Bio-Gas Plat, Solar Street Lights, Rain Water Harvesting, Any Other). Survey will be conducted and according to the data analyzed results, lacked arrangements will be provided, for the betterment of villagers

4.1.6 Methodology Frame Work for Development of Your Village:

Students working under Vishwakarma Yojana project have to prepare a holistic plan for development of the villages by,

- Designing Villages as Rurban communities.
- Redesigning spaces to retain and strengthen the community spirit and
- Re-imagining the economic structures.

Vishwakarma Project is divided in two phases: -
i) August 2020 to November 2020- Part-I
ii) January 2021 to April 2021- Part-II

The first phase project is aimed to study the present status, techno-economic survey and Design of Sustainable Infrastructure of proposed villages in Vadodara District of the state in terms of basic and public amenities, essential commodities, other infrastructural facilities for the need of people and to prepare report on adequacy of the available resource with reference to population of the village and growth of the area.

The first phase is deal with identifying the inadequate and additional resources required for the village and future scope of work to complete the assign task as per protocol/guideline suggested for the project along with detail design of Sustainable Infrastructure Planning with estimate given for village.

The second phase is concerned with preparing detail project report by survey planning, real design and estimate preparation for provision of identified inadequate and additional resources for development of village.

Figure 17 Frame work

4.1.7 Available Methodology for Development of related Civil / Electrical

❖ **Methodology-Implementation**

- The techno-economic survey of villages has been conducted in different districts of Gujarat in terms of seeking for basic and public appliances, other Infrastructural aids.

❖ **Techno-economic survey of villages**

- Conducted survey and obtained essential data regarding the amenities according to the forms provided by this program to held inspections, which includes dissimilar categories of basic needs.

❖ **Development document preparation**

- Directing the gap analysis, planning and estimating for proposed designs will be obtained.

❖ **Detailed Project report (DPR)**

- Preparing for development regarding the strategies and plan taken in action.

❖ **Data Analysis**

Gap Analysis will be managed by comparing allocated village with selected Ideal and Smart Villages. Guidelines for the proposing designs will be preferred from the forms

organized under the government, are Rural Planning norms and UDPFI (Urban Development Plans, Formation and Implementation).

❖ **Design Proposals**

- Under the consultancy of Concerned Government Officials (TDO, DDO and Sarpanch) the proposed development and planning strategic designs obtained from gap analysis will be held. Designs are proposed according to the needs of their allocated village, also the detailed Estimation is provided in Abstract sheets, Measurement Sheets, Recapitulation Sheet and Detailed Sketch. In the designing phase, students have to propose various designs from following;
- Physical Infrastructure Facilities (Solid and Liquid Waste Management, Water Tanks, Drainage Lines).
- Social Infrastructure Facilities (Education, Health and Sanitation Facilities)
- Socio-cultural Facilities (Community Hall, Library, Recreational Facilities and Other)
- Sustainable Infrastructure (Rainwater Harvesting, Bio-Gas Plant, Solar Street Lights, Eco-sanitation and other)
- Repair and Maintenance of Public Buildings for overall development of a village.

❖ **List of Objects Available related to Civil Methodology**

- Panchayat Building
- School
- Sub-center
- Water Tank
- Play Ground
- Bank
- Pound
- Drainage facilities

❖ **List of Objects Available related to Electrical Methodology**

- 24*7 Electricity
- Street light
- 6 to 8 Hours Electricity for agriculture
- Use of new technology for the villager like solar panel use

4.2 Study Area Profile

4.2.1 Study Area Location with Brief History Land Use Details

❖ **Brief History:**

Chapad is small village located in Vadodara district, Gujarat with total 530families residing. The Chapad village has population of 2419 of which 1256 are males while 1163 are females as per Population Census 2011.

In Chapad village out of total population, 1028 were engaged in work activities. 98.05 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 1.95 % were involved in Marginal activity providing livelihood for less than 6 months of 1028 workers engaged in Main Work, 147 were cultivators (owner or co-owner) while 615 were Agricultural laborers.

❖ Land use details: -

The area of Chapad village is mostly occupied by Agricultural area, residential area, and Water bodies.

The approximate land use by agriculture unit, residential unit and lakes are shown in table: 11

Table11: Land Use Details

Sr.no.	Description	Information Details (In Hector)
1	Total Area of Village (Approx.)	957.03
2	Agricultural Land Area	670.03
3	Residential Area	95.60
4	Other Area	76.56
5	Water bodies	114.84

4.2.2 Base Location map, Land map, Gram Tal map:

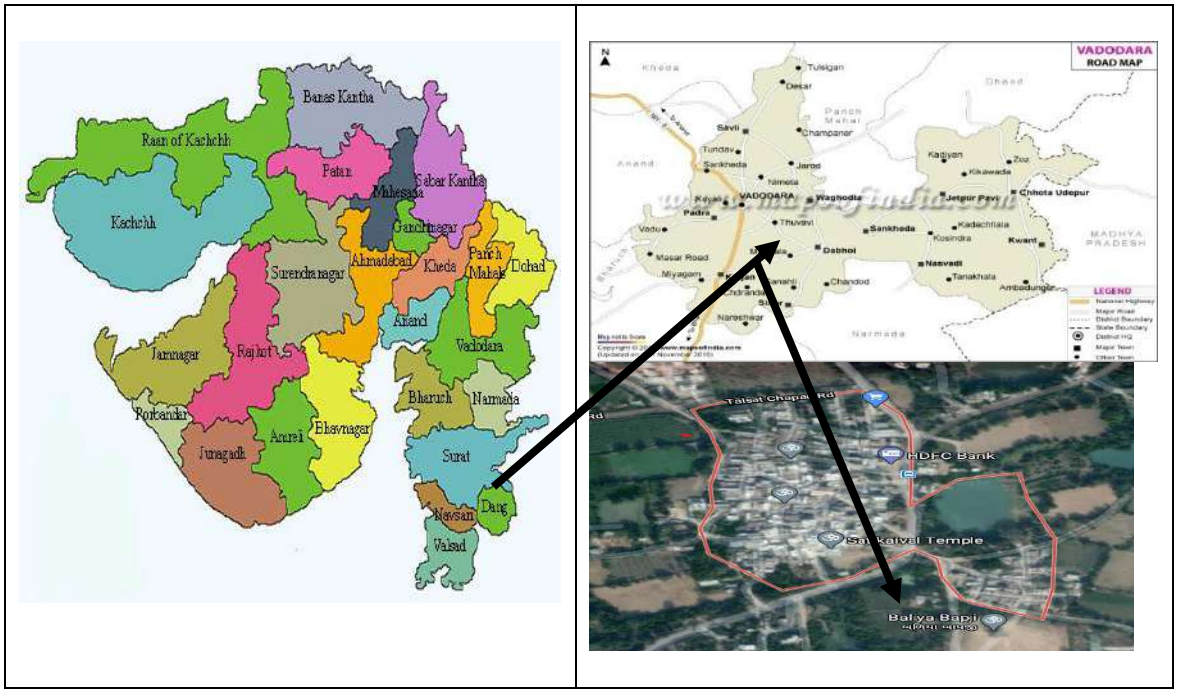


Figure 18 Location map

4.2.3 Economic Generation Profile/ Bank

- The main economic activity of the people of the area is farming, business and job. The people who are workers or the officers in the Chapad area are preferred to live in Chapad because the transportation facility is there which connect the Chapad. The basic economic activity is farming that people are also live in Chapad because their children get better education and easy transportation for the school and college.

- In Chapad village out of total population, 1028 were engaged in work activities. 98.05 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 1.95 % were involved in Marginal activity providing livelihood for less than 6 months. Of 1028 workers engaged in Main Work, 147 were cultivators (owner or co-owner) while 615 were Agricultural laborer.

Table12 Occupation Detail of Chapad Village

ECONOMICAL STATUS	
FARMER	70.00
JOB	10.00
OTHERS	20.00

- In Chapad village most of people are connected with cultivators, agricultural, labors, household industrial workers and marginal workers.
- Major crops grown in village are Rice, castor, Bajara and wheat.
- Other villagers are mostly self-employed.
- The HDFC Bank Available in village also villagers connected to smart banking phone and online payment.

Figure 19 Bank in village

4.2.4 Social Scenario-Preservation of Traditions, Festivals, Cuisine

- **Preservation of Tradition**
- It is important to preserve our cultural heritage, because it keeps our integrity as a people.
- They keep constant communication with family & friends.
- They gather as a group not just for holidays, but for ordinary meals, event or just conservation.
- **Festivals**
- The villages of the Indian state are special for their distinguished fairs and festivals.
- They celebrate the all-Indian festivals like Republic day, Diwali, Gandhi Jayanti, Independent day, Navratri, Janmastami etc.

4.2.5 Migration Reasons / Trends

- Employment opportunity is the most common reason due to which people migrate.

- Except this, lack of opportunity, better education, sometimes crop failure forced villagers to migrate to cities.
- Seeking a better life.
- Displacement because of environmental factors.

4.2.6 Actual Problem faced by Villagers and Smart Solution

Table13Actual Problem faced by Villagers and Smart Solution

Sr. no.	problem	Solution
1.	There is problem of solid waste generating on road &by houses which is being dump on opens paces.	**The solution is to provide an E-rickshaw for collection the solid waste from road sand from houses & to dispose to the one place.**
2	Post office: There is govt. building of post office. The office is not in good condition &the distributes the posts.	**The recreation of post office building.**
3	Bus stand facility: There is no bus stand facility for waiting the bus.	**So, providing bus stand.**
4	Strom water is runoff with no reuse.	**Providing rainwater harvesting system.**
5	There is no public garden	**Providing public garden.**
6	There is no govt. health center	**Providing govt. health Centre**
7	The storm water back to in drainage line in monsoon season.	**The drainage provided with chambers and bent to not get return.**
8	There is no community hall in village	**The community hall provides with new facility and community toilet.**
9	There is no skill development Centre	**To providing cybercafé for the interacting with internet**
10	There is no library available for the villagers Lacking of new technology for the farmer.	**The library provided with book and newspaper for the readers and also books related to technology.**

4.3 Data Collection about chapad Village

4.3.1 Methods for Data Collection

- Questionnaires: Villages related questions are asked to Sarpanch/Talati in order to consume Information.

- Interview: Interaction is made with local peoples of the villages to attain history and present condition of the village.
- Observation: In sake of gaining data, observation by own leads to better gathering of information about the village 'aesthetics.
- Case Studies: While acquiring specifics case studies of different villages helps in securing best stats of allocated village.
- Historical Growth: Helps in knowing the growth pattern of village from past years, by understanding their customs, Traditions, livelihood.
- Techno-economic survey of village: Collected all essential information from village such as: Household data, Occupational detail, Water facilities, Drainage facilities, Sanitation availability, Storm water network, Solid waste Management facilities, Electricity Networks, Recreation facilities, Education facilities, Health Facilities, Transportation facilities, Road network, Irrigation system, Use of non-conventional energy sources, Migration rate, Literacy rate and other necessary data.

4.3.2 Average size of the House-geo-tagging of house

- The process of tagging infrastructure with geographical information like Latitude, Longitude, Distance, place name, etc.
- It is connected to GPS which are monitored through computer internet networks.
- It can be used to locate important places like labs, dispensaries, milk center, etc.
- Geo Tagging is no implemented in Chapad village.

Figure 20 Average Size of House

4.3.3 Material available locally in the village and Material Out Sourced by the Villagers

❖ **For available material**

- There is milk production association.
- There is also shop available for rashan available.

❖ **For not available material**

- For the house, they used mainly bricks, sands and wood, this is not available so they take it from near town Vadodara which distance is 12 km from Chapad.
- All other commodities needed for villagers are imported from nearby cities Vadodara.
- Also, the cinema and higher medical facilities available 5 to 6 km from village.

4.3.4 Geographical Detail

Table 14 Geographical Details

Chapad - Village Overview		
Area of village (in Hector)	:	957.03 ha.
Forest area (in hect.)	:	0
Area under non-agricultural land (hect.)	:	172.16 ha.
Residential area (inhect.)	:	95.60 ha.
Agricultural land area (inhect.)	:	670.03 ha.
Pin code	:	391410
Area	:	495.99 hectares
Population	:	2,419
Households	:	530
Nearest Town	:	Padra (7 km)
Nearest village	:	Bil (3 km)
Co-ordinates of location of village	:	Longitude 73.147 latitude 22.234
Nearest City and its distance	:	12 km Away from Vadodara
Temperature	:	Min. 20° Max 43.33°
Connectivity to the roads	:	SH 06
Distance to nearest railway station	:	5 km Bhaili Station 12 km Vadodara Station
Distance to nearest Bus station	:	12 km Vadodara

4.3.5 Number of Human beings in One House

- According to the sarpanch and by survey there is an average of six members per House.

4.3.6 Demographical Detail-cast wise population details / which ID proof using by Villagers

- Villagers mainly used Aadhar card,Voting cars, Rashan card, PAN Card etc.
- Schedule Tribe (ST) constitutes 16.25 % while Schedule Caste (SC) were 9.76 % of total population in Chapad village.

4.4 Infrastructure Details

4.4.1 Drinking Water:

- Main source of drinking water is Gujarat Water Supply provided. Other than this the village is covered with taps through which the treated water is supplied regularly. This process is carried under SujalamSufalamYojana.
- Hand pumps, well, are not used and the canal is generally used as main source for irrigation.
- R.O. plant is established near the water tank. But it is not in working condition.
- Water Tank Facility

  i) Overhead tank capacity – 50,000 liters

  ii) Underground sump – 1, 00,000 liters

Figure 21 Water Tank

4.4.2 Drainage Network/ Sanitation facilities:

❖ **Drainage facility**

- Drainage facility is available throughout the village which is underground sewer (pipe line) system. There is no drainage problem in the village. The type of drainage is closed and the discharge is disposed in the river without any prior treatment. According to the Sarpanch and our suggestion there should be a facility of proper treatment and collection of wastes from house.

Figure 22 Drainage and Sanitation Facilities

❖ Sanitation facility:

- Solid waste is used as compost in fields and liquid waste is directly disposed to the ponds.
- There is a facility for collection of solid waste from house to house by E-Cycle from road.

Figure 23: Door to Door E-Cycle

- **Suggestion** - village requires and Waste collection facility if government can help by providing the means of conveying the waste from their village to the disposal and recycle plant.

4.4.3 Transportation and Road Network:

Road network:

- As far as road network concerned, Chapad village has very good internal street roads, main roads and approach road network.
- Road network of Chapad village is very well as overall boundary of the village is carried out by means of roads.
- Chapad village have a very good quality approach road in the form of S.H 6 having Rigid pavement, which provide good connectivity from village to Vadodara city area and also for commercial and Industrial goods transportation.
- The main roads of Chapad village having Rigid type pavement and in good condition.
- Internal streets of a village are mostly cement concrete pavements and also in good condition.
- Chapad village is very well connected to its neighborhood area like Padra Village, Bil village and Bhayli.

Figure 24: Internal Streets Having Cement Concrete Pavement

Local transportation:

- As far as local transportation concerned, bus and jeep are the two main transportation facilities available in Chapad village.
- There is one Bus stop available in Chapad village at entrance which is not in good condition.
- Local City Bus Available in three to four times in a Day and Government bus available in day.

Railway station:

- No railway station facility is available within Chapad village.
- But the nearest railway station is 'Vadodara Junction' which is just approximate 10.8 Km. Away from the village.
- The nearest Bhaili railway station 4.5 km away from Chapad Village.

Figure 25: Bus Stop

4.4.4 Housing Condition

- As far as housing conditions concerned, Chapad village has a very good housing condition in its residential area. Ratio of Kutcha / Pucca is 5/7.

Figure 26: Housing Conditions

4.4.5 Social Infrastructure Facilities

❖ **Health facility:**

- There is facility for medical available in the village. Also available facilities for the health sub center/ PHC / CHC /government hospital, private clinic / private hospital and Aanganvadi available for health welfare.
- The full medical facility is available in 7km and 12km form the village of Chapad.

Figure 27: Health Sub Centre

❖ Education facility:

As far as educational facility is concern, Chapad village has very good education facilities as shown in below table: 12

Table15: Education Facilities

Facilities	Numbers of Facilities	
	Gov.	Private
Aanganwadi	4	-
Primary School	1	1
Secondary School	-	1
English Medium school	-	1
Play group	1	1

- For further education, Vadodara is the nearest town for the people of Chapad Village.
- **AANGANWADI:** There are 4 Aanganwadi in Chapad village better facility in favor of children and remaining in good condition.

Figure 28: An Aaganwadi in Chapad Village

- **PRIMARY SCHOOL**: There is one government school in Chapad village and also one private school in the Village with adequate infrastructure facilities.
- There is one English medium School available near the Chapad Village.

Figure 29: Government Primary School in Chapad Village

❖ **Public library:**

- Public library and school library and it has daily newspaper supply.
- There is the govt./ Panchayat Library not available.

4.4.6 Existing condition of Public buildings & Maintenance of existing Public Infrastructures

❖ **Post Office**

- Post office is available in the village. There is no telecommunication network/ STD booth, general Shops and pharmacy or medical shop.
- Post office required maintenance.

Figure 30: Post Office

❖ **Panchayat Office**

- The Panchayat office required maintenance. And also required surrounding paver block.

❖ **Public Toilet**

- Public latrine blocks, community toilet is available and also in good condition but less people are using it because they have their private latrines at their respective houses.

4.4.7 Technology Mobile / WIFI / Internet Usage Detail

- As technological point of view internet users is available and also use in government offices.
- No public WIFI is available in village.
- Mobile tower is available in village.

4.4.8 Sports Activity as Gram Panchayat

- Open Space available in for sports activates. Also arrange the game like cricket, Volleyball, football etc. at village level.
- Currently no activities organized at Gram Panchayat. But Panchayat office under the renovation.
- Also, Water supply in Village provide by the Gram Panchayat is under repair and maintenance.

4.4.9 Socio-Cultural Facilities

- **Public garden** – There is no public garden hence the people spend their time in the temple which has some free space.
- **Playground**- Open Space available in for sports activates.
- **Ponds-**There are total 2 ponds in the village.
- **Assembly polling** is carried in the school and it has two 2 Centre's. It's in good condition.

4.4.10 Any Other facilities

- Internal roads of village are in CC road and side of road also paver block provided.
- Private shops are available but they do not have any public distribution system. Agriculture co-operative society is in form of private agency.
- That space is given for washing clothes near the pond.
- Birth and death registration are carried out at the place of the birth as such in the hospital and Panchayat office but now day it can be done online also.
  For Recreational center, cinema/video hall villagers need to travel to Vadodara.

4.5 Electrical Concept

4.5.1 Renewable energy source planning particularly for villages

- Village hasn't adopted any non-conventional energy or renewable sources.
- There is no biogas plant, rain water harvesting system, solid and liquid waste treatment and any agriculture programming.
- The solar panels used in new construction of the bus station it can be reduce the expenses in the village.
- Also provided street light energy using by solar panel.

- The solar panels using in design of cyber café to utilizes the natural source and reduce the expenses in the village.

4.5.2 Electricity Distribution in the village

- Government supplies electricity continuously for 24 hours which comes under MGVCL.
- Power supply for domestic use is provided by government through GETCO substation.
- Power supply for agricultural use is provided by government for 7 hours.
- Roads/street lights- the lights are only on the main road and that is maintained and governed at the village expenses.
- Electrification in government buildings/school/hospital- There is government supply and government pay the bill and other expenses.
- There are no any renewable energy sources facilities.

4.5.3 Irrigation facility

- Main source of irrigation is Canal water. If sufficient water is not available then they use private bore holes. Also, private bore holes using Power supply which govt. provide for the Agricultural Area.
- There are total 2 pounds in the village. It is not using for the irrigation but they utilize the water of pond for Cattle trough (drinking and bathing for animal).

CHAPTER – 5
CASE STUDY

5.1 Concept (Civil):

5.1.1 Vertical Farming

❖ Introduction

- In vertical farming, farms are stacked on top of one another, instead of branching out horizontally. ... Project focuses on use of technique of hydroponic in vertical farming. The resulting social benefit from project is that the future population gets fed with organic and nutritious food.

❖ Need for Vertical Farming Cost-Effectiveness

- Vertical farming is the urban farming of crops inside a building in a city or urban center, wherein the floors are designed to accommodate certain crops.
- These heights will act as future farm lands and that they can built by nations with little or no arable land, transforming nations which are currently unable to farm into top food producers.
- Vertical farming creates an alternate source of sustainable food production units for today's urban needs and future generation.

❖ Scope and Potential

- Less deforestation and land use. This means less erosion and less flooding.
- Abandoned or unused properties will be used productively.
- Crops will be protected from harsh weather conditions like floods, droughts and Snow.
- Reduction in vehicular transport as the crops produced is easily consumed.
- Less CO2 emission and pollution by decreasing reliance on coal burning product.
- Overall wellness as city wastes will be channelized directly into farm buildings.
- Water is used more effectively.

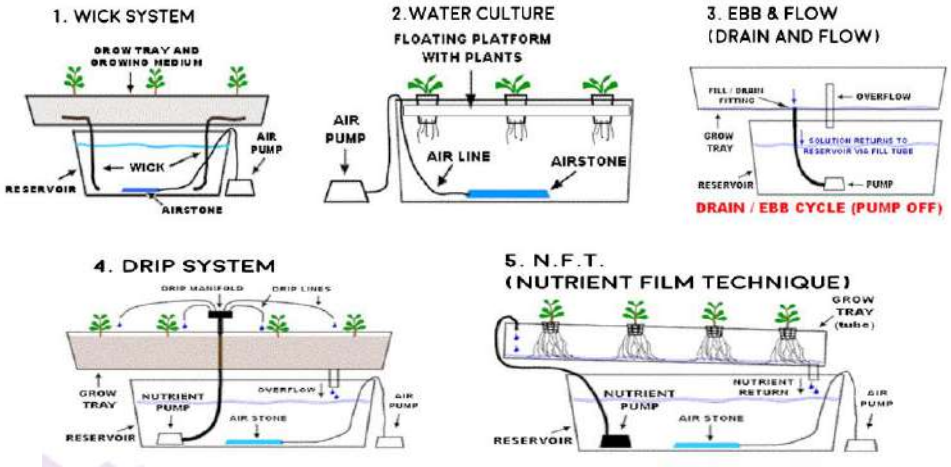


Figure 31 Vertical Farming

❖ Advantages of Vertical Farming

- **Preparation for Future:** By 2050, around 80 % of world population is expected to live in urban areas, and the growing population will lead to an increasing demand for food. The efficient use of vertical farming may perhaps play a significant role in preparing for such a challenge.
- **Increased and Year-Round Crop Production:** Vertical farming allows us to produce more crops from the same square footage of growing area. In fact, 1 acre of an indoor area offers equivalent production to at least 4-6 acres of outdoor capacity.
- **Less Use of Water in Cultivation:** Vertical farming allows us to produce crops with 70-95 less water than required for normal cultivation.
- **Not Affected by Unfavorable Weather Conditions:** Crops in a field can be adversely affected by natural calamities such as torrential rains, cyclones, flooding or severe drought. Indoor vertical farms are less likely to feel the brunt of the unfavorable weather, providing a greater certainty of harvest output throughout the year.
- **Increased Production of Organic Crops:** As crops are produced in a well-controlled indoor environment without the use of chemical pesticides, vertical farming allows us to grow pesticide-free and organic crops.
- **Human and environment Friendly:** Indoor vertical farming can significantly lessen the occupational hazards associated with traditional farming
- Farmers are not exposed to hazards related to heavy farming equipment, diseases like malaria, poisonous chemicals and so on.

Figure 32 Vertical Farming

❖ Limitations of Vertical Farming

- **No Established Economics:** The financial feasibility of this new farming method remains uncertain. The cost of building skyscrapers for farming, combined with other costs such as lighting, heating, and labour, can be more than the benefits we can get from the output of vertical farming. For a 60-hectare vertical farm, the building cost can be we000ll over $100 million.
- **Difficulties with Pollination:** Vertical farming takes place in a controlled environment without the presence of insects. As such, the pollination process needs to be done manually, which will be labour intensive and costly.
- **Labour Costs:** In vertical farming, the labour cost can be very high due to the need for highly skilled workers. So, the hourly cost of workers may be significantly higher than for agriculture in general. And vertical farming technologies will require significant training, which will add to labour costs.
- **Fewer Jobs:** Automation in vertical farms may lead to the need for fewer workers. Manual pollination may become one of the more labor-intensive functions in vertical farms.
- **Lower Worker Efficiency:** The layout of a vertical farm may pose a challenge for the workers to reach each layer. Climbing to upper layers takes time and energy, decreasing the overall employee efficiency.
- **Too Much Dependency on Technology:** the entire vertical farming is extremely dependent on various technologies for lighting, maintaining temperature, and humidity. Losing power for just a single day can prove very costly for a vertical farm.

5.1.2 Advance Sustainable construction techniques / Practices and Quantity Surveying:

Recommendations:

In mapping out sustainable practices that India must adopt a "cradle to grave" analysis is required. And for this we need to have a total approach than a patch work point system or a grade based certification system. In order to have a comprehensive plan for sustainable construction, every structure may be thought about based on the following parameters:

- Planning, design and specifications based on performance and service life
- Construction Practices
- Material Conservation and Selection
- Demolition and recycling
- Energy Conservation

1. Planning, Design and Specifications:

Structures in India are designed well however so far in most specifications, there is no reference to any service life or calculations thereof. To this effect, deeper study of various service life prediction models and calculations are essential. Specifications must to be performance based as opposed to their present form of being prescription based.

2. Construction Practices:

It is acknowledged that wastage in the construction industry is as high as 30%. That means at current valuation, we are talking about wastage to the tune of Rs.1200 billion or $27 billion in

India. This is in itself a large, yet relatively simple and straight forward challenge to tackle. These wastages are activities that absorb resources, man hours and materials but create no value. Most developed countries have different forums / institutes / researchers / academic institutions for seeking solutions to mitigate these wastages and lean construction practices that emerged have yielded encouraging. Lean construction is a "way to design production systems to minimize waste of materials, time and efforts in order to generate the maximum possible value". While some novel initiatives are being taken in some parts of India to adopt leaner construction practices, India does not have a fully focused lean construction forum. Creation of an industry consortium or lean construction forum may be a good beginning.

3. Material Conservation and Selection:

Concrete is the largest synthesized material which has a per capita consumption of 1.5 tons per annum in India. Presence of concrete is all pervading simply because it has the capacity to utilize locally available ingredients, develop adequate engineering properties for a variety of applications, easily adapt to any shape and size and has comparatively low initial and maintenance costs. While concrete not be as big of an energy consumer as structural steel, aluminum and glass; concrete and particularly cement still remains a major energy 'sink' due to its sheer volume of production and also environmentally unsustainable due to large quantities of CO2 evolution associated with its manufacture. Raw materials for cement manufacture include non-renewable natural resources like lime stone, aggregates, manufactured sands (fine aggregates), and so on. Hence the Indian Concrete Industry needs to take a fresh look at these challenges. Some of the problems faced by Indian concrete industry towards achieving sustainability in concrete utilization are as follows: Increase the use of fly ash and other cement substitutes; Use of manufactured sand; Use of lightweight aggregates.

4. Demolition and Recycling:

In India, the use of recycled aggregates has not been adequately explored. Reportedly, the construction and demolition waste has substantially increased as new super structures are being built on land after tearing down the smaller structures that previously existed. It is estimated that the construction industry in India generates about 10-12 million tons of waste annually. Projections for building materials requirement of the housing sector indicate a shortage of aggregates of about 55,000 million cu. m. An additional 750 million cu.m. of aggregates would be required for achieving the targets of the road sector. Recycling of aggregate material from construction and demolition waste may reduce the demand-supply gap in both these sectors. There is also an increasing-acute shortage of dumping grounds and landfills particularly in metropolitan cities. SERC, Ghaziabad had taken up a pilot R&D project on Recycling and Reuse of Demolition and Construction Wastes in Concrete for Low Rise and Low Cost Buildings in mid-nineties with the aim of developing techniques/methodologies for use of recycled aggregate concrete in construction. The experimental investigations were carried out in Mat Science laboratory and Institutes around Delhi/GZB to evaluate the mechanical properties and durability parameters of recycled aggregate concrete made with recycled coarse aggregate collected from different sources. Also, the suitability in construction of buildings has been studied.

5. Energy Conservation:

Since sources of good quality, aggregates are fast depleting, the concrete industry in India needs to prepare itself to use locally available 'marginal' aggregates. The use of local materials helps reduce the carbon footprint associated with transport. Thus, from sustainability angle, the emphasis should be placed on using locally-available aggregates, even if there are small deficiencies in their

quality. It has been amply demonstrated that desired properties of concrete can be obtained by intelligent blending of available aggregates with crushed sand, inert fillers, supplementary cementitious materials and chemical admixtures. Another important issue is that river sand and other construction materials are usually transported by road. India has a well-developed and efficient rail and water transport system that need to be leveraged by the construction industry. This is not only more sustainable option but also most cost effective.

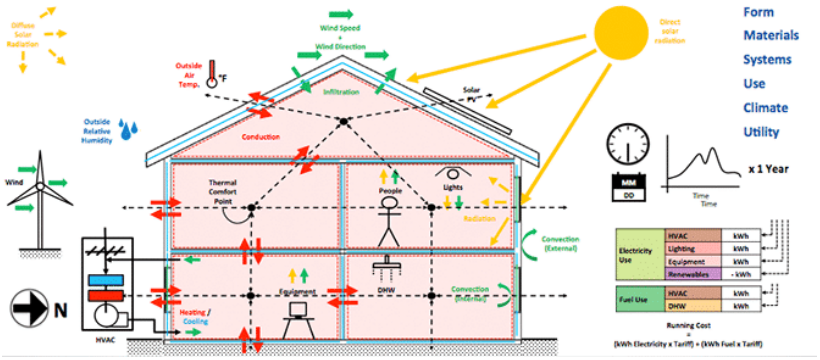


Figure 33 Sustainable construction techniques

5.1.3 Soil Liquefaction:

Soil liquefaction occurs when a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress such as shaking during an earthquake or other sudden change in stress condition, in which material that is ordinarily a solid behaves like a liquid.

In soil mechanics, the term "liquefied" was first used by Allen Hazen in reference to the 1918 failure of the Calaveras Dam in California. He described the mechanism of flow liquefaction of the embankment dam as: If the pressure of the water in the pores is great enough to carry all the load, it will have the effect of holding the particles apart and of producing a condition that is practically equivalent to that of quicksand… the initial movement of some part of the material might result in accumulating pressure, first on one point, and then on another, successively, as the early points of concentration were liquefied.

Type of soil causes liquefaction: Poorly drained fine-grained soils such as sandy, silty, and gravelly soils are the most susceptible to liquefaction.

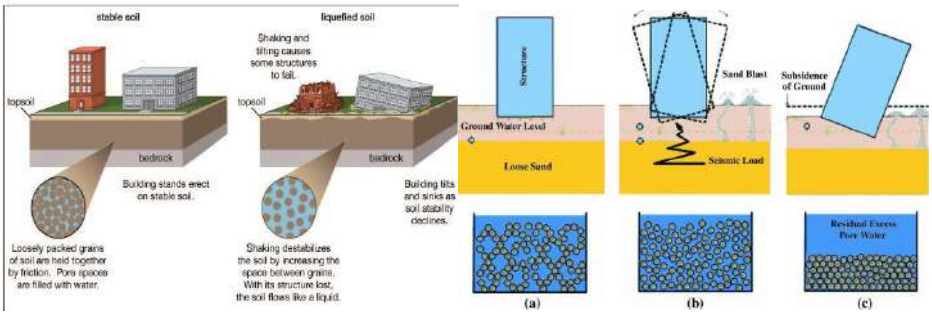


Figure 34 Soil Liquefaction

5.1.4 Sustainable Sanitation:

Sustainable sanitation is a sanitation system designed to meet certain criteria and to work well over the long-term. Sustainable sanitation systems consider the entire "sanitation value chain",

from the experience of the user, excreta and wastewater collection methods, transportation or conveyance of waste, treatment, and reuse or disposal. The Sustainable Sanitation Alliance (SuSanA) includes five features (or criteria) in its definition of "sustainable sanitation": Systems need to be economically and socially acceptable, technically and institutionally appropriate and protect the environment and natural resources.

- **Mixing different wastewater streams**: In centralised systems, wastewater from a range of different sources (domestic, industrial, street runoff) gets mixed, thus creating a wastewater with properties that are hard to handle for any treatment plant — even high tech ones. The range of different harmful substances (heavy metals, chemical and medical residues etc.) contained in such wastewater makes it also difficult to recycle it.
- **Water use:** Centralised sewage systems use a large amount of water; not only for flushing the toilet, but there also has to be a certain minimum water flow to ensure that the gravity operated sewers work. Water is getting an ever scarcer resource. According to the 2006 Human Development Report, "the scarcity at the heart of the global water crisis is rooted in power, poverty and inequality, not in physical availability" (UNDP 2006). In other words: there would be enough water for everyone, if it would be used wisely. Using water to flush toilets is definitely not the most sensible solution.
- **Energy consumption:** Many centralised conventional sewage treatment plants are effective, but very expensive and plant usually highly energy intensive, which again adds to cost, and also makes them susceptible to failure.
- **Health risks**: Wastewater, which is not treated and discharged into other surface water bodies, is a severe health risk to the people downstream using this water. "Unmanaged wastewater is a vector of disease, causing child mortality and reduced labour productivity, but receives a disproportionately low and often poorly targeted share of development aid and investment in developing countries. At least 1.8 million children under five years die every year due to water related disease, or one every 20 seconds (CORCORAN et al. 2010)"
- **Social acceptance:** Many approaches to improve sanitary circumstances are well meant, but were largely planned top-down. Often, this can result in a non-acceptance of a system, leading to the fact that the sanitation systems are not well maintained, and do not function properly
- **Closing the loop:** Yet, the largest drawbacks of centralised sewer system as they are used today is that they – in most cases – do not favour recycling of resources and thus closing the loop: Water (often groundwater) enters the water distribution system, and is essentially discharged into surface water, leading to groundwater depletion. And nutrients, which essentially come from the soil, are discharged into waterways, leading to soil depletion on the one hand and eutrophication on the other hand.

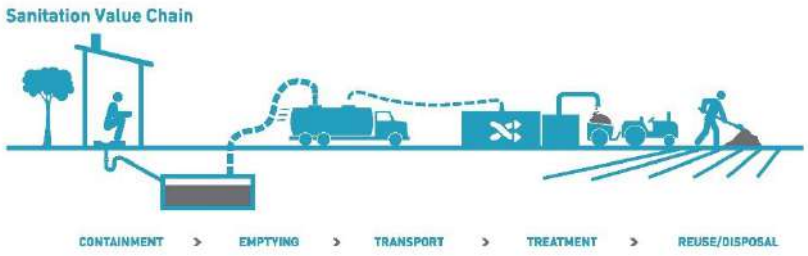


Figure 35 Sustainable Sanitation

5.1.5 Transport Infrastructure / system:

Transport infrastructure consists of the fixed installations necessary for transport and includes roads, railways, airways, waterways, and terminals. Transport is vital to the well-functioning of economic activities and a key to ensuring social well-being and cohesion of populations.

Transport ensures everyday mobility of people and is crucial to the production and distribution of goods. Adequate infrastructure is a fundamental precondition for transport systems. In their endeavour to facilitate transport, however, decision-makers in governments and international organizations face difficult challenges. These include the existence of physical barriers or hindrances, such as insufficient or inadequate transport infrastructures, bottlenecks and missing links, as well as lack of funds to remove them. Solving these problems is not an easy task. It requires action on the part of the governments concerned, actions that are coordinated with other governments at international level.

Transport infrastructure is composed of the **fixed installations of canals, waterways, airways, railways, roads, and terminals**, as well as pipelines such as seaports, refueling depots, trucking terminals, warehouses, bus stations, railway station, and airports.

Figure 36 Transport Infrastructure / system

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure:

Mechanism: In the case of Reinforced concrete structure the ingress of moisture or air may lead to corrosion of steel, cracking and spalling of the concrete cover thereby reducing durability of the concrete structure. Repair has been suggested as the protective solution for damaged structure due to corrosion. Corrosion of reinforcing steel is a significant economic and safety problem, preventing many buildings from attaining their design life. It is now a must look into field as corrosion of reinforcing steel is seen almost in every 10 out of 100 constructions within a life of 10 years. Nowadays the increase content of pollutants in the city atmosphere has very much affected the lifespan of RCC structures. The increased content of pollutants includes a very high rates of Sulphates and Chlorides which when these mixes with rain water and falls over these structures and damages the visible parts.

Prevention: Corrosion of steel in reinforced concrete structures can be divided into four different categories, based on how they provide protection:

1) Alternative reinforcement and slab design method includes materials that electrically isolate the steel from the concrete and create a barrier for chloride ions, materials that protect steel galvanic-ally, and materials that have significantly higher corrosion thresholds than conventional reinforcing steel. Concrete slabs have been designed without any internal reinforcement.

2) Barrier methods protect reinforced concrete from corrosion damage by preventing water, oxygen, and chloride ions from reaching the reinforcement and initiating corrosion.

3) Electrochemical methods use current and an external anode to protect the reinforcement, even when the chloride ion concentration is above the corrosion threshold.

4) Corrosion inhibitors offer protection by raising the threshold chloride concentration level, by reducing the permeability of the concrete, or by doing both.

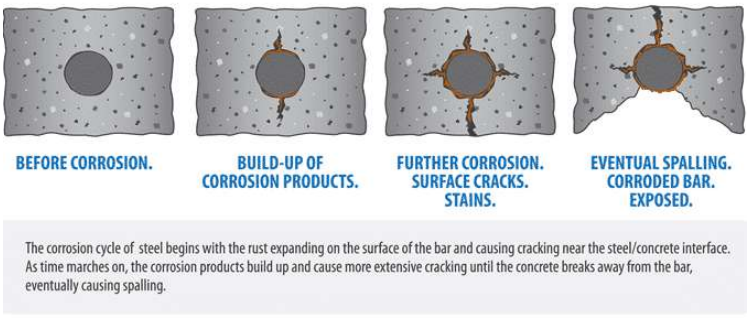


Figure 37 Corrosion in RCC Structure

5.1.7 Sewage treatment plant:

Sewage treatment plant is a plant where waste water is treated. Sewage treatment is the process of removing contaminants from municipal wastewater, containing mainly household sewage plus some industrial wastewater. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater (or treated effluent) that is safe enough for release into the environment.

A by-product of sewage treatment is a semi-solid waste or slurry, called sewage sludge. The sludge has to undergo further treatment before being suitable for disposal or application to land. Sewage treatment may also be referred to as wastewater treatment. However, the latter is a broader term that can also refer to industrial wastewater. For most cities, the sewer system will also carry a proportion of industrial effluent to the sewage treatment plant that has usually received pre-treatment at the factories to reduce the pollutant load. If the sewer system is a combined sewer, then it will also carry urban runoff (stormwater) to the sewage treatment plant. Sewage water can travel towards treatment plants via piping and in a flow aided by gravity and pumps. The first part of the filtration of sewage typically includes a bar screen to filter solids and large objects that are then collected in dumpsters and disposed of in landfills. Fat and grease are also removed before the primary treatment of sewage.

The term "sewage treatment plant" (or "sewage treatment works" in some countries) is nowadays often replaced with the term wastewater treatment plant or wastewater treatment station. Sewage can be treated close to where the sewage is created, which may be called a "decentralized" system or even an "on-site" system (in septic tanks, biofilters or aerobic treatment systems). Alternatively, sewage can be collected and transported by a network of pipes and pump stations to a municipal treatment plant. This is called a "centralized" system (see also sewerage and pipes and infrastructure).

Figure 38 Sewage treatment plant

5.1.8 Case study of Ideal Village of India/ Gujarat: Punsari village:

Punsari, located in Gujarat, puts most metros to shame. Funded by the Indian government and the village's own funding model, Punsari is no NRI-blessed zone. The village also boasts of a mini-bus commute system and various other facilities. Believe it. The population of Punsari was 5500 as per 2011 census of India which has increased to 5500 in 2011. As of June 2012, the population is 6000.

❖ **Basic Amenities and Rural Infrastructure:**

- It has underground Drainage system with three-point outlet which gets dumped in a landfill outside the village wherein all the waste gets absorb into the soil.
- For waste collection, a door-to-door collection system wherein a tractor trailer which collects waste twice a day i.e. (Morning & Evening) from the village in order to collect the maximum waste. The waste collected comprises of 100% plastic only.
- There is proper sanitization in all houses having a toilet i.e. Safety Tank toilets are installed in every home.
- The village is having all weather road and block road with covered pucca drainage system.
- PA system i.e., Public Announcement system is installed at two places wherein announcements, Bhajans and other news been announced twice a day i.e. Morning and evening.
- 16-point CC TV cameras and monitors linked with mobile application been installed at key locations in order to keep a close watch on the daily activities and around 40 people can view the same on their mobile. Also, CCTV cameras are installed in schools and health Centres.

Figure 39 16-point CC TV and Speaker

- There is one milk bank, one outpost police station, Two Banks, One Gram Hat, One Post office, One Community Hall and 24*7 primary health Centre, Talod railway station, Block and CC Road with Internal GIS & GPS System etc.

Figure 40: 24x7 primary health Centre

- The Gram Panchayat has adopted 7P Model i.e. Punsari, Public, People, Panchayat, Private, Profit and Partnership.
- Mineral RO plant for clean water costing worth approx. Rs.5.50 Lakhs is installed with no profit and no loss basis. Even RO Plant is also installed in Schools. The Villagers can get the big bottle at minimal cost of Rs. 6-7 and for commercial purpose it is available at Rs. 40/-. Around10 - 12 Families are associated and earn their livelihood by supplying the water bottles.

Figure 41: Mineral RO plant

- The gram panchayat has also started Internal Bus Service after analysing one of the reasons of death of infants and pregnant women. The bus undertakes 11-12 trips per day and having 4 pickup stand connecting women with milk banks with low fare of Just Rs. 3/- per trip. This has help in reductions in IMMR and IRMR rate.
- The villagers are also using bank and most of the families are having an account with SBI bank which is also money exchange bank having facilities of ATM cum Debit Card Services for withdrawing cash.

Figure 42: State Bank of India

❖ **Waste to Energy Plant:**

- The villagers are using cow dung waste generated in households and farms to generate electricity. The bio-electricity plant is installed; it supplies power to streetlights while the remaining electricity is supplied to the households.
- 400 LED street light has been setup with LED Lights, which runs on solar power and the gram panchayat tied up with GEDA which provides the solar grid at Approx. Rs.7 per unit having 3years maintenance contract and thereby led to 50% reduction in the cost (which was then Rs. 70000/- & Now Rs. 35000/-).

Figure 43: Waste to Energy Plant

❖ **Education:**

- There are Five Primary Schools (1 to 8 standards) and One Higher Secondary School (9 to 12 standard). Out of this schools 3 Schools are smart class and CCTV are also installed which is linked to Mobile app. The schools have 100% admission rate and 0% drop out rate. Similarly, there are eight Anganwadi centres running in the village with approx. 450 kids enrolled. The class rooms are having facilities of projectors, audio visual aid and computer laboratories to teach MS Excel, Word, to use the internet. Only 32 children are studying outside the village rest all are enrolled in the village only.

Figure 44: Primary Schools

- The Primary schools are CCTV camera enabled, which helps Panchayat and parents to monitor student's advancement and it is also helps the panchayat to keep a watch on teachers.
- The gram panchayat has also set up a Mobile Library with more than 400 books (Mainly of Primary Class). It has scheduled a particular day or time within different locations of the village.

Figure 45: Mobile Library

❖ **From No Electricity to Internet, Wi-Fi connectivity and Banking:**

- The village is connected Wi-Fi with unlimited access with 4 mbps speed at just Rs. 50 only which is collected from the villagers. The villagers are using E-gram, social networking and latest farming trends, Mandi prices, online tax payment, mobile app and even the panchayat sent the details of tax payment through some villagers are also buying products online through various ecommerce mediums. Online Monitoring of day-to-day activities of the villages.

Figure 46: Wi-Fi Connectivity

❖ **Skill Development Centre (Kaushal VardhakKendre):**

- Various programs such as vocational training in mechanics, Spoken English, Video Library, Beauty Parlour, Tailoring, Sewing and Stitching Classes and basics computer are offered by the centre and Even in near future, The Gram Panchayat along with the other 15 villages is going to start driving school for women.


Figure 47: Skill Development Centre

❖ **Guest Lectures and Employment:**

- The gram panchayat occasionally organizes guest lecture, wherein the corporate leaders interact with the youth of the Punsari village via Skype, Also the executives from corporates also visit the village; deliver lectures and interact with the youth of Punsari village. Around 10 to 15 youth got employment in the corporate offices as a security guard or helper etc. The gram panchayat is also organizing Skype presentation in schools and health centre.

❖ **Women Empowerment:**

- The Gram Panchayat is assisting Women of the village. There are 109 self-help groups (SHGs) (10-15 women per group). At present there are 1300 women engaged in SHGs. These groups contribute a minimum amount each month. They receive around 8% interest on their contribution and this self-help group have value of Rs. 32 lakhs. The gram panchayat builds a Commercial Building consisting 10 shops and it is given on monthly rent of Rs. 200 – 300 to the women's family (husband).

❖ **E-Governance:**

- The Gram Panchayat has developed a mechanism through which the villagers can pay their taxes online. Biometric attendance system for the government employees.
- The Gram Panchayat has digitized all land records, which can be easily accessed similarly; the Gram Panchayat facilitates people in paying electricity and other bills.
- Currently, the Gram Panchayat has a 75-lakh surplus fund against a net debt of 10 lakh in 2006
- The village has its own website containing all the detailed activities and achievements of the village.

❖ **Law and Order:**

- The Village has one outpost police station. After 2012 there is no single FIR filed against molesting or rape women excluding accidents and theft.

❖ **Awards, Accolades & Recognition:**

- The village received an award for being the best Gram Panchayat from the Ministry of Rural Development in 2011.

Figure 48: Sarpanch of Punsari Village

❖ **A Way Ahead – Future Needs:**

- E - Auction of Argo products.
- Recycling of drainage water.
- Requirement of an Easy Mechanism for penetration of Ecommerce in rural areas for FMCG/ Electronics/Apparels as the product that are available at local shops are not original also, they are buying various home appliances and electronics and apparels online.
- Two Way Public Announcement system enabling to communicate with people and create awareness about new government schemes and planned meeting involving villagers, Grievances Redressed etc.
- Creating an easy data base management for agriculture.

5.2 Concept (Electrical)

5.2.1 Effective Load Shedding Technique for Utility Department

❖ **Introduction**

It is an elementary case of power economic electric load demand versus generation supply. As we know, when a power system is stable at normal frequency the total mechanical power input from the prime movers to the generators is equal to the sum of all running load and all real power losses in the power system.

The frequency conditions of the overall power system will directly depend on the amount of active power that the generator could deliver to the system. Also, the prime mover's stored energy plays an important role on the system behavior. This stored energy varies drastically from thermal, to hydro units.

❖ **Methodology**

The main purpose of electric power system is to accord the power structure to consumer's loads. An electric power system consists three parts:

1. Power generation
2. Transmission system
3. Distribution system

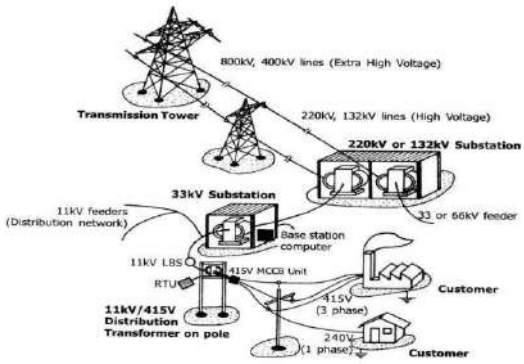


Figure 49: Distribution System

❖ Related Work

So, in this project "The Programmable load shedding time management system" we are connecting three loads operating through microcontroller using relay circuits. Here 230V AC supply is rectified to 12V DC which is then converted into input circuit supply of 5V DC with the help of voltage regulator.

❖ Block Diagram

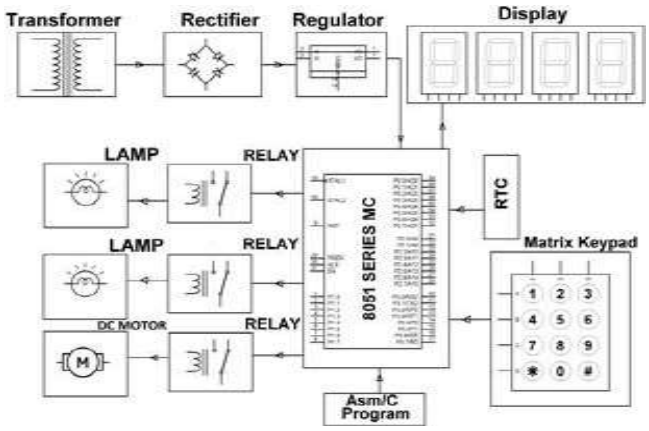


Figure 50 Simplified block diagram of the system

❖ Components Used

Liquid Crystal Display (LCD) comprises of rod-

A. AT89S52 Microcontroller

The AT89S52 is an 8-bit low-power, high

Programmable flash memory. This device is manufactured using high-thickness nonvolatile memory machinery of Atmel and is compatible with the industry-standard 80C51 instruction set and pin-out. The on-chip flash permits the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining an adaptable 8-bit CPU with in-system programmable flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller because of its high flexibility and cost-effective solutions to many embedded control applications.

B. Relay Driver ULN2003

Relay Driver ULN2003 is a high voltage, high current Darlington transistor array comprising seven open collector Darlington pairs with common emitters. It comprises of seven NPN Darlington pairs that feature high voltage outputs with communal cathode Clamp diodes for switching inductive loads. The collector current rating of a single Darlington pair is 510 mA. For higher current competences, the pairs can be paralleled. ULN2003 is used to edge relays with the microcontroller since the maximum output of the microcontroller is 5V with too little current distribution and is not practicable to operate a relay with that voltage.

C. Electromagnetic Relay

Relay is an electromagnetic device which is cast- off to isolate two circuits electrically and link them magnetically. For example, a relay can make a 9V DC battery circuit to switch a 230V AC mains circuit. Thus a small sensor circuit can drive, say, a small fan or an electric bulb.

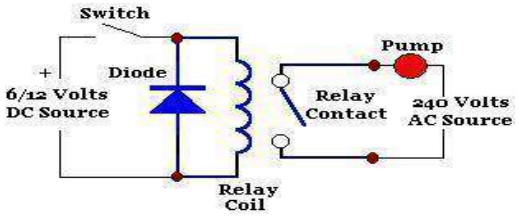


Figure 51 Circuit diagram of relay

D. LCD

Liquid Crystal Display (LCD) comprises of rod-shaped tiny molecules sandwiched between a flat piece of glass and a dense substrate. These rod-shaped molecules in between the plates bring into line two different physical positions based on the electric charge applied to them.

When electric charge is applied, they align to block the light incoming through them, whereas when no- charge is applied they become crystal clear. Light passing through it makes the desired images appear. This is the basic concept behind LCD displays. LCDs are most frequently used because of their advantages over other display technologies. They are tinny and even and consume very less amount of power related to LED displays and cathode ray tubes (CRTs).

Figure 52. Liquid crystal display

E. REAL TIME CLOCK (RTC)

A real-time clock (RTC) is a processer clock (most of ten in the form of an integrated circuit) that keeps track of the current time. A real time clock (RTC) is a timepiece module

having an independent battery for operation and has a backup RAM always provided with electric power from the battery. Many data processing circuits utilize real-time clocks to deliver a real-time clock value representing, for example, the current day, date and time. Typically, when the data dealing out the circuit is first activated, the correct day, date and time may need to be set. When the data handling circuit is shut down, power is sustained to the real-time clock by a battery, so that the real-time clock may continue to operate.

5.2.2 Electrical parameters measurement

- The standard units of electrical measurement used for the expression of voltage, current and resistance are the Volt [V], Ampere [A] and Ohm [Ω] respectively.
- These electrical units of measurement are based on the International (metric) System, also known as the SI System with other commonly used electrical units being derived from SI base units.
- Sometimes in electrical or electronic circuits and systems it is necessary to use multiples or sub-multiples (fractions) of these standard electrical measuring units when the quantities being measured are very large or very small.
- The following table gives a list of some of the standard electrical units of measure used in electrical formulas and component values

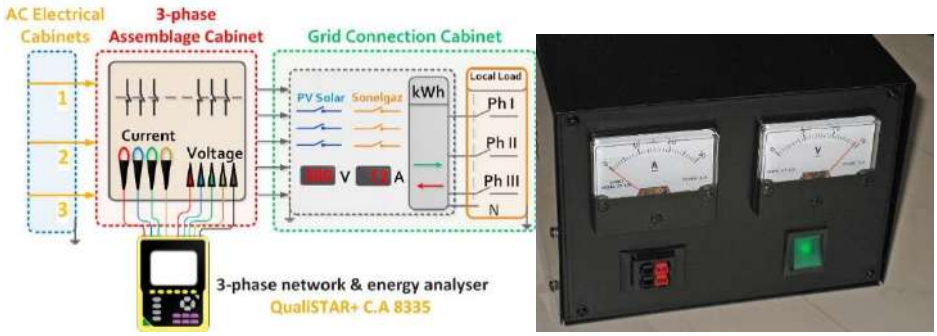


Figure 53 Electrical Parameters Measurement

Table 16 Electrical Parameters measurements

Electrical parameter	Measuring unit	symbol	Description
Voltage	Volt	V or E	Unit of Electrical Potential V = I × R
Current	Ampere	I or i	Unit of Electrical current I = v ÷ R
Resistance	ohm	R or Ω	Unit of DC Resistance R = V ÷ I
Conductance	Siemen	G or ℧	Reciprocal of Resistance G = 1 ÷ R
Capacitance	farad	C	Unit of Capacitance C = Q ÷ V
Charge	coulomb	Q	Unit of Electrical Charge Q = C × V
Inductance	henry	L and H	Unit of Inductance

5.2.3 Railway Security System Using IOT

- Railways is considered as one of the widely spread mode of transportation all over the globe. Nowadays there is an enormous increase in road and railway traffic. This rapid growth has given rise to more and more accidents at the level crossings. This is a serious concern for both railway and road traffic users.
- There are no easy ways for tackling this problem, but the main concern is regarding its feasibility for the fluctuating environmental conditions. In this paper, we are proposing an IoT based technique as an alternative and efficient solution for manned and unmanned level crossings.
- To implement this technology, we are fixing two Infrared Sensors at a pre-calculated distance to calculate the speed of train and time taken by the train to reach level crossings. With this data we are trying to automate closing and opening of gates at level crossings and to regulate road traffic users waiting time.
- This real time information is sent to database server with the help of Wi-Fi module through Internet of Things (IoT). With the help of GSM module, we send the intrusion detection information to the concerned train driver, station master and control room for efficient monitoring.

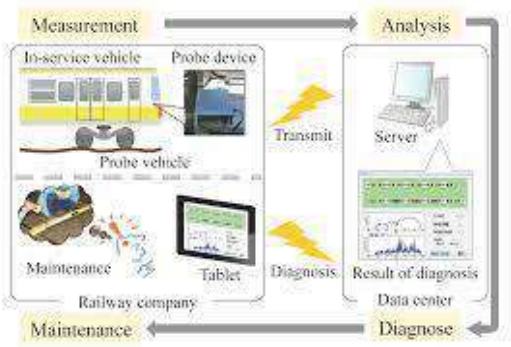


Figure 54 Railway Security systerm using IOT

5.2.4 Power Management through Energy Harvesting Concept

- The objective of the Power Management through Energy Harvesting Concept project work 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.
- The title of the project “Power Management” manages the load in different conditions & these loads are considered for the case study of our college.
- If a load at a particular zone is increased, then the control will trip. To overcome these drawbacks, we have designed and implemented the circuit.
- The objective is to minimize the cost of supplied power to the load point.

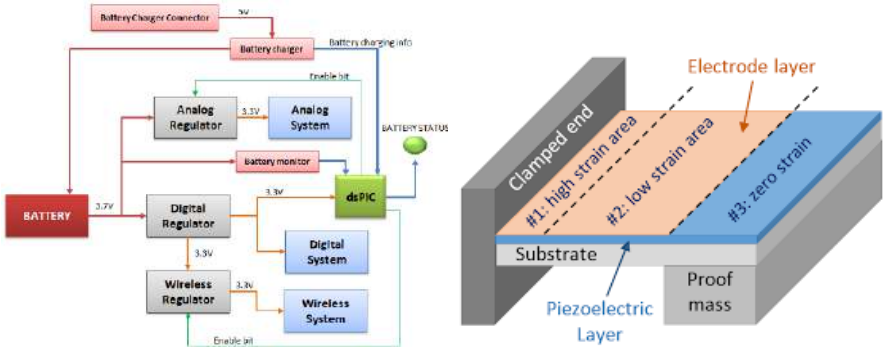


Figure 55 Power Management block diagram

5.2.5 Moisture monitoring system

- 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.

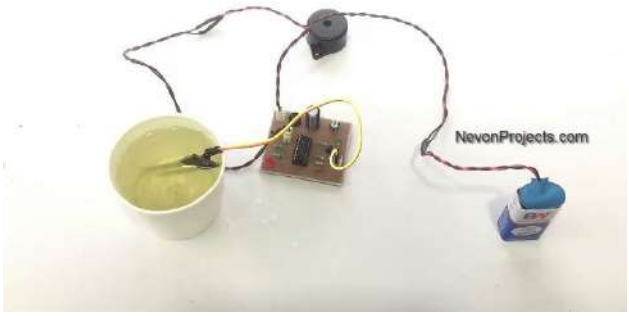


Figure 56 Moisture monitoring system

❖ **ADVANTAGES OF SOIL MOISTURE MONITORING**

keep track of what is happening in the soil root zone with regard to:
1. Water that infiltrates during and after irrigations
2. Water that gets depleted (up-taken by plants) between irrigations
3. Overall soil water conditions for plants production

❖ **WHAT TYPE OF SOIL MOISTURE SENSOR TO USE?**

➢ NEUTRON PROBE (content)

Larger soil volume sampled
Measurements at multiple depths
Not good at shallow depths (< 6 in.)
Need training & licensing
Radioactive source
Need soil -specific calibration

➢ GYPSUM BLOCKS (tension)

Very cheap & Maintenance free
Can last 1-3 years (soil moisture)
Sensitive to soil temperature
Corrosion of electrodes

- WATERMARK (tension)

- Read from 0 to 200 centibars
- Low soil moisture tension indicates moist soil
- High soil moisture tension indicates dry soil
- Saturated soil after irrigation or rainfall Reading < 5-10
- With evaporation and transpiration, readings gradually increase until irrigation is necessary

- DIELECTRIC (EM) SENSORS (content)

- Measure volumetric soil moisture
- Sense soil dielectric constant (function of soil moisture)
- Dry soil = 3-5; air = 1; water = 80
- Can be Capacitance, TDR and TDT
- Need calibration bw dielectric constant and soil moisture (manufacturer)
- Zone of influence 1-4 inches from the sensor

5.2.6 Pc based Electrical control

- 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, Kiel compiler and Language: Embedded C or Assembly.
- Kiel 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.
- 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 equipments 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.

Figure 57 Pc based Electrical control

5.2.7 Home automation using IOT/ any other method

- Home automation is constructing automation for a domestic, mentioned as a sensible home or smart house. In the IoT home automation ecosystem, you can control your devices like light, fan, TV, etc.
- A domestic automation system can monitor and/or manage home attributes adore lighting, climate, enjoyment systems, and appliances. It is very helpful to control your home devices.
- It's going to in addition incorporates domestic security such as access management and alarm systems. Once it coupled with the internet, domestic gadgets are a very important constituent of the Internet of Things.
- A domestic automation system usually connects controlled devices to a central hub or gateway.
- The program for control of the system makes use of both wall-mounted terminals, tablet or desktop computers, a smartphone application, or an online interface that may even be approachable off-site through the Internet.

CHAPTER – 6
SWACHH BHARAT ABHIYAN (CLEAN INDIA)

To accelerate the efforts to achieve universal sanitation coverage and to put focus on safe sanitation, the Prime Minister of India launched the Swachh Bharat Mission on 2nd October, 2014. The Mission Coordinator shall be Secretary, Ministry of Drinking Water and Sanitation (MDWS) with two Sub-Missions, the Swachh Bharat Mission (Gramin) and the Swachh Bharat Mission (Urban), which aims to achieve Swachh Bharat by 2019, as a fitting tribute to the 150th Birth Anniversary of Mahatma Gandhi, which in rural areas shall mean improving the levels of cleanliness in rural areas through Solid and Liquid Waste Management activities and making Gram Panchayats Open Defecation Free (ODF), clean and sanitized. ODF would mean the termination of faucal-oral transmission, defined by, a) no visible faces found in the environment/village and, b) every household as well as public/community institution(s) using safe technology option for disposal of faeces, as defined by the Ministry. The Mission shall strive for this by removing the bottlenecks that were hindering the progress, including partial funding for Individual Household Latrines from MGNREGS, and focusing on critical issues affecting outcomes.

6.1 Strategic for Swachh Bharat Abhiyan (Clean India)

The Strategy is to move towards a 'Swachh Bharat' by making it a massive mass movement that seeks to engage everyone in the task of cleaning homes, work places, villages, cities and surroundings, in a collective quest. The focus is to provide flexibility to State governments, as sanitation is a State subject, to decide on their implementation policy, use of funds and mechanisms, taking into account State specific requirements. This is to enable States to develop an Implementation Framework that can utilize the provisions under the Mission effectively and maximize the impact of the interventions. The Government of India's role would be to complement the efforts of the State governments through the focused programme being given the status of a Mission, recognizing its dire need for the country. The key elements of the Strategy include:

It is suggested that Implementation Framework of each State be prepared with a road map of activities covering the three important phases necessary for the Programme:

(i) Planning Phase
(ii) Implementation Phase
(iii) Sustainability Phase

6.2 Components of SBM

1. Start-Up Activities
2. Information, Education, Communication (IEC)
3. Capacity Building
4. Construction of Individual Household Latrines

5. Availability of Sanitary Material - through Rural Sanitary Marts (RSM), Production Centres (PC), Self Help Groups (SHG)
6. Provision of Revolving Fund at the District
7. Micro Financing of Construction of Toilets
8. Community Sanitary Complex (CSC)
9. Equity and inclusion
10. Solid and Liquid Resource Management
11. Administrative Charges

6.3 Methods use for solid waste management

➢ Landfill

- In this process, the waste that cannot be reused or recycled are separated out and spread as a thin layer in low-lying areas across a city. A layer of soil is added after each layer of garbage. However, once this process is complete, the area is declared unfit for construction of buildings for the next 20 years. Instead, it can only be used as a playground or a park.

➢ Incineration

- Incineration is the process of controlled combustion of garbage to reduce it to incombustible matter such as ash and waste gas. The exhaust gases from this process may be toxic, hence it is treated before being released into the environment. This process reduces the volume of waste by 90 per cent and is considered as one of the most hygienic methods of waste disposal. In some cases, the heat generated is used to produce electricity. However, some consider this process, not quite environmentally friendly due to the generation of greenhouse gases such as carbon dioxide and carbon monoxide.

➢ Waste Compaction

- The waste materials such as cans and plastic bottles are compacted into blocks and sent for recycling. This process prevents the oxidation of metals and reduces airspace need, thus making transportation and positioning easy.

➢ Biogas Generation

- Biodegradable waste, such as food items, animal waste or organic industrial waste from food packaging industries are sent to bio-degradation plants. In bio-degradation plants, they are converted to biogas by degradation with the help of bacteria, fungi, or other microbes. Here, the organic matter serves as food for the micro-organisms. The degradation can happen aerobically (with oxygen) or anaerobically (without oxygen). Biogas is generated as a result of this process, which is used as fuel, and the residue is used as manure.

➢ Composting

- All organic materials decompose with time. Food scraps, yard waste, etc., make up for one of the major organic wastes we throw every day. The process of composting starts with these organic wastes being buried under layers of soil and then, are left to decay under the action of microorganisms such as bacteria and fungi.

- This results in the formation of nutrient-rich manure. Also, this process ensures that the nutrients are replenished in the soil. Besides enriching the soil, composting also increases the water retention capacity. In agriculture, it is the best alternative to chemical fertilizers.

➢ Vermicomposting

- Vermicomposting is the process of using worms for the degradation of organic matter into nutrient-rich manure. Worms consume and digest the organic matter. The by-products of digestion which are excreted out by the worms make the soil nutrient-rich, thus enhancing the growth of bacteria and fungi. It is also far more effective than traditional composting.

Figure 58 Methods use for solid waste management

➢ Bangalore Method:

- Acharya (1939) had initiated the work of composting the town refuse and night soil. This process is also called Hot Fermentation Mechanism of composting or the Bangalore method.
- The raw materials used are mixed plant residues, animal dung and urine, earth, wood ash and water. All organic material wastes available on a farm such as weeds, stalks, stems, fallen leaves, pruning, chaff, and fodder leftover and so on, are collected and stacked in a pile.
- Hard woody material like cotton or pigeon pea stalks and stubble are first spread on the farm road and crushed under vehicles such as tractors or bullock carts before being piled. Such hard materials should in any case not exceed ten percent of the total plant residues. Green materials, which are soft and succulent, are allowed to wilt for two to three days to remove excess moisture before stacking; they tend to pack closely if they are stacked in the fresh state.
- The mixture of different kinds of organic material residue ensures a more efficient decomposition. While stacking, each type of material is spread in layers about 15 centimeters thick until the heap is about one and a half meters high.

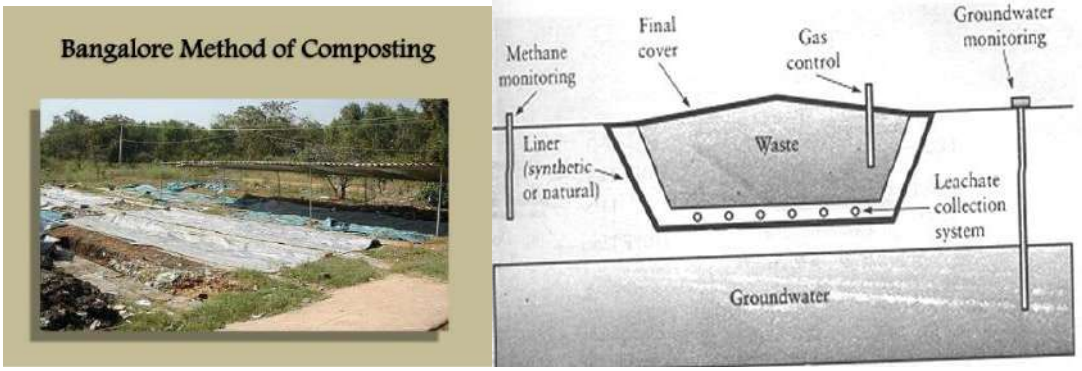


Figure 59 Bangalore method for composting

- This is a pit method of composting where anaerobic condition is conventionally carried out in pits. Initially the waste is an aerobically stabilized in pits where alternate layers of organic wastes and animal dung are laid (CPHEEO 2000). The pit method of making compost conserves moisture, so it is useful in areas with low rainfall and a long dry season. It should not be used in wet areas, as the compost may become waterlogged.
- The pit is completely filled and a final soil layer is laid, to prevent fly breeding, entry of rain water into the pit. The material is allowed to decompose for 4 to 6 months after which the stabilized material is taken out and used as compost. The Bangalore method requires longer time for stabilization of the material & hence needs larger land space. The gases generated in this anaerobic process also pose small &odor problems.

❖ Indore Method

- This process was developed by Howard and Wad in 1931 at Indore, Madhya Pradesh. In this method, waste materials such as plant residues, animal wastes, weeds, street refuse and other organic wastes can be composed.
- The waste materials are cut into small pieces and spread in layers of 10-15 cm thickness either in pits or in heaps of 1 m wide, 1 m deep and of convenient length. It is properly moistened with cow dung using earth. To ensure 50% moisture sufficient water should be sprinkled for making the compositing materials moist. Periodically, three to four turnings are given.
- This method of composting in pits involves filling of alternate layer of similar thickness as in Bangalore method. For starting the turning operation, the first turn is manually given using long handled rakes, 4 to 7 days after filling. The second turn is given after 5 to 10 more days. Third turn is also given after 5-10 days. Further turning is normally not required and the compost is ready in 4-5 weeks.
- The Indore method stabilizes the material in shorter time and needs lesser land space. As no odorous gases are generated in this process, it is environment friendly & hence commonly preferred. The composed material obtained by this method will contain 1.5% nitrogen, 1.0% phosphorus and 1.5% potassium.

6.4 Guidelines for the process of the implementation of SBA.

Solid waste management is the collection, transport, processing, recycling or disposal of waste materials, usually ones produced by human activity, in an effort to reduce their effect on human health or local aesthetics or amenity. For effective management of solid waste in rural areas, focus should be on management at household level. That which cannot be managed at household level should be managed at the community level. In general, the following approach should be followed:

Segregation of solid waste at the household level (biodegradable and nonbiodegradable)

- Reuse of non-biodegradable waste at the household level to the extent possible.
- Household level treatment of bio degradable waste.
- Collection and transportation of segregated waste at the household level to a place
- Identified at the community level (in cases where household level treatment is not possible.
- Community level treatment or recycling/reuse of waste.
- All the biodegradable waste should be composted at the community level.
- Non-biodegradable waste may be further segregated and sold or recycled.
- Waste which cannot be composed, reused or recycled may be disposed at the landfill.
- Sites following appropriate procedure, (such waste may usually be construction waste, may usually be construction waste, debris etc).

6.5 Actions for making your village clean

- We have done meeting and aware the people of Chapad village about the Swachh Bharat Abhiyan, and gave some knowledge about importance of cleanness in the village, its benefit, why it is necessary, etc. we communicate with them and discuss about some points and give suggestion for live healthy and clean life.
- Suggestions like:
- Keep paper bags with yourself to store wet waste and throw them in dustbin only.
- While traveling doesn't throw any wrapper, paper or any dry waste on road. Keep it in your bag or pocket (as it is a dry waste you can keep them in your bag/pocket).
- Avoid spitting on roads (as it can be the reason of viral disease).
- Avoid chewing Pan-Masala, Gutka and Tobacco.
- Avoid use of plastic bag.
- If someone is breaking the rule, then make them aware of it.
- Stop your friends if they are making such mistakes.
- Spread awareness to keep our village clean
- The slogan writes in open area wall to stop dump waste here.

CHAPTER – 7
VILLAGE CONDITION DUE TO COVID-19

7.1 Taken steps in allocated Village-Existing situation.

- The Government has introduced the AarogyaSetu mobile application to educate people about novel coronavirus and help them make informed decisions amid the crisis.
- Orientation is being provided to villagers and migrants on social distancing and what precautions they must take. Awareness is also being provided on social distancing and hand washing to agricultural labour and workers.
- But people have largely given up on social distancing and masks after months of sticking to the rules, believing the virus is not such a serious threat.
- Health Infrastructure is poor in Chapadvillage. In the Chapad village no public health Centre.
- Villagers aren't wearing masks or social distancing when they're gathering in small groups with family and friends because they think everyone if safe but that's exactly where most new cases are occurring.
- Also, the cases of COVID are small scale in the village.
- The sarpanchshri also wearing mask wen we are interacting with him and member of Panchayat.

7.2 Activity done by students for Allocated Village with photograph.

- Creating awareness about what is Covid-19 virus, how it spreads and explaining how social distancing checks spread of corona virus.
- Demonstrating how wearing of masks can reduce the risk of infecting others and protecting ourselves.
- Correct method of using and discarding the masks.
- Demonstrating of correct method of washing with soap.
- Effective use of sanitizers.
- Distribution of masks to the villagers.

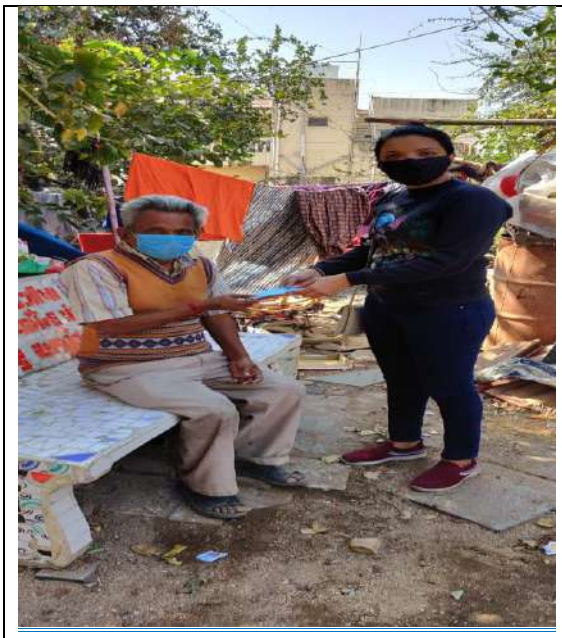


Figure 60 Distribution of Masks at allocated Village

CHAPTER – 8
SUSTAINABLE PLANNING PROPOSAL (PROTOTYPE DESIGN)

8.1 Design Proposal

Various design proposals for Chapad village are:

- Sustainable Design: Post office
- Physical design: Bus Station
- Social design: Library
- Socio-Cultural design: Vegetable market
- Smart Village Design: Cyber café
- Heritage Village Design: Public garden

8.2 Recommendations of the Design

As by gap analysis done by us, we found the requirement of proposed designs.

- Chapad village is connected by the State Highway-06 (Bhoj-Padra Vadodara Road). We provide a pickup stand for the villagers.
- As post office Building is not available, we provide a post office in Chapad Village.
- We provide the design of cyber cafe for the smart concept. It is use for the youngster to connect to smart technology.
- We provide a Library for the children and elder for the reading book and newspaper.
- Also, we providing the solar penal for the bus station and cybercafé to utilise the natural sources to produces electricity for them.
- In this way we approach these designs. Might be it can improve the economic and social level of village

❖ **Recommended Designs by us**

Designs to be recommended under	Proposed Designs
Sustainable Design	Post Office
Physical Design	Bus Stand
Social Design	Library
Socio-cultural Design	Vegetable Market
Smart Village Design	Cyber Cafe
Heritage Village Design	Public Garden

8.3 Design Proposal with Section, Elevation, Measurement, Costing, any other points related to Civil Designs.

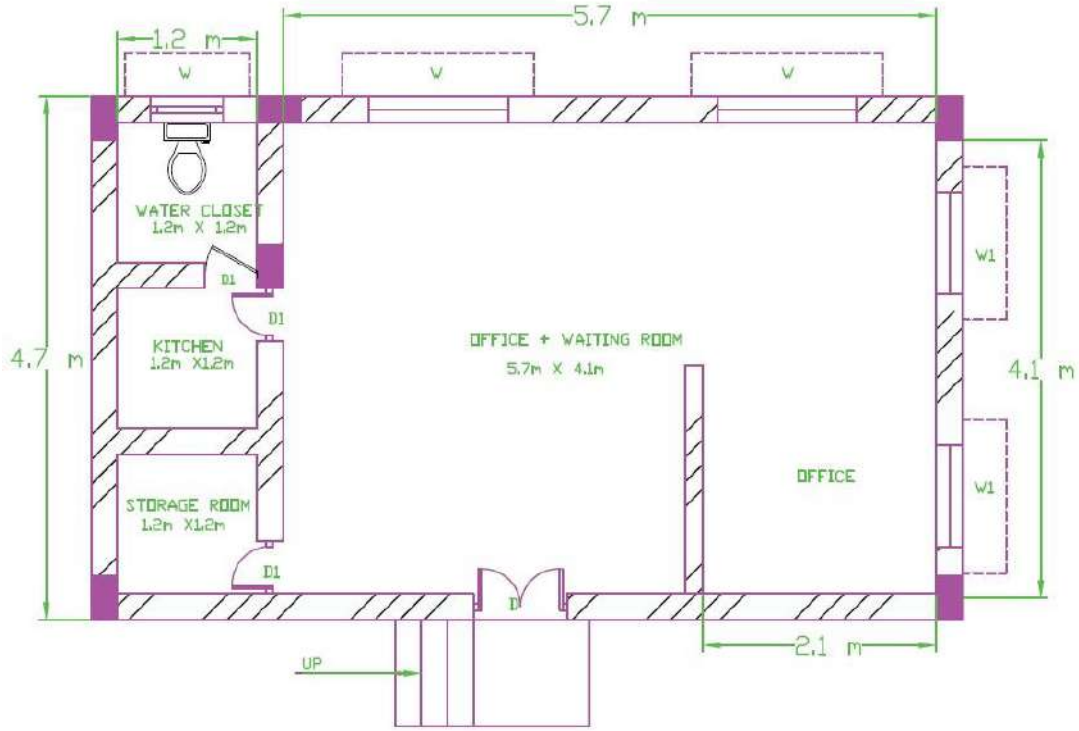
8.3.1 Sustainable Design – POST OFFICE

- A post office is a public facility that provides mail services, including accepting of letters and parcels, providing post office boxes, and selling postage stamps, packaging, and stationery. Post offices may also offer additional services, which vary by country.

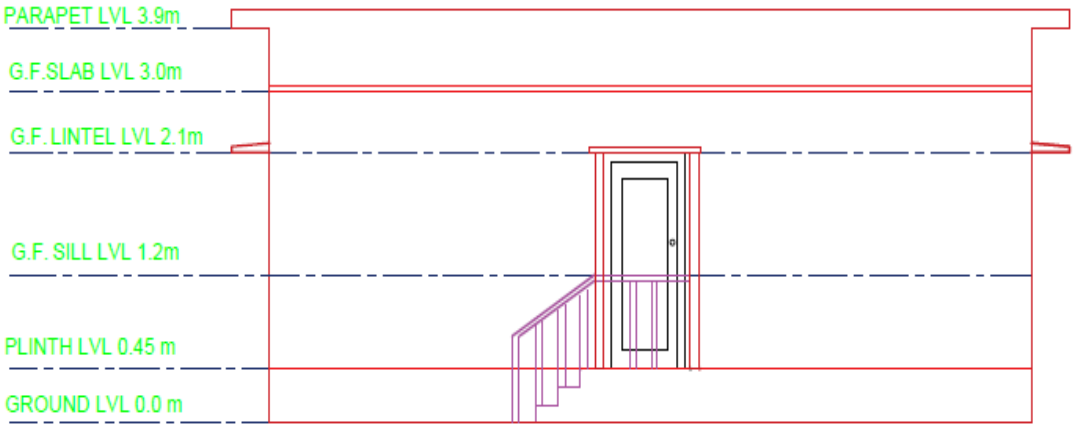
- The postal service serves as a foundation for services offered by every level of government, whether federal, state, or local. Due to its national reach and presence, it's often the only personal point of contact people have with the federal government.
- "Post offices play a vital role at the heart of local communities." Consumers and business rely on the post office for many services, not just sending and receiving parcels but accessing banking, getting local information and paying bills.
- Post offices in rural areas are also used much more for cash withdrawals (24% of rural consumers, 19% in urban areas.) post offices remain embedded in rural life, providing a range of community and retail services. These include offering local information, informal support and a place for meeting fellow residents.
- These Village Post Offices would be operated by the vendor and sell products and services such as stamps and flat-rate packaging. The Postal Service's primary benefit would be lower labour and facilities maintenance costs from replacing traditional, free standing post offices with Village Post Offices.

Area: 10.00 X 7.00 m

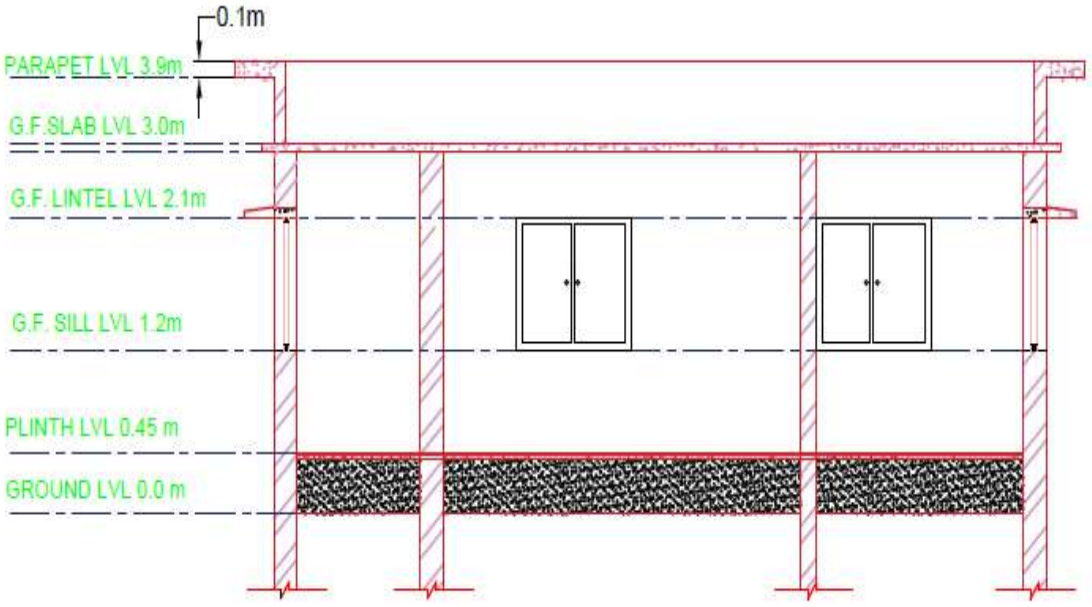
❖ **Design of Proposed Post Office**



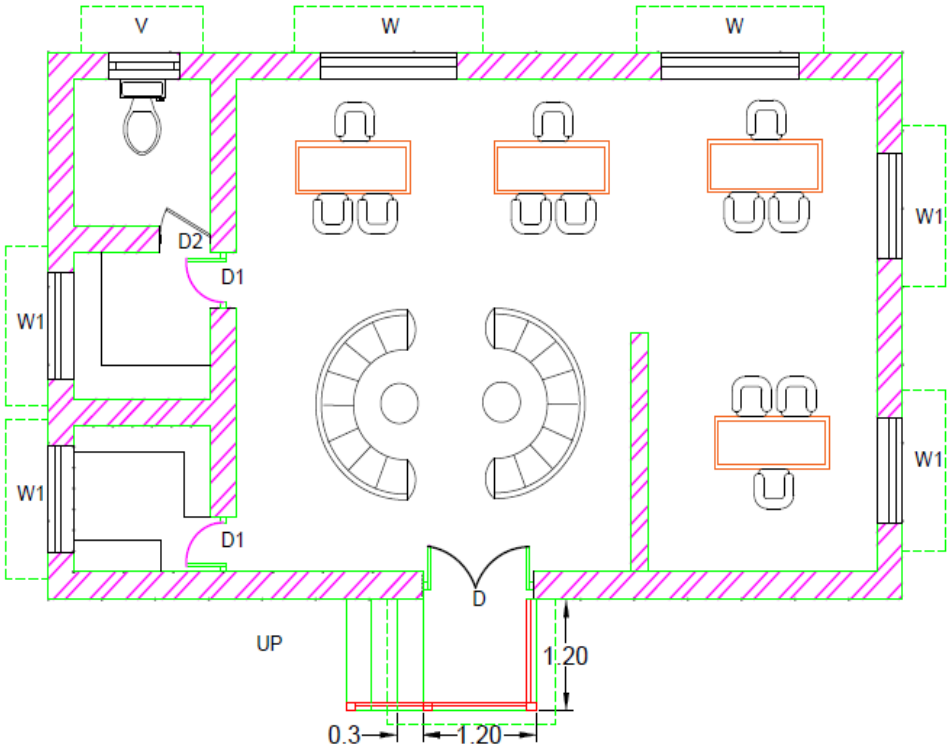
PLAN



ELEVATION



SECTION



LAYOUT PLAN

❖ Measurement Sheet of Post Office

Sr. No	Description	No.	Length (m)	Width (m)	Height (m)	Qty.	Total Qty.
1	**Excavation in foundation** Total centre line length T.C.=8.9+8.9+5.4+5.4+5.4+1.2+0.9+5.4+1.8+1.8 =45.1 m						**43.98**
	L= 45.1-(0.9/2)*10	1	40.6	0.9	1.2	43.85	
	for step	1	1.3	1	0.1	0.13	
2	**P.C.C. in foundation**	1	40.6	0.9	0.3	**10.96**	**11.09**
	for step	1	1.3	1	0.1	**0.13**	
3	**Brick Masonry up to plinth level**						**22.57**
	Step1 L=45.1-(0.6/2)*10	1	42.1	0.6	0.2	5.05	
	Step2 L=45.1-(0.5/2)*10	1	42.6	0.5	0.2	4.26	
	Step3 L=45.1-(0.4/2)*10	1	43.1	0.4	0.2	3.45	

	Step4 L=45.1-(0.3/2)*10	1	43.6	0.3	0.75	9.81	
4	**Brick masonry above plinth level** L=45.1-0.9-1.2-(0.3/2)*8	1	41.8	0.3	3	37.62	**33.01**
	Deduction						
	Window	2	1.2	0.9	0.3	0.65	
	Window1	4	1	0.9	0.3	1.08	
	Door	1	1.5	2.1	0.3	0.95	
	Door1	2	1	2.1	0.3	1.26	
	Door2	1	0.9	2.1	0.3	0.57	
	Ventilator	1	0.6	0.6	0.3	0.11	
	Total					**4.61**	
5	**Damp Proof Coarse (D.P.C.)**	1	43.6	0.3	0.1	**1.31**	**1.31**
6	**R.C.C. work for slab (11 cm thk.)**	1	8.9	5.7	0.15	**7.61**	**8.50**
7	**R.C.C chajja for windows, Door & Ventilator**						
	Door	1	1.5	1.2	0.1	0.18	
	Window	2	1.5	0.45	0.1	0.14	
	Window1	4	1.3	0.45	0.1	0.23	
	Ventilator	1	0.9	0.45	0.1	0.04	
	Total					**0.59**	
8	**R.C.C for lintel**	1	43.6	0.3	0.1	**1.31**	
9	**Brick masonry for outside porch column**	2	0.20	0.20	2.10	**0.17**	
10	**Inside Plaster work**						**57.30**
	Office + Waiting Room	2	6.5		3	39.00	
		2	5.1		3	30.60	
		2	2.55	0.2	3	3.06	
	Total					72.66	
	Deduction						
	Window	2	1.2		0.9	2.16	
	Window1	4	1		0.9	3.60	
	Door	1	1.5		2.1	3.15	
	Door1	2	1		2.1	4.20	
	Door2	1	0.9		2.1	1.89	
	Ventilator	1	0.6		0.6	0.36	
	Total					**15.36**	

11	**Outside plaster** L=8.9+8.9+5.7+5.7=29.20	1	29.2		3.9	113.88	**104.61**
	Deduction						
	Window	2	1.2		0.9	2.16	
	Window1	4	1		0.9	3.60	
	Door	1	1.5		2.1	3.15	
	Ventilator	1	0.6		0.6	0.36	
	Total					**9.27**	
12	**Parapet Brick Masonry**	1	29.2	0.2	0.75	**4.38**	**4.38**
13	**Inside Plaster for parapet wall**	1	29.2		0.75	**21.9**	**21.9**
14	**Flooring tile**	1	-	-	-	**70.75**	**70.75**

❖ **Abstract Sheet of Post Office**

Item no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	**Excavation in foundation**	**43.98**	90	M^3	**3960**
2	**P.C.C. in foundation**	11.09	3100	M^3	**34,380**
3	**DPC**	1.32	200	M^2	**270**
4	**Brick Masonry up to plinth level**	22.57	3200	M^3	**72,250**
5	**Brick masonry above plinth level**	33.01	3500	M^3	**1,15,540**
6	**RCC Work**	8.50	3200	M^3	**27,200**
7	**Inside Plaster (1:4)**	76.50	200	M^2	**1,530**
8	**Outside Plaster (1:3)**	104.61	150	M^2	**15,700**
9	**Flooring tiles**	70.75	500	M^2	**35,380**
10	**Brick masonry for parapet**	4.38	3500	M^3	**15,330**
11	**Plaster for parapet**	21.90	200	M^2	**4,380**
		Total Amount			**3,25,920**
		Contract's Profit (10%)			**32592.0**
		Contingencies (5%)			**16,296**
		Total Amount			**3,74,810**

8.3.2 Physical Design – BUS STAND

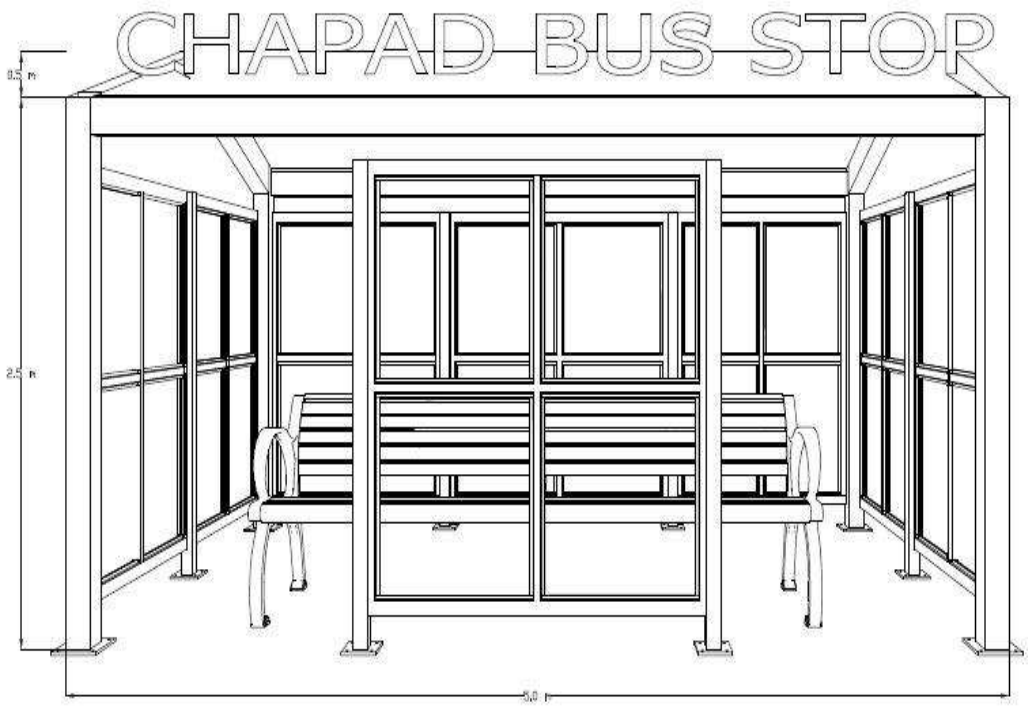
- A bus stand is a designated place where buses stop for passengers to board or alight from a bus. The construction of bus stand tends to reflect the level of usage, where stands at busy location may have shelters, seating and possibly electronic passenger information system; less busy stops may use a simple pole and slag to mark the location.
- Bus stands are, in some location, clustered together into transport hubs allowing interchange between routes from nearby stop and with other public transport modes to maximize convenience.

❖ Proposed Plan

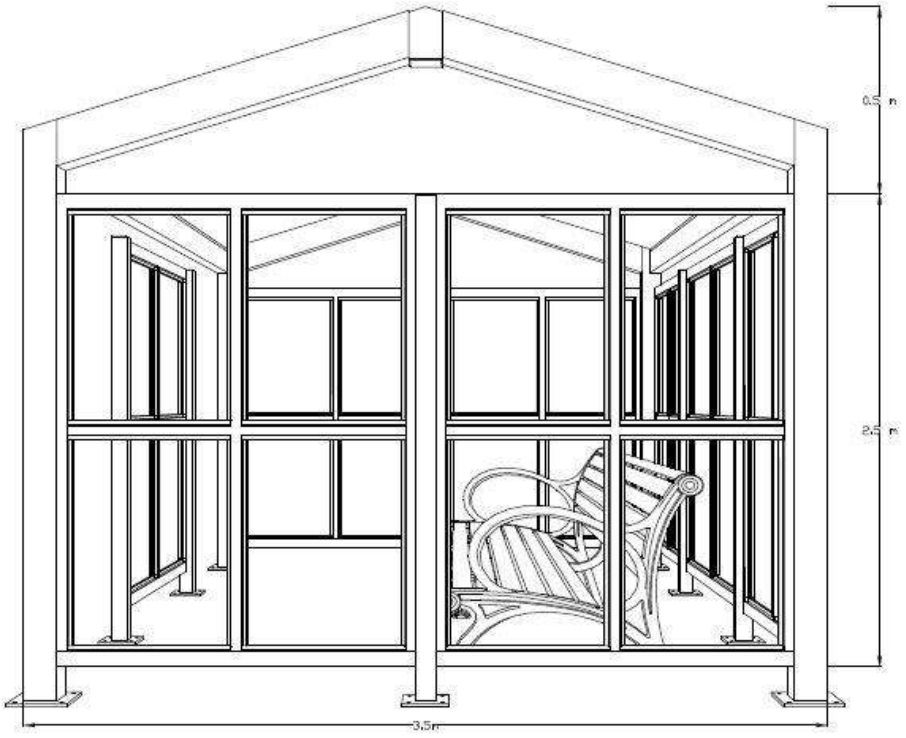
- Length: 5.0 m
- Breadth: 3.5 m
- Area: 17.5 sq.mtr

❖ Design of Proposed Bus stand

3D View



ELEVATION



SIDE VIEW

❖ **Abstract Sheet of Bus Stand**

Sr. No,	Description	Quantity (Cum)	Rate	Per	Amount
1	Stainless Steel Waiting Bench (160*52*72 cm)	3	3000	Nos	9,000
2	Paver blocks	17.5	25	Sqm	500
3	Exterior Steel Bus Stop Shelter	17	2900	Sqm	50,000
				Total Cost	59,500
				Add 2% water charge	1,190
				Add 10% contractor's profit	5,950
				Contingencies 5%	2,975
				Net Total Cost	**69,615**

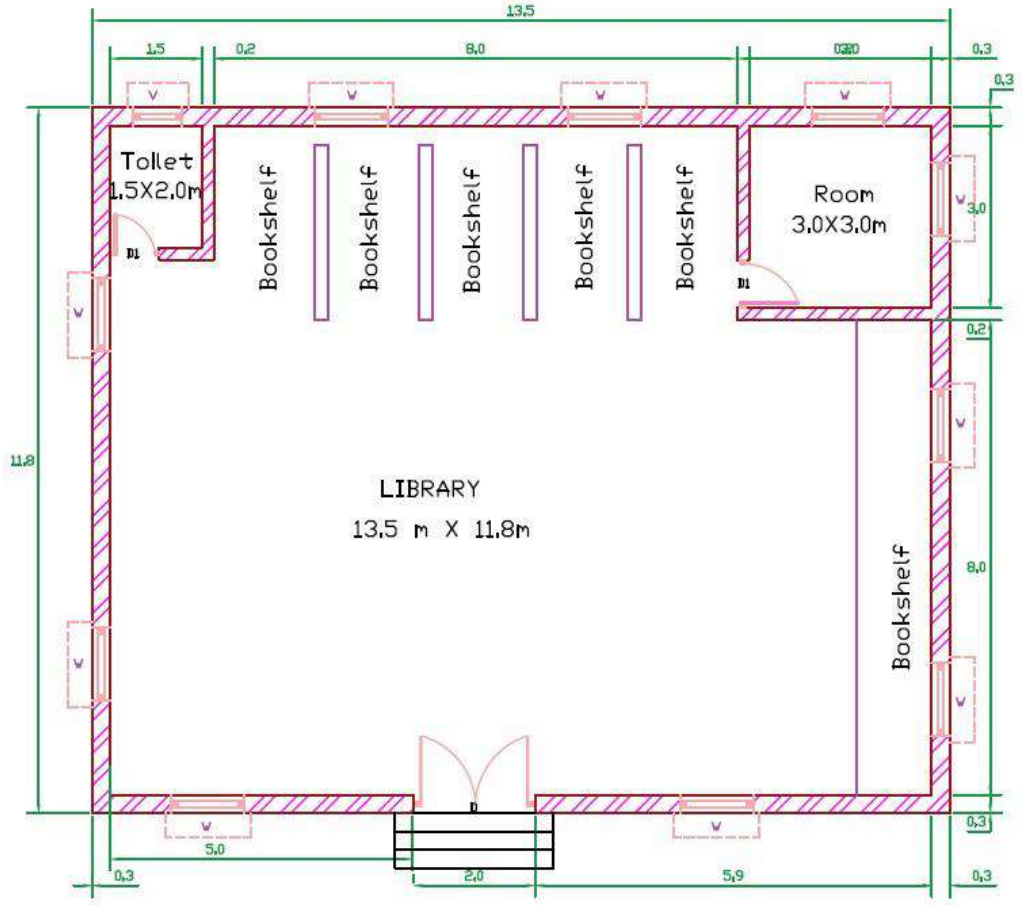
8.3.3 Social Design- Library

A library is a curated collection of sources of information and similar resources, selected by experts and made accessible to a defined community for reference or borrowing, often in a quiet environment conducive to study. It provides physical or digital access to material, and may be a physical location or a virtual space, or both.

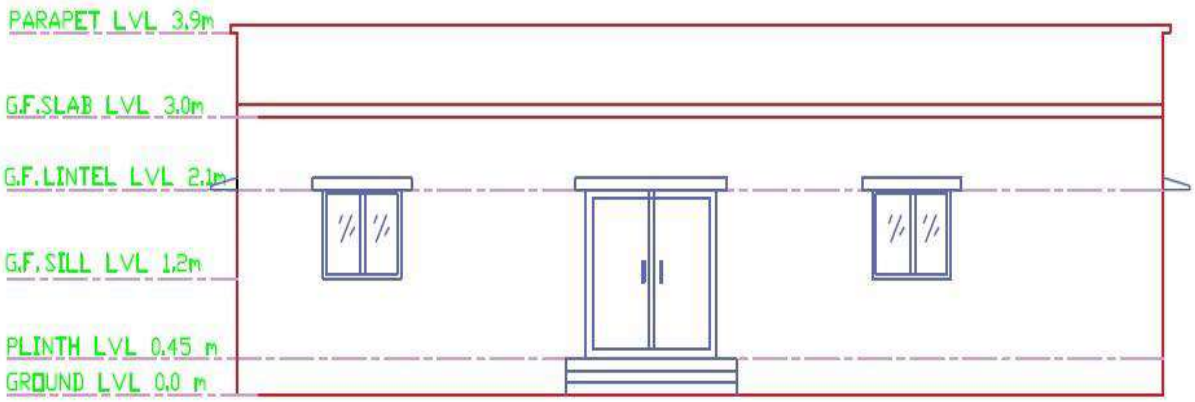
RRRLF is a central autonomous organization established and fully financed by the Ministry of Culture, Government of India. RRRLF is registered under the West Bengal Societies Registration Act, 1961. It is the nodal agency of the Government of India to support public library services and systems and promote public library movement in the country commensurate with the objectives as embodied in its Memorandum of Association.

AREA: 8.6*5.6 m

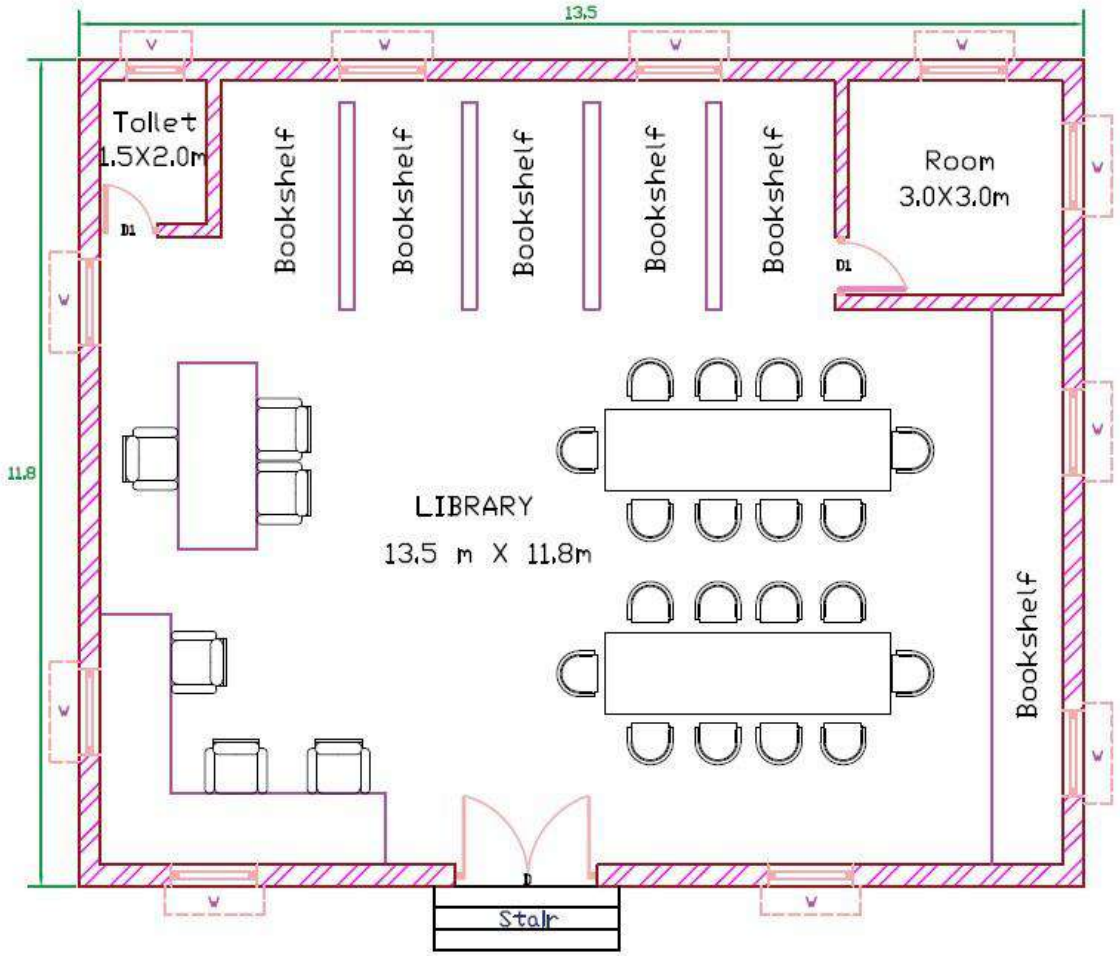
❖ **Design of Proposed Library**



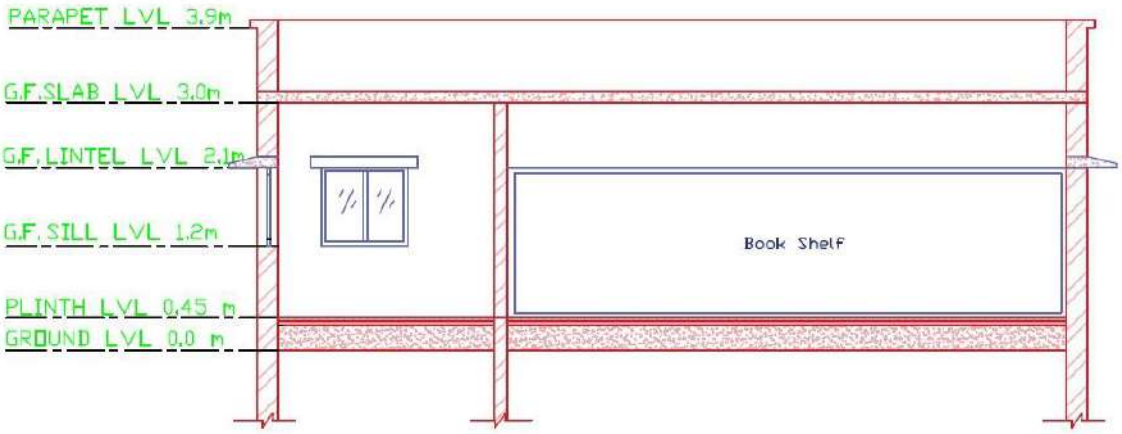
PLAN



ELEVATION



LAYOUT PLAN



SECTION

❖ Measurement Sheet of Library

Sr. No.	Description	No.	Length (m)	Width (m)	Height (m)	Qty.	Total Qty.
1	**Excavation in foundation**	1	49.4	0.9	1.2	53.352	**53.612**
	Total centre line length						
	T.C.=11.5+11.5+13.2+13.2						
	=49.4 m						
	L= 49.4-(0.9/2)*0						
	for step	1	2.6	1	0.1	0.26	
2	**P.C.C. in foundation**	1	49.4	0.9	0.3	13.338	**13.598**
	for step	1	2.6	1	0.1	0.26	
3	**Brick Masonry up to plinth level**						**25.935**
	Step1	1	49.4	0.6	0.2	5.928	
	Step2	1	49.4	0.5	0.2	4.94	
	Step3	1	49.4	0.4	0.2	3.952	
	Step4	1	49.4	0.3	0.75	11.115	
4	**Brick masonry above plinth level**	1	49.4	0.3	2.55	37.791	**32.841**
	Deduction						
	Window	10	0.9	0.3	0.9	2.43	
	Door	1	2	0.3	2.1	1.26	
	Door 1	2	1	0.3	2.1	1.26	
5	**Parapet wall(0.2)**	1	49.4	0.2	0.7	**6.916**	**6.916**
6	**Damp Proof Coarse (D.P.C.)**	1	49.4	0.3	-	**14.82**	**14.82**
7	**R.C.C. work for slab (11 cm thk.)**	1	13.5	11.8	0.1	15.93	**18.504**
8	**R.C.C chajja for windows, Door & Ventilator**						
	Door	1	2	0.45	0.1	0.09	
	Door 1	2	1	0.45	0.1	0.09	
	Window	10	0.9	0.45	0.1	0.405	
9	**R.C.C for lintel**						
	Door	1	2.3	0.3	0.1	0.069	
	Door 1	2	1.3	0.3	0.1	0.078	
	Window	10	1.2	0.3	0.1	0.36	
	coping	1	49.4	0.3	0.1	1.482	
10	**Inside Plaster work**	1	26	-	3	78	**229.05**
	Deduction						
	Window	5	0.9	-	0.9	4.05	

	Door 1	1	1	-	2.1	2.1	
	Door	0.5	2	-	2.1	2.1	
	celling	1	13.5	11.8	-	159.3	
11	**Inside Plaster for parapet wall**	1	49.4	-	0.8	**39.52**	
12	**Outside plaster**	1	50.6	-	4.2	212.52	
	Deduction						
	Window	5	0.9	-	0.9	4.05	
	Door 1	1	1	-	2.1	2.1	**208.38**
	Door	0.5	2	-	2.1	2.1	
	step	3	2	0.55	-	3.3	
	side	2	0.9	-	0.45	0.81	
12	**Flooring tiles**	-	-	-	-	159	**159**

❖ **Abstract Sheet of Library**

Item no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	**Excavation in foundation**	53.612	**90**	M^3	**4825.08**
2	**P.C.C. in foundation**	13.598	**3100**	M^3	**42153.8**
3	**DPC**	14.82	**200**	M^2	**2964**
4	**Brick Masonry up to plinth level**	25.935	**3200**	M^3	**82992**
5	**Brick masonry above plinth level**	32.841	**3500**	M^3	**114943.5**
6	**RCC Work**	18.5	**3200**	M^3	**59200**
7	**Inside Plaster (1:4)**	229.05	**200**	M^2	**45810**
8	**Outside Plaster (1:3)**	208.38	**150**	M^2	**31257**
9	**Flooring tiles**	159	**500**	M^2	**79500**
10	**Brick masonry for parapet**	6.916	**3500**	M^3	**24206**
		Total Amount			**487851.38**
		Contract's Profit (10%)			**48785.138**
		Contingencies (5%)			**24392.569**
		Total Amount			**561029.087**

8.3.4 Socio-Cultural Design – Vegetable market

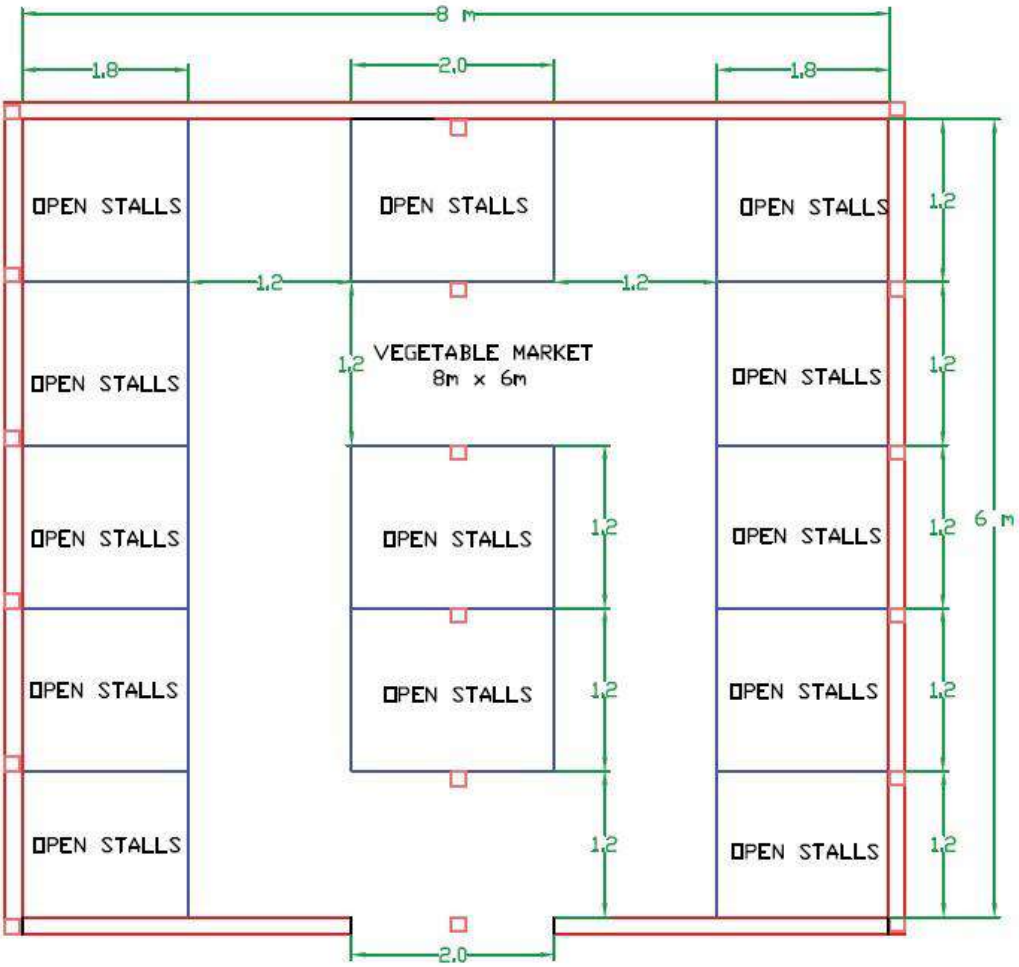
Vegetables are parts of plants that are consumed by humans or other animals as food. The original meaning is still commonly used and is applied to plants collectively to refer to all edible plant matter, including the flowers, fruits, stems, leaves, roots, and seeds. The alternate definition of the term is applied somewhat arbitrarily, often by culinary and cultural tradition. It may exclude foods derived from some plants that are fruits, flowers, nuts, and cereal grains, but include savory fruits such as tomatoes and corvettes, flowers such as broccoli, and seeds such as pulses. It is provided for villagers to all vegetables and grains are available near them.

Also, same small business development in village.

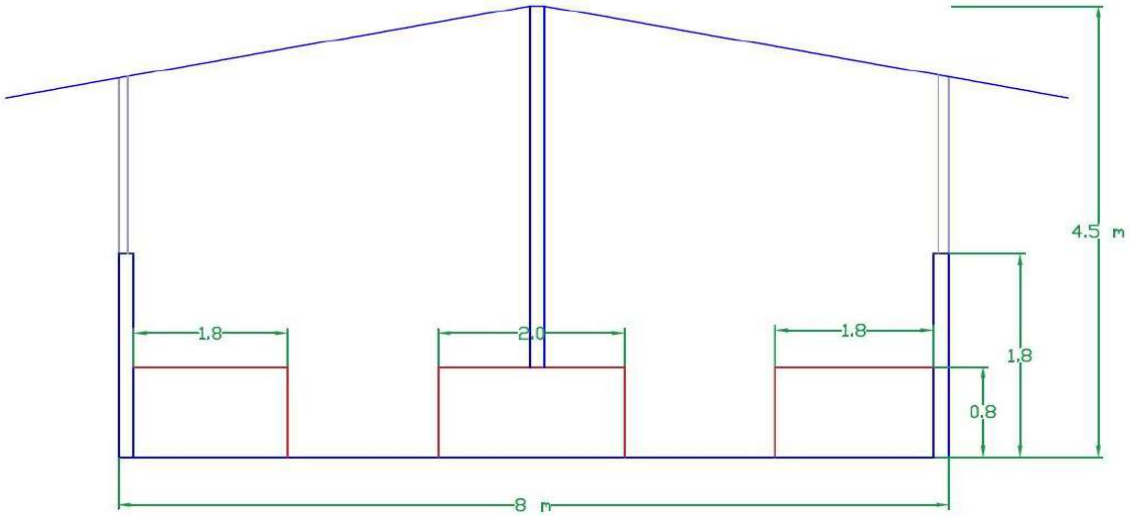
AREA: 6 X 6 m

❖ **Design of ProposedVegetable market**

3D VIEW



PLAN



ELEVATION

❖ Measurement Sheet of Vegetable-Market

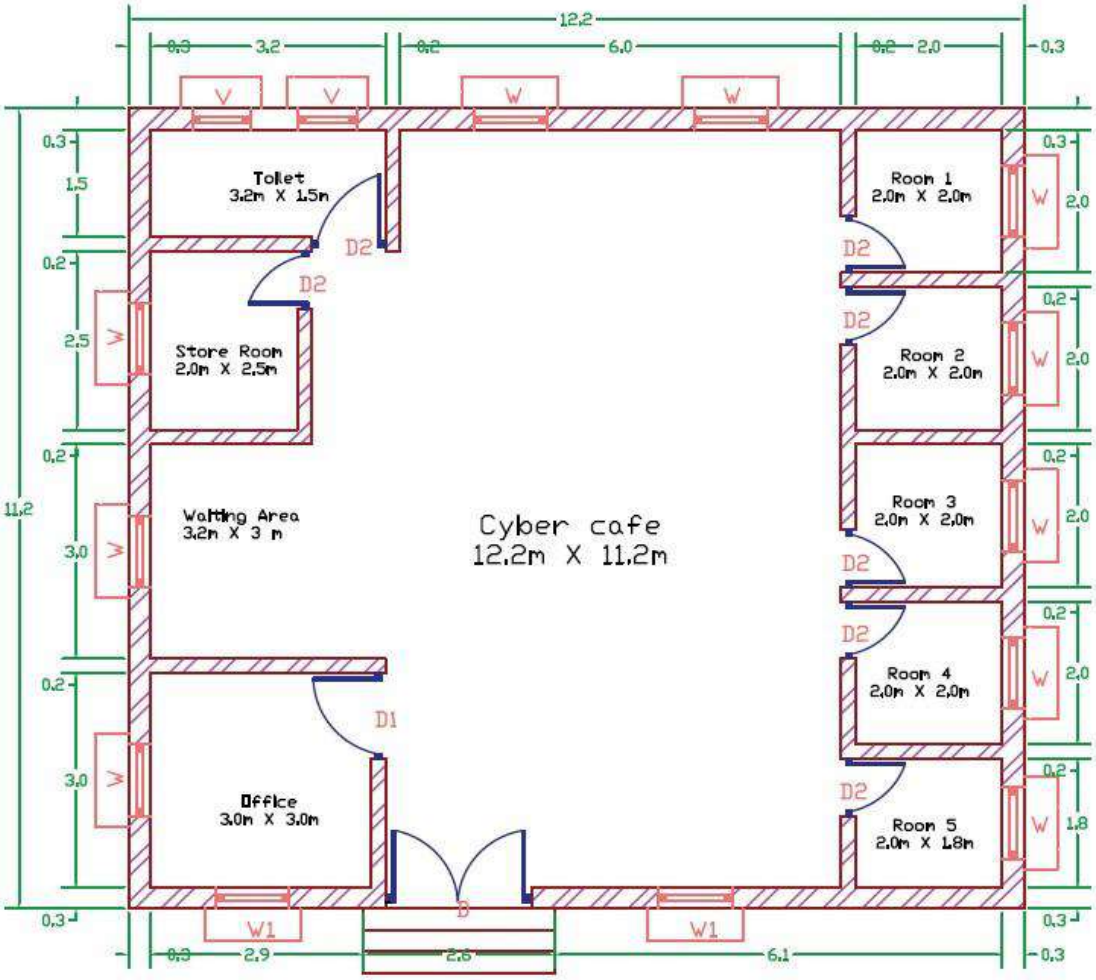
No	Description	No	Length (m)	Width (m)	Height (m)	Qty	Total Qty
1	Excavation in Foundation						
	Total Centre line Length=28 m	1	28	0.9	1.2	30.24	30.24
2	P.C.C. in foundation	1	28	0.9	0.3	7.56	7.56
3	Brick Masonry up to plinth level						16.38
	Step1	1	28	0.7	0.2	3.92	
	Step2	1	28	0.6	0.2	3.36	
	Step3	1	28	0.5	0.2	2.8	
	Step4	1	28	0.3	0.75	6.3	
4	Brick masonry above plinth level	1	28	0.3	1.8	15.12	14.15
	Deduction - Gate	1	1.8	0.3	1.8	0.97	
5	DPC	1	8	6	0.1	4.8	4.8
6	PCC for platform						
	Platform-1	10	1.8	1.2	0.2	4.32	6.24
	Platform-2	4	2	1.2	0.2	1.92	
7	Brick work for platform						
	platform1	10	6	0.2	0.5	6	8.56
	platform2	4	6.4	0.2	0.5	2.56	
8	Earth filling in platform						8.16
	platform1	10	1.4	0.8	0.5	5.6	
	platform2	4	1.6	0.8	0.5	2.56	
9	Plaster						130.26
	For outer wall (inside)	1	25	-	2.2	36.5	
	(0utside)	1	25	-	2	32.4	
	Platform-1	1	12	-	0.8	9.6	
	top		6	-	1.8	10.8	
	Platform-2	1	13.2	-	0.8	10.56	
	top	1	15.2	-	2	30.4	

❖ Abstract Sheet of Vegetable-Market

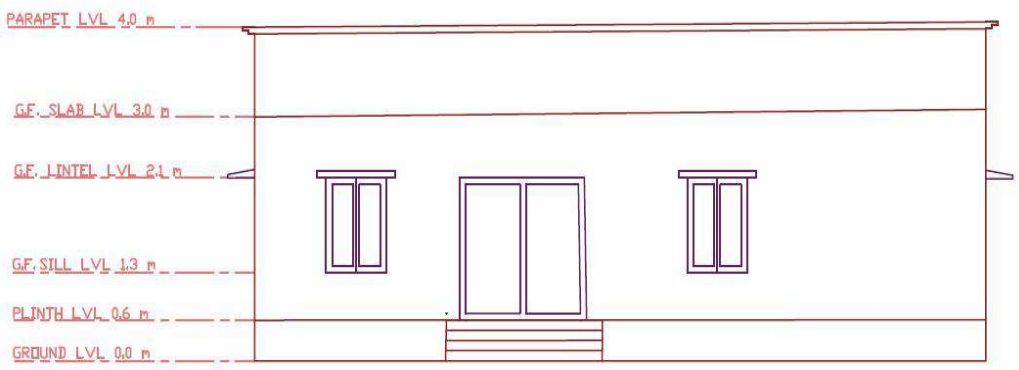
Item no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	Excavation in foundation	30.24	90	M^3	2721.6
2	P.C.C. in foundation	7.56	3100	M^3	23436
3	DPC	4.8	200	M^2	960
4	Brick Masonry up to plinth level	16.38	3200	M^3	52416
5	Brick masonry above plinth level	14.15	3500	M^3	49525

6	PCC for platform	6.24	3100	M^3	19344
7	Brick work for platform	8.56	3200	M^3	27392
8	Earth filling in platform	8.16	60	M^3	489.6
9	Plaster (1:4)	130.26	200	M^2	26052
10	Steel work (approximate)				
	shade				10800
	column				60000
		Total Amount			273136.2
		Contract's Profit (10%)			27313.62
		Contingencies (5%)			13656.81
		Total Amount			314106.63

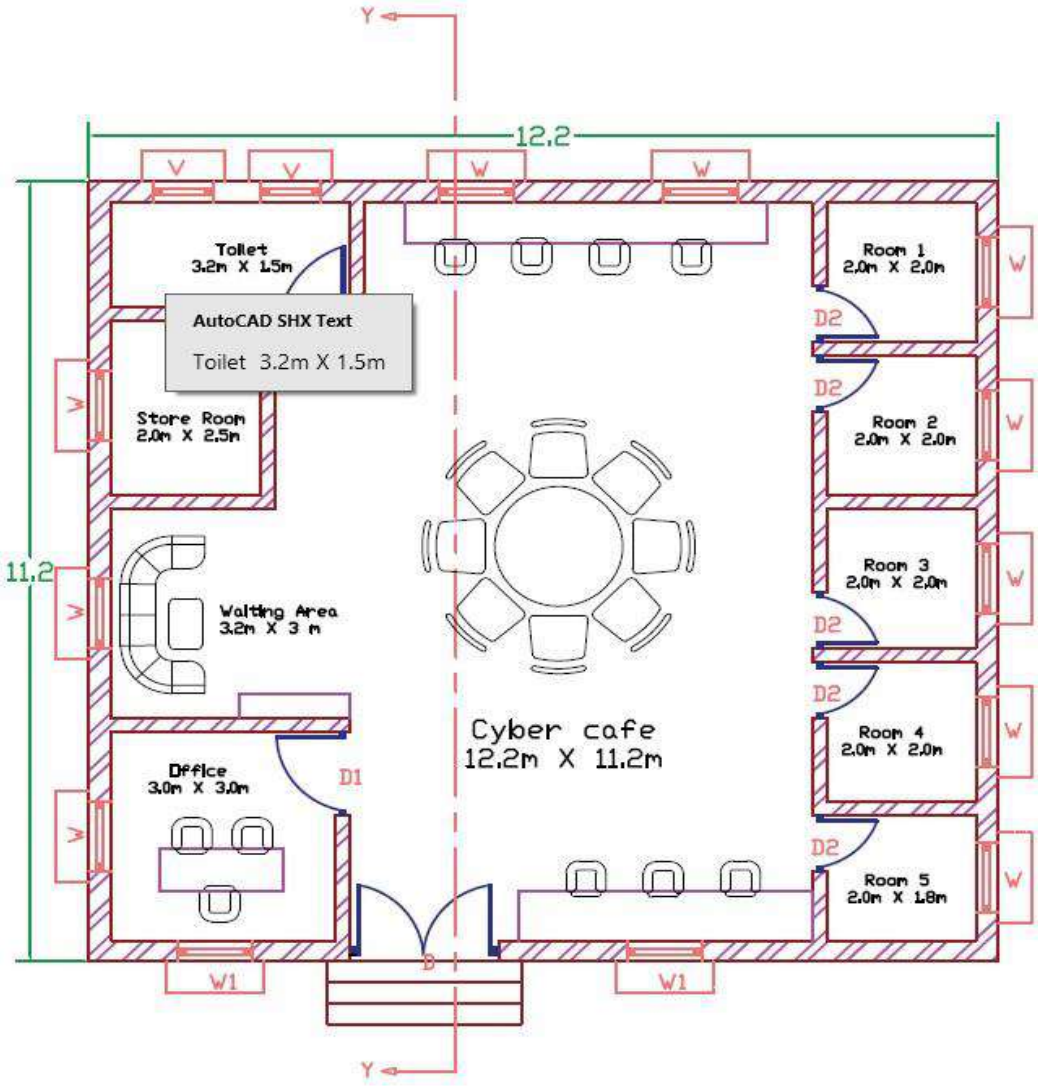
8.3.5 Smart village Design – Cyber Café



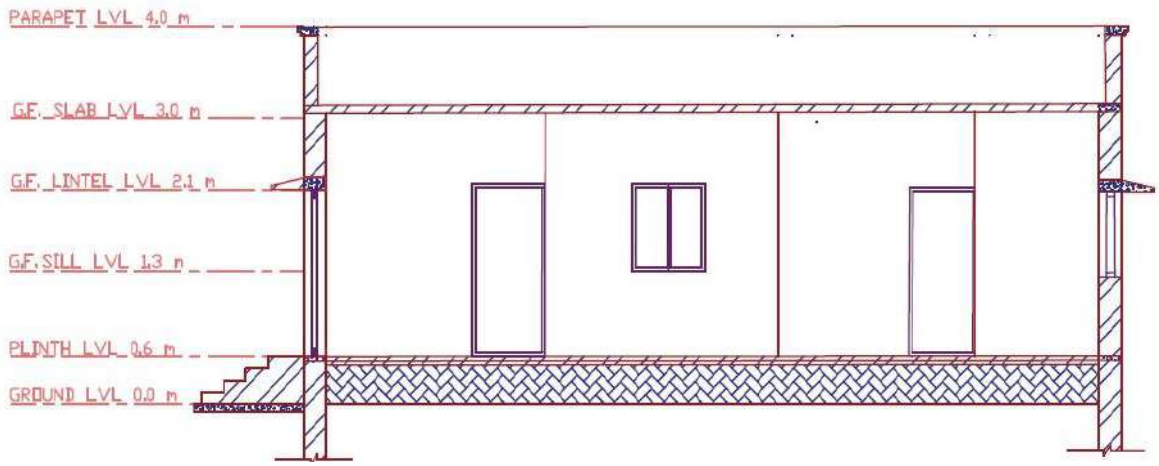
PLAN



ELEVATION



LAYOUT PLAN



SECTION

❖ **Measurement Sheet of Cyber Café**

Sr. No.	Description	No.	Length (m)	Width (m)	Height (m)	Qty.	Total Qty.
1	Excavation in foundation						82.82
	Total centre line length						
	T.C.=81.4						
	L= 81.4-(0.9/2) *11	1	76.45	0.9	1.2	82.566	
	for step	1	2.6	1	0.1	0.26	
2	P.C.C. in foundation	1	73.26	0.9	0.3	19.7802	20.04
	for step	1	2.6	1	0.1	0.26	
3	Brick Masonry up to plinth level						30.75
	Step1	1	78.1	0.6	0.2	9.372	
	L=81.4-(0.6/2) *11						
	Step2	1	78.65	0.5	0.2	7.865	
	L=81.4-(0.5/2) *11						
	Step3	1	79.2	0.4	0.2	6.336	
	L=81.4-(0.4/2) *11						
	Step4	1	79.75	0.3	0.3	7.1775	
	L=81.4-(0.3/2) *11						
4	Brick masonry above plinth level	1	79.75	0.3	3	71.775	62.51
	L=79.75						
	Deduction						
	Window	10	1	0.3	1	3	
	Window1	2	1.2	0.3	1	0.72	
	Door	1	1.5	0.3	2.1	0.945	

	Door1	1	1	0.3	2.1	0.63	
	Door2	7	0.9	0.3	2.1	3.969	
5	Damp Proof Coarse (D.P.C.)	1	79.75	0.2	-	15.95	15.95
6	R.C.C. work for slab (10 cm thk.)	1	12.2	11.2	0.1	13.664	
7	R.C.C chajja for windows, Door & Ventilator						
	Door	1	2.6	0.45	0.1	0.117	
	Window	10	1.3	0.45	0.1	0.585	
	Window1	2	1.5	0.45	0.1	0.135	
	ventilator	2	0.6	0.45	0.1	0.054	
8	R.C.C for lintel						16.93
	Door	1	1.8	0.3	0.1	0.054	
	Door1	10	1.3	0.3	0.1	0.39	
	Door2	7	1.2	0.3	0.1	0.252	
	Window	4	1.3	0.3	0.1	0.156	
	Window1	2	1.5	0.3	0.1	0.09	
	ventilator	2	0.6	0.3	0.1	0.036	
	coping	1	46.8	0.3	0.1	1.404	
10	Inside Plaster work	1	92.4	-	3	277.2	
	Deduction						
	Door	0.5	1.5	0.3	2.1	0.4725	
	Door1	0.5	1	0.3	2.1	0.315	405.3
	Door2	3.5	0.9	0.3	2.1	1.9845	
	Window	5	1	-	1	5	
	Window1	0.5	1.5	-	1	0.75	
	celling	1	11.2	12.2	-	136.64	
11	Outside plaster	1	46.8	-	5.05	236.34	
	Deduction						
	Window	5	1	-	1	5	
	Window1	1	1.2	-	1	1.2	225.8
	Door	0.5	0.5	0.2	0.9	0.05	
	step	3	2.6	0.55	-	4.29	
	side	2	0.9	-	0.45	0.81	
13	Inside Plaster for parapet wall	1	45.6	-	1	45.6	45.6
14	Flooring Tiles	-	-	-	-	129.71	129.71

❖ **Abstract Sheet of Cyber Cafe**

Item no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	Excavation in foundation	82.83	90	M^3	**7454.7**
2	P.C.C. in foundation	20.04	3100	M^3	**62124**
3	DPC	15.95	200	M^2	**3190**
4	Brick Masonry up to plinth level	30.75	3200	M^3	**98400**
5	Brick masonry above plinth level	62.51	3500	M^3	**218785**
6	RCC Work	16.93	3200	M^3	**54176**
7	Inside Plaster (1:4)	405.32	200	M^2	**81064**
8	Outside Plaster (1:3)	225.8	150	M^2	**33870**
9	Flooring tiles	129.71	500	M^2	**64855**
10	Inside plaster for parapet	45	200	M^2	**9000**
		Total Amount			**632919**
		Contract's Profit (10%)			**63291.9**
		Contingencies (5%)			**31645.95**
		Total Amount			**727856.85**

8.3.6 Heritage Village Design – PUBLIC GARDEN

A garden is a planned space, usually outdoors, set aside for the display, cultivation or enjoyment of plants and other forms of nature. The garden can incorporate both natural and man-made materials. The most common form today is a residential garden, but the term garden has traditionally been a more general one.

Gardens may exhibit structural enhancements including statuary, follies, pergolas, trellises, stupefies, dry creek beds and water features such as foundations, ponds, waterfalls or creeks. Some gardens are for ornamental purposes only, while some gardens also produce food crops, sometimes in separate areas, or sometimes intermixed with the ornamental plants. Food-producing gardens are distinguished from farms by their smaller scale, more labour-intensive methods and their purpose. Flower gardens combine plants of different heights, colour, textures and fragrances to create interest and delight the senses.

Gardening is the activity of growing and maintaining the garden. This work is done by an amateur or professional gardener. A gardener might also work in a non-garden setting, such as park, a roadside embankment, or other public space.

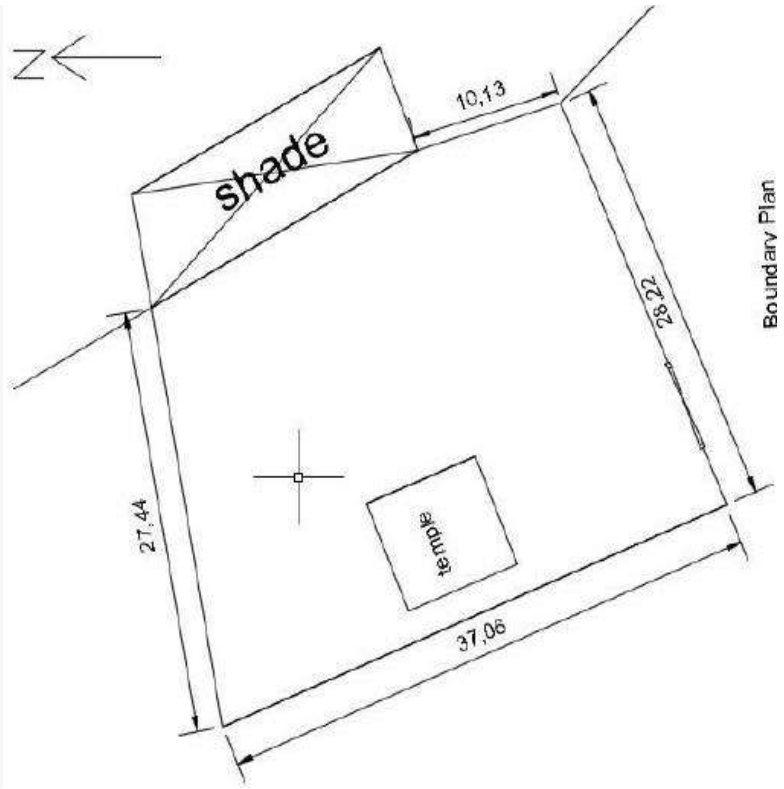
❖ **Proposed Plan**

Length: 37.06 m

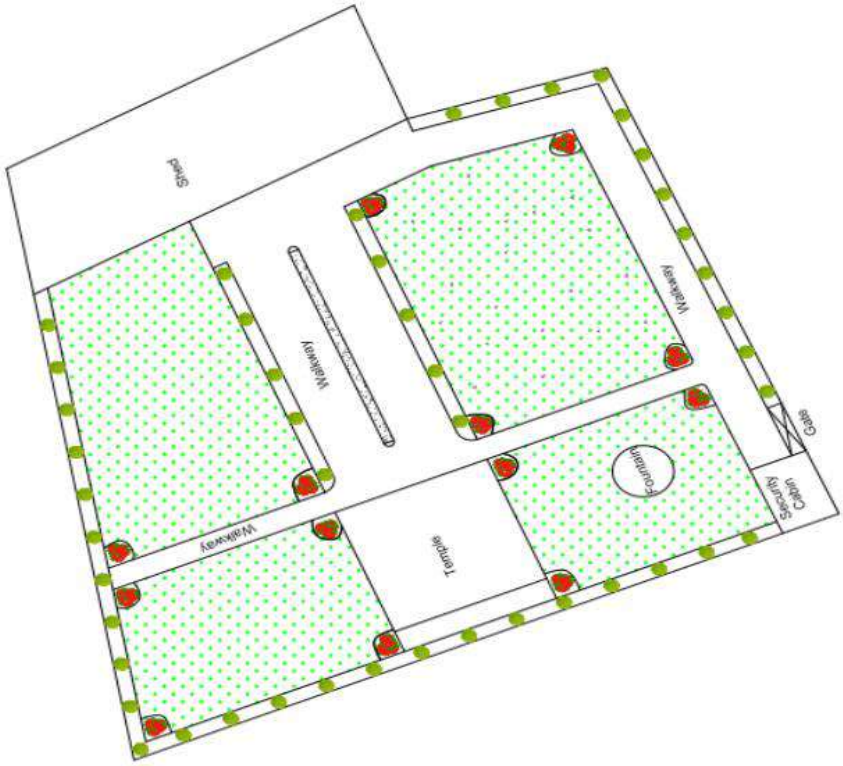
Breadth: 23 m

Area: 632.5 sq.m

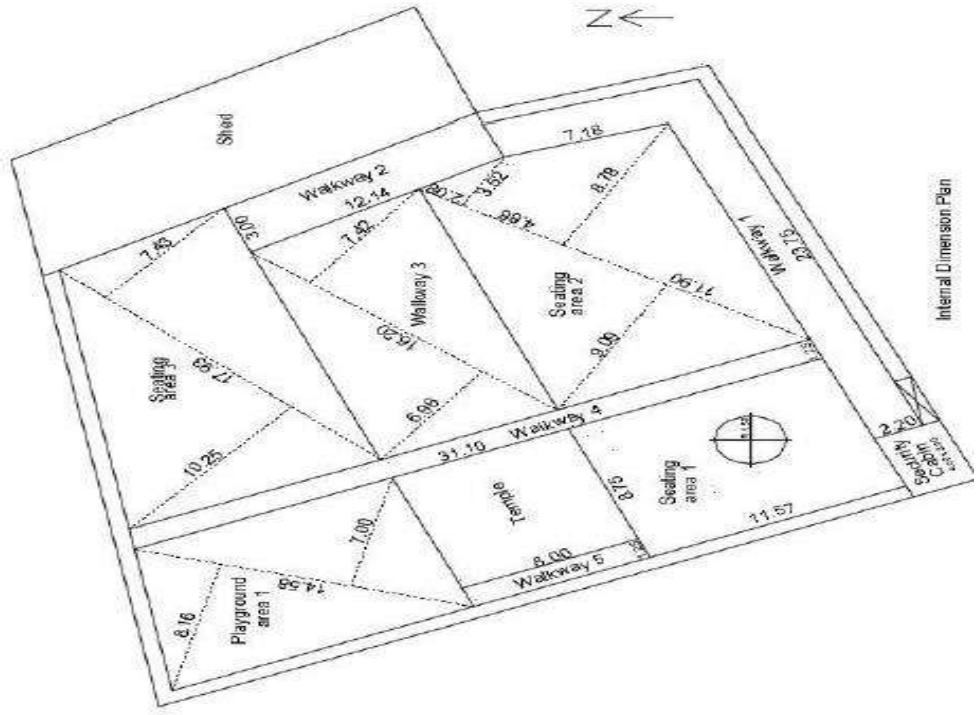
❖ **Design of Proposed public garden**



BOUNDARY PLAN



LAYOUT PLAN



LAYOUT PLAN

❖ Measurement Sheet of Public Garden

Sr.no.	Item	No	Area	Unit	Quantity
1	Site Preparation	1		LS	**1**
2	Carpet Lawn			Sq. mt.	
	Seating Area 1	1	8.75 x 11.57		**101.24**
	Seating Area 2	1	1/2 x 9.09 x 18.86		**85.72**
		1	1/2 x 11.90 x 8.78		**52.24**
		1	1/2 x 2.08 x 3.52		**3.66**
		1	1/2(8.78+3.52) x 4.88		**30.01**
	Seating Area 3	1	1/2 x 17.93 x (10.25+7.43)		**158.5**
	Playground	1	1/2 x 14.58 x (8.16+7.00)		**110.52**
	Deduction	1	7.07(Fountain)		**7.07**
				Total	**534.82**
3	Paver Block Walkway			Sq. mt.	
	Walkway 1	1	(23.75+7.18) x 2.20		**68.05**
	Walkway 2	1	12.14 x 3.00		**36.42**
	Walkway 3	1	1/2 x 16.20 x(6.96 +7.42)		**116.48**
	Walkway 4	1	31.10 x 1.25		**38.88**
	Walkway 5	1	8.00 x 1.25		**10**
				Total	**269.83**

4	Fountain	1		Nos	**1**
5	Security Cabin	1		Nos	**1**
6	**Tree Plantation**	**1**		**LS**	**1**

❖ **Abstract Sheet of Public Garden**

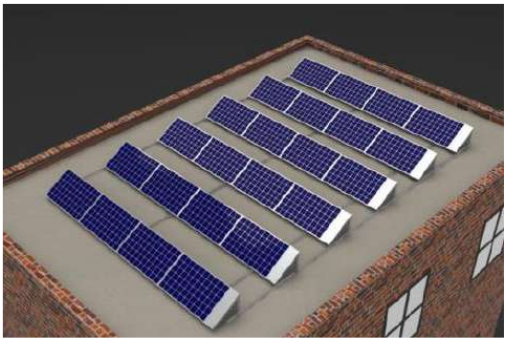
Item no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	Site Preparation	1	5000	LS	5000.00
2	Carpet Lawn	534.82	250	Sq.mt	133705.00
3	Paver Block Walkway	269.83	90.00	Sq.mt	24284.70
4	Fountain	1	10000.00	Nos	10000.00
5	Security Cabin	1	50000.00	Nos	50000.00
6	Tree Plantation	1	30000.00	LS	30000.00
		Total Amount			**252989.70**
		Contract's Profit (10%)			**25298.97**
		Contingencies (5%)			**50597.89**
		Total Amount			**280000.00**

8.3.7 Design of Proposed Solar Panel System for cyber café

- Below are the basic and general components and devices which needed for a solar panel system installation at home. Details of each device is given below each section.

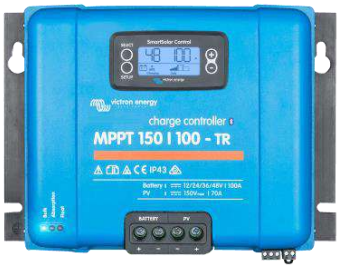
1) Solar Panel

- Solar panel also known as Solar Cell or Photo Voltaic Cell is the backbone of solar power system. There are some types of solar panels such as polycrystalline and monocrystalline. Monocrystalline is more efficient and littler bit expensive as compared to polycrystalline solar panels. The selection criteria for a solar panel are different i.e., space, warranty, efficiency, technology type, cost etc. Keep in mind that output is the king when selecting a proper solar panel for residential solar power installation.
- In general, the solar panel is directly connected to the charge controller but there is different connection of solar panel arrays such as series and parallel connection which depends on load calculation and specific energy requirement for home appliances, battery bank connection, roof surface space, climate and peak sunshine hours.



(2) Charge Controller

- As the name suggests, a charge controller (also known as charge regulator) is a device which is used to regulate the voltage and current from the solar panels connected to the batteries. The main purpose of a charge controller is to prevent the overcharging of batteries (which may lead to damage the battery as well) through solar panels as 12V solar panels



provided 17-20V in case of no load or full sunshine. The reason behind this scene is that manufacture design a solar panel for different climate and environment so that, you get the max rated voltage in case of cloud cover, low sunshine and heavy haze etc.

(3) Battery

- Batteries are used for backup charge storage. there are different types of batteries used in solar power system for storage and backup operation at overnight when the direct power from solar panels are not available. Series, parallel or series-parallel connection of batteries bank is depending on the system design i.e., 12V, 24V or 48V system configuration. In case of clouds and no sunshine, the battery bank can be charged through AC supply from power grid via inverter for later use.

(4) Inverter / UPS

- Inverter is a device which convert the DC power supply to the AC power supply. Inverter and converter which known as UPS (Uninterruptible Power Supply) is used to convert the DC voltage to AC for AC operated home appliances. UPS is also used to convert the AC to DC to charge the battery from direct AC power supply.

Table 17 Types 0f solar panels

Parameters	Mono crystalline	Polycrystalline
Best research cell efficiency	25.0%	20.4%
Typical module efficiency	15-20%	13-16%
Area required for 1 kW	6-9 m2	8-9 m2
Typical length of warranty	25 years	25 years
Lowest price	51₹ /Watt	41₹ /Watt
Temperature resistance	Performance drops 10-15% at high temperatures	Less temperature resistant than monocrystalline
Additional details	Oldest cell technology and most widely used	Less silicon waste in the production process

❖ ABSTRACT SHEET OF SOLAR PANEL SYSTEM FOR CYBER CAFE

NO	PARTS NAME	QTY	RS
1	Solar panel	10	49200
2	Battery (150Ah)	4	60000
3	Lightning arrestor	1	15000
4	Inverter	1	35000
5	Charge controller	1	11000
6	Dc distribution box	1	3000
7	Dc wire (16mm sqaure)	10m	9740
8	Dc wire (10mm sqaure)	20m	2219
Total cost		1,85,159	

- **Solar Panel proving for the cyber café. The nature source using for the electricity which is using in cyber café for the PC work.**
- **So it should be more useful in future purpose. This concept not effect in nature or environment.**

8.3.8 Design of Proposed LED street light

1) Post

One component common to all types of street lights is the post, which rises from a base at the ground and supports the lighting element above. Street light posts contain the electrical wiring that connects the lights directly to the electric grid. Some posts also include a service door for gaining access to a street light's control unit and making repairs or adjustments from ground level.

Street lights posts need to be able to withstand ice, wind and rain. Rust-resistant metals or a protective coat of paint can help preserve the post against the elements, and metal is by far the most common material for its strength and rigidity. Some street light posts, such as those in an historic district, may be decorative, while others are simple grey shafts.

2) Bulb

Street light bulbs come in a wide range of styles and sizes. Most conventional street lights use halogen bulbs, which are similar in function and appearance to household incandescent bulbs. These bulbs consist of a vacuum tube with a filament inside and an inert gas (such as halogen) that causes the burned portion of the filament to recollect on the filament wire, extending the life of the bulb. Metal halide bulbs employ similar technology but use even less energy and produce more light.

Fluorescent street light bulbs are fluorescent tubes, which contain a gas that reacts to a current to create illumination. Fluorescent street lights tend to use less energy than other bulbs and cast a greenish light, while halogen bulbs cast a warmer, orange light. Finally, light-emitted diodes, or LEDs, are the most efficient type of street light bulb. LEDs are semiconductors that produce a strong illumination and last much longer than bulbs.

3) Heat Exchangers

LED street lights include heat exchangers to regulate temperature. These devices moderate the heat that an electrical current produces as it powers the LED. Heat exchangers use the passage of air over a series of fins to keep the lighting element cool and to make sure that the LED is able to produce even light without darker areas or "hot spots" that might otherwise occur.

4) Lens

LED and conventional street lights feature a curved lens that is usually made of heavy-duty glass or, more commonly, plastic. Street light lenses function to magnify the effect of the light inside. They also direct the light downward toward the street for maximum efficiency. Finally, street light lenses protect the delicate lighting elements inside. Fogged, scratched or broken lenses are much easier and cost-effective to replace than entire lighting elements.

•LED SELECTION

LED TO BE SELECTED: We need to select the LED light that give the light the maximum street Area. Usually, light used currently MGVCL is 60 Watt. Led light is 3 times more power. So, we need to use minimum 20-watt LED for sufficient light.

Specifications of selected LED:

•Current –2 Amp

•Voltage –12V

•P= V x I = 20 W

❖ **Measurement sheet for 1 set of LED light**

NO	PARTS NAME	QTY	RS
1	24 Volt DC 12.5 Watt Solar panel	1 No	7500
2	12 V DC 7.5 Amp Hr Battery	1 No	2500
3	Charger Controller	1	1250
4	Switch Board	1 No	30
5	Panel Stand	1 No	1200
6	LED light (20 Watt)	1 No	900
7	LED Bucket	1 No	30
8	Dc wire	5 m	120
9	Labour	-	700
10	1 Amp Switch	4Nos	240
11	Cement Pole Structure (Optional)	1No	2000
	Total Rs /- for 1 complete Set		16470

Total house in **Chapad** village is 530, so we need to install solar light accordingly to the number of houses. We select one solar street light between FIVE houses.

So, Total Number of Street Light Required = 530 / 5 = **106 Nos.**

❖ **Abstract sheet for total LED light**

Sr. No.	Name	No.	Cost per 1 part	Total Quantity
1	**LED Light**	**106**	**16,470**	**17,45,820.00**

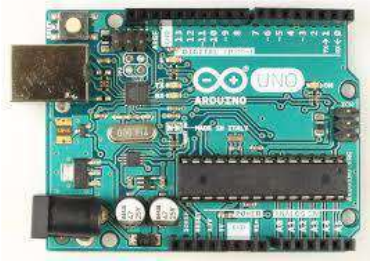
8.3.9 Design of Proposed Seven Segment Display

- The 7-segment display, also written as "seven segment display", consists of seven LEDs (hence its name) arranged in a rectangular fashion as shown. Each of the seven LEDs is called a segment because when illuminated the segment forms part of a numerical digit (both Decimal and Hex) to be displayed. An additional 8th LED is sometimes used within the same package thus allowing the indication of a decimal point, (DP) when two or more 7-segment displays are connected together to display numbers greater than ten.
- Each one of the seven LEDs in the display is given a positional segment with one of its connection pins being brought straight out of the rectangular plastic package. These individually LED pins are labelled from a through to g representing each individual LED. The other LED pins are connected together and wired to form a common pin.
- So by forward biasing the appropriate pins of the LED segments in a particular order, some segments will be light and others will be dark allowing the desired character pattern of the number to be generated on the display. This then allows us to display each of the ten decimal digits 0 through to 9 on the same 7-segment display.

❖ **Main components of seven segment display**

1) Arduino Uno R3

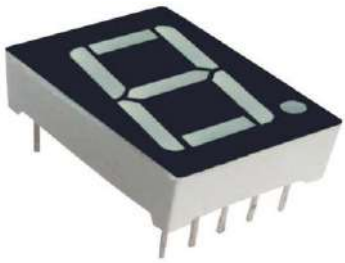
Arduino Uno R3 is one kind of ATmega328P based microcontroller board. It includes the whole thing required to hold up the microcontroller; just attach it to a PC with the help of a USB cable, and give the supply using AC-DC adapter or a battery to get started. The term Uno means "one" in the language of "Italian" and was selected for marking the release of Arduino's IDE 1.0 software. The R3 Arduino Uno is the 3rd as well as most recent modification of the Arduino Uno. Arduino board and IDE software are the reference versions of Arduino and currently progressed to new releases. The Uno-board is the primary in a sequence of USB-Arduino boards, & the reference model designed for the Arduino platform.



2) LED Display 7-Segment Red

Seven segment display is the most common device used for displaying digits and alphabet. You can see the Seven Segment Display devices in TV shows counting down to '0'. Use of LEDs in seven segment displays made it more popular.

The binary information can be displayed in the form of decimal using this seven-segment display. Its wide range of applications is in microwave ovens, calculators, washing machines, radios, digital clocks etc.



The seven segment displays are made up of either LEDs (Light emitting diode) or LCDs (Liquid crystal display). LED or light emitting diode is P-N junction diode which emits the energy in the form of light, differing from normal P-N junction diode which emits in the form of heat.
Liquid crystal displays (LCD) use the properties of liquid crystal for displaying. LCD will not emit the light directly.

3) Alkaline battery

An **alkaline battery** is a type of primary battery. which derives its energy from the reaction between zinc metal and manganese dioxide.
Compared with zinc–carbon batteries of the Laplanche cell or zinc chloride types, alkaline batteries have a higher energy density and longer shelf life, yet provide the same voltage.
The alkaline battery gets its name because it has an alkaline electrolyte of potassium hydroxide (KOH) instead of the acidic ammonium chloride (NH4Cl) or zinc chloride (ZnCl2) electrolyte of the zinc–carbon batteries. Other battery systems also use alkaline electrolytes, but they use different active materials for the electrodes.

4) BCD-to-7-segment latch decoder driver

The CD74HCT4543 high-speed silicon-gate is a BCD-to-7 segment latch/decoder/driver designed primarily for directly driving liquid-crystal displays. While the latch enable (LD) is low, the latches are enabled to store the BCD inputs. When the latch enable is high, the latches are disabled, making the outputs transparent to the BCD inputs.

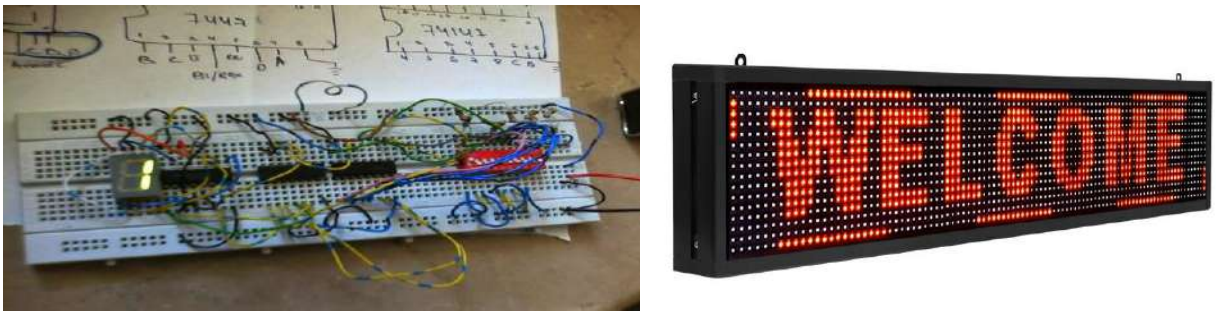


Figure 61 Seven Segment Display

- **The seven segment is proving in Bus Stop for the lighting board. It will be using for other purpose like entrance gate to noting for the village name, Panchayat building for more update look for it, also proving for the garden name plate etc.**
- **In our project we will using in bus stop for name of village located in stop.**

❖ Abstract Sheet of Seven Segment Display

No	Parts name	QTY	Rs
1	Arduino Uno R3	1	1500
2	Display 7-Segment Red	As per requirement	**80**
3	220Ω Carbon Film Resistor	20	100
4	10kΩ Carbon Film Resistor	10	50
5	General Purpose Transistor	10	150
6	9V Battery Snap	1	130
7	9V Alkaline Battery	1	200
8	830-Point Solderless Breadboard	1	800
9	70-Piece Jumper Wire Kit	1	500
10	BCD to 7 Segment Latch decoder Driver	1	40
11	Labour cost	-	1000
Total cost	**=**	**4500**	

8.4 About Designs Suggestions / Benefit of the villagers.

- As village is connected with the major cities, we provide pickup stand for the convenience of the villagers.
- Skill Development Centre which might help them diversify.
- The development of Infrastructure facility in the village.
- By implementation of rain water harvesting system an additional source of water will be available which could be used at the time of emergency or water shortage.
- To get more government facilities.

CHAPTER – 9
FUTURE SCOPE-REQUIREMENT OF THE VILLAGE. (FOR THE PART-II)

- The study is aimed to know the basic scenario of village through techno economic survey and gap analysis done.
- As major facilities are already available in village, few facilities are required which we suggest. One these all-basic facilities are available in CHAPAD Village, then we should focus on making the village smarter by adopting various technology.
- In new design proposed by as, we should focus on regular maintenance of these facilities.
- For maintenance purpose we should provide a maintenance plan which is economical and effective. It can be done by villagers them self.
- In this way with coordination between various Government agencies, we can develop CHAPAD village in better way as other smart or model villages.
- For future development of the CHAPAD village we are proposing the designs for Part II design in which following points should be considered.

- In next part we will design are below:

1. Sustainable design: Rain water harvesting

- An additional source of water will be available which could be used at the time of emergency or water shortage by implementing the Rain Water Harvesting system in the village households.

2. Physical design: Bio Gas Plant

- Currently the villagers are dumping bio waste dumping in internal side of the road and Ukarda in village. So, for the solution of the bio waste we will design bio gas plant for the villagers. Also, the wastage of bio content like cow dung, plant waste, roots and branches, kitchen waste, dry leaves etc. are dumping in bio gas plant and bio gas plant should be using in the community hall for the kitchen area and other selected poor area for their cooking gas.

3. Social design: Public Health Centre

- facilitate good health amenities through building of health centre for the villagers. Currently there are no PHC present in the village. Hence provision of a PHC in the village will prove to be useful in the time of emergency and also day to day basic treatment

4. Socio-Cultural design: Skill Development Centre, community hall

- There is no any child development or maternity home or skill development centre in the CHAPAD village but for the better development of students and children there should be one skill development centre in the village.

- 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.

5. Smart village design: smart plant monitoring system using IOT, automatic light control system using LDR in public garden and Camera system

- For the smart development of the CHAPAD village we have proposed the smart concepts as the automatic light control system using LDR in public garden. the system will produce a safer environment. It is the new concept for village.
- Most of villagers in CHAPAD are engaged in agricultural activities like farming, so we will be providing them to new concept using in their farming. It will be reducing in the electricity, water saving, manpower saving and more care in plantation.
- For the safety and security for the village camera system using for it. A bullet camera is a small camera designed for security applications.

6. Heritage village design: Krishi Kendra

- Most of villagers in CHAPAD are engaged in agricultural activities like farming, hence provision of Krishi Kendra will prove too beneficial to villagers. Farmers problems can be resolve in that Centre.

These are the proposed designs for the future development of CHAPAD village for Vishwakarma Yojana phase VIII, Part 2 design.

CHAPTER – 10
CONCLUSION

Villages and small towns play an important role as a “rural incubator” in the process of rural development and provide services in areas of marketing, providing agricultural inputs such as fertilizer and agricultural machinery, municipal services such as educational facilities, health care and so on for their rural domains.

We visited villages and held a complete survey of allocated village “CHADAD”, smart village “ANKODIYA” and ideal village “BIl”. After analysing the data, conclusion arrived that, there are primary infrastructure in which requires some maintenance in them. On that note, we have proposed some designs. Our goal is to develop the allocated village with the beauty of the ideal village and have technological elements same as there in smart village. On conducting gap analysis and taking support from the past survey of the project, we came across the problems and the work we had to design so as to give the village a sustainable and a developed rural area, an area with clean and green environment and full of prosperity and knowledge.

All the success of village depends on the Sarpanch of village. A Sarpanch is the only person who can increase the level of village in all aspects. There are so many Govt. scheme for villages and for villagers, but the Sarpanch is the only a Link between these two phases. With some little awareness and ground work can achieve anything, which Bil village has proved.

Likewise, Ankodiya is also a village which is role model of Award-winning gram panchayat. It is known for its cleanliness. It is a Smart Village of Gujarat.

After visiting these two villages, we visit our Chapad Village. We saw the huge difference between the local bodies and villagers. Major issue for rural development particularly in India is the Political issues. All are working for themselves. They only want to develop them self instead of village. Villages need long term planning proposals in terms of master plan.

From our study we conclude that providing facilities is not the solution of rural development. All villages in Gujarat are now become very well compare to past. But we should focus on improvement on existing facilities. Villagers and also Gram Panchayats are not focusing on the existing facilities. Due to these villagers try to discarding for its use. Also, villagers are not aware about new technologies, which make them a better one. We should try to aware them.

CHAPTER – 11
REFERENCES OF REPORT VARIOUS BOOKS REFERRED

- Vishwakarma Guidelines.
- Estimation and Costing, B.N. Dutta, UBS publisher's Pvt.Ltd.
- Building planning, designing and scheduling by Gurcharan Singh, standard book. New Delhi.
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- SOR of R & B department of Vadodara region.

❖ Various Journals Referred

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- Central Public Health and environmental engineering organization (CPHEEO). Report of the urban development, Government of India.
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- Smart city and Smart villages by N. Viswanadham.
- Norms and standards of municipal basic services in India by National institutions of Urban Affair.
- Handbook on sustainable development goals and Gram Panchayat.

❖ Various official websites used

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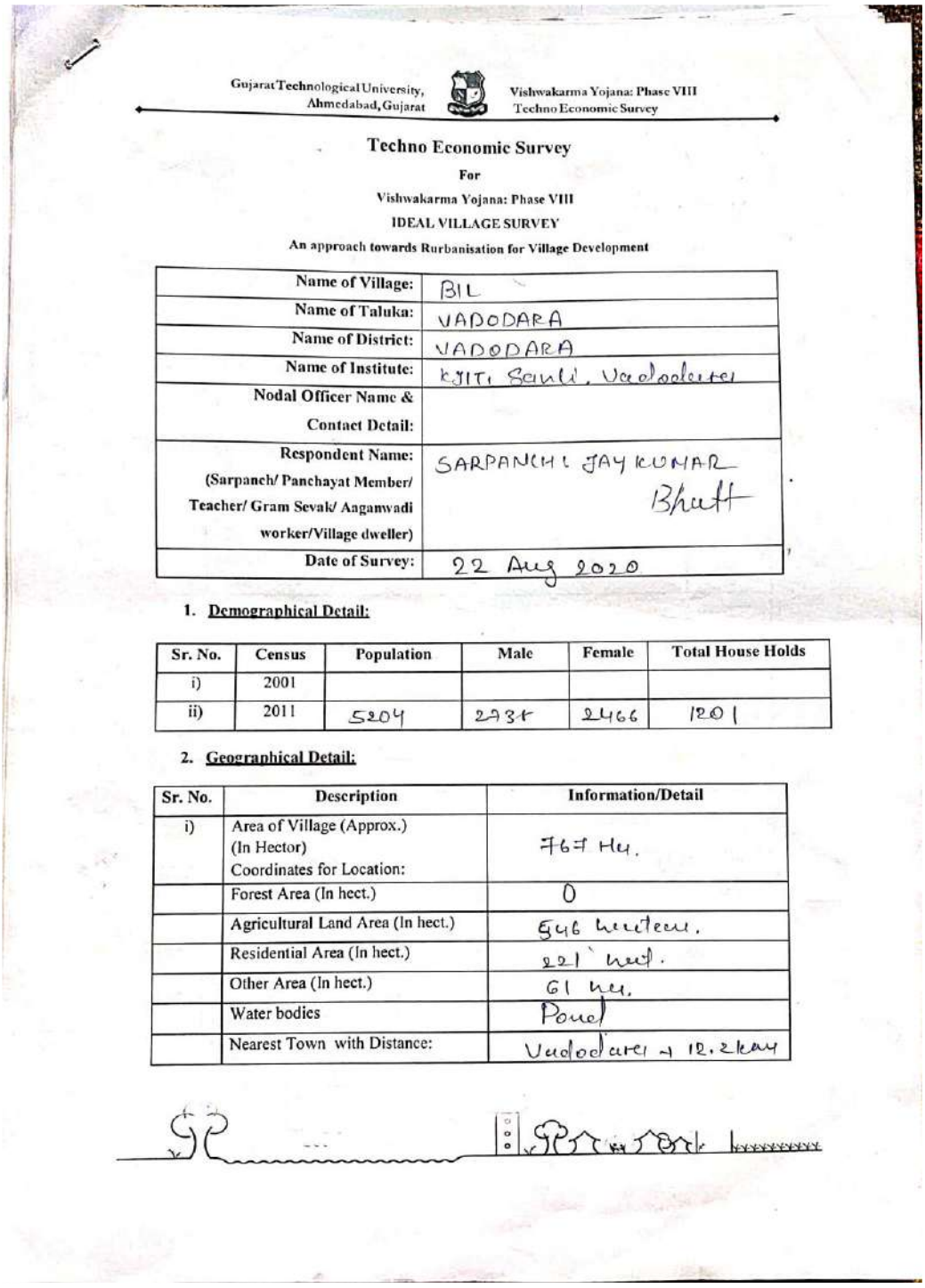
- www.censusindia.gov.in
- www.sagy.gov.in
- www.swaniti.in
- http://panchayat.gujarat.gov.in
- www.unhabitat.org
- www.giftgujarat.in
- VUDA (Vadodara Urban Development Authority)
- www.gujaratgov.in

CHAPTER – 12
ANNEXURE

12.1 Original Ideal Village Survey Form



Gujarat Technological University, Ahmedabad, Gujarat — 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:	BIL
Name of Taluka:	VADODARA
Name of District:	VADODARA
Name of Institute:	KJIT, Baroda, Vadodara
Nodal Officer Name & Contact Detail:	
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Anganwadi worker/Village dweller)	SARPANCH : JAY KUMAR Bhatt
Date of Survey:	22 Aug 2020

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001				
ii)	2011	5204	2738	2466	1201

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	767 Hect.
	Forest Area (In hect.)	0
	Agricultural Land Area (In hect.)	546 hectare.
	Residential Area (In hect.)	221 hect.
	Other Area (In hect.)	61 hect.
	Water bodies	Pond
	Nearest Town with Distance:	Vadodara - 12.2km

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1. Agriculture,
	2.
	3.

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	965 house.	Yes		
	• RO Water				
	• Well (Covered/ Uncovered)		Yes		
	• Hand pumps	1 NO.	Yes		
	• Tube well/ Borehole				
	• River/ Canal/ Spring/ Lake/ Pond	4 NO.	Yes		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity: 5,00,000 lit + 3000 + 5000	Yes		6 NO.
	Underground Sump	Capacity:		No.	
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	CLOSED DRAINAGE	Yes		
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	CLOSED			
	If Open than Pucca / Kutchcha	PUCCA			
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	WATER BODIES			
Suggestions if any:					

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Techno Economic Survey

E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	C.C. ROAD	Yes		
	Main road	RCC			
	Internal streets	C.C. ROAD	Yes		
	Nearest NH/SH/MDR/ODR Dist. in kms.	8.24 km			
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	VADODARA 5.9 km 2.1 km - Bhayli	Yes		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	BHAYLI 5.3 km	Yes		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	CT BUS GOV. BUS.	Yes		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	11 KV.	Yes		More then 6 hr.
	Power supply for Domestic Use		Yes		
	Power supply for Agricultural Use		Yes		
	Power supply for Commercial Use	8 Connection	Yes		For Industry
	Road/ Street Lights		Yes		

	Electrification in Government Buildings/ Schools/ Hospitals		YES		
	Renewable Energy Source Facilities (Y/ N)		YES	~~NO~~.	
	LED Facilities		YES	~~NO~~.	
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	GAMTAL	~~YES~~	NO	~~2 NOS~~;
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	YES.		~~NO~~.	
	Solid & liquid waste Disposal system available			NO.	
	Any facility for Waste collection from road	GAMTAL	YES		← RICKSHAW.
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	CANAL WELL	YES		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	PUCCA	YES		

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

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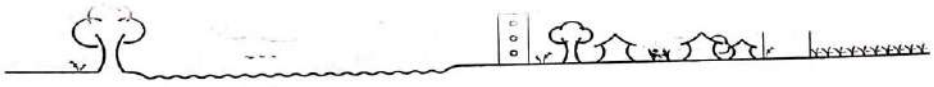
Techno Economic Survey

K.	Health Facilities:				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	SOB - HEALTH CENTRE 1 NO.			
	Private Clinic/Private Hospital/ Nursing Home	PRIVATE	YES		3 KM BAPS hospital
	If any of the above Facility is not available in village than approx. distance from village: ..4.....kms.			BHAYLI	
Suggestions if any:					
L.	Education Facilities:				
	Aaganwadi/ Play group	4			
	Primary School	1 NO.	YES		
	Secondary school	1 NO.	YES		
	Higher sec. School	.	YES		
	ITI college/ vocational Training Center			YES	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	ART		YES	
	If any of the above Facility is not available in village than approx. distance from village: .....kms.	VIBGYOR High school - 2 km			
Suggestions if any:					
M.	Socio- Culture Facilities				
	Community Hall (With or without TV) Location:			YES	



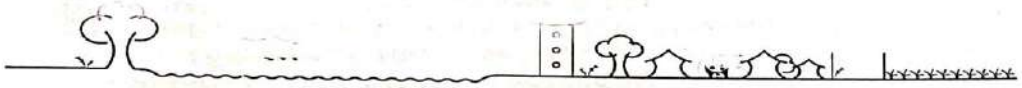
	General Market			Yes	
	Shops (Public Distribution System)		Yes		
	Panchayat Building		Yes		
	Pharmacy/Medical Shop	5 No.	Yes		
	Bank & ATM Facility	8 Nos.		Yes	
	Agriculture Co-operative Society		Yes	1	
	Milk Co-operative Soc.		Yes		
	Small Scale Industries		Yes		
	Internet Cafes/ Common Service Center/Wi Fi		Yes		
	Other Facility				
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			Yes	
P.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System			Yes	
Q.	Any Other				

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	NOT AVAILABLE



	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:			Yes	
	Public Garden Location: Condition:			Yes	
	Village Pond Location: Condition:	✓		Yes	
	Recreation Center Location: Condition:			Yes	
	Cinema/ Video Hall Location: Condition:	No.		Yes	
	Assembly Polling Station Location: Condition:			Yes.	
	Birth & Death Registration Office Location: Condition:	At PANCHAYAT OFFICE	No.		
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			Yes	
	Telecommunication Network/ STD booth			Yes	

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Recent Projects going on for Development of Village	POND DEVELOPMENT
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)	YES: Need Repair & Maint.	
2.	Additional Information/ Requirement		

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:
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Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

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12.2 Original Smart Village Survey Details

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Name of District:	Vadodara.
Name of Taluka:	Vadodara
Name of Village:	Ankodiya
Name of Institute:	KJIT, Savli, Vadodara
Nodal Officer Name & Contact Detail:	
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch - VIPESH PATEL
Date of Survey:	22 Aug 2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	4608	2406	2202	1089

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	507 hectores
2.	Forest Area (In hect.)	0 hectores
3.	Agricultural Land Area (In hect.)	500 hectores
4.	Residential Area (In hect.)	7 hectores
5.	Other Area (In hect.)	0 hectores
6.	Distance to the nearest railway station (in kilometers):	8 - 10 km

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7.	Name of Nearest Town with Distance:	Vadodara – 4 km
8.	Distance to the nearest bus station (in kilometers):	2 - 4 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.	Agriculture
	2.	Animal Husbandry
	3.	Office work
Major crops grown in the village:	1.	Weat / Drum stick
	2.	Rice
	3.	Bajri

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 Tube Well Or Bore Well	Yes, fully available	✓		All such facilities are available
2.	**DUG WELL** Protected Well Un Protected Well	2 wells	✓	✓	closed, not in use.
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring Rainwater Tanker Truck Cart With Small Tank	8 wells	✓		Though in smaller scale
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump Other(Specify)**Lake/ Pond**	NO		✓	Village don't contain such facilities

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Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity: 25KL	V		working
	Underground Sump	Capacity: 2 NO.	V		1) 2 lac 2) 50 K
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	closed			Not working
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	PUCCA DAMAR	Yes		
	Main road		Yes		
	Internal streets		Yes		
	Nearest NH/SH/MDR/ODR Dist. in kms.	2km			
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Not there		No	10 km apart
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Not there		No	2-3 km apart
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Available	Yes		Private Vehicles
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	MGVCL	Yes		24 hours

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	Power supply for Domestic Use	Available	Yes		For 24 hrs
	Power supply for Agricultural Use	Available	Yes		For 8 hrs
	Power supply for Commercial Use	Available	Yes		For 24 hrs
	Road/ Street Lights	Available	Yes		
	Electrification in Government Buildings/ Schools/ Hospitals	Available	Yes		For 24 hrs
	Renewable Energy Source Facilities (Y/ N)		Yes		4-5 in Nos
	LED Facilities		Yes		

Suggestions if any:

G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Available	Yes		One latrine block is available
	Location Condition	Good			
	Community Toilet (With bath/ without bath facilities)	Available	Yes		without Bath facilities
	Solid & liquid waste Disposal system available	Available	Yes		~~without Bath facilities~~ Still not working
	Any facility for Waste collection from road	Available	Yes		Provided by the phanchayat

Suggestions if any:

H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL OTHER (SPECIFY)	Private tube wells.	Yes		18 - 20 Nos in village

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Available	Yes		700 Pucca while remaining are kutchha

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	Available	✓		3 in Nos
	Sub-Centre	Available	✓		1 in No
	PHC	Available	✓		1 in No.
	BLOCK PHC			✓	
	CHC/RH			✓	
	District/ Govt. Hospital				
	Govt. Dispensary				
	Private Clinic		✓		2 in Nos
	Private Hospital/				
	Nursing Home				
	AYUSH Health Facility		✓		1 Ayurvedic Hospital
	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		✓		3 in Nos
	Primary School		✓		2 in Nos.
	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.				

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Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	Good		YES	
	Public Library (With daily newspaper supply: Y/N)	Not in use	N	YES	
	Public Garden	Good	N	YES	
	Village Pond		N	YES	
	Recreation Center		GAMTAL	YES	
	Cinema/ Video Hall			YES	NO
	Assembly Polling Station		PRIMARY SCHOOL	YES	
	Birth & Death Registration		PANCHAYAT ITSELF	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	WORKING	GAMTAL	YES	
	Telecommunication Network/ STD booth				NO
	General Market				NO
	Shops (Public Distribution System)	Good	GAMTAL	YES	
	Panchayat Building	Good	GAMTAL	YES	
	Pharmacy/Medical Shop			YES	
	Bank & ATM Facility	Good	GAMTAL	YES	
	Agriculture Co-operative Society				NO
	Milk Co-operative Soc.				NO
	Small Scale Industries				NO
	Internet Cafes/ Common Service Center/Wi Fi				NO
	Youth Club				NO
	Mahila Mandal	Good	GAMTAL	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			NO	
	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?			Yes	
	3. Janani Suraksha Yojana			Yes	
	4. Kishori Shakti Yojana			Yes	
	5. Balika Samriddhi Yojana			Yes	
	6. Mid-day Meal Programme				NO
	7. Intergrated Child Development Scheme (ICDS)				NO
	8. Mahila Mandal Protsahan Yojana (MMPY)				NO
	9. National Food for work Programme (NFFWP)				NO
	10. National Social Assistance Programme			Yes	
	11. Sanitation Programme (SP)				NO
	12. Rajiv Gandhi National Drinking Water Mission			Yes	
	13. Swarnjayanti Gram Swarozgar Yojana			Yes	
	14. Minimum Needs Programme (MNP)				NO
	15. National Rural Employment Programme				NO
	16. Employee Guarantee Scheme (EGS)				NO.
	17. Prime Minister Rojgar Yojana (PMRY)			Yes	
	18. Jawahar Rozgar Yojana (JRY)				NO
	19. Indira Awas Yaojna (IAY)				NO
	20. Samagra Awas Yojana (SAY)			Yes	
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				NO
	22. Jawahar Gram Samridhi Yojana (JGSY)				NO
	23. Other (SPECIFY)		PANCHAYAT YOJANA	Yes	

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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	PRIVATE AVAILABLE	YES		
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System			YES	NOT APPLIED YET
3.	Any Other	IN USE	YES		SANITATION E-RIKSHAW.

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy			YES	NOT AVAILABLE
2.	Recent Projects going on for Development of Village	BEAUTIFICATION OF LAKE			
3.	Any NGO working for village development	NO		YES	
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)	FLOOD		YES	

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	NOT-REQUIRED	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?	SWATCH-BHARAT	

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	IMPLEMENTED	UNDER ENHANCEMENT PROGRAMME

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

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Email ID: rurban@gtu.edu.in

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12.3 Original Your Village Techno-Economic Survey Form

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

Name of District:	CHAPAD
Name of Taluka:	VADODARA
Name of Village:	VADODARA
Name of Institute:	KJIT, Savli, Vadodara
Nodal Officer Name & Contact Detail:	
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	SARPANCH : RAJESHBHAI PARMAR
Date of Survey:	22 Aug 2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	2280	1277	1053	400
2.	2011	2419	1256	1163	530

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	957.00 hect.
2.	Forest Area (In hect.)	0
3.	Agricultural Land Area (In hect.)	670.03 hect.
4.	Residential Area (In hect.)	95.60 hect.
5.	Other Area (In hect.)	76.56 hect.
6.	Distance to the nearest railway station (in kilometers):	12 km.

7.	Name of Nearest Town with Distance:	Vadodara 12kms
8.	Distance to the nearest bus station (in kilometers):	BS 12kms
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. Agriculture 2. Animal husbandary 3. Office people
Major crops grown in the village:	1. Wheat / Dhan Stick 2. Rice 3. Mayen

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 Tube Well Or Bore Well	Yes fully available.	✓		All such facilities are available
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	Irrigation channel	✓		
	Bottled Water Hand Pump				

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	Other(Specify)**Lake/ Pond**	Pond.	Yes.		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	✓		50,000 lits
	Underground Sump	Capacity:	✓		1,00,000 lit
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	closed			Not available
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	RCC	Yes		
	Main road		Yes		
	Internal streets		Yes		
	Nearest NH/SH/MDR/ODR Dist. in kms.	2kms			SH 06.
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Not ~~thate~~ available		No	12kms 5 Kms Bhalli
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Not available		No	2 kms
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	~~Available~~	Yes		Private vehicles, city bus
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	MGVCL	Yes		24 hrs.

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	Power supply for Domestic Use	Available	Yes		for 24 hrs
	Power supply for Agricultural Use	Available	Yes		for 8 hrs
	Power supply for Commercial Use	Available	Yes		for 24 hrs
	Road/ Street Lights	Available	Yes		
	Electrification in Government Buildings/ Schools/ Hospitals	Available	Yes		for 24 hrs
	Renewable Energy Source Facilities (Y/ N)		Yes		4-5 in Nos.
	LED Facilities		Yes		
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Available	Yes		One public toilet is available
	Location Condition	Good			
	Community Toilet (With bath/ without bath facilities)	Available	Yes		without Bath facilities
	Solid & liquid waste Disposal system available			No.	
	Any facility for Waste collection from road	Available	Yes		Provided by Panchayat
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER ✓ CANAL WELL ✓ TUBE WELL OTHER (SPECIFY)	YES GWSSB			Canal Tube well
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Available	Yes		

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	Available	Yes		4 in Nos
	Sub-Centre	NO.			
	PHC	Available	Yes	No	1 in No.
	BLOCK PHC			NO.	
	CHC/RH			NO.	
	District/ Govt. Hospital			NO	
	Govt. Dispensary		Yes		
	Private Clinic		.	NO	
	Private Hospital/ Nursing Home		.	NO	
	AYUSH Health Facility		.	NO	
	sonography /ultrasound facility			NO.	
	If any of the above Facility is not available in village than approx. distance from village: ...5...kms.		Bhaili, Atladara.		
	Suggestions if any:				
K.	**Education Facilities:**				
	Aaganwadi/ Play group		Yes		4 in nos.
	Primary School		Yes		
	Secondary school		Yes	.	Private
	Higher sec. School			No	
	ITI college/ vocational Training Center			No.	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities			No.	

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If any of the above Facility is not available in village than approx. distance from village: ....5....kms. VIRAYAR High School - Atladara. near

Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)			YES.	YES 2 NOS
	Public Library (With daily newspaper supply: Y/N)	Not in Good condition		YES	
	Public Garden			.	NO.
	Village Pond			YES	
	Recreation Center				NO.
	Cinema/ Video Hall				NO.
	Assembly Polling Station				NO.
	Birth & Death Registration Office		PANCHAYAT		

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	Working	Private	YES	
	Telecommunication Network/ STD booth				NO
	General Market				NO
	Shops (Public Distribution System)	Good			
	Panchayat Building	Not in Good condition			
	Pharmacy/Medical Shop			YES	
	Bank & ATM Facility	Good	GRAMIN	YES	
	Agriculture Co-operative Society	Not in Good condition		YES	
	Milk Co-operative Soc.			YES	
	Small Scale Industries				NO
	Internet Cafes/ Common Service Center/Wi Fi				NO.
	Youth Club			-	NO.
	Mahila Mandal			YES	NO.

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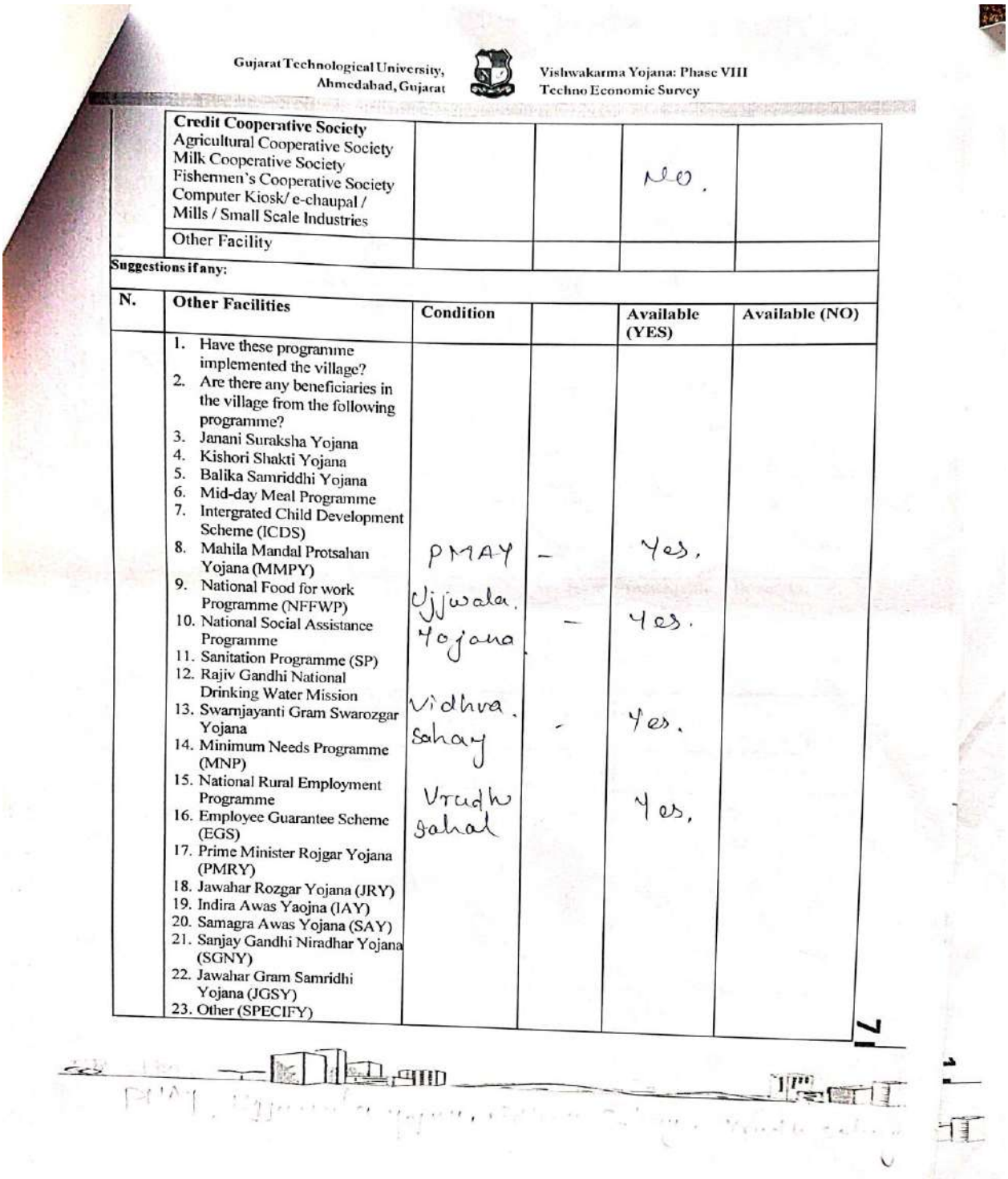

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	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries			NO.	
	Other Facility				

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				
	7. Intergrated Child Development Scheme (ICDS)				
	8. Mahila Mandal Protsahan Yojana (MMPY)	PMAY	-	Yes.	
	9. National Food for work Programme (NFFWP)	Ujjwala.			
	10. National Social Assistance Programme	Yojana	-	Yes.	
	11. Sanitation Programme (SP)				
	12. Rajiv Gandhi National Drinking Water Mission				
	13. Swarnjayanti Gram Swarozgar Yojana	Vidhva.	-	Yes.	
	14. Minimum Needs Programme (MNP)	Sahay			
	15. National Rural Employment Programme				
	16. Employee Guarantee Scheme (EGS)	Vrudh		Yes.	
	17. Prime Minister Rojgar Yojana (PMRY)	Sahal			
	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)				

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

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	WASMO		YES	25,00,000 Lits Sump.
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)	Flood			

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

VIII. 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	Panchayat	Renovation and color paint.
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 ?		

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

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12.4 Gap Analysis of the Allocated Village

- The team of Vishwakarma Yojana of Chapad village prepared a gap analysis to find out the gaps of various facilities.
- Higher the gap, higher the requirement of that facility. However, it is not necessary the facility with higher gap must be provided in village. If that facility is available at very short distance from village in neighborhood, then it can be neglected.
- The required facilities are decided by the population of the village. The planning commission and UDPFI norms are followed during gap analysis.

Table18 Gap Analysis of the Allocated Village

VILLAGE GAP Analysis					
Village Facilities	**Planning Commission/UDPFI Norms**	**Village Name:**	Chapad, Vadodara		
		Population:		**2419**	
		Existing	**Required as per Norms**	**Smart Village / Cities / Heritage Future Projection Design**	**Gap**
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	4	2	8	0
Primary School	Each Per 2500 population	2	0	5	0
Secondary School	Per 7,500 population	2	0	1	0
Higher Secondary School	Per 15,000 Population	0	0	1	0
College	Per 125,000 Population	0	0	0	0
Tech. Training Institute	Per 100000 Population	0	0	0	0
Agriculture Research Centre	Per 100000 Population	0	0	0	0
Skill Development Center	Per 100000 Population	0	0	0	0
Health Facility					

Govt/Panchayat Dispensary or Sub PHC or Health Centre	Each Village	1	1	1	0
Primary Health & Child Health Center	Per 20,000 population	1	0	1	0
Child Welfare and Maternity Home	Per 10,000 population	1	0	1	0
Multi-specialty Hospital	Per 100000 Population	0	0	1	0
Public Latrines	1 for 50 families (if toilet is not there in home, especially for slum pockets & kutcha house)	1	1	1	0
Physical Infrastructure Facilities					
Transportation					
Pucca Village Approach Road	Each village	**Adequate**			
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	0	1	1	1
Drinking Water (Minimum 70 lpcd)		**Adequate**			
Over Head Tank	1/3 of Total Demand		44,500 Lit.		
U/G Sump	2/3 of Total Demand		89,000 Lit.		
Drainage Network - Open		Under Ground			
Drainage Network - Cover		**Adequate**			
Waste Management System		**Inadequate**			
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	0	0	1	0
community hall and Public Library	Per 15000 Population	0	0	1	0
Cremation Ground	Per 20,000 population	0	0	1	0
Post Office	Per 10,000 population	1	0	1	0
Gram Panchayat Building	Each individual/group panchayat	1	1	1	0
APMC	Per 100000 Population	0	0	0	0
Fire Station	Per 100000 Population	0	0	1	0

Public Garden	Per village	0	1	1	1
Police post	Per 40,000Population	0	0	1	0
Shopping Mall					
Electrical Design					
Electricity Network		**Adequate**			
Any Smart Village Facility					
Technology	LED Light	Yes	yes	yes	no
		ESR cap	**50,000 liters**		
		Sump cap	**1,00,000 liters**		

12.5 Summary of Chapad Village Designs

Table19 Summary of Chapad Village Designs

SR. NO	NAME	BRANCH	PART-I	PART-II
1	**CHAPAD VILLAGE**	**CIVIL**	Post Office	Rain water harvesting
2			Bus Stand	Bio gas plant
3			Library	Public health Centre
4			Vegetable Market	Skill Development centre
5			Cyber café	Community hall
6			Public Garden	Krishi Kendra
7	**CHAPAD VILLAGE**	**ELECTRICAL**	Solar panel for cyber café	Camera system
8			LED Light for Public garden	automatic light control system using LDR in public garden
9			Seven Segment Display	smart plant monitoring system using IOT

12.6 Summary of Good Photographs

Table20 Summary of good photograph of Chapad village

Allocated Village- Chapad Village	
	
Gram Pamchayat	**Primary School**
	
Bank & ATM	**Water Tank**
	
Aanganvadi	**Aanganvadi**

Bus Stand

Post Office

Main Entrance

Public Toilet

Health Centre

Community Hall

Pond

Cremation Ground

Door to Door

Drainage System

Play Ground

House Condition

	
Internal Road	**Sarpanch of Chapad Village**

Table21 Summary of good photograph of Ankodiya Village

Smart Village : ANKODIYA	
	
Entrance Gate	**Primary School**
	
Bank & ATM	**Community Hall**

Gram Panchayat

Road Condition

Cleaning staff at Ankodiya Village

Water Tank

Speaker Facility

Post Office

	
Public Toilet	**Garden**
	
Public Health Sub Centre	**CCTV Camera**

Table22 Summary of good photograph of Bil village

Ideal Village : BIL	
	
Entrance Gate	**Primary School**

	
Water Tank	**Gram Panchayat**
	
House Condition and Internal Road	**Milk Centre**
	
Secondary School	**Post Office**

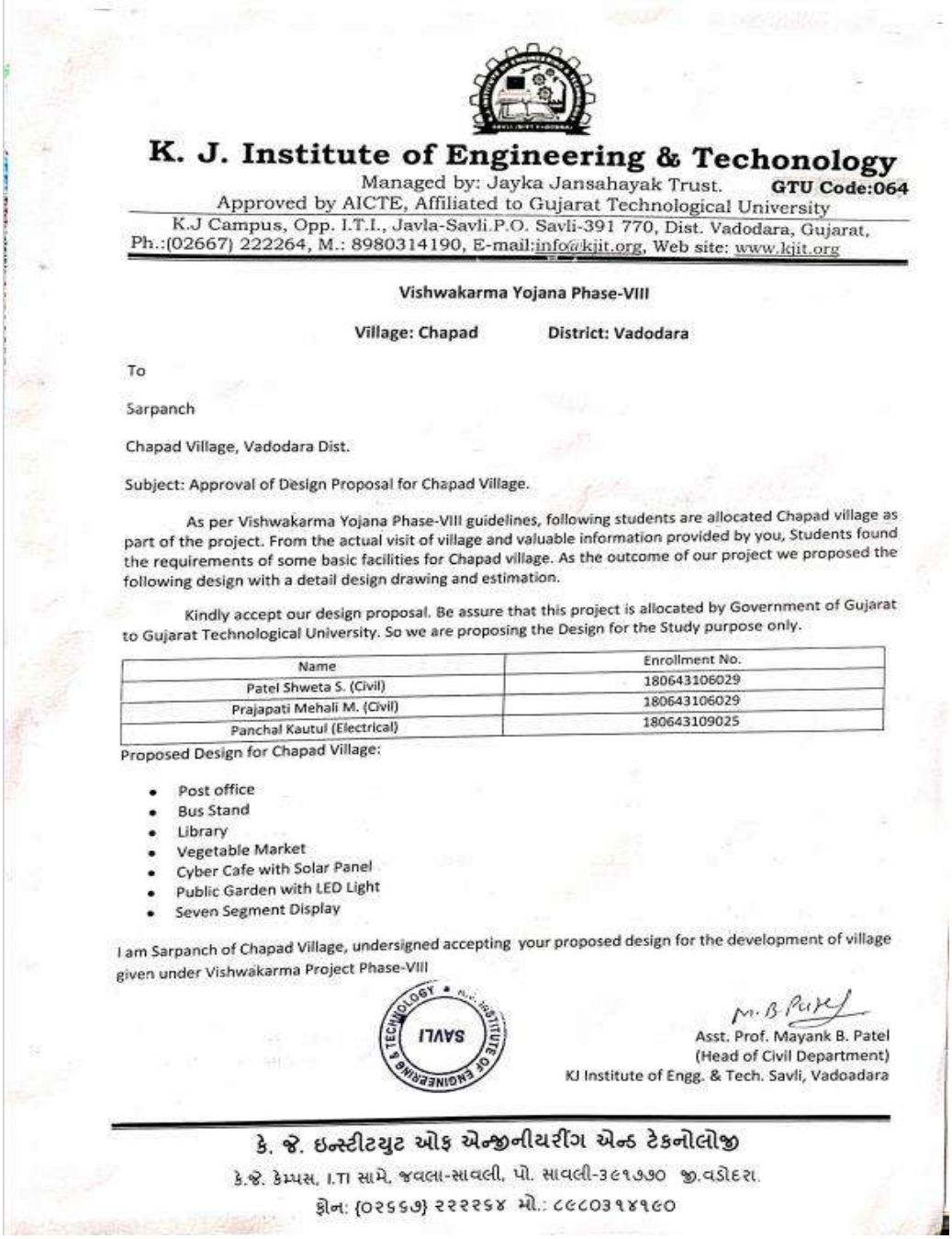
	
Garden	**Door to Door E Cycle**
	
Internal Road	**Pond**
	
Aanganwadi	**Sarpanch of Bil Village**

12.7 Village Interaction with Sarpanch Report with the photograph

- As per the guideline of Vishwakarma Yojana, we visit Chapad Village for the study purpose.
- We met to the Surpanch Rajeshbhai Parmar. He gives us the information and data whenever we required.
- We also visited all the internal part of the village and interact with villagers directly and ask them about the present situation of village. We conduct a Techno-economic survey of Chapad village.
- After all this study, we have done the gap analysis and provide the necessary facilities to village. We saw that a per URDPFI norms there is adequate facility is available in village but as per our visit we found that some of facilities are not available there. Like Pickup Stand, etc.
- We provide Pickup Stand, Post Office, Public Garden, Cyber Café, Vegetable Mark, Library, Solar Panel for Cybercafé and LED lights for Public garden for village at primary basis. Then in second stage we will provide Rain water harvesting, Bio Gas plant, Vermi Composting, Sewage treatment Plant, Krishi kendra, Speaker System and centre LED Poll for playground,
- We also send our design proposal to Gram Panchayat of Chapad Village.
- In this way we approach to various problems faced by villagers and various criteria given by GTU (VY section).

Figure 62 Sarpanch of Chapad village

12.8 Approval of Design Proposal by Sarpanch of Chapad Village



K. J. Institute of Engineering & Techonology

Managed by: Jayka Jansahayak Trust. **GTU Code:064**

Approved by AICTE, Affiliated to Gujarat Technological University

K.J Campus, Opp. I.T.I., Javla-Savli.P.O. Savli-391 770, Dist. Vadodara, Gujarat,
Ph.:(02667) 222264, M.: 8980314190, E-mail:info@kjit.org, Web site: www.kjit.org

Vishwakarma Yojana Phase-VIII

Village: Chapad **District: Vadodara**

To

Sarpanch

Chapad Village, Vadodara Dist.

Subject: Approval of Design Proposal for Chapad Village.

As per Vishwakarma Yojana Phase-VIII guidelines, following students are allocated Chapad village as part of the project. From the actual visit of village and valuable information provided by you, Students found the requirements of some basic facilities for Chapad village. As the outcome of our project we proposed the following design with a detail design drawing and estimation.

Kindly accept our design proposal. Be assure that this project is allocated by Government of Gujarat to Gujarat Technological University. So we are proposing the Design for the Study purpose only.

Name	Enrollment No.
Patel Shweta S. (Civil)	180643106029
Prajapati Mehali M. (Civil)	180643106029
Panchal Kautul (Electrical)	180643109025

Proposed Design for Chapad Village:

- Post office
- Bus Stand
- Library
- Vegetable Market
- Cyber Cafe with Solar Panel
- Public Garden with LED Light
- Seven Segment Display

I am Sarpanch of Chapad Village, undersigned accepting your proposed design for the development of village given under Vishwakarma Project Phase-VIII

SAVLI

Asst. Prof. Mayank B. Patel
(Head of Civil Department)
KJ Institute of Engg. & Tech. Savli, Vadoadara

કે. જે. ઇન્સ્ટીટયુટ ઓફ એન્જીનીયરીંગ એન્ડ ટેકનોલોજી

કે.જે. કેમ્પસ, I.TI સામે, જવલા-સાવલી, પો. સાવલી-૩૯૧૭૭૦ જી.વડોદરા.

ફોન: (૦૨૬૬૭) ૨૨૨૨૬૪ મો.: ૮૯૮૦૩૧૪૧૬૦

Figure 63 Approval letter

CHAPTER: 13
FUTURE ASPECTS

13.1 Design Proposals

13.1.1 Rain Water Harvesting

- Rainwater harvesting is a type of method in which the rain drops are collected and stored for the future use, rather than allowing them to run off. Rainwater can be collected from rivers or roofs and redirected to a deep pit (well, shaft, or borehole), aquifer, a reservoir with percolation, or collected from dew or fog with nets or other tools. Its uses include water for gardens, livestock, irrigation, domestic use with proper treatment, indoor heating for houses, etc. The harvested water can also be used as drinking water, longer-term storage, and for other purposes such as groundwater recharge.
- It plays a vital role during crisis of water deficiency and need of water for domestic as well as agriculture methods. It provides an independent water supply during water restrictions. In areas where clean water is costly, or difficult to come by, rainwater harvesting is a critical source of clean water. In our village chapad the water sources are limited to storage tanks and rain water, so areas like this will be beneficial due to installation of this method.
- It will be an optional method to be adopted by the villagers, if they find it convenient and affordable. But it will be beneficial to the household which adopts this system.
- **Design:**
- **Components of rainwater harvesting:**

  Catchment area: The catchment of a water harvesting system is the surface which directly receives the rainfall and provides water to the system. A roof made of reinforced cement concrete (RCC) can be used for water harvesting. Coarse mesh is provided at the roof to prevent the passage of debris.
  Conduits: Conduits are pipelines or drains that carry rainwater from the catchment to the system. Conduits can be of any material like polyvinyl chloride (PVC) or galvanized iron (GI), materials that are commonly available.
  Filter: The filter is used to remove suspended pollutants from rainwater collected over roof. A filter unit is a chamber filled with filtering media such as fiber, coarse sand and gravel layers to remove debris and dirt from water before it enters the storage tank.
  Storage tank: the storage tank can construct underground in rectangular shape with RCC work.
  Overflow tank: The overflow tank is provided for safety against overflow of storage tank.
- **Data:**
  Catchment area: 10 X 15 m
  Collected data:
  Rooftop area – 150 m2

Rainfall intensity – 0.869 m 2
Run-off Co-efficient – 0.9
Strom duration – 2 hr
For Rooftop Discharge will be (Q): -

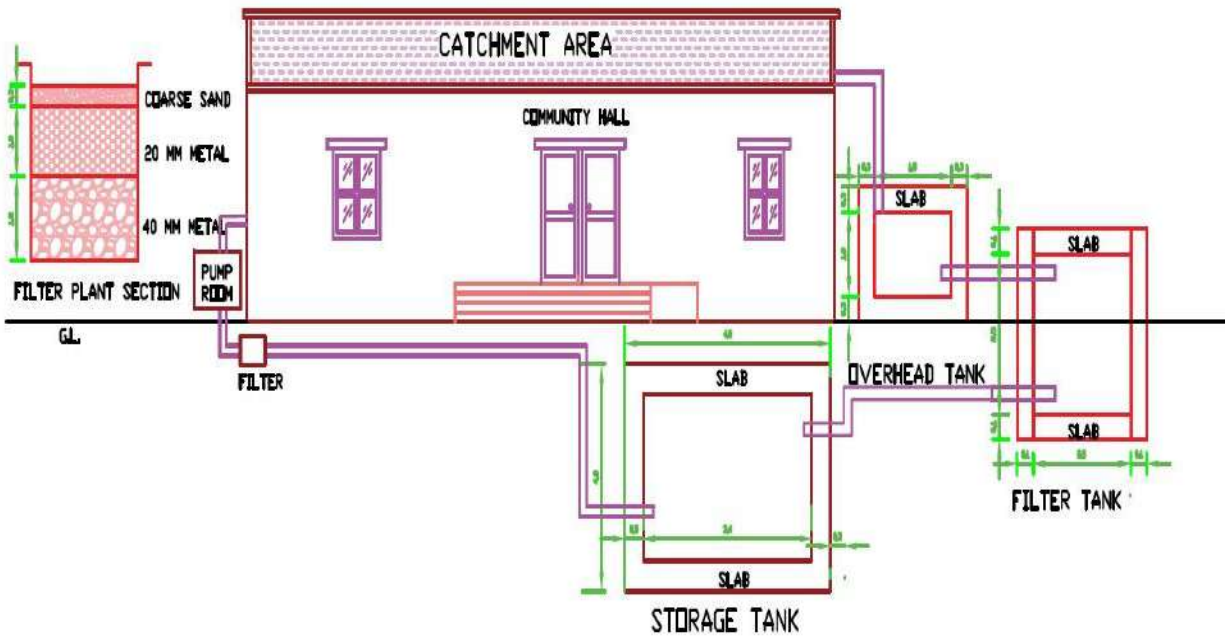
$$Q = C \times I \times A/3.6$$
$$= 0.9 \times 0.869 \times 150 \times 10\text{-}6 / 3.6$$
$$Q = 2.09 \times 10\text{-}6 \text{ m } 2 \text{ /sec}$$

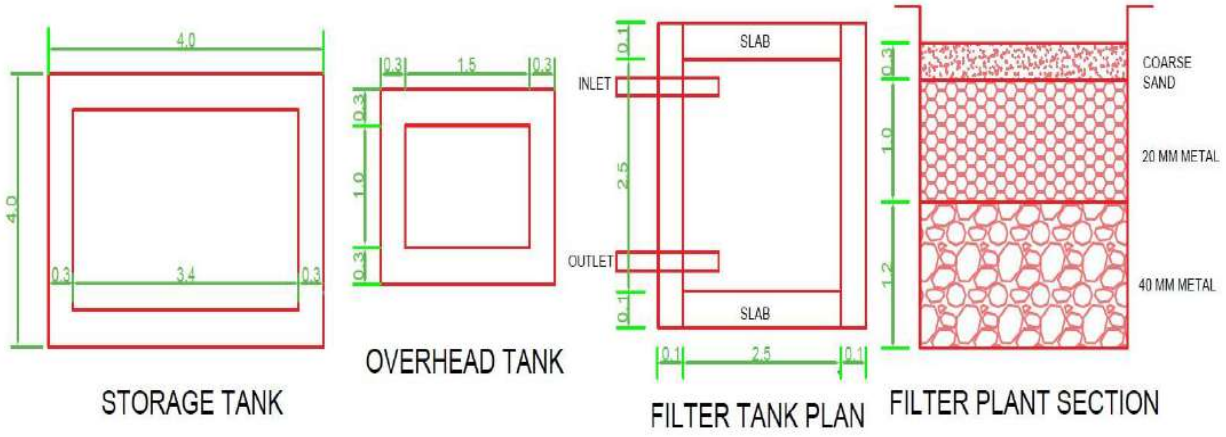
To design rain water harvesting system we found out average rainfall data of last 10 years is 928 mm in Vadodara. We design this system on community hall in Chapad village, Vadodara.

Rainfall: 869mm = 0.86 meter
Catchment area of rainfall = 9 X 14 meter
=126 m2
Volume of rainfall water = catchment area X rainfall
= 126 X 0.86
=108.36 m3 = 108360litter / year

We can provide tank is about 40 cubic meter capacities. And 60% of water used for table water recharging of well in village.

Component	Width(m)	Length(m)	Height(m)
filter tank	2.5	2.5	2
underground tank	4.0	4.0	2.5
over flow tank	1.5	1.0	1.0





- **Measurement Sheet Rain Water Harvesting**

Sr. No	Description	No	Dimension			Quantity	Total Qty
			Length (m)	Width (m)	Height (m)		
1	**Excavation**						
	filter tank	1					
	underground tank	1	4.3	4.3	2.7	49.92	
	over flow tank	1	1.7	1.3	1.2	2.65	
							52.60
2	**R.C.C. work**						
	filter tank						
	bottom slab	1	2.5	2.5	0.15	0.94	
	side wall	4	2.5	2	0.15	3.00	
	top slab	1	2.5	2.5	0.1	0.63	
	underground tank						
	bottom slab	1	4	4	0.15	2.40	
	side wall	4	4	2.5	0.15	6.00	
	top slab	1	4	4	0.1	1.60	
	over flow tank						
	bottom slab	1	1.5	1	0.15	0.23	
	side wall	4	1.5	1	0.15	0.90	
	top slab	1	1.5	1	0.1	0.15	
	Deduction	2	0.5	0.5	0.1	0.05	
							15.79

3	**Plastering**						
	filter tank	2	10	2	-	40.00	
		2	2.5	2.5	-	12.50	
	underground tank	1	16	2.5	-	40.00	
		2	4	4	-	32.00	
	over flow tank	2	5	1	-	10.00	
							134.50
4	PVC piping for rainwater 10 mm diameter	5	3	-	-	15	**15**
5	Filter sand					6	**6**

- **Abstract Sheet of Rain Water Harvesting**

Item no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	Excavation in foundation	52.6	320	m^3	16832
2	R.C.C. work	15.79	8800	m^3	138952
3	Plastering	134.5	150	m^2	20175
4	PVC piping for rainwater 2 inch diameter	9	220	meter	1980
5	PVC piping for rainwater 4 inch diameter	9	1350	piece	12150
6	Filter sand	4.5	1400	m^3	6300
7	covering	2	3000	no	6000
					202389
		contractor's Profit (5% of total cost)			**10119.45**
		Contingency +water Charges + Plumbing (5%+1.5% of total cost)			**13155.285**
		Total amount			**225663.735**

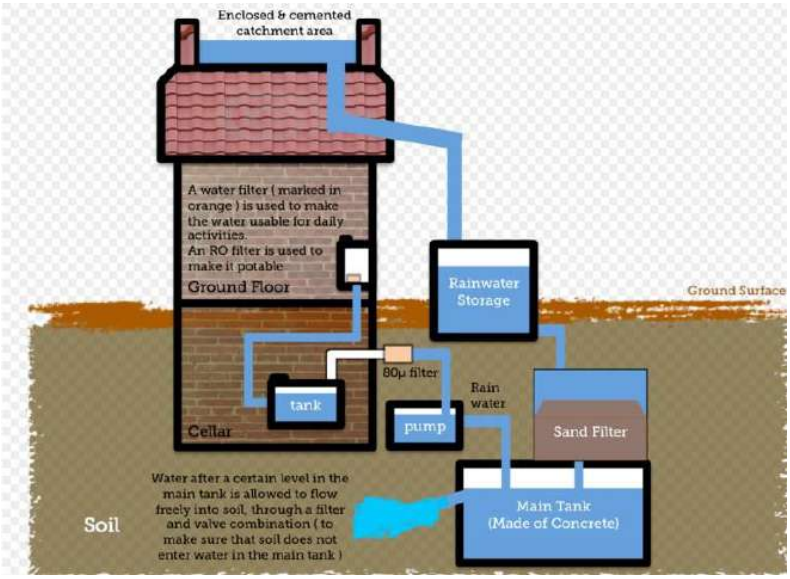


Figure 64 Rain water harvesting

13.1.2 Bio Gas Plant

- **We will design the bio gas plant for the villagers where GOKHANA place available where animal waste generated so we will plan for this type of dumping product is utilizing in the bio gas plant and stop the spreading disease in village.**
- **The gas generated in bio gas plant will using in poor area and community kitchen area.**
- **So this design will be future purpose for village like reducing cow dung in open area.**
- **this design is ecofriendly in an environment.**
- **Scenario**

The waste management is essential nowadays but in villages there is poor/ no solid waste management. Due to lack of solid waste management various kind of diseases, pollution of air & land is occurring and there for that place is not desirable for living purpose.

- **Existing Situation**

There is no any kind of the solid waste management system in the villages. Because of that villages throw the waste anywhere i.e. ukarda.

- **Proposed**

We propose bio-gas plant for the waste management.

- **Design of bio-gas plant:**

Population forecasting of Chapad Village:
This biogas plant prepares for future requirement at 2031.
The population of Chapad village in 2031.

Pn=P+nI
=2419+2*(270)
=2959

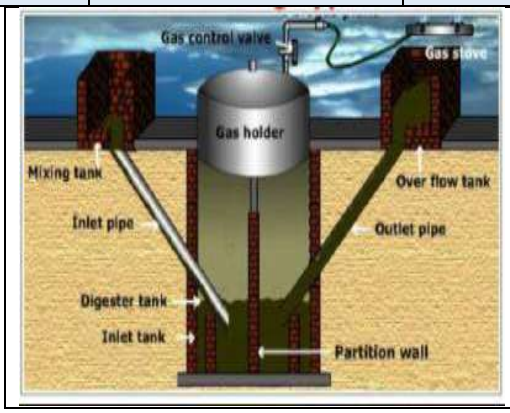
Where, P=Present population
n=No of Decades
I = Increment of population per decade
Waste Generation= 750 gm. / person / day Total
Waste Generation=0.75*2959
=2219.25 ≈ 2500Kg
Assume Waste: water Ratio for Slurry=1:1
So, Total waste Generation=Volume of (waste + Water)
= 2500+2500 = 5000 lit
Retention Time = 35 Day
Design of digester tank
Volume required for Digester Tank = 5000*35
= 175000 Lit =1.75 m3
Assume height of digester Tank = 3 m
Area = Volume/Depth
= 175/3 = 58.33 m2
Now, Area = πr2
So, r = 4.3 m
D = 8.6 m
Calculation of Gas Production In slurry 72% is Non-Volatile Solid and 28% volatile solid.
So, volatile solid = 0.28*2500
= 700 Kg
18% of Volatile solid can be digested.
So, the digested slurry = 0.18*700
= 126 Kg
Typical range for Gas production = 0.17 to 1.2 m3/Kg (Take 1 m3/Kg)
Gas production = 126 m3/Day
Density of biogas = 1.2 Kg/m3
Row gas generation = 126*1.2
= 151.2 Kg/Day (It contents 50% to 70% of Methane Gas)
Volume of Methane = 0.60*151.2
= 90.72 Kg/day
= 2800 Kg/Month
Now, Gas/ Cylinder = 14.2 Kg
So, No. Of cylinders = 2800/14.2 = 197.18 ≈ 200 cylinders
Design of Floating cover
Diameter of digester = 8.6 m
Assume 0.3 m thick wall
So, effective diameter of tank = 8.6-0.6 = 8.0 m (Diameter of Floating cover)
Now, Area of floating cover = πd2/4
=50.26 m2
Height of floating cover = gas Production / area
= 90.72 / 50.26
= 2.0 m

- **Design of proposed for BIO GAS**
- **Area: 10*8 m**
- **Measurement Sheet of Bio Gas Plant**

Sr. No.	Description	No.	Dimensions		Quantity
			Radius(m)	Height(m)	
1	Excavation				
	Area= πr^2 = π*4.3² =58.08 m²	1	4.3	3.1	180.00
2	P.C.C				
	Area= πr^2 = π*4.3² =58.08 m²	1	4.3	0.1	5.80
3	RCC Pardi				
	Area=(πr^2-$\pi r'^2$) = 2.67 m²	1	r=4.3 r'=4.2	3.0	8.00
4	Steel Cover				
	Area=(πR^2-πr^2) =58.05 m²	1	R=4.3 r'=0.1	0.05	2.90

- **Abstract Sheet of Bio Gas Plant**

no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	**Excavation**	180.0	250	m³	45000
2	**P.C.C**	5.80	729	m³	4228.2
3	**RCC Pardi**	8.0	34269	m³	274152
4	**Steel Cover**	2.90	40	kg	116
		Total Amount			323496.2
		Contract's Profit (10%)			32349.62
		Contingencies (5%)			16174.81
		Pipe inlet-outlet an labour etc(5% of total cost)			16174.81
		Total Amount			**388195.43**



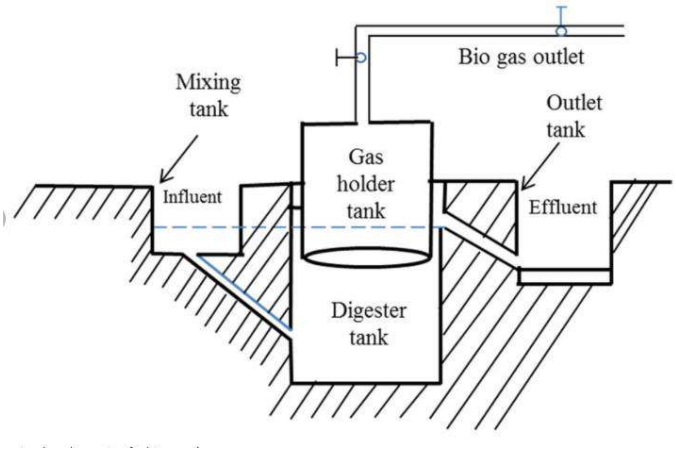
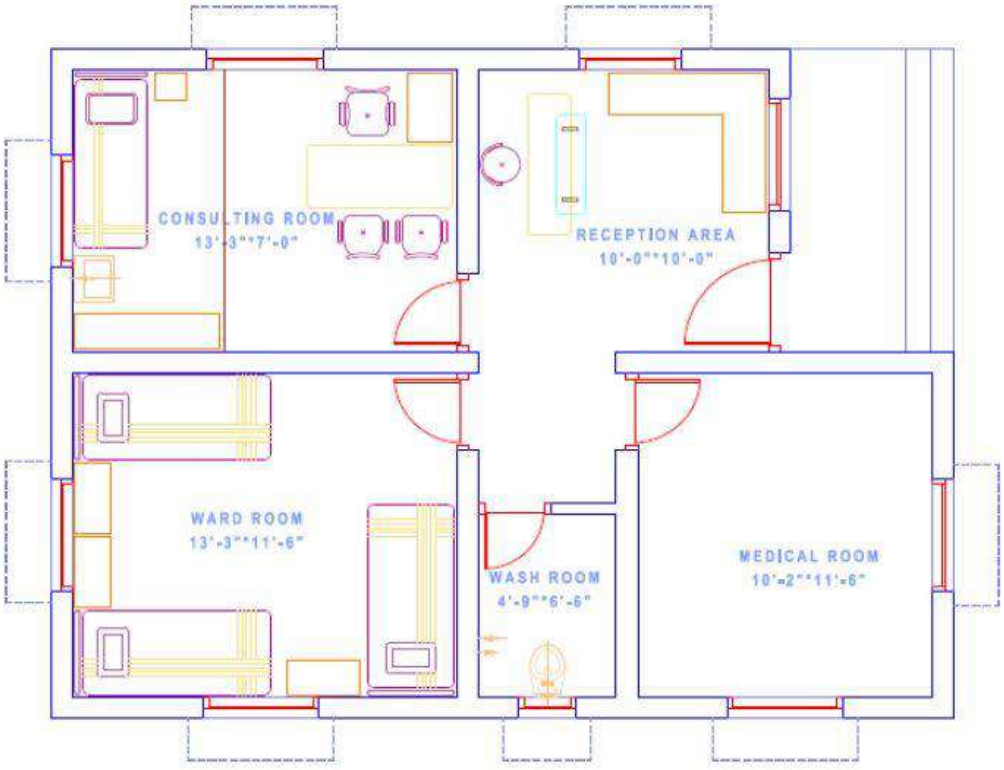


Figure 65 Bio gas plant

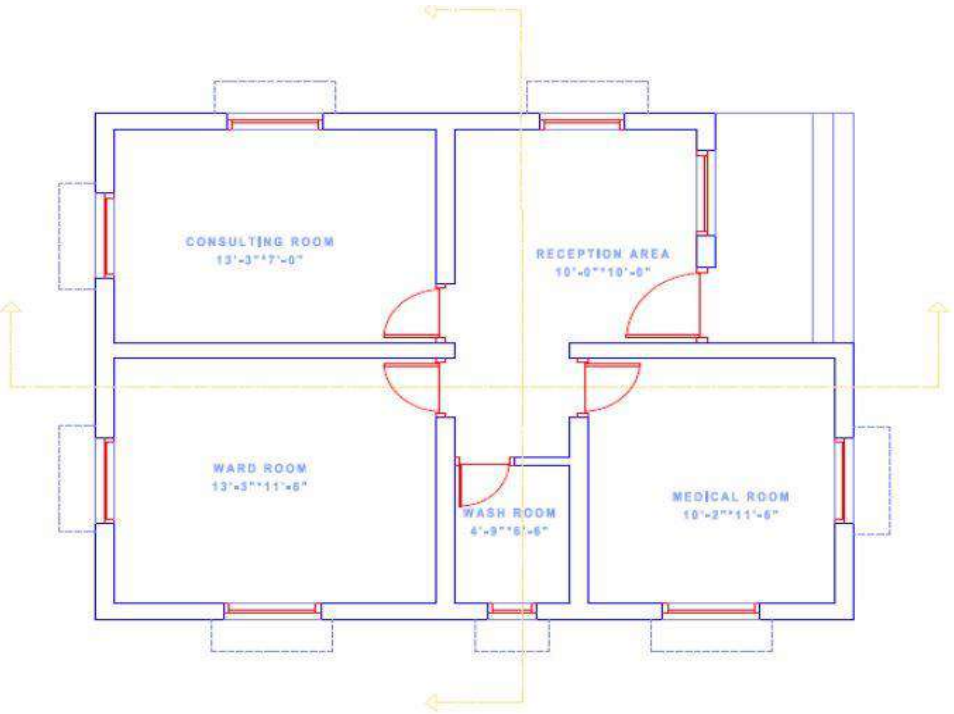
13.1.3 Public Health Centre

The Chapad village has population of 2419 peoples but they do not have any kind of preliminary Health facility. If they required any kind of treatment they have to go at Padra or Vadodara for It. So we are going to design one PHC for Chapad village because health is one of the most.

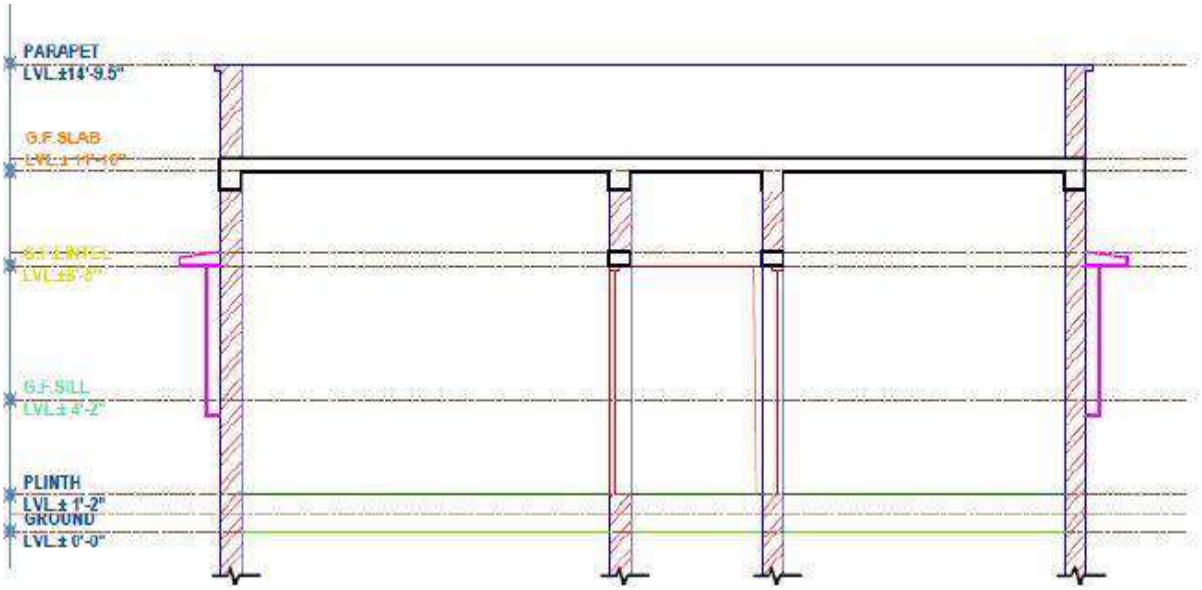
- **Design of proposed for Public Health Centre**
- **Area: 10*8 m**



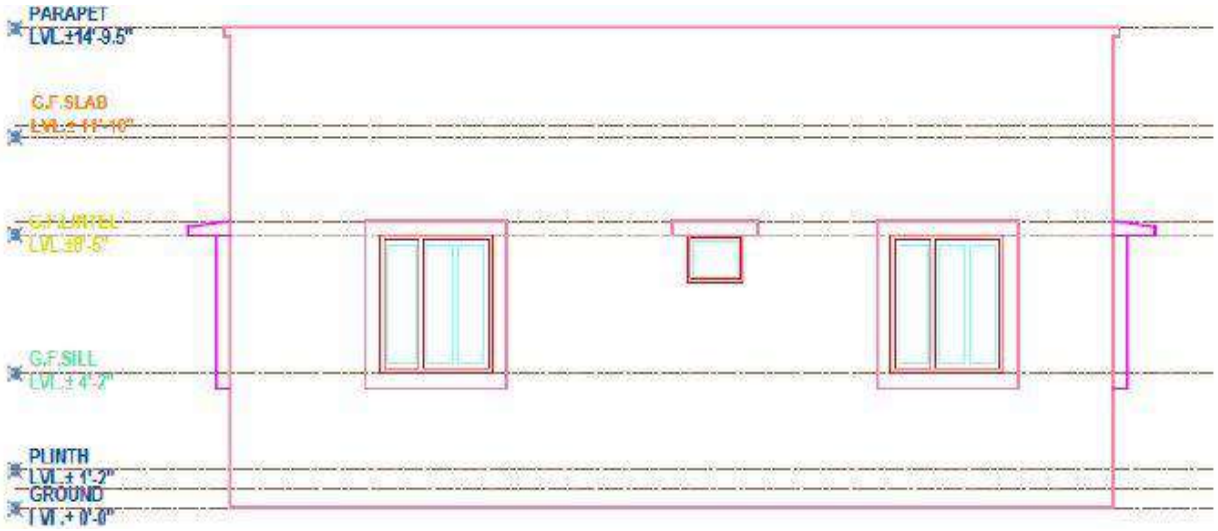
LAYOUT PLAN



PLAN



SECTION Y-Y



ELEVATION

3D VIEW

- **Measurement Sheet of PHC**

	Description	No.	Length (m)	Width (m)	Height (m)	Quantity	Total quantity
1	**Excavation in foundation**						
	Total center line length=52.62						
	L= 52.62- (0.6/2) *7 =50.52	1	50.52	0.6	1.4	42.44	**42.44m³**
2	**P.C.C. in foundation**	1	50.52	0.6	0.3	9.09	**9.09m³**
3	**Brick Masonry up to plinth level**						**25.14m³**
	Step1	1	50.87	0.5	0.2	5.09	
	Step2	1	51.22	0.4	0.2	4.1	
	Step3	1	51.57	0.3	0.2	3.09	
	Step4	1	51.82	0.23	0.86	10.25	
	Stairs						
	Step1	1	3.28	1.73	0.18	1.02	
	Step2	1	3.28	1.47	0.18	0.87	
	Step3 (platform)	1	3.28	1.22	0.18	0.72	
4	**Brick masonry above plinth level**	1	50.52	0.23	3.12	36.25	**31.18m³**
	Deduction						
	Window1	7	1.22	0.23	1.3	2.55	
	Window2	1	1.07	0.23	1.3	0.32	
	Door1	1	1.07	0.23	2.2	0.54	
	Door2	3	0.84	0.23	2.2	1.28	
	Door3	1	0.76	0.23	2.2	0.38	
5	**Damp Proof Coarse (D.P.C.)**	1	50.52	0.23		11.62	**11.62m³**
6	**R.C.C. work for slab (11 cm thk.)**	1	7.24	9.5	0.11	7.57	**7.57m³**
7	**R.C.C. chajja for windows**	7	1.52	0.46	0.13	0.64	**0.64m³**
8	**R.C.C. for lintel**	1	50.52	0.23	0.13	1.51	**1.51m³**
9	**Flooring Tile work**	1	7.24	9.5		68.78	**68.78m²**
10	**Parapet wall**	1	32.56	0.23	0.91	6.81	**6.81m³**
11	**Plaster**						**179.99m²**
	Inside plaster (1:3)						

	wall (x-axis)	6	3.51		3.12	65.71	
		4	3.05		3.12	38.06	
	wall (y-axis)	4	4.01		3.12	50.04	
		3	1.45		3.12	13.57	
		3	3.1		3.12	29.02	
		1	3.05		3.12	9.52	
	Deduction						
	Window1	7	1.22		1.3	11.1	
	Window2	1	1.07		1.3	1.39	
	Door1	1	1.07		2.2	2.35	
	Door2	6	0.84		2.2	11.09	
	Door3	2	0.75		2.2	3.3	
	Outside Plaster (1:4)						
	Wall (x-axis)	1	7.77		4.51	35.04	
		2	7.24		4.51	65.3	
		1	9.5		4.51	42.85	
		1	1.73		4.51	7.8	**150.94m²**
		1	3.28		4.51	14.79	
	Deduction						
	Window1	7	1.22		1.3	11.1	
	Window2	1	1.07		1.3	1.39	
12	**Ceiling plaster**	1	6.78	9.04		61.29	**61.29m²**
13	**Back filling in excavation**						
	Total excavation					42.44	**15.11m³**
	CC in foundation					9.09	
	Brick work below GL					18.24	

- **Abstract Sheet of PHC**

Item no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	**Excavation in foundation**	42.44	85	m³	3607.4
2	**Filling in excavation**	15.11	50	m³	755.5
3	**CC (1:6)**	9.09	3100	m³	28179
4	**Brick Masonry up to plinth Level**	25.14	3200	m³	80448
5	**Brick Masonry above plinth level**	31.18	3500	m³	109130
6	**Damp Proof Coarse (D.P.C.)**	11.62	170	m²	1975.4
7	**Flooring tiles work**	68.78	500	m²	34390
8	**R.C.C. work for lintel**	1.51	8800	m³	13288

9	**R.C.C. chajja**	0.64	8800	m^3	5632
10	**R.C.C. work for slab (11cmthk.)**	7.57	8800	m^3	66616
	(excluding centering and shuttering and reinforcement				
11	**Plaster**				
	Inside Plaster (1:3)	179.99	150	m^2	26998.5
	Outside Plaster (1:4)	150.94	200	m^2	30188
	Ceiling plaster	61.29	150	m^2	9193.5
12	**Brick work for parapet**	6.81	3500	m^3	23835
		Total Amount			434236.3
		Contract's Profit (10%)			43423.63
		Contingencies (5%)			21711.82
		Total Amount			**499371.7**

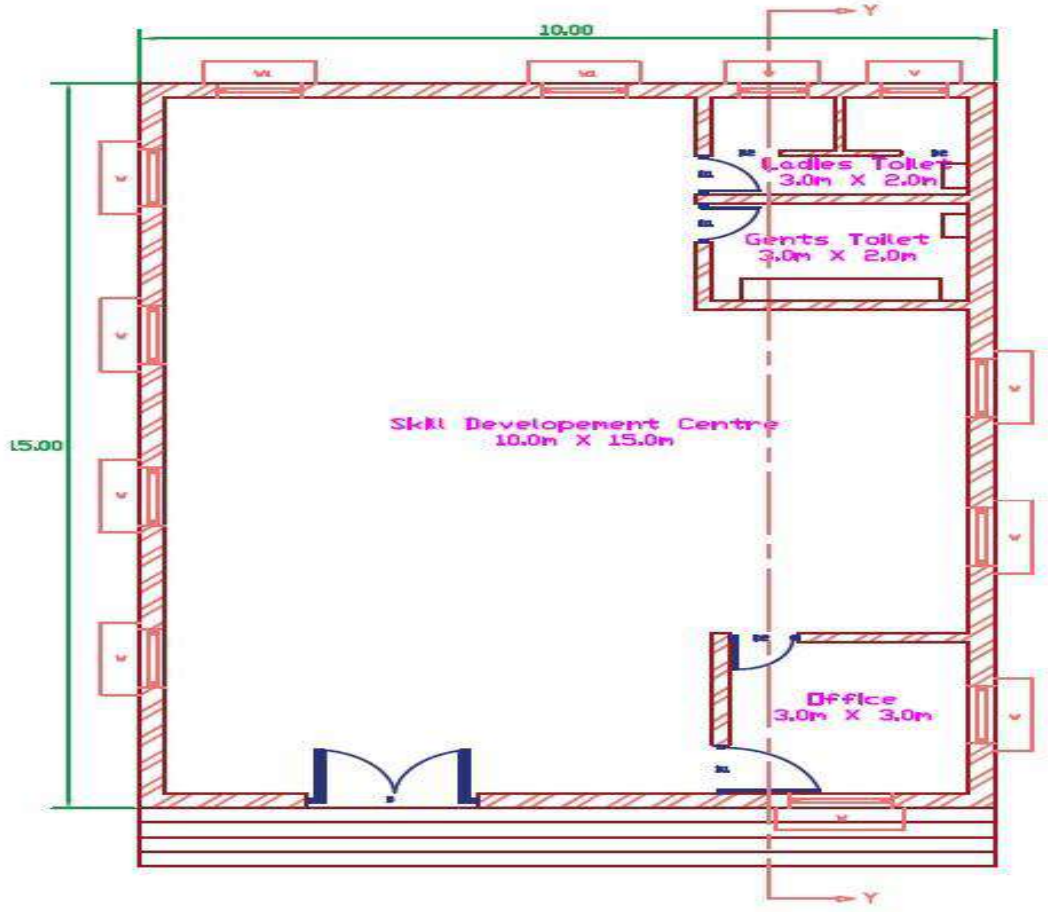
13.1.4 Skill Development Centre

Skill development is an important driver to address poverty reduction by improving employability, productivity and helping sustainable enterprise development and inclusive growth. India is facing a paradoxical situation, where on the hand, youth entering the labour market have no jobs; on the other hand, industries are complaining of unavailability of appropriately skilled manpower. The employment sector in India poses great challenge in terms of its structure which is dominated by informal workers, high levels of under employment, skill shortages and labour markets with rigid labour laws and institutions.

The Pradhanmantri Kaushal Vikas Yojana (PMKVY) was thus envisaged as a key measure to impact skills-based training to young men and women, making them capable of earning and supporting the nation's anti-poverty endeavors. The scheme becomes all the more important in India as it has the world's largest youth population that requires employable skills.
The government has partnered with various telecom operators to create awareness about the PMKVT. After the nationwide launch telecom operators are likely to send out mass SMS about the scheme and will provide potential candidates a number to call and to give a missed call on toll free number 1800 102 6000.

Apart from training the candidates shall also go through an assessment at the end of the training schedule. A certificate of merit shall also be issued to candidates at the end of this training period based on the assessment. Third party assessment bodies have been roped in by the NSDC to assess the candidates on the skill required and a monetary or reward is given to exemplary candidates. The average monetary reward that each successful candidate is likely to get is about INR 8000.

- **Design of proposed for Skill Development Centre**
- **Area: 10*15 m**



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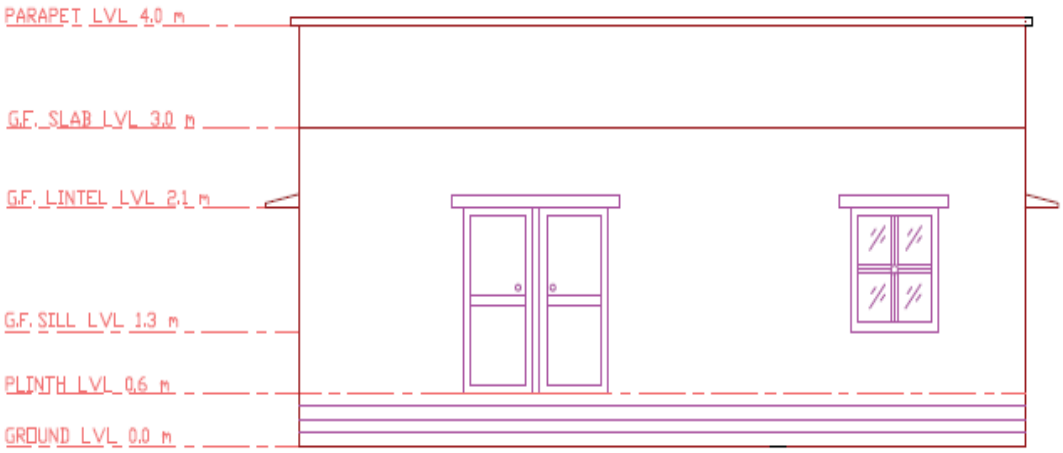

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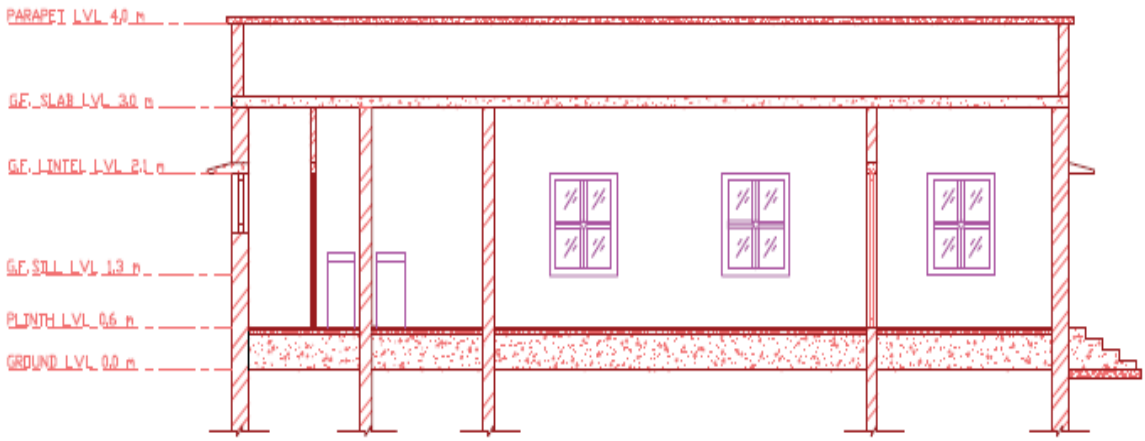


SECTION

- **Measurement Sheet of Skill Development Centre**

Sr. No.	Description	No.	Length (m)	Width (m)	Height (m)	Quantity	Total quantity
1	**Excavation in foundation**	1	64.8	0.9	1.2	69.98	**71.63**
	steps	1	10	1.1	0.15	1.65	
2	**P.C.C. in foundation**	1	64.8	0.9	0.3	17.50	**19.15**
	steps	1	10	1.1	0.15	1.65	
3	**Brick Masonry up to plinth level**						**34.07**
	Step1	1	63.4	0.7	0.2	8.88	
	Step2	1	63.6	0.6	0.2	7.63	
	Step3	1	63.8	0.5	0.2	6.38	
	Step4	1	64.2	0.3	0.3	5.78	
	Stairs	6	10	0.3	0.3	5.40	
4	**Brick masonry above plinth level**	1	64.2	0.3	3	57.78	**51.83**
	10 cm Thk wall	1	4	0.1	3	1.20	
	Deduction						
	Window	8	1.2	0.3	1	2.88	
	Window 1	2	1	0.3	1	0.60	
	Door	1	1.5	0.3	2.1	0.95	
	Door1	3	1	0.3	2.1	1.89	
	Door2	3	0.9	0.1	2.1	0.57	
	Ventilator	3	0.6	0.3	0.5	0.27	
5	**Damp Proof Coarse (D.P.C.)**	1	68.2	0.3	0.15	3.07	**3.07**

6	**R.C.C. work for slab (12 cm thk.)**	1	10	12	0.15	18.00	**18.00**
7	**R.C.C. chajja for windows**	8	1.5	0.45	0.12	0.65	
	Window 1	2	1.3	0.45	0.12	0.14	
	Door	1	1.8	0.45	0.12	0.10	**1.03**
	Ventilator	3	0.9	0.45	0.12	0.15	
8	**R.C.C. for lintel**						
	Window	8	1.5	0.3	0.1	0.36	
	Window 1	2	1.3	0.3	0.1	0.08	
	Door	1	1.8	0.3	0.1	0.05	
	Door1	3	1.3	0.2	0.1	0.08	**0.68**
	Door2	3	1	0.1	0.1	0.03	
	Ventilator	3	0.9	0.3	0.1	0.08	
9	**Parapet wall**	1	49.2	0.2	0.9	8.86	**8.86**
10	**Coping for parapet wall**	1	49.2	0.3	0.1	1.48	**1.48**
11	**Flooring Tile**	1	10	15	-	150.00	
	steps	8	10	0.3	-	3.00	
	steps	20	0.3	0.3	-	0.09	
	Terrace	1	10	15	-	150.00	**303.09**
12	**Plaster**						
	Inside plaster (1:3)	1	87.6	3	-	262.80	
	Deduction						
	Window	4	1.2	-	1	4.80	**248.99**
	Window2	1	1	-	1	1.00	
	Door	0.5	1.5	-	2.1	1.58	
	Door1	1.5	1	-	2.1	3.15	
	Door2	1.5	0.9	-	2.1	2.84	
	Ventilator	1.5	0.6	-	0.5	0.45	
	Outside Plaster (1:4)	1	50	-	4.4	220.00	
	Deduction						
	Window	4	1.2	-	1	4.80	
	Door	0.5	1.5	-	2.1	1.58	**212.18**
	Window1	1	1	-	1	1.00	
	Ventilator	1.5	0.6	-	0.5	0.45	
13	**Ceiling plaster**	1	10	15	-	150.00	**150.00**
14	**Painting**	-	-	-	-	621.50	**621.50**
15	**Back filling in excavation**	-	-	-	-	18.42	**18.42**

- **Abstract Sheet of Skill Development Centre**

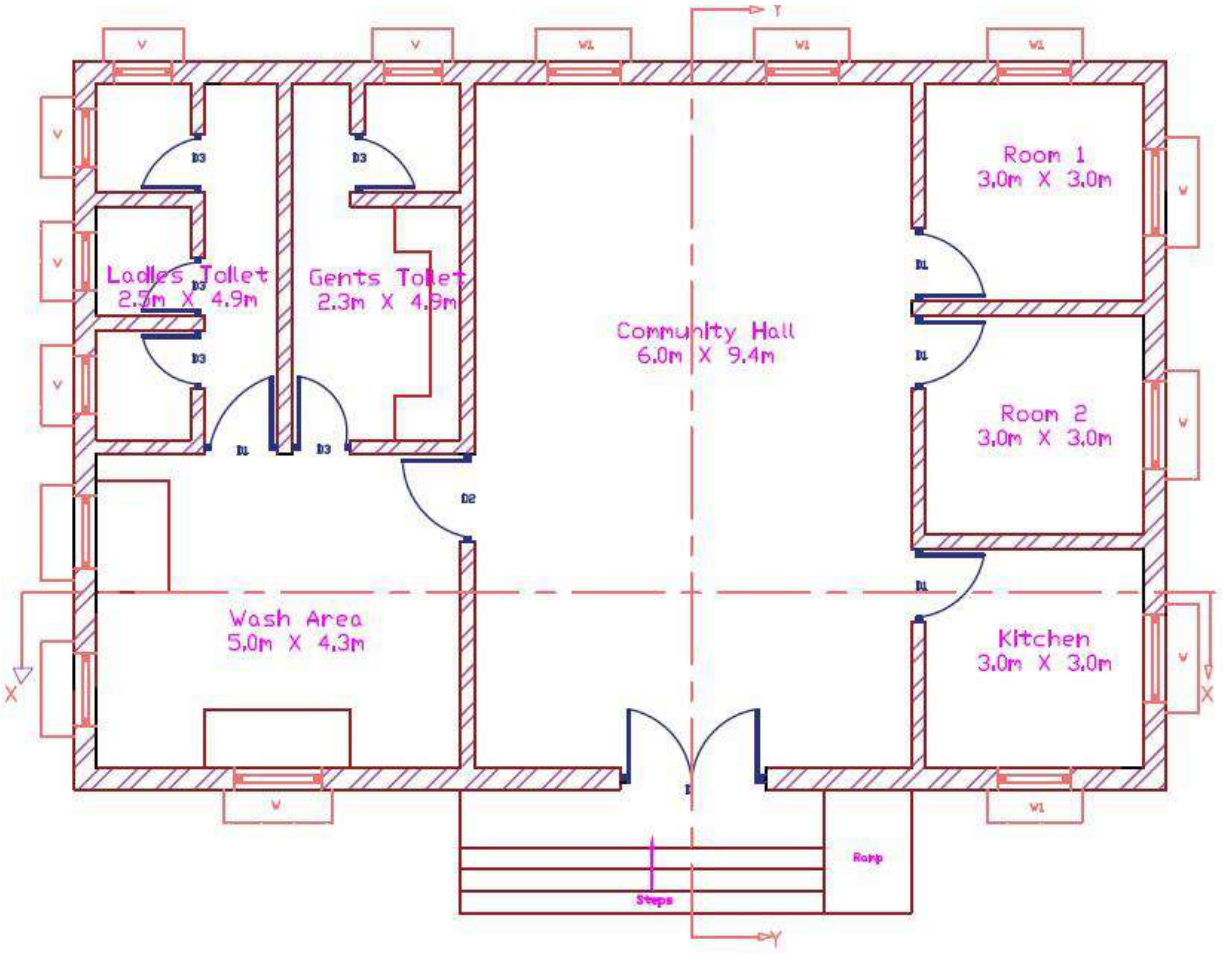
Item no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	**Excavation in foundation**	71.63	85	m^3	6088.55
2	**Filling in excavation**	18.42	50	m^3	921
3	**P.C.C. in foundation**	19.15	3100	m^3	59365
4	**Brick Masonry up to plinth**	34.07	3200	m^3	109024
5	**Brick Masonry above plinth level**	51.83	3500	m^3	181405
6	**Damp Proof Coarse (D.P.C.)**	3.07	170	m^3	521.9
7	**Flooring tiles work**	303.9	500	m^2	151950
8	**R.C.C. work for lintel**	0.68	8800	m^3	5984
9	**R.C.C. chajja**	1.03	8800	m^3	9064
10	**R.C.C. work for slab (12cmthk.)**	18	8800	m^3	158400
	(excluding centering and shuttering and reinforcement				
11	**Coping**	1.48	8800	m^2	13024
12	**Plaster**				
	Inside Plaster (1:3)	249	150	m^2	37350
	Outside Plaster (1:4)	212.18	200	m^2	42436
13	**Brick work for parapet**	8.86	3500	m^3	31010
14	**Ceiling plaster**	150	150	m^2	22500
15	**Painting**	621.5	70	m^2	43505
		Total Amount			872548.5
		Contract's Profit (10%)			87254.85
		Contingencies (5%)			43627.42
		Total Amount			**1003431**

13.1.5 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.

A village hall is a charitable community facility that is available to the public in a particular area for community-related recreational activities. Village halls are charitable because they held on trust to be used for purposes set out by the Recreational Charities Act 1958.

- **Design of proposed for Community hall**
- **Area:15*10 m**



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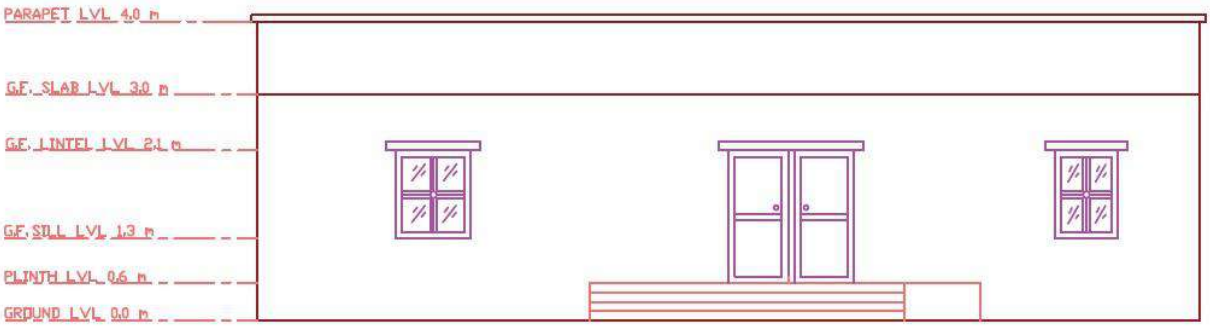

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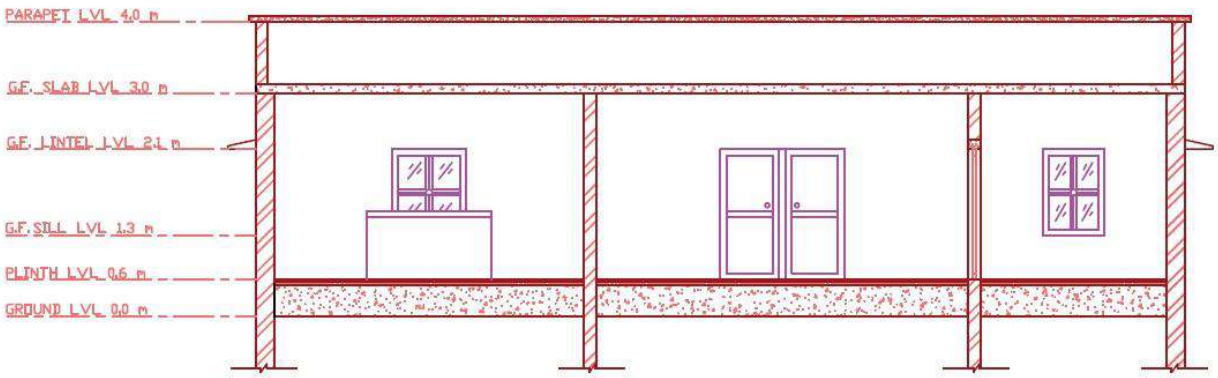
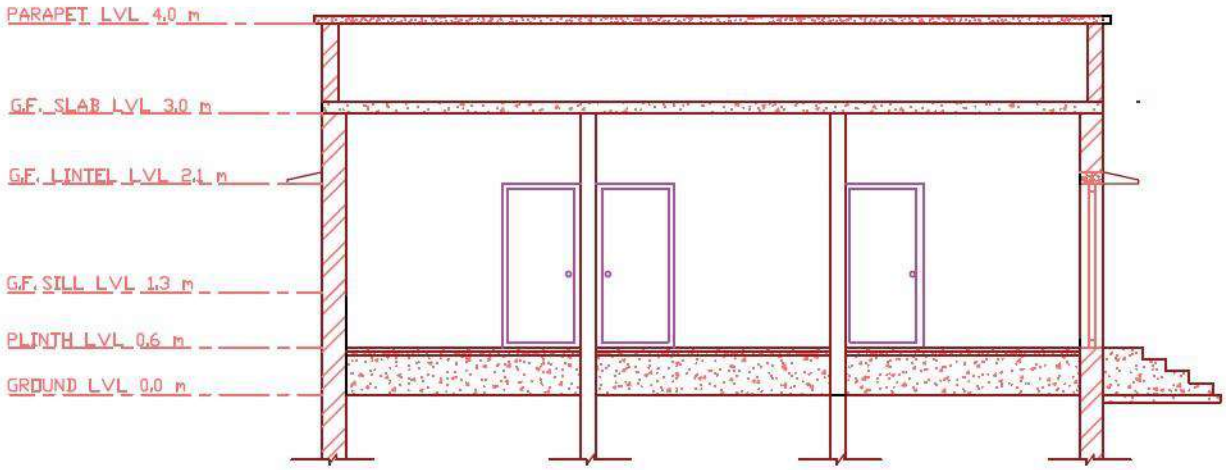


SECTION X-X



SECTION Y-Y

- **Measurement Sheet of Community Hall**

No.	Description	No	Length (m)	Width (m)	Height (m)	Quantity	Total quantity
	Total center line length						
	For 30 cm L= 49.1 m						
	For 20 cm L=46.95 m						
1	**Excavation in foundation**						**81.45m^3**
	For 30 cm L= 49.1	1	49.1	0.9	1.2	53.02	
	For 20 cm L= 38.05 m	1	38.05	0.7	1.0	26.63	
	For step and ramp	1	6	2	0.15	1.80	
2	**P.C.C. in foundation**						**24.86m^3**
	For 30 cm L= 49.1	1	49.1	0.9	0.3	13.26	

	For 20 cm L= 38.05 m	1	38.05	0.7	0.3	8.00	
	For step and ramp	1	6	2	0.3	3.60	
3	**Brick Masonry up to plinth level**						**26.93m^3**
	For 30 cm wall Step1	1	49.1	0.6	0.2	5.89	
	Step2	1	49.1	0.5	0.2	4.91	
	Step3	1	49.1	0.4	0.2	3.92	
	Step4	1	49.1	0.3	0.3	4.41	
	For 20 cm wall Step1	1	38.05	0.4	0.2	3.04	
	Step2	1	38.05	0.3	0.2	2.28	
	Step3	1	38.05	0.2	0.3	2.28	
	For step	6	4.5	0.3	0.15	0.20	
4 5	**Brick masonry above plinth level**						**39.75 m^3**
	For 30 cm L= 49.1m	1	49.1	0.3	2.1	30.93	
	For 20 cm L= 38.05 m	1	38.05	0.2	2.1	15.98	
	Deduction					**46.91 m^3**	
	Window	4	1.2	0.3	1.0	0.14	
	Window1	6	1.0	0.3	1.0	1.8	
	Door	1	1.5	0.3	2.1	0.95	
	Door1	4	1.2	0.2	2.1	2.01	
	Door2	1	1.0	0.2	2.1	0.42	
	Door3	5	0.8	0.2	2.1	1.68	
	ventilator	5	0.4	0.2	0.4	0.16	
	Damp Proof Coarse (D.P.C.)	1	49.1	0.3	0.1	1.47	**2.23 m^3**
			38.05	0.2	0.1	0.76	
6	**R.C.C. work for slab (12 cm thk.)**	1	10	15	0.12	18	**18.76 m^3**
	Ramp	1	1.5	1.7	0.3	0.76	
7	**R.C.C. chajja**						**0.9 m^3**
	Window	4	1.5	0.45	0.12	0.32	
	Window1	6	1.3	0.45	0.12	0.42	
	For ventilator	5	0.6	0.45	0.12	0.16	
8	**R.C.C. for lintel**						**2.9 m^3**
	Window	4	1.5	0.3	0.12	2.16	
	Window1	6	1.3	0.3	0.12	0.28	
	Door	1	1.8	0.3	0.12	0.08	
	Door1	4	1.5	0.2	0.12	0.18	
	Door2	1	1.3	0.2	0.12	0.03	

	Door3	5	1.1	0.2	0.12	0.13	
	ventilator	5	0.4	0.2	0.12	0.04	
9	**Coping for parapet wall**	1	49.2	0.3	0.1	1.47	**1.47 m^3**
10	**Flooring Tile work**	1	14.4	9.4	-	135.36	
	steps	1	9	2.7	-	24.3	
	Terrace	1	14.6	9.6	-	140.16	**300.16 m^2**
11	**Parapet wall**	1	49.2	0.2	0.9	8.85	**8.85m^3**
12	**Plaster**						**372.34 m^2**
	Inside plaster (1:3)	1	130	-	3.0	390	
	Deduction						
	Window	2	1.2	-	1.0	2.4	
	Window1	3	1.0	-	1.0	3.0	
	Door	0.5	1.5	-	2.1	1.57	
	Door1	2	1.2	-	2.1	5.04	
	Door2	0.5	1.0	-	2.1	1.05	
	Door3	2.5	0.8	-	2.1	4.2	
	ventilator	2.5	0.4	-	0.4	0.4	
	Outside Plaster (1:4)	1	50	-	4.4	220	**213.03m^2**
	Deduction						
	Window	2	1.2	-	1.0	2.4	
	Window1	3	1.0	-	1.0	3.0	
	Door	0.5	1.5	-	2.1	1.57	
13	**Ceiling plaster**	1	9.4	14.4	-	135.36	**135.36m^2**
14	**Painting**	1	-	-	-		**720.73 m^2**
15	**Back filling in excavation**	-	-	-	-	-	**29.66m^3**

- **Abstract Sheet of Community Hall**

no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	**Excavation in foundation**	81.45	85	m^3	6923.25
2	**Filling in excavation**	29.66	50	m^3	1483
3	**CC (1:6)**	24.86	3100	m^3	77066
4	**Brick Masonry up to plinth level**	26.93	3200	m^3	86176
5	**Brick Masonry above plinth level**	39.75	3500	m^3	139125
6	**Damp Proof Coarse (D.P.C.)**	2.23	170	m^3	379.1
7	**Flooring tiles work**	300.16	500	m^2	150080
8	**R.C.C. work for lintel**	2.9	8800	m^3	25520
9	**R.C.C. chajja**	0.9	8800	m^3	7920

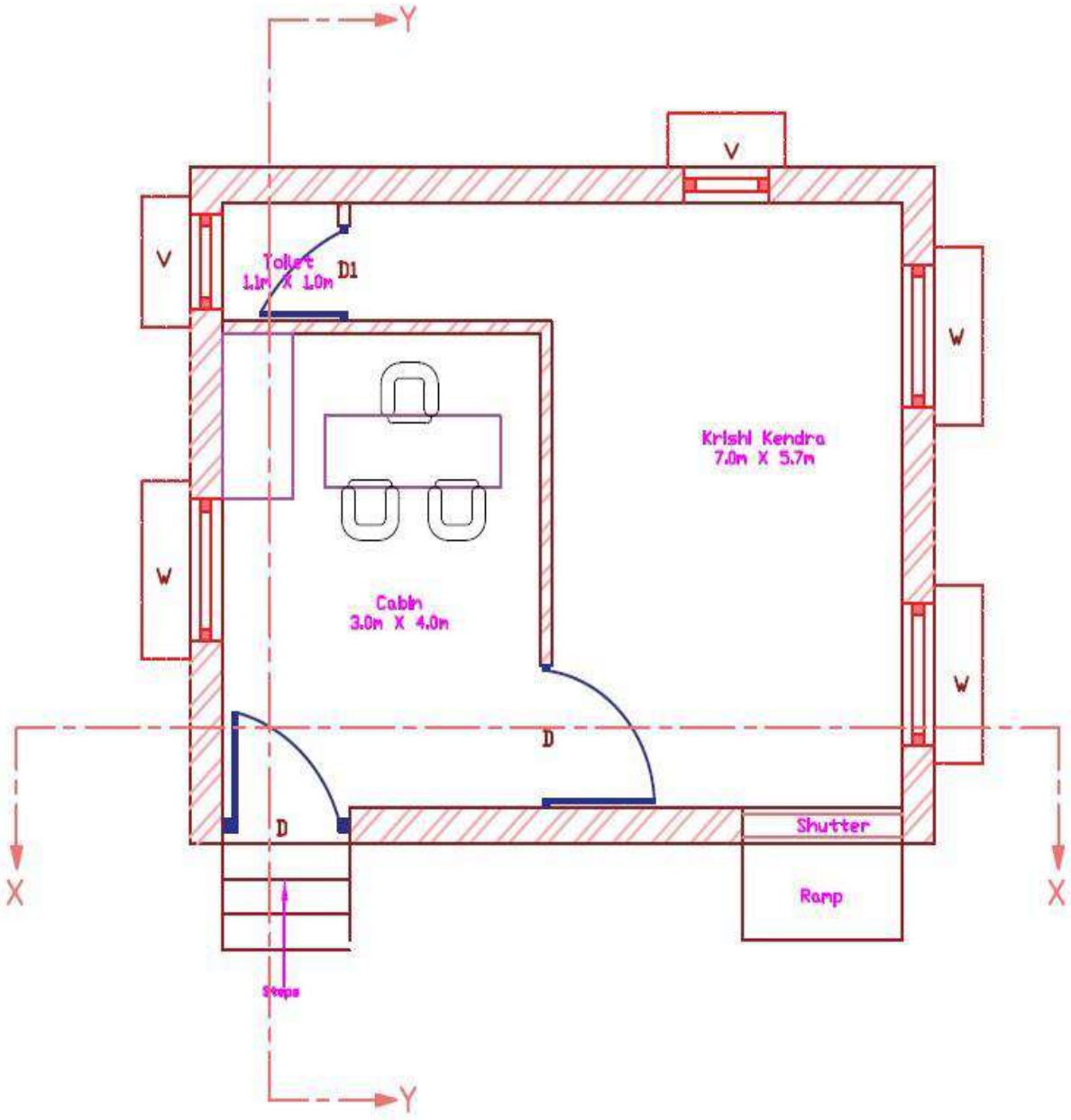
10	**R.C.C. work for slab (12cmthk.)**	18.76	8800	m^3	165088
	(excluding centering and shuttering and reinforcement				
11	**Coping**	1.47	8800	m^2	12936
12	**Plaster**				
	Inside Plaster (1:3)	372.34	150	m^2	55851
	Outside Plaster (1:4)	213.03	200	m^2	42606
13	**Brick work for parapet**	8.85	3500	m^3	30975
14	**Ceiling plaster**	135.36	150	m^2	20304
15	**Painting**	720.73	70	m^2	50451.1
		Total Amount			822614
		Contract's Profit (10%)			82261.4
		Contingencies (5%)			41130.7
		Total Amount			**946006.1 =946010**

13.1.6 Krishi Kendra

A Krishi Vigyan Kendra (KVK) is an agricultural extension center in India. The name means "farm science center". Usually associated with a local agricultural university, these centers serve as the ultimate link between the Indian Council of Agricultural Research and farmers, and aim to apply agricultural research in a practical, localized setting. All KVKs fall under the jurisdiction of one of the 11 Agricultural Technology Application Research Institutes (ATARIs) throughout India.

- **Responsibilities of Krishi Kendra**
- **On-Farm Testing:** Each KVK operates a small farm to test new technologies, such as seed varieties or innovative farming methods, developed by ICAR institutes. This allows new technologies to be tested at the local level before being transferred to farmers.
- **Front-line Demonstration:** Due to the KVK's farm and its proximity to nearby villages, it organizes programs to show the efficacy of new technologies on farmer fields.
- **Capacity Building**: In addition to demonstrating new technologies, the KVK also hosts capacity building exercises and workshops to discuss modern farming techniques with groups of farmers.
- **Multi-sector Support:** Offer support to various private and public initiatives through its local network and expertise. It is very common for government research institutes to leverage the network of KVKs when performing surveys with a wide range of farmers.
- **Advisory Services:** Due to the growing use of ICT, KVKs have implemented technologies to provide farmers information, such as weather advisories or market pricing, through radio and mobile phones.

- **Design of proposed Kirshi Kendra**
  Area: 7*6 m



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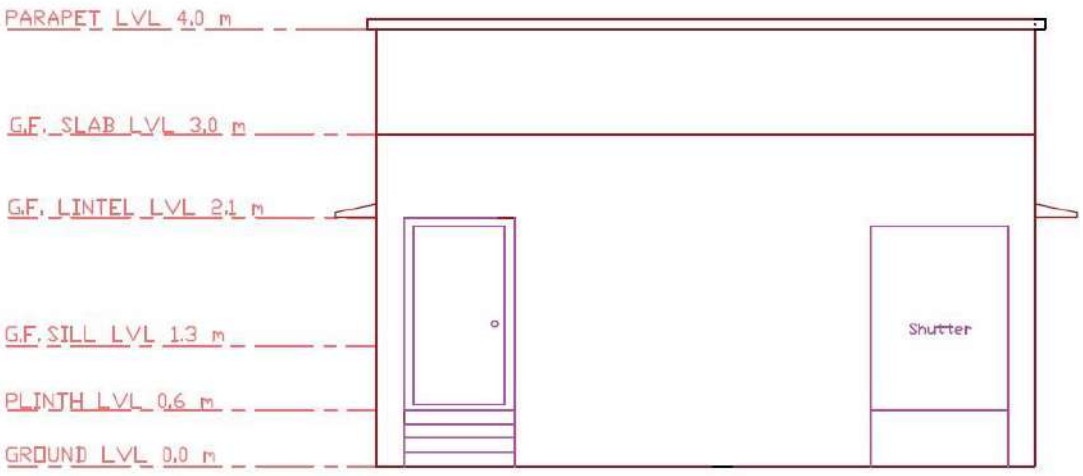

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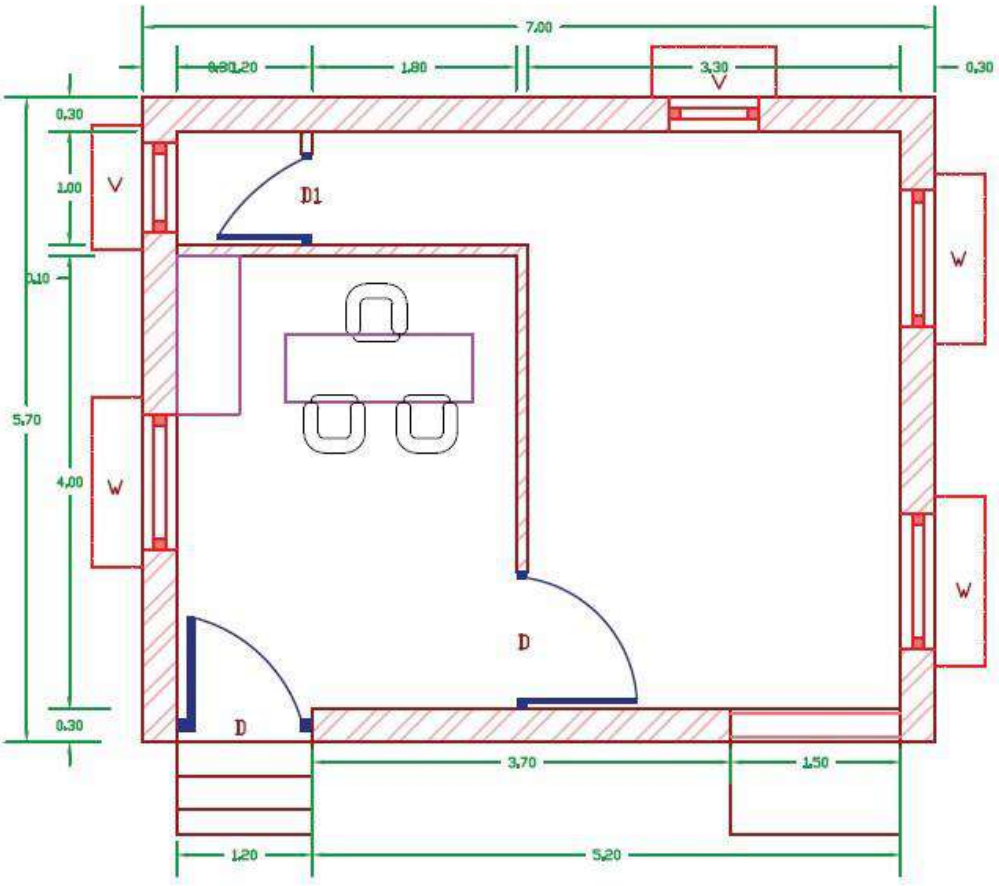

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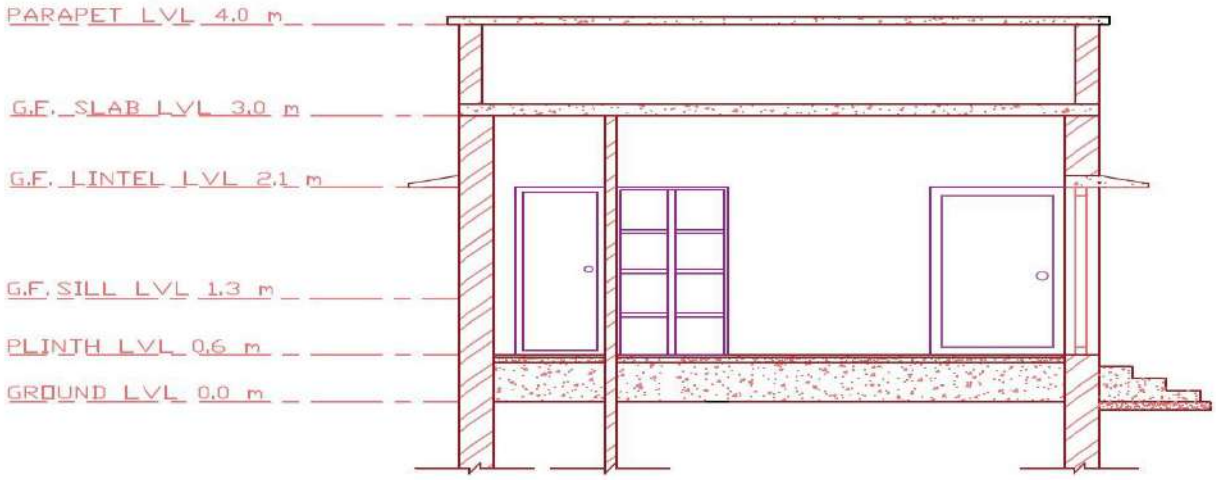
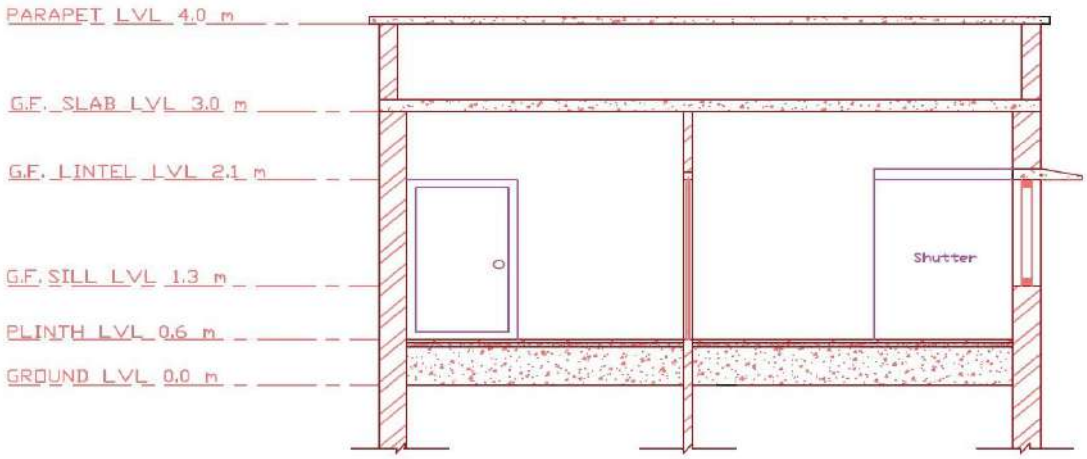


SECTION Y-Y



SECTION X-X

- **Measurement Sheet of Krishi Kendra**

Sr. No.	Description	No.	Length (m)	Width (m)	Height (m)	Quantity	Total quantity
1	**Excavation in foundation**	1	24.2	0.9	1.2	26.14	**26.38**
	steps	1	1.5	1.1	0.15	0.25	
2	**P.C.C. in foundation**	1	24.2	0.9	0.3	6.53	**6.78**
	steps	1	1.5	1.1	0.15	0.25	
3	**Brick Masonry up to plinth level**						**8.63**
	Step1	1	24.2	0.5	0.2	2.42	
	Step2	1	24.2	0.4	0.2	1.94	
	Step3	1	24.2	0.3	0.2	1.45	

	Step4	1	24.2	0.3	0.3	2.18	
	Stairs	6	1.2	0.3	0.3	0.65	
4	**Brick masonry above plinth level**	1	24.2	0.3	2.1	15.25	
	10 cm Thk wall	1	7	0.1	2.1	1.47	**13.61**
	Deduction						
	Window	3	1	1	0.3	0.90	
	Door	2	1.2	2.1	0.1	0.50	
	Door1	1	0.9	2.1	0.3	0.57	
	Shutter	1	1.5	2.1	0.3	0.95	
	Ventilator	2	0.8	0.4	0.3	0.19	
5	**Damp Proof Coarse (D.P.C.)**	1	24.2	0.15		3.63	**3.63**
6	**R.C.C. work for slab (12 cm thk.)**	1	5.7	7	0.12	4.79	**5.69**
	ramp	1	1.5	2	0.3	0.90	
7	**R.C.C. chajja for windows**	3	1.3	0.45	0.12	0.21	**0.33**
	Ventilator	2	1.1	0.45	0.12	0.12	
8	**R.C.C. for lintel**						
	Window	3	1.3	0.3	0.12	0.14	**0.44**
	Door	2	1.5	0.3	0.12	0.11	
	Door1	1	1	0.1	0.12	0.01	
	Shutter	1	1.8	0.3	0.12	0.06	
9	**Parapet wall**	1	24.6	0.2	0.9	4.43	**4.43**
10	**Coping for parapet wall**	1	24.6	0.3	0.1	0.74	**0.74**
11	**Flooring Tile work**	1	5.7	7	-	39.90	
	steps	4	1.2	0.15	-	0.72	
	steps	3	1.2	0.3	-	1.08	**74.34**
	Terrace	1	6.4	5.1	-	32.64	
12	**Plaster**						
	Inside plaster (1:3)	1	37	-	3	111.00	
	Deduction						
	Window	1.5	1	-	1	1.00	
	Door	1	1.2	-	2.1	2.52	**102.12**
	Door1	0.5	0.9	-	2.1	1.89	
	Shutter	0.5	1.5	-	2.1	3.15	
	Ventilator	1	0.8	-	0.4	0.32	
	Outside Plaster (1:4)	1	25.4	-	4.4	111.76	
	Deduction						

	Window	1.5	1	-	1	1.00	**104.77**
	Door	0.5	1.2	-	2.1	2.52	
	Shutter	0.5	1.5	-	2.1	3.15	
	Ventilator	1	0.8	-	0.4	0.32	
13	**Ceiling plaster**	1	5.7	7	-	39.90	**39.90**
14	**Painting**	1	-	-	-	-	**246.79**
15	**Back filling in excavation**	-	-	-	-	-	**10.97**

- **Abstract Sheet of Krishi Kendra**

Item no.	Item Description	Quantity	Rate (Rs)	Per	Amount (Rs)
1	**Excavation in foundation**	26.38	85	m^3	2242.3
2	**Filling in excavation**	10.97	50	m^3	548.5
3	**CC (1:6)**	6.78	3100	m^3	21018
4	**Brick Masonry up to plinth**	8.63	3200	m^3	27616
5	**Brick Masonry above plinth level**	13.61	3500	m^3	47635
6	**Damp Proof Coarse (D.P.C.)**	3.63	170	m^3	617.1
7	**Flooring tiles work**	74.34	500	m^2	37170
8	**R.C.C. work for lintel**	0.44	8800	m^3	3872
9	**R.C.C. chajja**	0.33	8800	m^3	2904
10	**R.C.C. work for slab (12cmthk.)**	5.69	8800	m^3	50072
	(excluding centering and shuttering and reinforcement				
11	**Coping**	0.74	8800	m^2	6512
12	**Plaster**				
	Inside Plaster (1:3)	102.12	150	m^2	15318
	Outside Plaster (1:4)	104.77	200	m^2	20954
13	**Brick work for parapet**	39.9	3500	m^3	139650
14	**Ceiling plaster**	135.36	150	m^2	20304
15	**Painting**	246.79	70	m^2	17275.3
		Total Amount			413708.2
		Contract's Profit (10%)			41370.82
		Contingencies (5%)			20685.41
		Total Amount			**475764.43**

13.1.7 SMART PLANT MONITORING SYSTEM USING IOT

- Agriculture is the backbone of Indian economy as roughly 70-75% of the population depends directly or indirectly on agriculture. The Indian economic growth is directly proportional to the agriculture industry growth. Plant leaves and stems are affects by some insects and diseases. Affected plants reduce the quality and quantity of agricultural profits. Monitoring the condition of the plant plays an important role in successful cultivation of crops in farming.
- An automated system for monitoring the growth of plant can be done with appropriate taxonomies. This work combines Image Processing and IOT to monitor the plant and to collect the environmental factors such as humidity, insects, soil and temperature. In image processing, a recognition system capable of identifying plants by using the images of their leaves, stem has been developed and with the help of the image compare with previous plant images. Identify the problem in database and find it. Then choose the rectified natural pesticides and spread to the affected plants.

figure 66 smart plant monitoring system using iot

• Main components of smart plant monitoring system using Iot

1) Raspberry PI

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics. It does not include peripherals or cases. However, some accessories have been included in several official and unofficial bundles. The Raspberry Pi is a capable little computer which can be used in electronics projects, and for many of the things that your desktop PC does, like spreadsheet, word processing, browsing the internet, and playing games.

2) Motor Driver

The L298N is a dual H-Bridge motor driver which allows speed and direction control oftwoDC motors at the same time. The L298N module candriveDC motors that have voltages between 5 and 35V, with a peak current up to 2A. The module has two screw terminal blocks for the motor A and

B, and another screw terminal block for the Ground pin, the VCC for motor and a 5V pin which can either be an input or output.

3) DC Gear

Motors A Direct Current (DC) motor is a rotating electrical device that converts direct current of electrical energy into mechanical energy. An Inductor inside the DC motor produces a magnetic field that creates rotary motion as DC voltage is applied to its terminal. Inside the motor is an iron shaft, wrapped in a coil of wire. This shaft contains two fixed, North and South, magnets on both sides which cause both a repulsive and attractive force, intern, producing torque. A gear motor is a combination of a motor and gearbox. The addition of a gear head to a motor reduces the speed while increasing the torque output.

4) Servo Motor

A servo motor is an electrical device which can push or rotate an object with great precision. It is a combination of DC motor, position control system, gears. The position of the shaft of the DC motor is adjusted by the control electronics in the servo, based on the duty ratio of the PWM signal the signal pin.

5) Pi Camera

The Raspberry Pi camera module can be used to take high-definition video, as well as stills photographs. The Pi camera module is a portable light weight camera that supports Raspberry Pi. It communicates with Pi using the MIPI camera serial interface protocol. It is normally used in image processing, machine learning or in surveillance projects. It is commonly used in surveillance drones since the payload of camera is very less

6) Ultrasonic Sensor

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic soundwaves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. High-frequency sound waves reflect from boundaries to produce distinct echo patterns. Ultrasonic sensors work by sending out a sound wave at a frequency above the range of human hearing. The transducer of the sensor acts as a microphone to receive and send the ultrasonic sound. Ultrasonic sensor, like many others, uses a single transducer to send a pulse and to receive the echo.

- **ABSTRACT SHEET OF SMART PLANT MONITORING SYSTEM USING IOT**

No	Parts Name	QTY	Rs
1	Raspberry pi	1	5000
2	Motor driver	1	500
3	Dc motor gear	1	400
4	Servo motor	1	300
5	Raspberry pi camera	1	500
6	Ultrasonic sensor	1	400
7	Soil moisture sensor	1	200
8	Temp moisture sensor	1	250
9	LCD display	1	250
TOTAL PRICE		**7800**	

13.1.8 Automatic Light Control System Using LDR in Public Garden

- Automatic Light Control System is a simple yet powerful concept, which uses transistor as a switch. By using this system manual works are 100% removed. It automatically switches ON lights when the sunlight goes below the visible region of our eyes. This is done by a sensor called Light Dependent Resistor (LDR) which senses the light actually like our eyes.

- It automatically switches OFF lights whenever the sunlight comes, visible to our eyes. By using this system energy consumption is also reduced because nowadays the manually operated street lights are not switched off even the sunlight comes and also switched on earlier before sunset. In this project, no need of manual operation like ON time and OFF time setting.
    - **Main components of automatic on-off light control using LDR**

1) LDR (LIGHT DEPENDENT RESISTER)

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically.

When the light level is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Consequently, the LED does not light

2) TRANSISTORS

BC547 is an NPN bi-polar junction transistor. A transistor, stands for transfer or resistance commonly used to amplify current. A small current at its base controls a larger current at collector & emitter terminals. BC547 is mainly used for amplification and switching purposes. It has a maximum current gain of 800. Its equivalent transits.

3) **RESISTORS**

Resistor is an electrical component that reduces the electric current. The resistor's ability to reduce the current is called resistance and is measured in units of ohms (symbol: Ω).If we make an analogy to water flow through pipes, the resistor is a thin pipe that reduces the water flow.

4) LED (LIGHT EMITTING DIODE)

A light-emitting diode (LED) is a two-lead semiconductor light source that resembles a basic p-n junction diode, except that an LED also emits light. When an LED's anode lead has a voltage that is more positive than its cathode lead by at least the LED's forward

voltage drops, current flows. Electrons are able to recombine with holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor.

5) POWER SUPPLY

A power supply is a device that supplies electric power to an electrical load. The term is most commonly applied to electric power converters that convert one form of electrical energy to another, though it may also refer to devices that convert another form of energy (mechanical, chemical, solar) to electrical energy. A regulated power supply is one that controls the output voltage or current to a specific value; the controlled value is held nearly.

- **Abstract sheet for on-off light control using LDR**

No	Parts name	Range	Rs
1	LDR	-	20
2	TRANSISTOR	BC -547 NPN	20
3	RESISTOR	1K, 330 ohm	180
4	LED	-	20
5	PCB	-	200
6	Power supply	6V OR 9V	200
TOTAL COST		-	**640**
Total cost for all Garden lights		14	**8960**
Other cost		-	**2000**
Total amount			**10,960**

13.1.9 Design of Proposed for Camera System

- Bullet cameras are small (2 to 2.5 inches long) and are limited to a fixed focal length lens. While bullet cameras are good for small spaces, the images may have slightly cut-off corners because the camera shape and design can interfere with the actions of the of the camera lens and filter. Bullet cameras are also called lipstick cameras.
- A bullet camera is a small camera designed for security applications. The name comes from the small size of these cameras resembling bullets. The camera is typically connected to a surveillance system. These cameras allow businesses and individuals to monitor their property for suspicious activity. Their small size makes them easy to conceal.

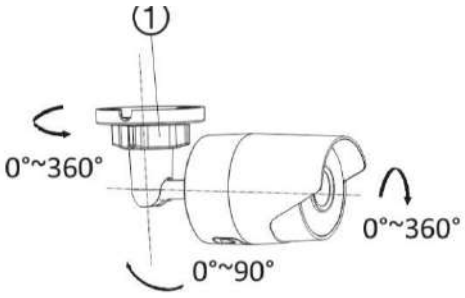


Figure 67 Camera system

- **Specifications**
- Ultra Sync Wi-Fi IP Bullet Camera
- **Electrical**

Voltage input	12 VDC, PoE (IEEE 802.3af)
Power consumption	Max. 5.8 W

- **Wi-Fi parameters**

Wi-Fi standard	IEEE802.11b/g/n
Frequency range	2.4 to 2.4835 GHz
Communication bandwidth	Support 20/40 MHz
security	64/128-bit WEP, WPA/WPA2, WPA-PSK/WPA2-PSK, WPS
Transmission rate	11b: 11Mbps, 11g: 54 Mbps, 11n: up to 150 Mbps

- **General**

Dimensions	70×157×62 mm (2.8×6.1×2.4 in.)
Weight	500 g (1.1 lb.)

- **Components required**

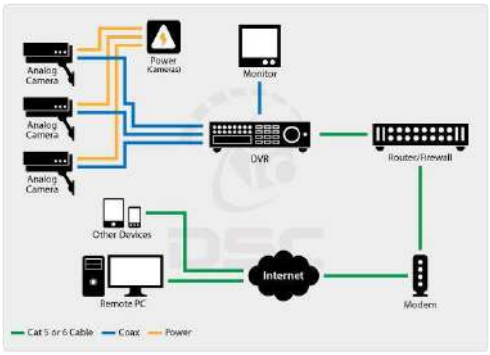


Figure 68 Components of camera system

• **DVR (Digital Video Recorder)**– The receiver responsible for storing and processing the video feed from your surveillance cameras. They are available in 4, 8, 16 and 32 channel variants. Each extra channel can connect one additional camera to your DVR.

• **Hard Disk –** Although some DVRs come bundled with a hard disk, several models do not have one preinstalled. The required capacity of the hard drive
depends on the number of cameras you have, the quality of the feed, and duration of footage to be stored.
• **Security Cameras –**These are the eyes of the Analog Surveillance system. Analog cameras are responsible for capturing video from your premises and transmitting them to a receiver, usually a DVR. There are multitudes of options available in the market. Hence, base your decision on the quality of video feed required, your brand preference, and intended install location.

• **Power Supply** –Since each power output point on a power supply will power one camera, buy one that can power all the cameras in your system. However, refer to the input voltage and current requirements of your devices as well, before buying the camera.
• **Cables –** Cables act as bridges between your cameras and the rest of the surveillance system. One of the most popular kinds of cables is the Siamese Cable, deriving its name from its thick outer cover, which encases two kinds of wires: The RG-59 cable inside it transmits video and the 18/2 cable delivers power.
Connectors – Another essential component that acts as a bridge between the different parts of the security systems. Each camera you want to install requires two PT-3s, one PT-4, and two Twist-On BNC connectors.

❖ **Abstract Sheet for Camera System**

Camera Style	Range	Cost	Wiring Cost	Pole Cost	Total Cost
Bullet camera	25 to 30m	5000 Rs	2500 Rs	2000 Rs	9500 Rs

Location of camera point

1. **Camera-1 Entrance gate**
2. **Camera-2 Post office**
3. **Camera-3 Gram Panchayat**
4. **Camera-4 Back entrance gate**
5. **Camera-5 entrance of Goukhana**
6. **Camea-6 Patel and mandir fadiyu**
7. **Camera-7 Tekari Fadiyu**
8. **Camera-8 near Headwork**
9. **Camera-9 Community hall-1**
10. **Camera-10 Community hall-2**
11. **Camrea-11 bhrahmim and other fadiyu**
12. **Camera-12 Other activity**

Total cost
Cost for 12 Cameras = 12*9500
=1,14,000 Rs

Other cost =20,000
2 Computer set= 75,000
Total cost of Camera System= 2,09,000.00 Rs.

13.2 Reason for students recommending this design

- As above the all design we are recommending for the villager to their easily usage and smart facilities will be using in the village.
- The lack of facilities in the villages so we are designing the different structures.
- To provide the easy and comfortable to villagers to all facilities available for them to develop the village like city and not wont to go any other place.
- All the design to recommending for the improvement in village.

13.3 About designs suggestions/ Benefits of the villagers

- As village is connected with the major cities, we provide pickup stand for the convenience of the villagers.
- Skill Development Centre which might help them diversify.
- The development of Infrastructure facility in the village.
- By implementation of rain water harvesting system an additional source of water will be available which could be used at the time of emergency or water shortage.
- To get more government facilities.
- Providing using of the natural resources to generating the electricity and smart components in the government property.
- There is no any kind of the solid waste management system in the villages. Because of that villages throw the waste anywhere i.e. ukarda So we provided the Bio gas plant for villagers to reducing the solid waste and improvement in village.
- Also the gestating the bio gas use for the cooking purpose and other usage.
- For the education facilities library and cyber café for to connecting to the internet and smart concept for the student.
- To safety purpose the camera system providing in the entrance and the main spot of the village.
- To the enjoyment purpose and for the peaceful rea were villagers can be sit there so proving play ground with the temple.

CHAPTER-14
TECHICAL OPTIONS WITH CASE STUDIES

14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistance

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.

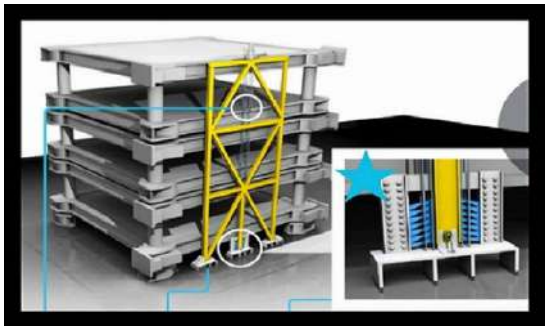


Figure 69 Advanced Earthquake Resistance

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. Among the most important advanced techniques of earthquake resistant design and construction are:

1. Base Isolation
2. Energy Dissipation Devices

1. Base Isolation Method of Earthquake Resistant Design

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, and 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.

- **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.

2. Construction Methods

Base-isolation are designed in buildings. It is a building designed to reduce amount of energy that reaches the building during earthquake. 2. Flexible joints and automatic shut off valves can be installed. Protecting Against Earthquake Damage Prepare a Seismic Risk Map for the globe which identifies rock types, liquefaction potential, and landslide potential. Extensive geological surveying has to be done to identify all active faults, including hidden faults. Earthquake Resistant Design of Structures Enact building codes to design and build earthquake-resistant structures in high seismic risk areas. Wood, steel and reinforced concrete are preferred as they tend to move with the shaking ground (unreinforced concrete and heavy masonry tend to move independently and in opposition to the shaking, battering one another until the structure collapses).

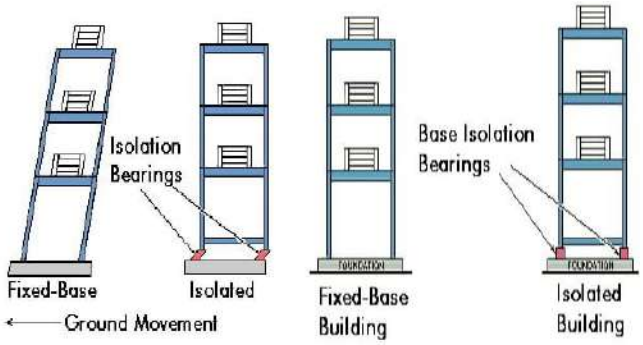


Figure 70 Construction Method

❖ Guidelines for Earthquake Resistant Construction

In addition to the main earthquake design code 1893 the BIS(Bureau of Indian Standards)has published other relevant earthquake design codes for earthquake resistant construction Masonry structures (IS-13828 1993)

• Horizontal bands should be provided at plinth, lintel and roof levels as per code

• Providing vertical reinforcement at important locations such as corners, internal and external wall junctions as per code.

• Grade of mortar should be as per codes specified for different earthquake zones.

• Irregular shapes should be avoided both in plan and vertical configuration.

• Quality assurance and proper workmanship must be ensured at all cost without any compromise.

In RCC framed structures (IS-13920)

• In RCC framed structures the spacing of lateral ties should be kept closer as per the code

• The hook in the ties should be at 135 degrees instead of 90 degrees for better anchoragement.

• The arrangement of lateral ties in the columnsshould be as per code and must be continued through the joint as well.

14.1.2 Seismic Retrofitting of Building

❖ Introduction

The aftermath of an earthquake manifests great devastation due to unpredicted seismic motion striking extensive damage to innumerable buildings of varying degree i.e. either full or partial or slight. This damage to structures in its turn causes irreparable loss of life with a large number of casualties. As a result, frightened occupants may refuse to enter the building unless assured of the safety of building from future earthquakes. It has been observed that majority of such earthquake damaged buildings may be safely reused if they are converted into seismically resistant structures by employing a few retrofitting measures. Moreover, it has often been seen that retrofitting of buildings is generally more economical as compared to demolition and reconstruction even in the case of severe structural damage. Therefore, seismic retrofitting of building structures is one of the most important aspects for mitigating seismic hazards especially in earthquake prone countries. Various terms are associated to retrofitting with a

marginal difference like repair, strengthening, retrofitting, remolding, rehabilitation, reconstruction etc. but there is no consensus on them.

The need of retrofitting of existing earthquake vulnerable buildings may arise due to one or more than one of the following reasons.

1. The buildings have been designed according to a seismic code, but the code has been upgraded in later years;
2. Buildings designed to meet the modern seismic codes, but deficiencies exist in the design and or construction;
3. Essential buildings must be strengthened like hospitals, historical monuments and architectural buildings;
4. Important buildings whose service is assumed to be essential even just after an earthquake.
5. Buildings, the use of which has changed through the years.

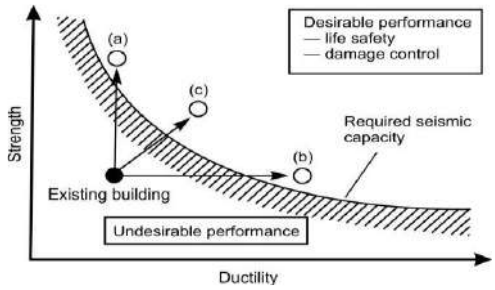


Figure 71 Aims of Seismic Strengthening

❖ Classification of Retrofitting Techniques

There are two ways to enhance the seismic capacity of existing structures. The first is a structural-level approach of retrofitting which involves global modifications to the structural system. The second is a member level approach of retrofitting or local retrofitting which deals with an increase of the ductility of components with adequate capacities to satisfy their specific limit states. Based on the above concept the available techniques of retrofitting of reinforced concrete buildings may be classified as in Figure.

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

❖ Introduction

To understand all how and about of super performing construction materials we must study materials according to their use from very root to tip. By that way we can easily conclude and infer about the application, implementation and feasibility of that particular construction material. Elements of construction where these smart materials and techniques shall be implemented are: Foundation, Plinth, Beam, Column, Wall, Sill, Window, Door, Roof, Parapet, Skylights, Finishing Works.

❖ Super Performing Materials

1. High Performance Concrete

Lafarge has developed a whole new family of concretes called Ductal. These concretes have high compressive and flexural strength, and their special characteristics enable the achievement of outstanding architectural feats. Ductal concrete incorporates strengthening fibers and opens the horizon to ultrahigh performance due to its special composition which provides it with outstanding strength, six to eight times greater than traditional concrete (under compression).“Fiber-reinforced” means that it contains metal fibers which make it a ductile material. Highly resistant to bending, its great flexural strength means it can withstand significant transformations without breaking. Ductal also comes with organic fibers for applications with less load and for advanced architectural applications.

Figure 72 Bridge made of high performance concrete

2. Aerated Concrete

It was discovered in 1914 in Sweden that adding aluminum powder to cement, lime, water, and finely ground sand caused the mixture to expand dramatically. The Swedes allowed this “foamed” concrete to harden in a mold, and then they cured it in a pressurized steam chamber-- an autoclave. Autoclaved aerated concrete is produced by about 200 plants in 35 countries and is used extensively in residential, commercial, and industrial buildings. At a density of roughly one-fifth that of conventional concrete and a compressive strength of about one tenth, AAC is used in load-bearing walls only in low-rise buildings. In high-rises, AAC is used in partition and curtain walls.

Figure 73 Light Weight Concrete

3. Laminated thermos Plastic Panels

Blizzard Composite GmbH manufactures high-tech plastic composites for the architectural field as well as the trucking industry. Their core expanding machinery heats up and vertically expands solid thermoplastic sheets, which are then processed into sandwich panels by lamination equipment. Due to the unique geometry of the Pep Core, the panels are of low weight and provide an excellent combination of high stiffness and compressive strength.

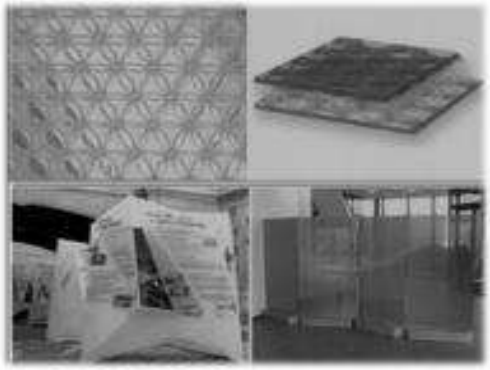


Figure 74 Laminated Thermoplastic Panels

4. Tension Fabric Structure

"Transform it's" provocative tension fabric structures are appropriate for use in entertainment venues, special events, exhibits & trade shows, or anywhere that fabric architecture is appropriate. Made of nylon spandex, the structures offer a viable surface for any type of projection or lighting display, including front and rear projected video. It is also possible to print on the fabric via silk-screening or dye sublimation digital printing.

Figure 75 Tensile Fabric Structures

❖ Some Repurposed Materials and techniques

Rubber Sidewalks: Sidewalks or walkways made using used tires and hard boarding sheets.
Strawboard: Made from agro waste mainly.
Bagasse Boards: Boards made of material left from sugarcane after extracting juice.
Natural Fiber Insulation: Insulation panels made out of used cloths.
Frit: Fine powdered glass from waste with ceramics remolded for reuse.

Acoustic-cell: Boards made for acoustics from rubber shredding.
Asphalt: Plastic blended with asphalt on roads for waste management.
Fly-Ash Concrete: Using Fly-ash residue as strengthening material with cement

❖ Types of Modern Methods of Construction

1. Precast Flat Panel System
2. 3D Volumetric Modules
3. Flat Slab Construction
4. Precast Cladding Panels
5. Concrete Wall and Floors
6. Twin Wall Technology
7. Precast Concrete Foundation
8. Concrete Formwork Insulation

❖ 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.

Figure 76 Precast Flat Panel

❖ 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.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.

Figure 77 3D Volumetric Construction

❖ **Precast Concrete Foundations**

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.

Figure 78 Precast Concrete Foundations

The foundation assembled is mainly supported by concrete piles. During assembling, both the systems are connected together. These foundation systems help 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.

14.1.4 Engineering Aspects of Soil Mechanics- Environment Impact Assessment

❖ **The Impact of the Soil Mechanics**

Geotechnical engineers have the potential for major impacts on the environment. Often they will be involved in site selection for major infrastructure works, large movements of soil with matching large energy consumption and the use of substantial amounts of raw and man-made

materials. These impacts are an inevitable consequence of the work but the scale of the impacts becomes stark if environmental impact is considered as a function of added value (see Figure 1, Clift and Wright, 2000).

A good example of this is in the management of the use of hardwoods. Many companies will not now use or sell hardwoods that do not come from sustainable forestry even if this leads to higher costs. Reducing wood use is not effective; ensuring that the wood that is used is sustainably produced is the key issue. It follows that reducing geotechnical activity will not improve sustainability. Better geotechnical practice will help but ultimately the greatest reduction in impact will be achieved when those higher up the chain recognise that they buy in their environmental impact and that they can achieve the greatest reductions in the total impact by recycling some of their added value to activities lower down the supply chain. This points towards the radical conclusion that the geotechnical engineer should refuse to work on projects where the funding is insufficient to provide a sustainable (and harmonious) solution.

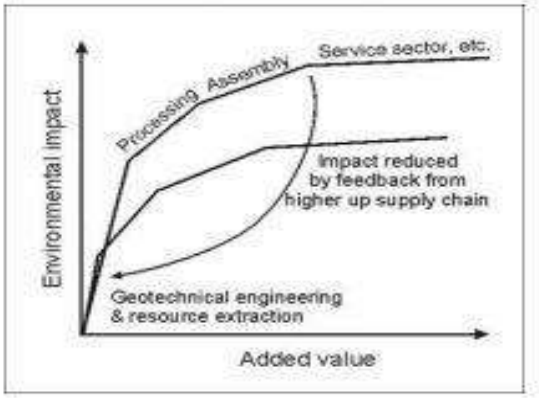


Figure 79 The environmental impacts of geotechnical engineering

❖ Life Cycle Assessment

British Standard BS EN ISO 14040: 1997 states that Life cycle assessment (LCA) is 'a technique for assessing the environmental aspects and potential impacts associated with a product. LCA studies the environmental aspects and potential impacts throughout the life cycle of a product from raw material acquisition through production, use and disposal'. The Standard continues 'LCA can assist in:

- Identifying opportunities to improve the environmental aspects of products at various points in their life cycle;
- Decision-making in industry, governmental or nongovernmental organizations (e.g.. strategic planning, priority setting, product or process design or redesign):
- Selection of relevant indicators of environmental performance, including measurement techniques; and
- Marketing (e.g. an environmental claim, ecolabelling scheme or environmental product declaration)'.

LCA provides a formal and structured procedure by which environmental impacts can be quantified but a substantial amount of detailed information is always essential if transparent, auditable assessments are to be achieved. Harmony and sustainability will require yet more detail as LCA does not consider social factors.

14.1.5 Water Supply-Sewerage System-Waste Water- Sustainable Development Techniques

❖ **Characteristics of waste water:**

BOD	300 to 350 Mg / Ltr.
COD	350 to 450 Mg / Ltr.
TSS	350 to 450 Mg / Ltr.
PH	7 to 8
Oil & Grease	100 to 510 mg / Ltr.

❖ **Characteristics of treated effluent:**

BOD5	< 10 Mg / Ltr.
COD	< 100 Mg / Ltr.
TSS	< 20 Mg / Ltr.
PH	< 6.5 to 7.5.
Oil & Grease	< 10 Mg / Ltr.
Turbidiy	<2 NTU
E – Coli	Nil
Residual Chlorine	>=1 mg/l

❖ **Data &Assumption: -**

Design Flow = 180 KLD
Influent BOD = 400mg/L
Total Suspended Solids = 300mg/L
F/M Ratio = 0.18/day
MLSS = 4000mg/L
VSS/TSS = 0.8
Maximum Volume of BOD Loading = 3.2 Kg/m3.d
Minimum Aeration Time = 2 Hr
Minimum Mean Cell Residence Time (MCRT) = 3 days

❖ **Design:**

1. **Bar Screen Chamber:**

Max Flow = 180 KLD
Detention Time = 6.0 min
Bar Screen Chamber Volume = **0.45 m3**
Let Side water depth (SWD) be 1.0 m

BSC Size = 3.0 m x 1.5m x 1.0
Screen is made out of MS Flat of Size 10mm x 50mm (10mm facing the flow)
Clear spacing between bars = 20mm
Inclination of bars with horizontal = 60° (For Manual Cleaning)

2. **Equalization Tank:**

Design average flow = 180 KLD
Detention Time = 8 Hr
Volume of Equalization tank = 120.0 m3
Equalization tank dimension = **6.5m x6.5m x 3.0m**

3. **Bio Reactor:**

No. of. Tanks = 2 No.
No. of. Sequential Batch = 2 Nos.
Cycle duration = 16 Hr each
Average flow to the reactor, Q = 180 KLD
Total BOD entering STP, Y0 = 400mg/L
BOD of the Effluent, YE = 10mg/L
BOD removal to be achieved = 390mg/L
MLSS, X = 4000mg/L
Influent VSS, Xt = 4000 x 0.8 = 3200mg/L
F/M ratio = 0.18/day

$$\frac{F}{M} = \frac{Q \times Y0}{V \times X}$$

Bio reactor volume, V= **90 m**3
Each Bio reactor dimension = **5.5m x 5.5m x 2.9m**

BOD Loading = $\frac{Q \times Y0}{V}$ = 0.72 Kg/m3.d

Hydraulic Retention Time = $\frac{V}{Q} = \frac{90\ m3 \times 16\ Hrs}{180 m3}$ = 8 Hrs

Mean Cell Residence Time, θc (Sludge Age)
Influent VSS, Xt = 0.8 x 400mg/L = 320mg/L

$\Theta c = \frac{VX}{QXt} = \frac{90 \times 4000}{180 \times 320}$ = 6.25 days (OK since >3 days)

4. **Decant Tank:**

Unlike Other treatment processes, in SBR the Clarified water tank is designed tohold decanted supernatant from each batch, i.e., 105 m3/batch.
Thus Clarified Water Tank dimension = **5.5m x 5.5m x 3.5m**

5. **Sludge Holding Tank:**
   Reactor Volume = 20 *m*3
   MLSS = 4000mg/L
   Weight of solid = 20*m*3 x 4kg/L = 80 Kg
   Sludge retention time for 9 days, SRT9 = 80 Kg = 8.88 Kg Sludge/day
   Wasting during Aeration phase = 49.2
   Sludge holding tank dimension = **2.3m x 3.0m x 3.5m**

6. **Mechanical filter press: 34 chambers**
   Dimensions: 0.61 m x 0.61 m

7. **Tertiary treatment units**
   The wastewater after biological treatment still contains some solids, color, Odor and harmful micro-organisms. The pressure sand filter and activated carbon filter are used to remove the solids and color. The disinfection process issued to remove the micro-organisms and odor.

7.1 Pressure sand filter

Pressure sand filter with various grades of pebbles and sand media help in the removal of residual suspended solids. The filter will be operating in the pressure range of 3-3.5 kg/cm2. Residual suspended solids. The filter will be operating in the pressure range of3-3.5 kg/cm2. Assuming a loading rate of 10.0 m3/ hr Design flow = 180 m3/day and considering 20 hr/day of operations of PSF The recommended PSF dimension is 1.2 m dia and height 3 m. Suitable designed backwashing system is adopted.

7.2 Activated Carbon Filter

Considering the same parameters for designing the activated carbon filter, the recommended dimensions for ACF is 1.2 m Dia and height 3.0 m

8. **Pre Aeration Tank:**
   Detention time = 3.0 Hrs
   Volume of Final collection tank = **50.4 m3**
   Final Collection tank dimension = **2.4m x 6.0m x 3.5m**

9. **Final Collection Tank:**
   Detention time = 7 Hrs
   Volume of Final collection tank = **138.0 m3**
   Final Collection tank dimension = **5.6m x 7.0m x 3.5m**

10. **Disinfection**
    In order to disinfect the treated effluent various disinfection methods like chlorination, zonation etc. can be used. However, chlorination is proved to be cheaper and relatively effective. Hence the same system is adopted. The Chlorine can be administered in the form of liquid or solid (bleaching powder) into the treated effluent channel. An automatic electronic metering system can be adopted. The chlorine demand is calculated based on the 'break point chlorination' and to allow residual chlorine of more than 1 mg/l in the treated Effluent.

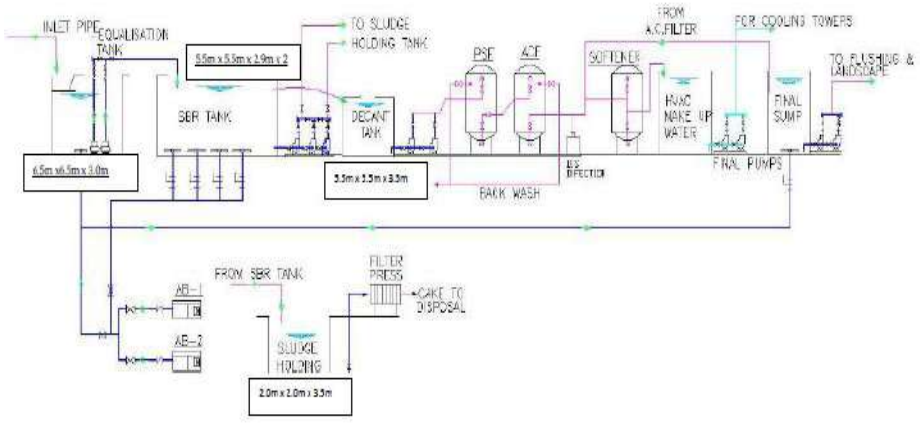


Figure 80 Sewage treatment plant

14.2 Electrical Engineering

14.2.1 Design of Power Electronics Converter

❖ Introduction

Sustainable energy is the main driving force for all renewable energy sources applications. Due their nature, energy supply from renewable energy sources is fluctuating depending on the availability of the energy source. Availability of the energy sources is mostly unpredictable (e.g. wind energy, solar energy, etc.) therefore, it is essential to have other energy sources that are more predictable to guarantee energy availability during periods of low energy supply from renewable sources. During period of energy surplus it is advantageous to store energy and make it available during the periods of low energy production and high energy demand. An efficient and high density way of storing energy is to produce fuel to accumulate the energy surplus.

According to the energy statergy by "A visinory danish policy" published on January 2007, the goal is that wind energy should contribute for 50% of the national electricity consumption by 2025 Large scale integration of wind power and other renewable energy sources will require the development of a suitable grid infrastructure for handling the variability of the generation and load conditions.

❖ Power Electronics Converters for Fuel Cell Hybrid Energy Systems

According to the characteristics of the distributed generation systems based on the fuel cells, interface converters are necessary to boost the low variable voltage from the fuel cells and other auxiliary power sources (APS) such as batteries and super-capacitors, in order to provide the high quality, regulated dc voltage to the cascaded inverter for grid-connecting purposes. Hence, a large number of alternative converter topologies and implementations for low voltage high power applications have been proposed.

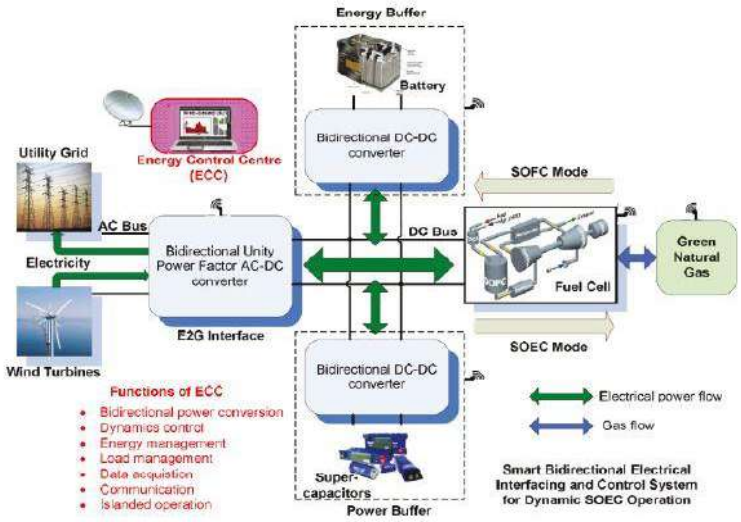


Figure 81 Block diagram of a fuel cell battery and super-capacitor powered line-interactive renewable generation system.

DC-DC converters

Basically, DC-DC converters can be divided into two categories depending on using the galvanic insulation or not: non-isolated converter or isolated converter. As to the non-isolated converters, normally, boost-type converters are favorable to fuel cell application These topologies are simple, but they require a bulky input inductor to limit the current ripple in the components, especially with high voltage gains are required. To minimize the input inductor size and the current ripple, as well as to reduce the switch current stress, the converter can be designed with multiple legs interleaving each other by means of the input coupling inductors, and high efficiency can be obtained. For isolated DC-DC converters, in, the low voltage high power isolated converters have been overviewed and compared very well. The high efficiency full-bridge boost type fuel cell converter without any auxiliary snubbed circuit is designed in. Moreover, a novel parallel method is proposed in to increase the power level to 10 kW. Summarily, as with typical designs, tradeoffs exist in choosing the optimum DC-DC converter, so the designers must establish the exact requirements of the fuel cell system in question to determine the most advantageous design.

❖ Hybrid DC-DC conversion systems

The block diagrams of the widely utilized DC-DC hybrid systems with FCs and APS are summarized in Fig. 2 (a) and (e). In Fig. 2 (a) and (b), the DC bus is fixed by the fuel cell or by the APS. In this case, the main advantage is related with the fact that the current flows through APSs only during the transients, enlarging the lifetime of the APS. The critical disadvantage is that the usual dc bus conditions impose that the DC voltage cannot vary strongly. In Fig. 2 (c), only one power converter is used. The main characteristic of this direct connection is that both elements, the fuel cell and the APS, share the same voltage value

❖ DC-AC inverters

The DC/AC converter technology is mature and uses mainly the hard-switching voltage source inverter (VSI), with single-phase, dual-phase or three-phase output, controlled by means of sinusoidal pulse-width-modulation (SPWM) or space vector PWM (SVPWM) [18]. Multilevel voltage-source inverters provide a cost effective solution in the medium voltage energy

management market. Nowadays, there exist three commercial topologies of multilevel voltage-source inverters: neutral point clamped (NPC), cascaded H-bridge (CHB), and flying capacitors (FCs). Among the high-power converters, the NPC inverter introduced 25 years ago is the most widely used in all types of industrial applications, such as wind power generation, UPS and so on, in the medium and high voltage range.

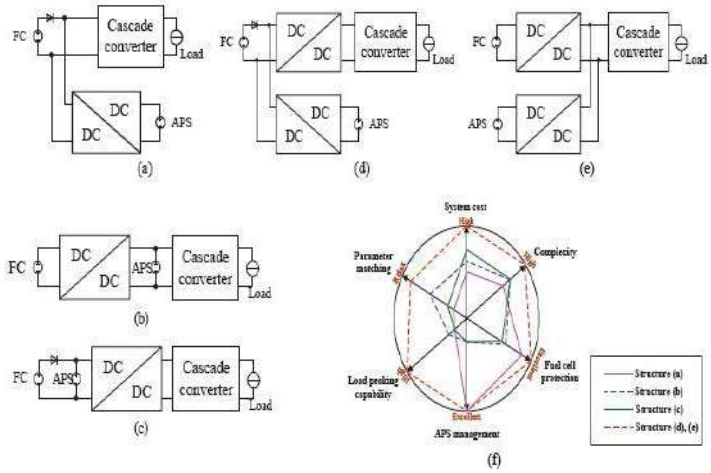


Figure 82 Various converter connections and comparison

❖ Proposed topology and System Design

The authors and other researchers from the Electronics Group, Technical University of Denmark (DTU), have given many contributions on analysis and design of the fuel cell converters. Based on our research results in this topic, a dual-input two-stage power conversion system, including DC-DC and DCAC is proposed, analyzed and verified in this paper.

14.2.2 ELECTRONIC SOFT STARTER FOR 1/3 PHASEINDUCTION MOTOR

❖ Introduction

An induction machine plays a very important role in industry & Home application and there is a strong demand for their reliable and safe operation. Faults and failures of induction machines can lead to excessive downtimes and generate large losses in terms of maintenance this motivates the examination of condition monitoring. On condition monitoring involves taking measurements on a machine while it is operating in order to detect faults with the aim of reducing both unexpected failures and maintenance costs. This project focuses on surveys the current trends in on-line fault detection and alert System. Condition monitoring of electric Motors can significantly reduce the cost of maintenance and the risk of unexpected failures by allowing the early detection of potentially catastrophic faults.

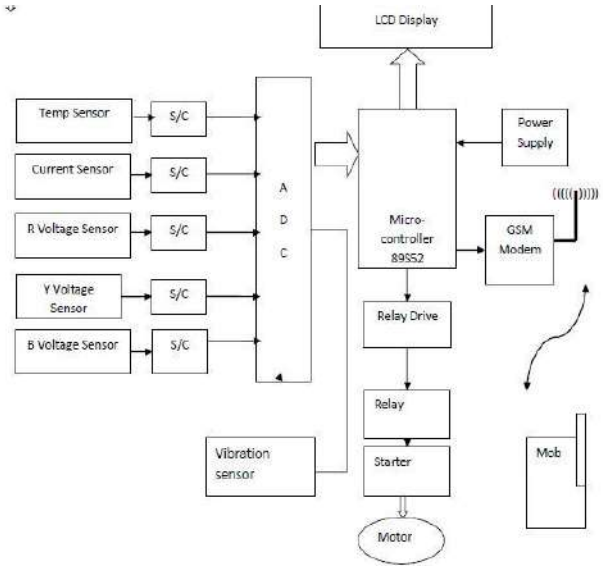


Figure 83 Block Diagram.

❖ Working

In this project, Microcontroller 89 S 52 which is compatible microcontroller 8051 is the key part. The 5 V Dc Power supply is designed and mounted on the controller board which provides the operating voltage to the microcontroller and other components like sensors, relay etc. In this project the line input voltage sensor is a Step down Transformer along with rectifier is used, here the concept is for any change in the Input to the transformer changes the voltage at the output. With this under Voltage and overvoltage conditions are observed. Again is to sense the current a Current transformer is used and a signal conditioning is a current to voltage conversion circuit is used.

❖ Microcontroller at 89S52 Description

The Microcontroller IC 89S52 has 256x8 bit internal RAM which is most important feature for this application. Here eight to ten readings can be recorded in RAM after each half an hour to achieve data logging. The Timer/Counter application of 89S52 is used to count the pulses from proximity sensor. The interrupt pin INTR0 is used to switch into different setting modes the serial channel is used to get interface with pc for data logger application.

❖ GSM Technology

GSM (Global System for Mobile Communication) is a public service available at no cost to the user. Nowadays mobile hand set is not new to the farmers. Everywhere farmers can be seen using mobile phones and they are very much conversant with mobile hand set. There is no extra cost of \communication equipment's. Using GSM technology, a motor can be controlled and monitored from every corner of the world. It has no bar of distance like Infrared, Bluetooth, Radio waves etc.

❖ Transformer

Transformer is electrical device that transfer energy between two or more circuits through electromagnetic induction. Good Quality Transformer, power supplies for all kinds of project &

circuit boards. Step down 230 V AC to 9V with a maximum of 500mAmp current. Generally known as 9-0-9

Specification:

- voltage: 2 x 9V
- current: 1 x 500Ma
- rated power: 9VA

❖ **Current Transformer**

A current transformer (CT) is a transformer that is used to produce an alternating current (AC) in its secondary which is proportional to the AC current in its primary. Current transformers, together with voltage transformers (VTs) or potential transformers (PTs), which are designed for measurement, are known as instrument transformers.

When a current is too high to measure directly or the voltage of the circuit is too high, a current transformer can be used to provide an isolated lower current in its secondary which is proportional to the current in the primary circuit. The induced secondary current is then suitable for measuring instruments or processing in electronic equipment. Current transformers also have little effect on the primary circuit. Often, in electronic equipment, the isolation between the primary and secondary circuit is the important characteristic.

14.2.3 Advanced Wireless Power Transfer System

❖ **Introduction**

The Transfer of electrical power in reliable and efficient way is always challenging for the designers and engineers. Presently all electrical power from the generating stations to the distribution station is transferred by the uses of wires and underground cables. One of the major issues in these types of systems is the losses due to resistance of the material. Generally the percentage of loss of power during the transmission and distribution is 26%.

In modern technology the use of portable device has increased such as mobile robots and electric vehicle. Mobility is the main concern of these equipment i.e. they are not connected to the main source of power.

1. **Wireless Power Transfer Method**

❖ **Inductive Coupling**

This type of WPT is simply based on inductive coupling between two coils. This is a type of near field technique measuring with appliance near the source. It is generally based on the principle of mutual induction, where two coils are placed vicinity to each other and there is no physical connection between these two coils. The simplest example is transformer where the transfer of energy takes place due to electromagnetic coupling. Each of these coils connected without wires and it has been an important and popular technology to transfer power without wires because of its simplicity and reliability. Based on this technology there are various application device has been already made including electric brush and charging pad for cell phones or laptop. But this kind of method also have some limitation i.e. the range can be very less upto few cm and separation distance is very less than the coil diameter.

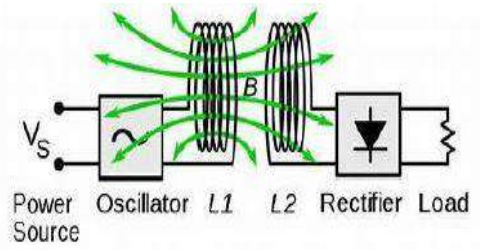


Figure 84 inductive coupling

❖ Magnetic Resonance Coupling Wpt

This is also one of the important method for transferring power based on near field technique. It generally overcome the disadvantage of up to some extent which arise in non-resonant inductive coupling. This type of coupling used the concept of resonance. At resonance we know that natural frequency and excitation frequency are same. This leads to the maximum amplitude that means a maximum amount of energy is transferred between two coils. Here the receiver and transmitter coils are tuned to be at same resonant frequency. These type of system are used for building mid-range power transfer. Mid-range can be specified by distance up to 10 times the diameter of the transmitting coil. Magnetic resonance coupling have several advantage such as efficiency increases with decrease in the radiation and power loss and range can be increase up to some meter and it is directional. The mainly disadvantage is that selection of resonance frequency which tunes with the natural frequency and it cannot be used for long range application.

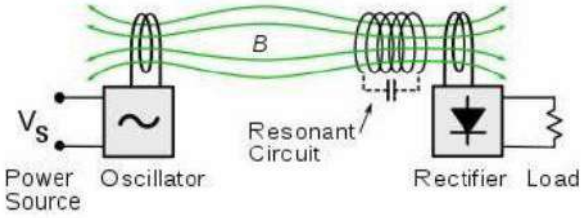


Figure 85 Magnetic resonance coupling

❖ Microwave WPT

This is one of the type of far-field technique of WPT which have range upto KM, with power transfer up to MW. This method uses microwave frequency ranging from 1GHZ to 1000GHZ generated from the microwave generator. First the microwave is generated by microwave generator which pass through the coax-waveguide adapter to the waveguide circulator. Then a tuner and directional coupler are used to separate wave according to their propagation direction. Then they are transmitted through antenna. At the receiver terminal, a receiver antenna receives which pass through a low pass filter to finally produce DC power. Based on microwave WPT system the present application is solar power satellite

❖ Laser WPT

This is also one of the types of far- field technique, where the power is transmitted through LASER beams. For power transmission firstly the electrical energy is converted to high LASER beams and at receiving side, these LASER beams are converted to electricity by using photo voltaic cells. This type of WPT has several disadvantage i.e. why it is not used for electrical power transmission because LASER beams can easilyharm human being if they cut LASER beam path. Therefore, these are generally used for military weapon development and space research.

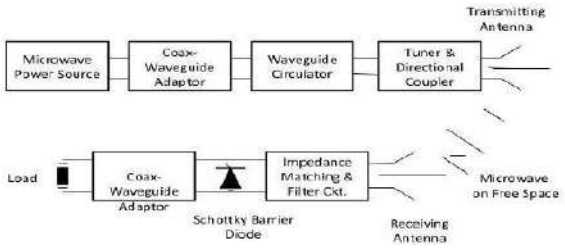


Figure 86 Functional block diagram of WPT

2. Application of WPT

❖ Medical Devices

The most important application of WPT is in medical science. As we know medical device uses very small amount of power. Some medical device are LAVAD heart assist pumps, pacemaker and infusion pumps. These device one implemented in human body. Now for replacement of battery there is a need of surgery after a particular period. With using the WPT technology, the power can sufficiency supplied to medical device without harming human body.

❖ Electrical Vehicles

Electrical vehicles are the new technology which uses electrical energy for their operation. The main concern about the electrical vehicles is that their mobility i.e. they are not directly connected to the source of power by wires. With using this technology, it enables the reliable and efficient power transmission to electrical vehicles without using of wires. WPT also marketed the electrical vehicles which attract the consumers to buy it and decrease the load on diesel and petrol vehicles.

❖ Solar Power Satellite (Sps)

The most important application of WPT system is solar power satellite that uses the microwave for energy transferring. Satellites are generally equipped with solar power transmitter and receiver antenna. Solar panel converted the generated electricity into high power microwave beams and directed towards the ground station receiver antenna. The major problem with this system is it biological effect of microwave radiation on human and animals, if they are distracted from their path. The receiving zone of SPS is much larger for getting a small amount of power.

14.2.4 Industrial Temperature Controller

❖ Introduction

The modern sensing technology and control methods are undergoing continuous innovation, where the real-time temperature control is demanding higher accuracy and faster response more than ever. Temperature control is widely used in production and industrial control processes in all aspects. For example, in the iron and steel smelting process, iron and steel to be baked requires heat treatment in order to achieve their performance indicators; plastic qualitative process also needs to maintain a certain temperature range. The fact is that the temperature control system is a complex process object involving large inertia and pure delay with multi-variable and time-varying parameters. At present, the PID control methodology is adopted in most cases.

❖ System design

In this design, the temperature control system consists of hardware and software components.

❖ System hardware

In the hardware part of the system, the acquisition module uses the temperature sensor to measure the measured object temperature, and the temperature signals are converted into electrical signals,

which are then transmitted to the temperature transmitter, where the electrical signal is converted into a 4 ~ 20mA current signal, so that the module EM235 in the PLC expansion module can be facilitated as to the analog signal input. EM235 receives data, which will be sent directly to the PLC output control text display (display temperature) and the temperature control device (heating &cooling device). The system block diagram is shown in Figure.

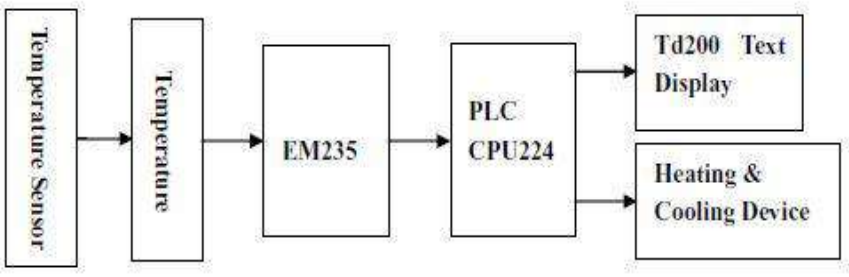


Figure 87 Block Diagram of Temperature Control System

❖ System software

The software of this system adopts STEP7 for PLC200, the popular programming software by Siemens, for software compilation, and the temperature controller device adopts fuzzy PID algorithm for temperature control, with the simulation to be implemented by MATLAB simulation software.

Figure 1 shows that the system consists of four modules, i.e., acquisition module, control module, display module and implementation module. The acquisition module includes PT100 temperature sensor and temperature transmitter. PT100 temperature sensor works with a temperature variable that can be converted into a standardized output signal. This instrument is mainly used for industrial process with measurement temperature and control parameters. The temperature transmitter is a signal conversion device, which is responsible for the signals collected by the temperature sensor to be converted to electrical signals of 4 ~ 20mA. This is quite convenient for PLC200's identification and collection of temperature signal. For control module, Siemens PLC200 is chosen as the core controller, playing the role of the completion of the temperature signal collection, signal processing and signal transmission. Display module usingTD200 text display can be better compatible with the PLC to complete the data transmission.

❖ Software design

According to the system design requirements, the software program flow is shown in Figure

First of all, the parameters of the temperature control system undergo wake-up initialization, mainly to set the control temperature and the PID initial value, including the value settings of PID gain, PID integral time, PID differential time and PID sampling time. Then, the ambient temperature is collected through the sensor in a range of 6400 ~ 320000, as the digital signal. As the fuzzy PID algorithm requires real-format temperature signal input, there is the need for A/D conversion of temperature signal prior to the PID algorithm process. The collected digital signal is converted into double integer signal, which is then transformed into a real figure. The actual temperature is calculated by the temperature calculation formula. The measured temperature is taken as the input signal for PID operation, and the output is ready for the control of the heating resistance and cold air fan.

In the design, the temperature control is based on the PID control algorithm. PID is the most commonly applied in industrial production, a control method being able to meet the need for high-

precision measurement and control systems. Using PID algorithm to achieve the temperature control system can be more stable and reliable.

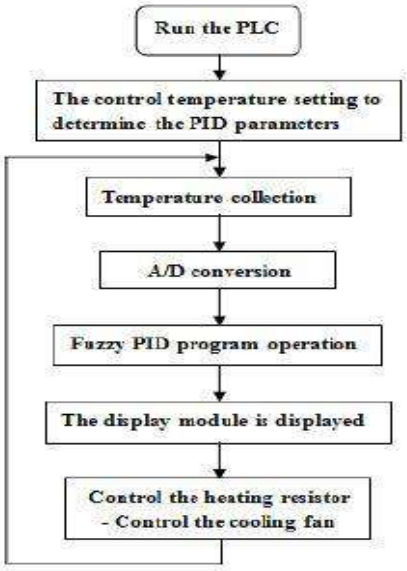


Figure 88 Program Flow.

14.2.5 Accidents Alerts in Modern Traffic Signal Control System-Camera Surveillance System

❖ Introduction

Nowadays Wireless Sensor Networks (WSN) has been applied in various domains like weather monitoring, military, home automation, health care monitoring, security and safety etc. or in a nut shell one can say wireless sensor network can be applied in most of the domains. Traffic Signal System or traffic monitoring is a vast domain where WSN can be applied to gather information about the incoming flow of traffic, traffic load on a particular road, traffic load at particular period of time (peak hours) and in vehicle prioritization. WSN installed along a road can beutilized to control the traffic load on roads and at traffic intersections.

The sensor nodes that are to be deployed along the road are small in size and have low energy consumption. These sensors run on both battery power as well as solar energy. They have the capability to draw solar energy so that they can use sunlight for functioning in bright and sunny condition and the battery power for functioning at night or in cloudy or foggy condition. Sensors used in the Wireless Sensor Network for traffic signal systems are mainly of two types: i) Intrusive type and ii) Non-Intrusive type.

I) Intrusive types of sensor are kept under the road and sense the traffic waiting at the signal. This type of sensor has the same working principle as that of a metal detector.

ii) Non-Intrusive types of sensor is fitted on the road. The installation of this type of sensor is easy as no cutting of road is needed to be done. Non-intrusive sensor includes acoustic sensors or video image processors to detect the presence of vehicles waiting at the traffic intersection.

❖ Proposed System

In proposed system if a vehicle has met accidents, immediately an alert message with the location

coordinates is sent to the Control center. From the control center, a message is sent to the nearby ambulance. Also signal is transmitted to all the signals in between ambulance and vehicle location to provide RF communication between ambulance and traffic section. The vehicle accident observed using vibration sensor and in the control section it is received by the microcontroller and then the nearby ambulance is received from the PC and controller sends the message to the ambulance. The signal to Traffic signal section is transmitted through RF communication. Also if any fire occurs, it is detected using fire sensor and an alarm message is directly sent to the fire station.

❖ System Implementation

Our system consists of three main units, which coordinates with each other and makes sure that ambulance reaches the hospital without any time lag. Thus our system is divided into following three units,

A. The Vehicle Unit
B. The Ambulance/control Unit
C. Traffic unit
D. Vehicle unit

A, The Vehicle Unit

The vehicle unit installed in the vehicle senses the accident and sends the location of the accident to the controller. According to our system, every vehicle should have a vehicle unit. The vehicle unit consists of a vibration sensor, controller, siren, a user interface, GPS system and a GSM module. The vibration sensor used in the vehicle will continuously sense for any large scale vibration in the vehicle. The sensed data is given to the controller GPS SYSTEM inside the vehicle. The GPS SYSTEM finds out the current position of the vehicle (latitude and the longitude) which is the location of the accident spot and gives that data to the GSM MODULE. The GSM MODULE sends this data to the control unit whose GSM number is already there in the module as an emergency number.

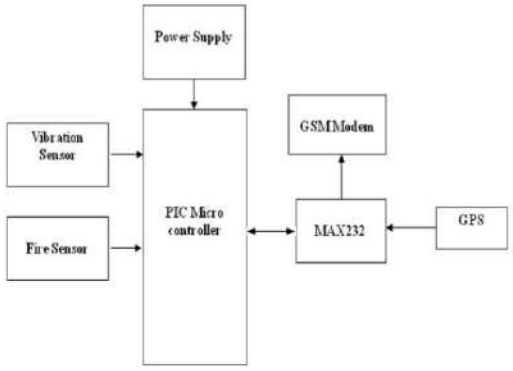


Figure 89 Block diagram of vehicle unit

B, Ambulance unit

The controller finds the nearest ambulance to the accident spot and also the shortest path between the ambulance, accident spot and the nearest hospital. The controller then sends this path to the ambulance. Also using this information, the controller controls all the traffic signals in the path of ambulance and makes it ready to provide free path to ambulance, which ensures that the ambulance

reaches the hospital without delay.

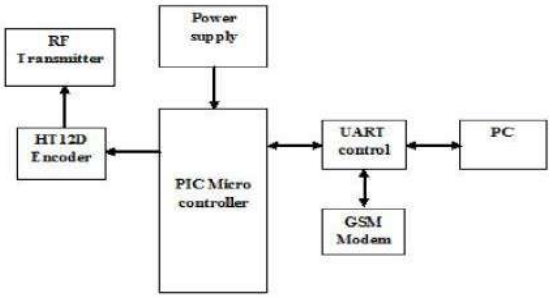


Figure 90 Block Diagram of Ambulance/Control Unit

C. Traffic unit

Whenever traffic signal section receives the information about accident, the RF receiver in this section is turned ON to search for ambulance nearing the traffic signal. Whenever the ambulance reaches near to the traffic signal (approximately 100m), the traffic signal will be made to green through RF communication. Thereby the ambulance is recommended to reach the hospital in time.

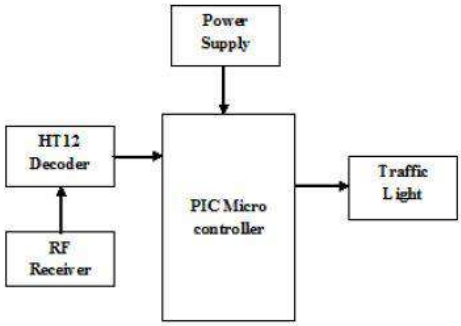


Figure 91 Block Diagram Of traffic unit

Chapter 15

Smart or Sustainable features of Chapter 8 & 13 designs, Impact on Society. With doing small changes, Period, Amount Expenditure and Benefit- (a) Immediately (b) Within 1 year (c) long term (3-5 years) (d) if possible, list the sources of the funding available with the Village gram panchayat

15.1.1 The Total Existing scenario of the Implantation

- Recently Gram Panchayat has completed development work like, C.C road and Drainage line.
- In this Village door to door collection of waste is not available.
- The basic facility like public toilet is available in the village.
- Recently Gram Panchayat renovate the Panchayat house and color it.

15.1.2 how can be improved with small changes, Period - a) Immediately, b) Within 1 year and c) Long term (3-5 years) along with cost estimation

A. IMMEDIATELY:

- As immediately we should implement the design proposed by us from the available grant. Because for making any village smart or model, basic facilities are prime requirement of the village.
- Some of our proposed design like bus stand, Post Office, Library and Public health center can be implemented immediately.
- Dwellers are also not aware or habitat of latest technology usage. Involvement of Gram panchayat or Sarpanch is supreme requirement for village development.

Table 23 Immediately work for village

Sr. No.	Design Name	Cost of Design	Benefits
1	Bus Stand	69,615.00	The waiting area for bus
2	Seven segment Display	13,500.00	To easy show the routs
3	Post office	3,74,810.00	For the post work
4	Public health center	4,99,371.00	For good health service provided in village
5	community hall	9,46,010.00	For the function and ceremony
6	Library	5,61,029.00	For study area and knowledge

B. WITHIN 1 YEAR:

- Chapad Village should approach to various Govt. schemes of central Govt.
- Some of our proposed design like Post Office, camera system, Public garden and Skill development center can be implemented within a year.

Table 24 Within 1 year work for village

Sr. No.	Design Name	Cost of Design	Benefits
1	Skill Development center	10,03,431.00	For women employment
2	Camera System	2,09,000.00	For safety purpose
3	Public garden	2,80,000.00	For playing and setting area
4	Automatic light control system using LDR in public garden	10,960.00	For save energy
5	Vegetable market	3,14,107.00	For easy available vegetable and small employment
6	Krishi Kendra	4,75,765.00	For farming all products and machinery available
7	LED street light	17,45,820.00	To save the energy

C. Long Terms (3-5 years):

- From our proposed design long term development include this infrastructure which can be provided after few years
- Some of our proposed design like cyber café, bio gas plant, rain water harvesting can be implemented for long term.

Table 25 Long term work for village

Sr. No.	Design Name	Cost of Design	Benefits
1	Cyber café	1,85,159.00	For the internet and study purpose
2	Bio Gas plant	3,88,196.00	To utilize bio-waste in energy
3	Rain water harvesting	2,25,665.00	To collect the water and use it
4	Plant monitoring system using IOT	7800.00	For the smart plantation and farmers
5	Solar panel for cyber café	1,37,327.00	To use solar energy

Chapter 16
Survey by interviewing with Talati 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	Agriculture, business hub, job
2	What are the chances of employment in village?	Yes	Nearly business hub
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?	Yes	
6	Is women health awareness Program organized in village?	Yes	In Anganwadi.
7	Are women having opportunity to work and income?	Yes	Almost all the girls engage
8	Child girl education is appreciated in village?	Yes	
9	Facility of vaccination to child is available in village?	Yes	In Anganwadi & PHC
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	Almost all have taken
11	Women help line number information is provided to village people?	Yes	-
12	Is water scarcity in village? How many days per year?	No	Full facilities for water
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	There is no issue related debt
16	Is any death of patient occurred due to unavailability of medical facility in village?	NO	-
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	Gram Panchayat working on development of village
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?	No	-

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

સરપંચ
ચાપડ ગ્રામ પંચાયત
તા. જી. વડોદરા.

Chapter 17
Irrigation / Agricultural Activities and Agro Industry, Alternate Techniques and Solution

Irrigation is defined as the carefully controlled process of watering agricultural crop through artificial means in order to facilitate their growth and development. Now you will see that we have mentioned the phrase „carefully controlled" in the definition and are probably wondering what means.

Well, the whole process of irrigation is strictly controlled. The farmer must determine the extra amount of water required by the crop. Too little water will dry out the plants, whereas too much water may damage the root. In addition to watering the crops, irrigation also entails watering the lands before planting seeds to create a favorable habitat for crop. It also needs to be done carefully. Thus, irrigation is a much more complicated process than just watering plants.

Agriculture or farming is a very ancient occupation, and so are methods of irrigation. We can see evidence of different irrigation techniques employed by ancient civilizations which include irrigation canals, dams, water storage facilities, structures like aqueducts and the like.

17.1 Modern Methods of Irrigation

The methods of irrigation can be divided into four main types. These include – Surface irrigation, sprinkler, Drip and Subsurface.
These modern irrigation techniques have been discussed in detail below:

Surface irrigation:
It is one of the most common methods of irrigation. Here water is applied to the soil with the help of gravity. Since the distribution of water is not regulated, surface irrigation is also known as flood irrigation.
This irrigation system is farther classified into three other types of modern method of irrigation. These are as follows:

1. **Furrow –** In case of furrow irrigation, water is made to flow through shallow channels which are evenly spaced out and at a slope to the field. The water in these shallow channels are supplied through a variety of ways such as siphon, main ditch, gated pipe, etc.

Inflow rate, soil infiltration, slope and shape of furrow and surface roughness determine the speed of the water. It requires less capital investment, but it is one of the most labour intensive methods of irrigation.

2.**Basin and Border irrigation –** Both of these techniques involve water running through the soil. However, in basin irrigation, water is supplied to a field which may result in ponding for a while. On the other hand, water is made to flow through ditches running through the ground with a drainage system at the end.

3. Sprinkler:

In case of this irrigation system, water is sprinkled or sprayed on plants. The effect is similar to rainfall. A sprinkler irrigation system requires sprinklers, laterals, mainlines, sub mainlines and pump unit.

The mainlines and sub mainlines transport the water from pumps to fields where it is sprayed on the plants via the sprinkles. Sprinklers are differentiated based on the volume of water it can spray. Examples of crops which are watered through this irrigation technique are cotton, onion, maize, wheat, gram, sunflower etc.

- **Advantage of this technique are:**

It is suitable for watering all type of soil except heavy clay.
It is useful in areas where crop population per unit is high.
It reduces soil compaction.

4.Drip:

This irrigation system, as the name suggests, involves watering the crops drip by drip. Hence, it is also known as trickle irrigation method. The irrigation system includes small diameter pipes with emitter or drippers that lie close to grounds, thereby providing water to the roots. It is one of the most efficient modern irrigation techniques as it reduces runoff and water evaporation significantly. This irrigation technique can also be used to provide fertilizers to crops.

The water application is more frequent with this irrigation technique compared to other methods which results in high moisture levels in the soil. Some crops which require this type of irrigation are vegetables, cash crops, plantation, spices, etc.

- **Some of the benefits of the drip irrigation system are:**

It helps in the conservation of water and reduces the cost of fertilization.

Since water is provided uniformly, crop growth is also consistent.

- **Necessities of Irrigation**

Irrigation techniques enable farmers to grow multiple crops in a year thereby enhancing productivity.

Proper irrigation helps crops to develop quickly, which ensures higher returns for farmers.

Irrigation protects against insufficient rainfall and drought.

❖ Details of chapad village agricultural area:

Agricultural Area in chapad village: 670.3 ha.
Water for irrigation: Tube well, canal and bore
Methods using in farming for irrigation: Farrow and Drip
In village 70% are depended in agriculture.
Crop growth: Rice, costor, Bajara and wheat

Chapter 18
Social Activities

Figure 92 Social Activities performed with NGO (Society of Human Resource Professionals)

Chapter 19
Chapad Village SAGY Questionnaire Survey form with the Sarpanch Signature

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: CHAPAD Gram Panchayat: CHAPAD Ward No. –

Block: – District: VADODARA

State: GUJARAT L S Constituency: CHAPAD

1. Family Identity and Size

Name of Head of Household	Patanvadiya Rajesh Rameshbhai							Male/ Female	M
SECC Survey ID:		Family Size	6	Over 18	4	6 to 18		Under 6	2

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	SC	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]
Rameshbhai	60	M	Y N	Y		Y	Y	Y
Kamalaben	58	F	Y N	Y		Y	Y	Y
Niyamaben	29	F	Y N	Y		Y	Y	–

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

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
Dhamik	05	M	N	N	N	–	–	29
Dhyey	2 mth	M	N	Y N	N	–	–	29

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4
[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011)
[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: 5
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):		

11. Source of Lighting and Power

Electricity Connection to Household: Yes / ~~No~~
Lighting: Electricity/~~Kerosene~~/~~Solar Power~~
Mention if Any Other: LPG
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	YES
Sharecropping /Farming Leased Land	–
Animal Husbandry	–
Pisciculture	–
Fishing	–
Skilled Wage Worker	–
Unskilled Wage Worker	–
Salaried Employment in Government	✓
Salaried Employment - Private Sector	YES
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
Wheat		
Rice		

17. Livestock Numbers

Cows: –	Bullocks: –	Calves: –
Female Buffalo: –	Male Buffalo: –	Buffalo Calves: –
Goats/ Sheep: –	Poultry/ Ducks: –	Pigs: –
Any other: Type _____		No. _____
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): _____		

18. What games do Children Play
Cricket, Volyball

19. Do children play musical instrument (mention)
NO.

Schedule Filled By:
Principal Respondent:
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: CHAPAD

b. Block: -

c. District: VADODARA

d. State: GUJARAT

e. Lok Sabha Constituency: -

f. Number of Wards in the Gram Panchayat: -

g. Number of Villages in the Gram Panchayat: -

h. Names of Villages:

CHAPAD

Demographic Information

Number of Households 530 Total Population 2419 Male 1256 Female 1163

SC HHs 117 ST HHs 393 OBC HHs _____ 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	
b.	Nearest Primary Health Centre (PHC)	YES	
c.	Nearest Community Health Centre (CHC)	YES	
d.	Nearest Post Office	YES	
e.	Nearest Bank Branch (Any)	YES	HDFC.
f.	Nearest Bank with CBS Facility	NO	
g.	Nearest ATM	YES	
h.	Nearest Primary School	YES	
i.	Nearest Middle School	YES	
j.	Nearest Secondary School	YES.	
k.	Nearest Higher Secondary School / +2 College	YES NO	2 KM
l.	Nearest Graduate College	YES NO.	4 KM
m	Nearest ITI / Polytechnic Centre	NO	5 KM
n	Kisan Seva Kendra	NO	

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	YES	Not in good condition
p	Nearest Agro Service Centre	NO	
p	MSP based Government Procurement Centre	NO	
q	Milk Cooperative /Collection Centre	YES	
r	Veterinary Care Centre	NO	5 Km.
s	Ayurveda Centre	NO	
t	E – Seva Kendra	NO	
u	Bus Stop	YES	
v	Railway Station	YES	
w	Library	YES	Not in good condition.
x	Common Service Centre	YES	2 NO.

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 2 Public 2 Private 0

b. Mini Stadium : NO. Yes(Y) /No (N) *(Playground with equipment and sitting arrangement)*

V. Education, ICDS

a. Number of Angan Wadi Centres: 4 NOS.

b. Number of villages without Angan Wadi Centres –

Names of such villages: CHAPAD

c. Schools (Number)

Primary Private: 1 Primary Govt.: 1

Middle Private: 1 Middle Govt.: 1

Secondary Private: 1 Secondary Govt.:

Higher Secondary Private: 1 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)	–	–	Rice Wheat	–	–	–	–
b.	Kerosene	–	–	–	–	–	–	–
c.	Other (mention)	–	–	–	–	–	–	–

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 YES / Not Covered	CHAPAD	
b.	Hand Pump Coverage in Villages:	Covered V / Not Covered	chapad (9 NOS)	
c.	Coverage under Covered Drains:	Covered YES / Not Covered	CHAPAD	
d.	Coverage under Open Drains:	Covered / Not Covered	–	
e.	Villages with Household Electricity Connection (Numbers)	Connected V YES / Not Connected	CHAPAD	

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	670.03 ha	d.	Pasture / Grazing Land	0	g.	Check Dam	—
b.	Irrigated Land	114.84 ha	e.	Forests/ Plantations	0	h.	Wells/Bore Wells	20
c.	Un-irrigated Land	76.56 ha.	f.	Other Common Land	0	i	Tanks /Ponds – 2	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)	NA
b)	Number of Households receiving pension (old age, widow, disability)	NA
c)	Number of eligible Households who are not receiving pension	NA
d)	Number of Households eligible for Ration Card	412
e)	Number of eligible HHs having ration cards	412
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	0
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	0
h)	Number of active Job Card holders under MGNREGA	0
i)	Number of Job Card holders who completed 100 days of work during 2013-14	NA
j)	Number of shops selling alcohol	0
k)	Number of BPL families	120
l)	Number of landless households	0
m)	Number of IAY beneficiaries	0
n)	Number of FRA[2] beneficiaries	0
o)	Number of Community Sanitary Complexes	0
p)	Number of Households headed by single women	4
q)	Number of Households headed by physically handicapped persons	0
r)	Total number of Persons with Disability in the village	0
s)	Number of SHGs	0
t)	Number of active SHGs	0
u)	Number of SHG Federations	0
v)	Number of Youth Clubs	0
w)	Number of Bharat Nirman Volunteers	0

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
	સરપંચ ચાપડ ગ્રામ પંચાયત તા. જી. વડોદરા.		07/05/2021

[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: CHAPAD

b. Ward Number: _____

c. Gram Panchayat: CHAPAD

d. Block: _____

e. District: VADODARA

f. State: GUJARAT

g. Lok Sabha Constituency: _____

h. Number of Habitations / Hamlets in the Gram Panchayat: _____

i. Names of Habitations / Hamlets:

Demographic Information

Number of Households 530 Total Population 2419 Male 1256 Female 1163

SC HHs 117 ST HHs 393 OBC HHs _____ 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	YES	
c.	Nearest Secondary School	NO.	2 KM
d.	Kisan Seva Kendra	YES	Not in good condition
e.	Milk Cooperative /Collection Centre	YES	
g.	Health Sub Centre	NO	
h.	Bank	YES	HDFC.
i.	ATM	YES	HDFC
j.	Bus Stop	YES	Not in good condition
k.	Railway Station	NO.	4 KM

[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	YES	
m	Common Service Centre	YES	2 NOS
n	Veterinary Care Centre	NO	

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-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

b.Hand Pump Coverage in Habitations: _____ *(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: _____*(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

b. Coverage under Open Drains: _____*(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

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: 4

c. Schools (Number)

Primary Private: 1 Primary Govt.: 1

Middle Private: 1 Middle Govt.: 1

Secondary Private: 1 Secondary Govt.: -

Higher Secondary Private: 1 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	670.03 ha	d.	Pasture / Grazing Land	0	g.	Check Dam	—
b.	Irrigated Land	114.84 ha	e.	Forests/ Plnatations	0	h.	Wells/Bore Wells	15
c.	Un-irrigated Land	76.56 ha	f.	Other Common Land	0	I	Tanks /Ponds	2

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	0
2	Number of active Job Card holders who have completed 100 days of work	NO.
3	Number of shops selling alcohol	NO
4	Number of BPL families	120
5	Number of landless households	—
6	Number of IAY beneficiaries Indira Awass Yojana.	—
7	Number of FRA beneficiaries Full Retirement Age.	—
8	Number of common sanitation complexes	—
9	Number of SHGs Self Help Groups.	—
10	Number of active SHGs	—
11	Existence of SHG Federation in the Village (Yes / No)	—
12	Number of Youth Clubs	NO
13	Number of Bharat Nirman Volunteers	NO.

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey
	સરપચ ચાપડ ગ્રામ પંચાયત તા. જી. વડોદરા.		07/05/2021

Chapter 20
TDO – DDO – Collector email sending soft copy

7/6/2021 Gmail - VYojana-VIII- Chapad Village Detailed Project Report

Gmail **Prajapati Mehali <prajapatimehu560@gmail.com>**

VYojana-VIII- Chapad Village Detailed Project Report
1 message

Prajapati Mehali <prajapatimehu560@gmail.com> 6 July 2021 at 14:03
To: ddo-vad@gujarat.gov.in, tdo@vmc.gov.in, collector-vad@gujarat.gov.in, vadodarac@gmail.com, dclr-vad@gujarat.gov.in, commissioner@vmc.gov.in, cityengr@vmc.gov.in, moh@vmc.gov.in, futuristicvmc@gmail.com, Shweta Patel <patelshweta2711@gmail.com>, kautulpanchal@icloud.com
Cc: Vishwakarma Yojana <rurban@gtu.edu.in>, HOD - Civil <hod.civil@kjit.org>, hod.electrical@kjit.org

We are the Students of KJ Institute of Engineering and Technology, Vadodara affiliated to Gujarat Technological University - GTU. GTU has been assigned Vishwakarma Yojana- VY Phase VIII under which Students Survey Various Villages and Design Various amenities to Deliver to the Villages making them an ideal place for living a better life as per requirements & village problems 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 all notify about "Chapad" village profile of issues for development and our design work for them which is attached in the form of a report below with amount expenditures and benefits.

Contact Person :-
1. Prajapati Mehali M. : No.- 7405956834
Email id- prajapatimehu560@gmail.com
2. Patel Shweta S. : NO.- 8401496970
Email id- patelshweta2711@gmail.com
3. Panchal Kautul : No.- 7698011473
Email id- kautulpanchal@icloud.com

2 attachments

Chapad report.pdf
14554K

Design Detail Estimate Chapad.pdf
501K

https://mail.google.com/mail/u/0?ik=f2d5d958dc&view=pt&search=all&permthid=thread-a%3Ar7358390995255394479&simpl=msg-a%3Ar736665341... 1/1

Chapter 21
Comprehensive report for the entire village

COMPEHENSIVE REPORT
ON
VishwakarmaYojana: Phase VIII

AN APPROACH TOWARDS RURBANISATION
Chapad Village
Vadodara District

Prepared By

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
PATEL SHWETA S.	CIVIL	180643106026
PRAJAPATIMEHALI M.	CIVIL	180643106029
PANCHAL KAUTUL	ELECTRICAL	180643109025

K. J. INSTITUTE OF ENGINEERING &TECHNOLOGY, SAVALI, VADODARA

Principal Name
Prof. (Dr.) D. U. Shah

NODAL OFFICERS NAME
Mr. Mayank Patel
H.O.D. (Civil Engineering)
Mr. Yatin Patel
H.O.D.(Electrical Engineering)

Year: 2020-21
Gujarat Technological University,
Chandkheda, Ahmedabad– 382424 Gujarat

❖ Introduction

With the increasing population and desire of people to have better living standards and better lifestyle, migration from villages to cities have been increasing. This has led to increase in pressure on cities. Vishwakarma Yojana is one such initiative towards Rurbanization of villages by Government of Gujarat that hinders such migrations. This Yojana aims at developing the village by providing all the urban facilities that a city may have, yet maintaining the Rural soul.
We visited villages and held a complete survey of allocated village "Chapad", smart village "Ankodiya" and ideal village "Bil". After analysing the data, conclusion arrived that, there are primary infrastructure in which requires some maintenance in them. On that note, we have proposed some designs. Our goal is to develop the allocated village with the beauty of the ideal village and have technological elements same as there in smart village. On conducting gap analysis and taking support from the past survey of the project, we came across the problems and the work we had to design so as to give the village a sustainable and a developed rural area, an area with clean and green environment and full of prosperity and knowledge.

❖ Need of study

Vishwakarma Yojana is one of the approaches to reduce urban city pressure and lower the migration rate by developing village with a rural soul but with all urban amenities that a city may have. The development work in village that could undertake as per the need of the village in particular included Physical, Social and Renewable infrastructure facilities. Further there are cascading effects of poverty, unemployment, Poor and inadequate infrastructure in rural areas on urban centres causing slums and consequential social and economic tensions manifesting in economic deprivation and urban poverty. Hence, Rural Development which is concerned with economic growth and social justice, improvement in the living standard of the rural people by providing adequate and quality social services and minimum basic needs becomes essential.

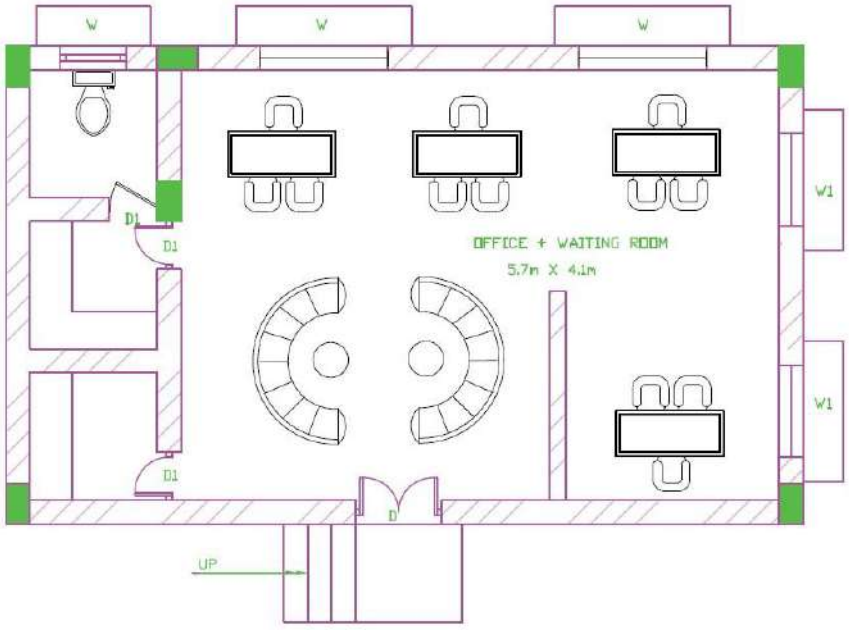
❖ Objectives of study

Vishwakarma Yojana is government project for developing various villages. In this project various details of villages like demographical details, geographical details, occupational details, physical infrastructure facilities, social infrastructure facilities etc. various data are collected. And it try to develop facilities as possible as best. Its main purpose is make village as model or ideal village with maximum facilities.

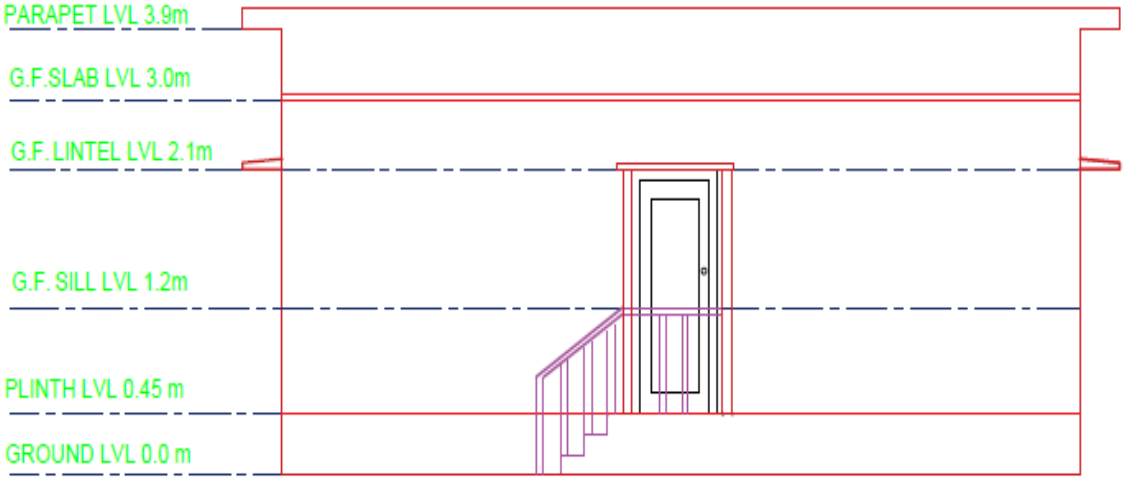
- Basic physical infrastructure – Water Supply, Transport, Sewerage and Solid Waste Management should be the main concern focus.
- Basic Social infrastructure – Health and Education facilities should be provided and ensure proper delivery of facilities to village dwellers

DESIGN PROPOSED BY THE STUDENTS

Design Proposal: POST OFFICE
Approximate Cost: 3,74,810



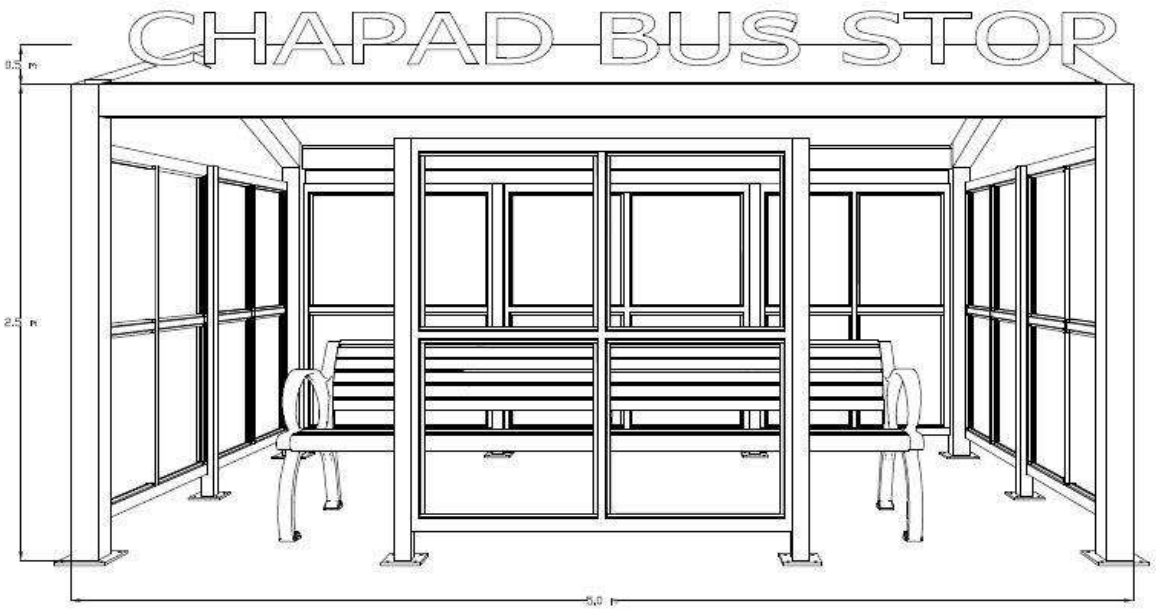
PLAN



ELEVATION

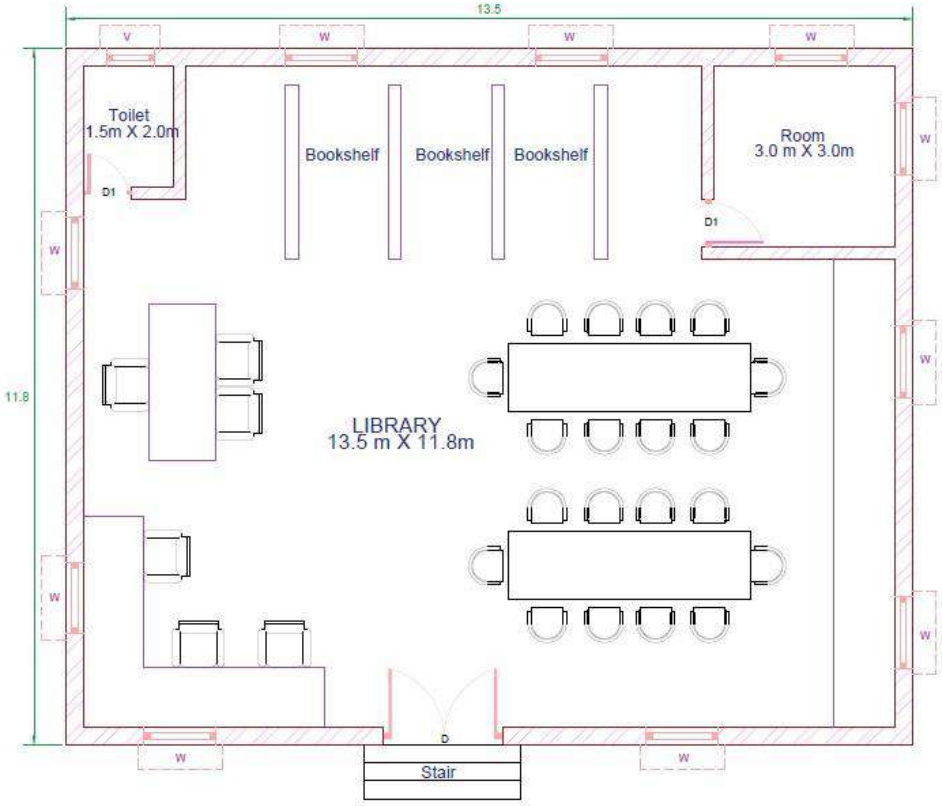
Design Proposal: BUS STAND
Approximate Cost: 69,615

3D VIEW

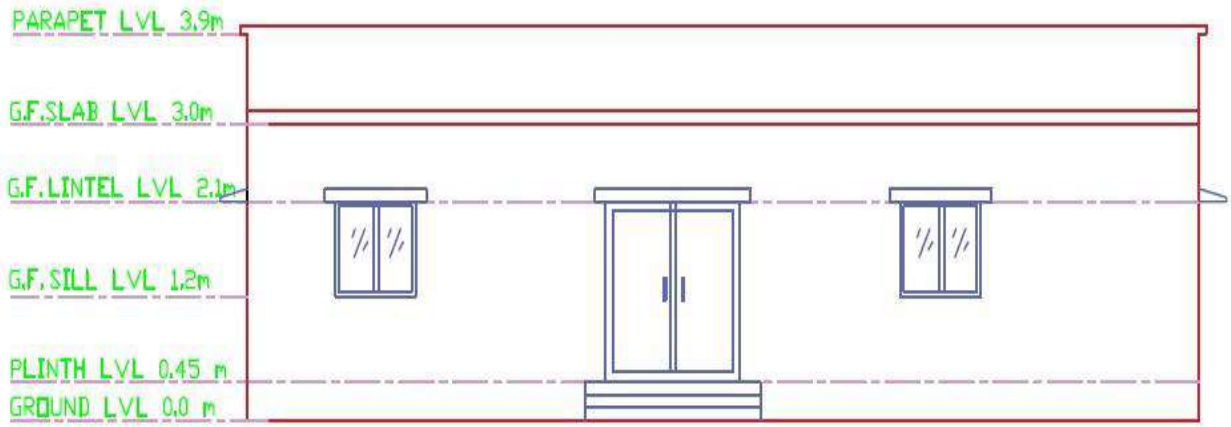


ELEVATION

Design Proposal: LIBRARY
Approximate Cost: 5,61,029.00

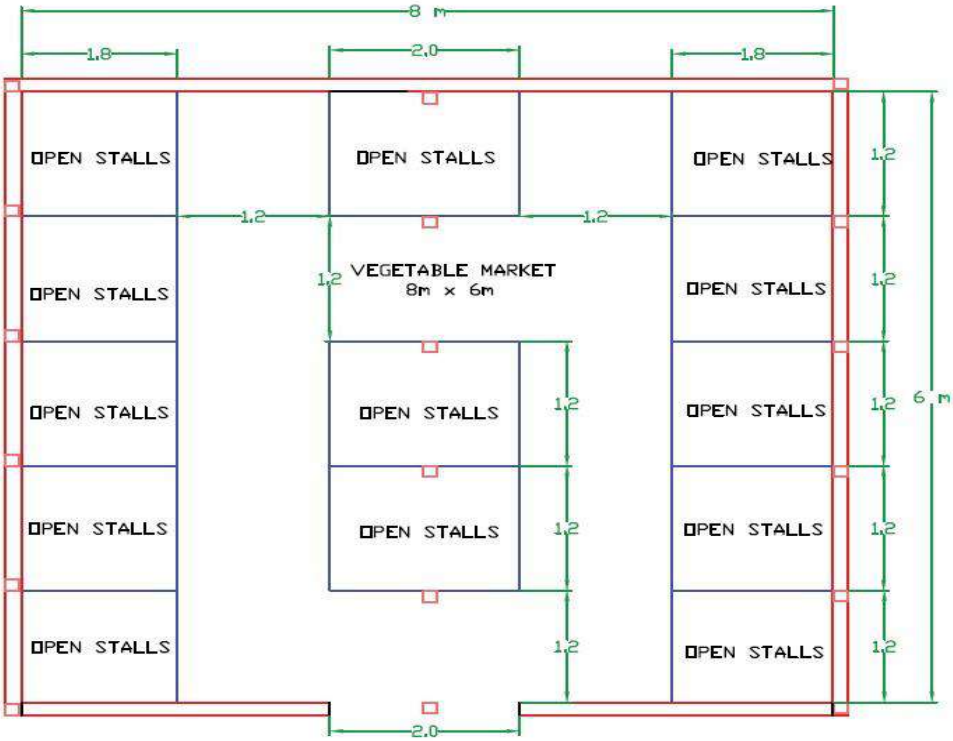


PLAN



ELEVATION

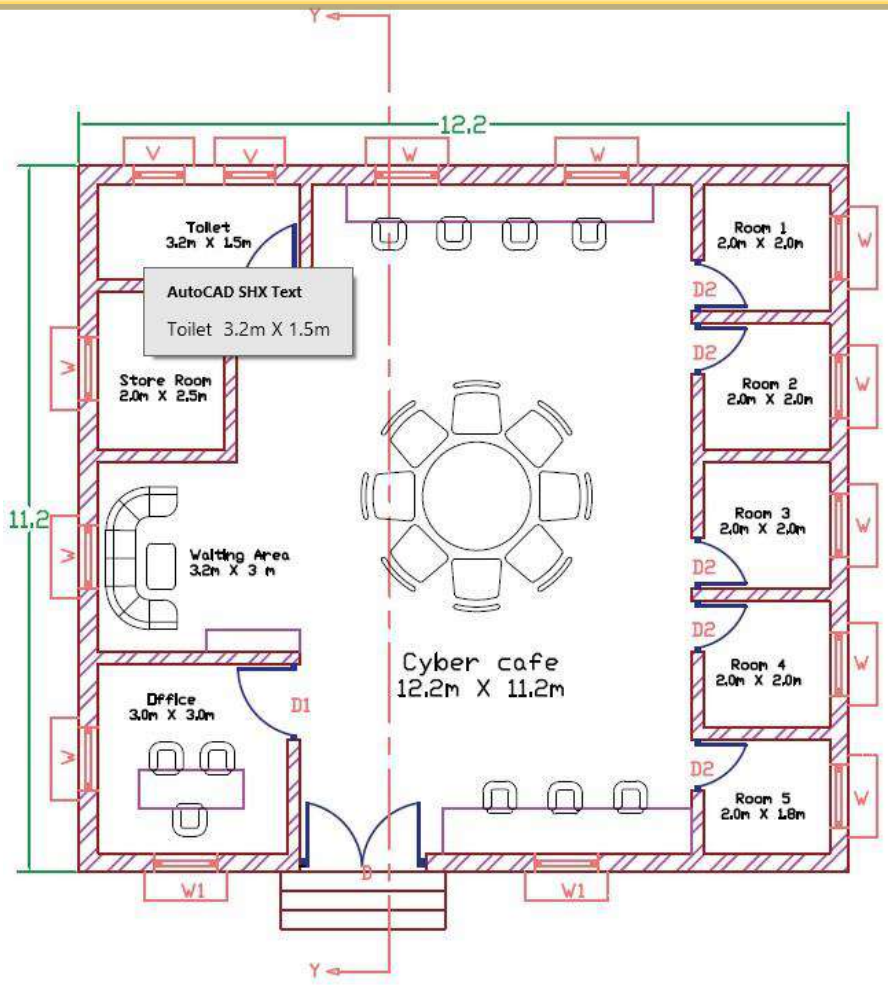
Design Proposal: VEGETABLE MARKET
Approximate Cost: 3,14,107.00



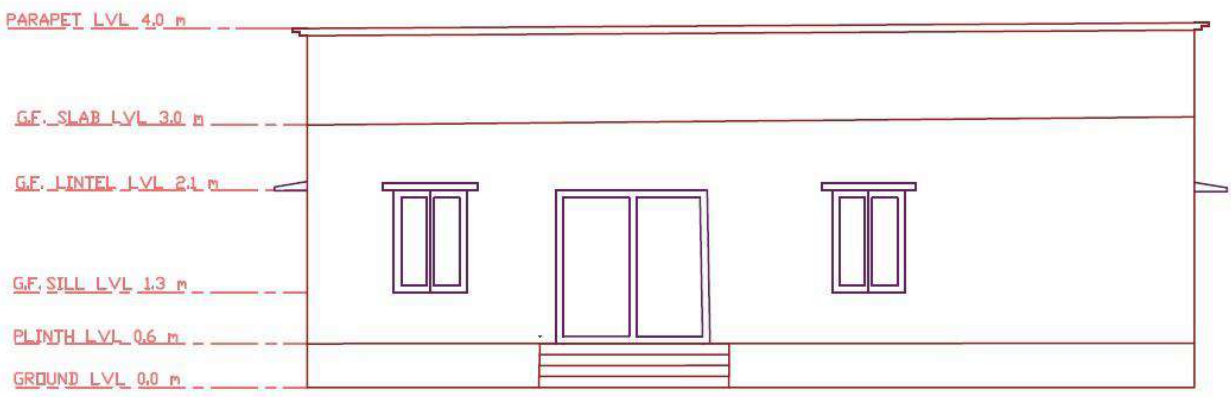
PLAN

3D VIEW

Design Proposal: CYBER CAFÉ
Approximate Cost: 7,27,857.00

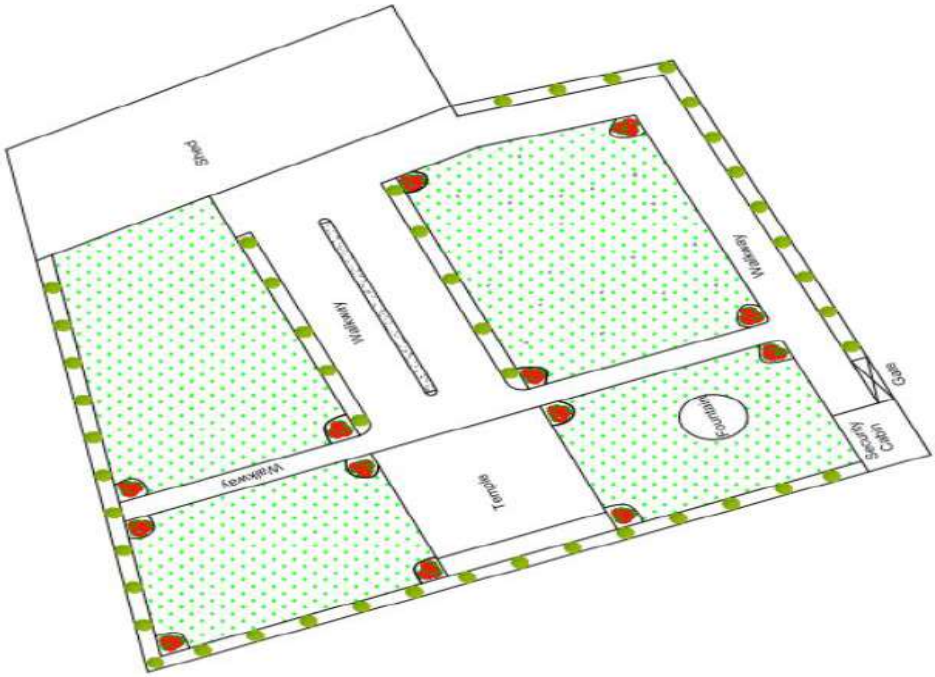


PLAN



ELEVATION

Design Proposal: PUBLIC GARDEN and Automatic light control system using LDR in public garden
Approximate Cost: 2,80,000 + 10,960



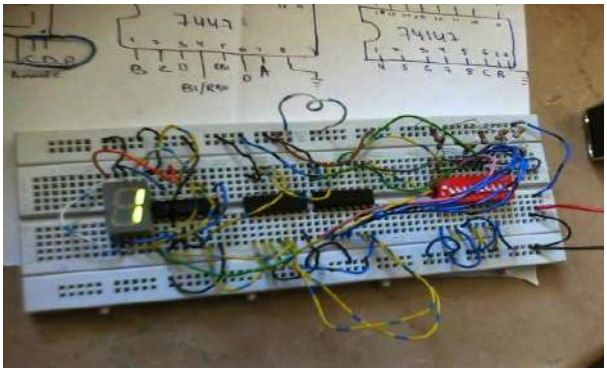
LAYOUT PLAN

Automatic light control system using LDR in public garden

Design Proposal: LED LIGHT
Approximate Cost: 17,45,820.00

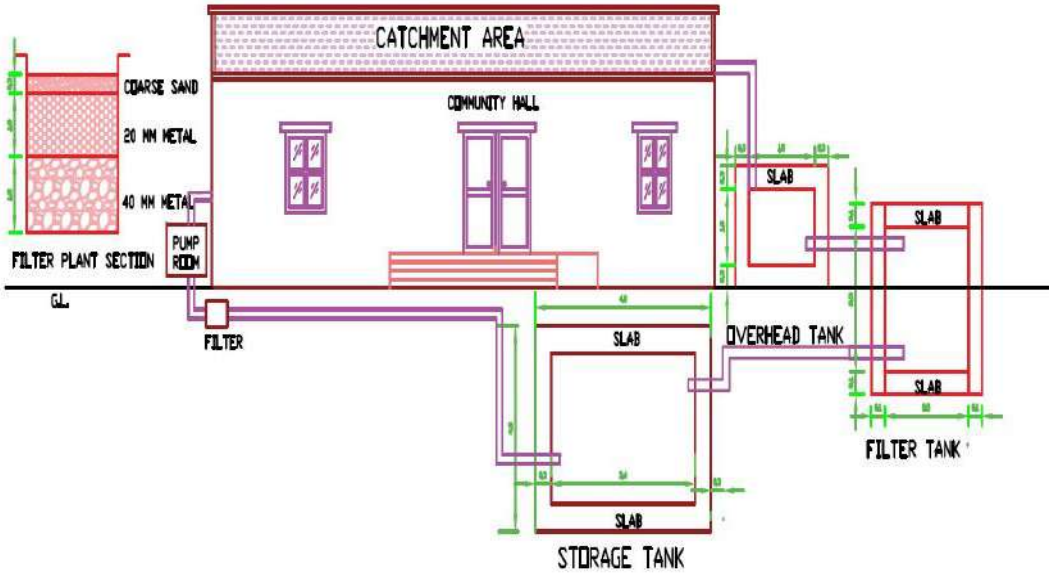
PLAN

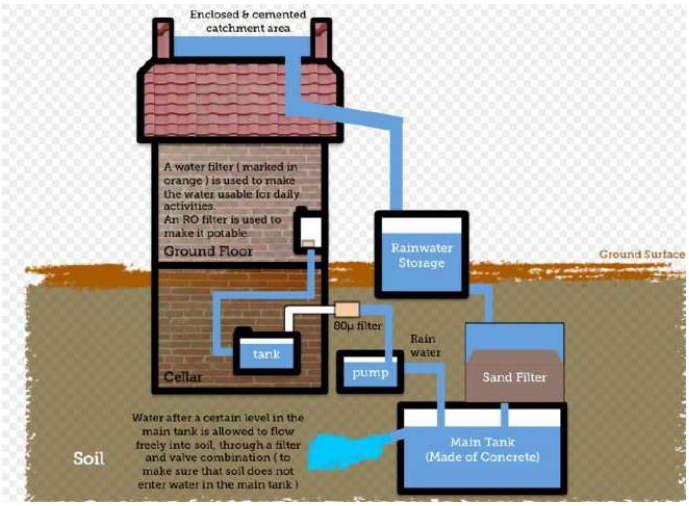
Design Proposal: SEVEN SEGMENT DISPLAY
Approximate Cost: 12,199

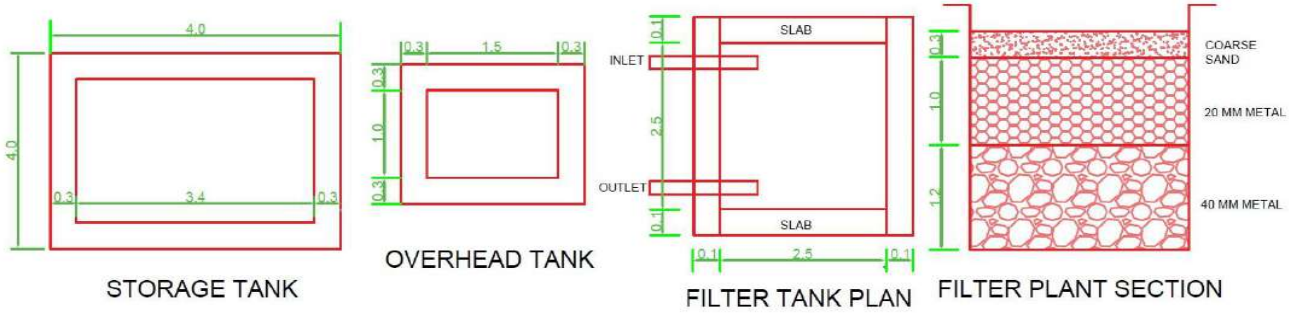


PLAN

Design Proposal: RAIN WATER HARVESTING
Approximate Cost: 2.25.664

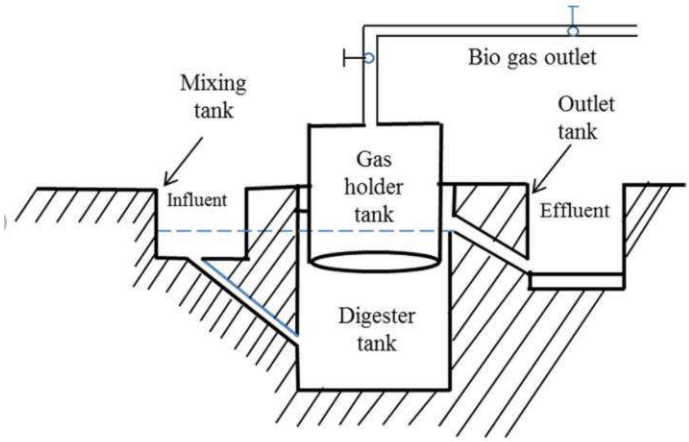


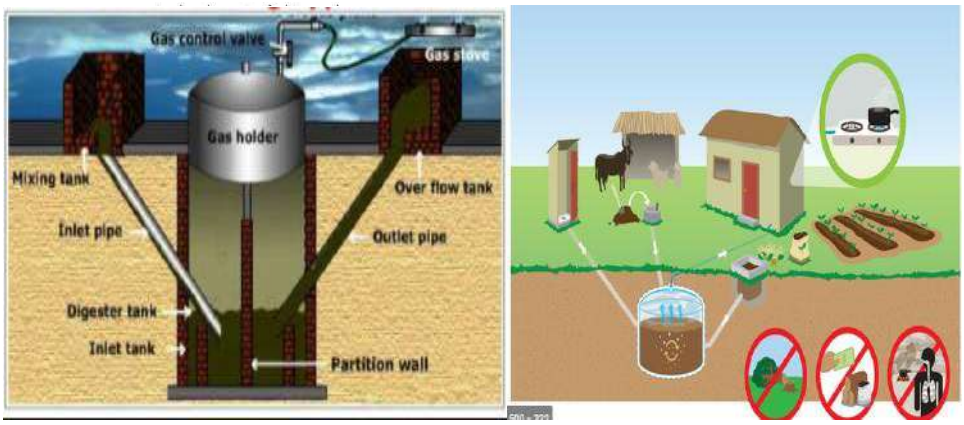




PLAN

Design Proposal: BIO GAS PLANT
Approximate Cost: 3,88,196

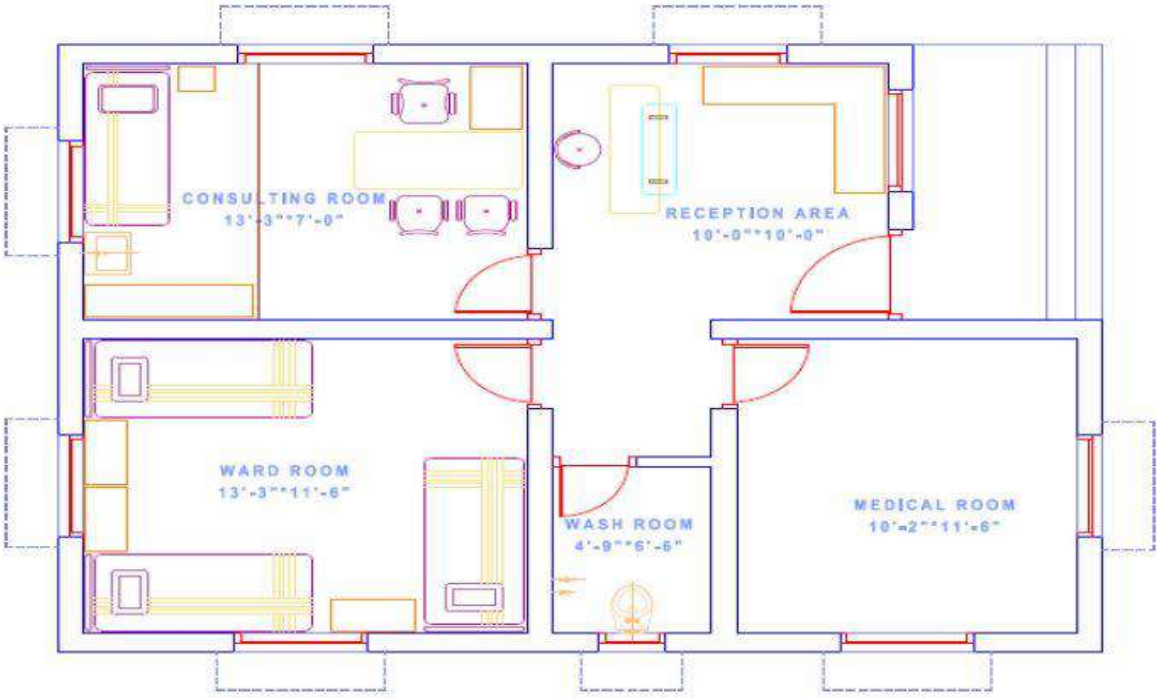




PLAN

Design Proposal: Smart plant monitoring system using IOT
Approximate Cost:17800.00

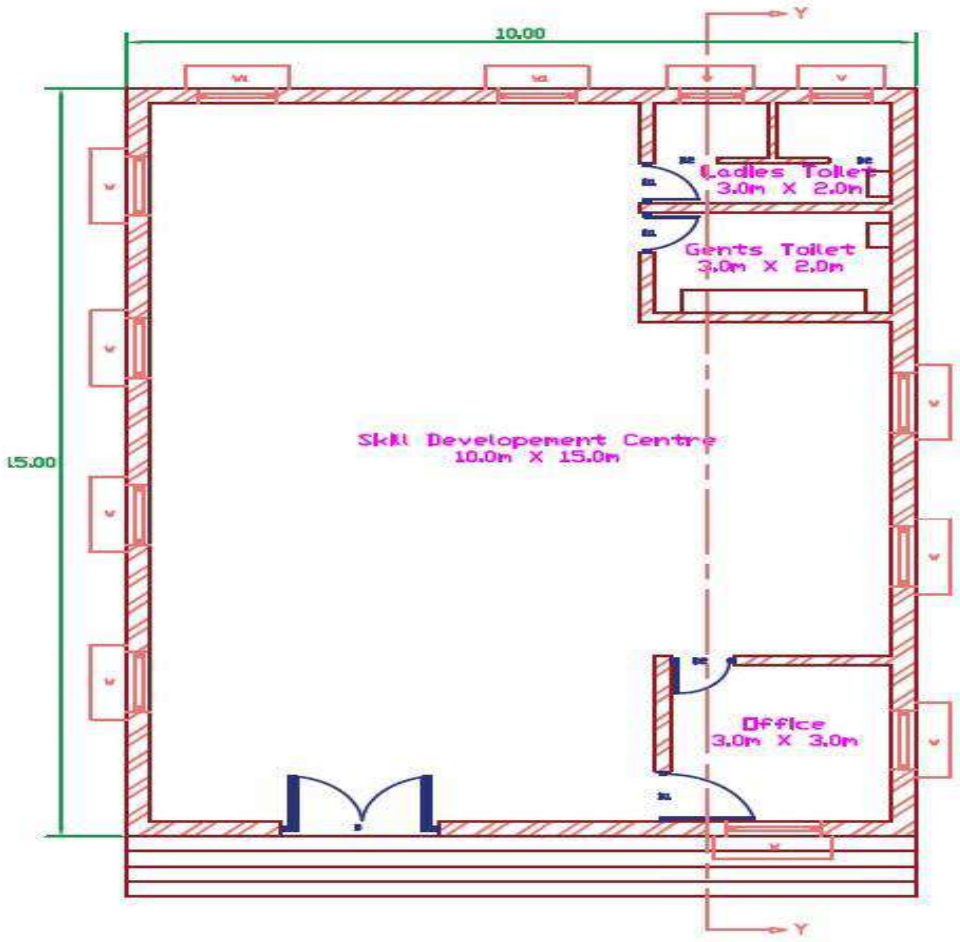
Design Proposal: PUBLIC HEALTH CENTRE
Approximate Cost: 4,99,372



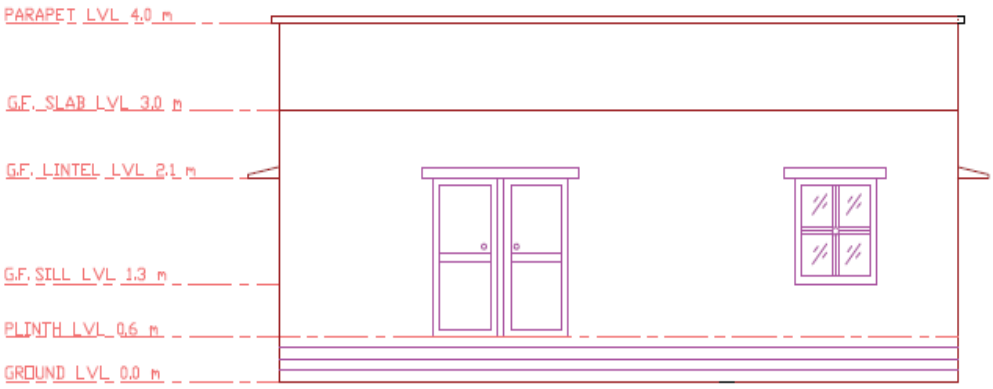
PLAN

3D VIEW

Design Proposal: SKILL DEVELOPMENT CENTRE
Approximate Cost: 10,03,431

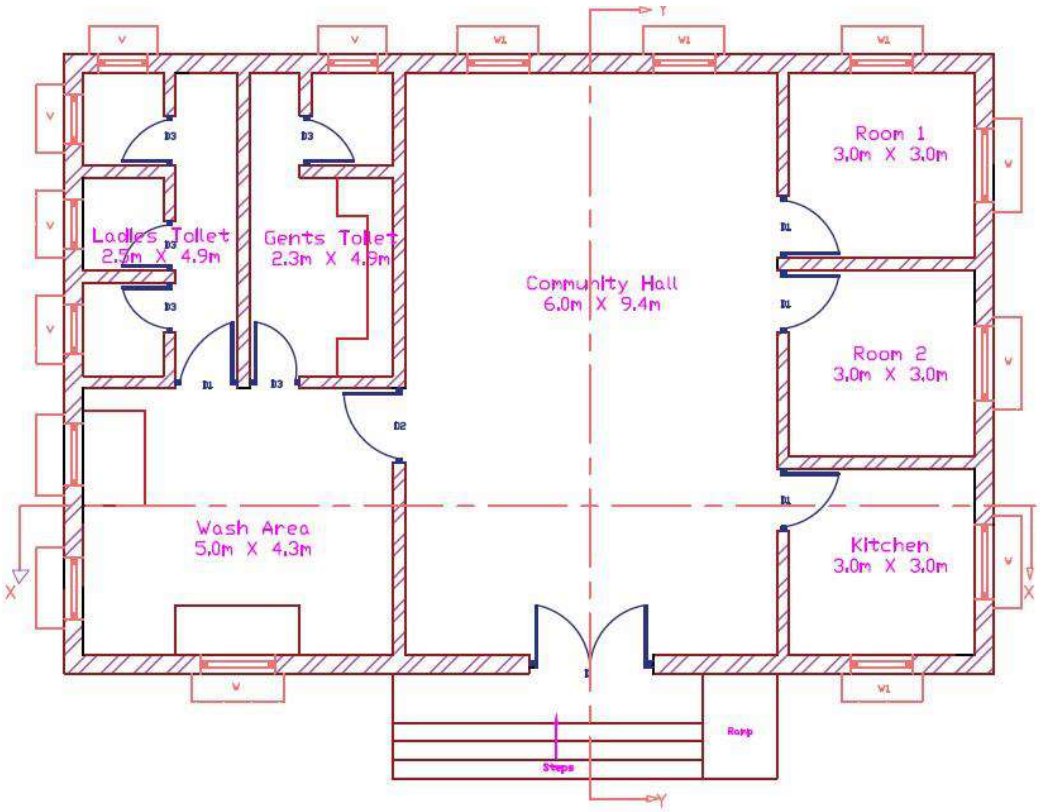


PLAN

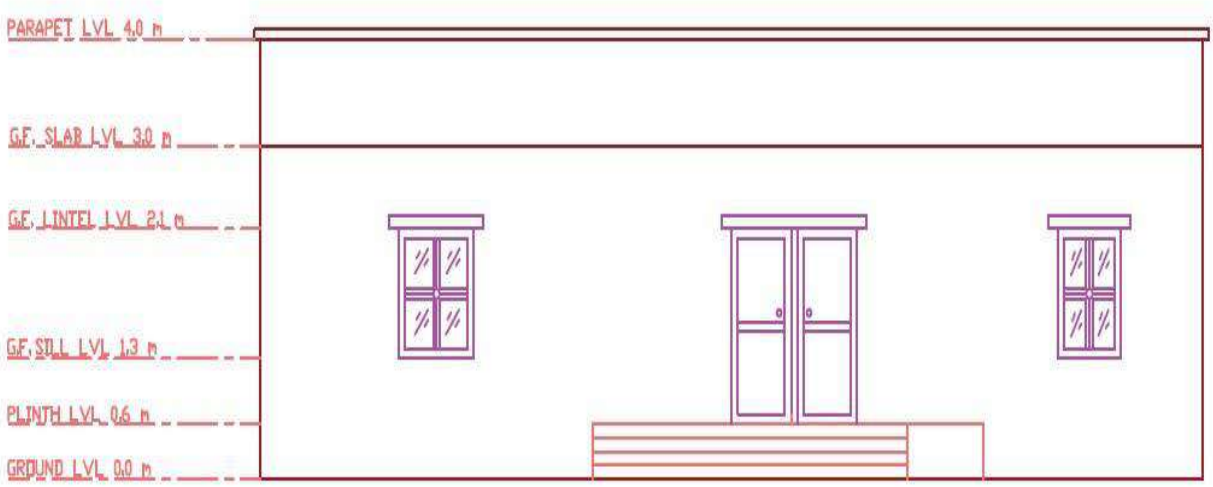


ELEVATION

Design Proposal: COMMUNITY HALL
Approximate Cost: 9,46,010

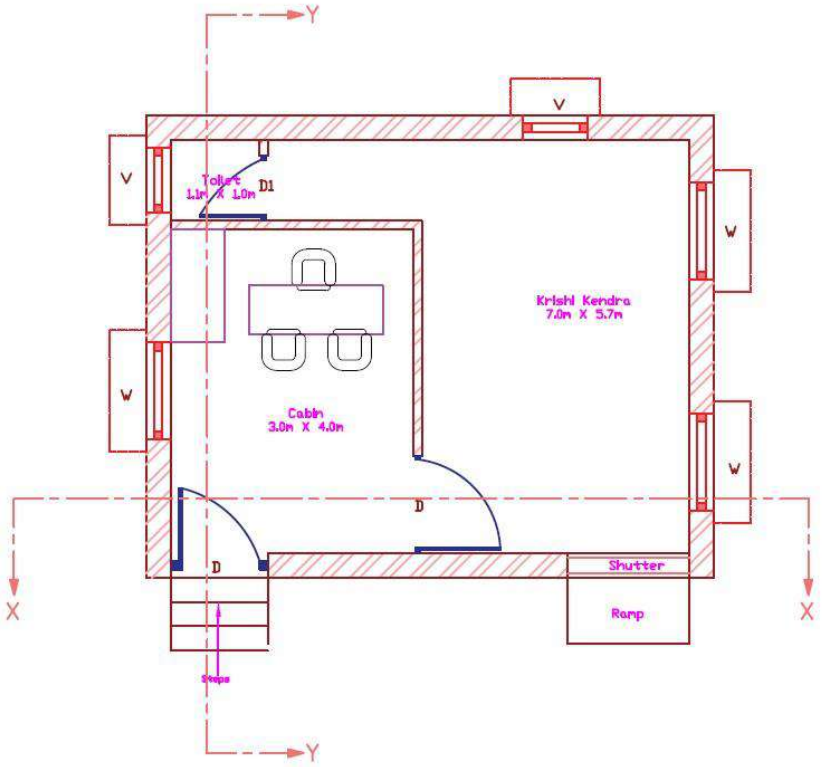


PLAN

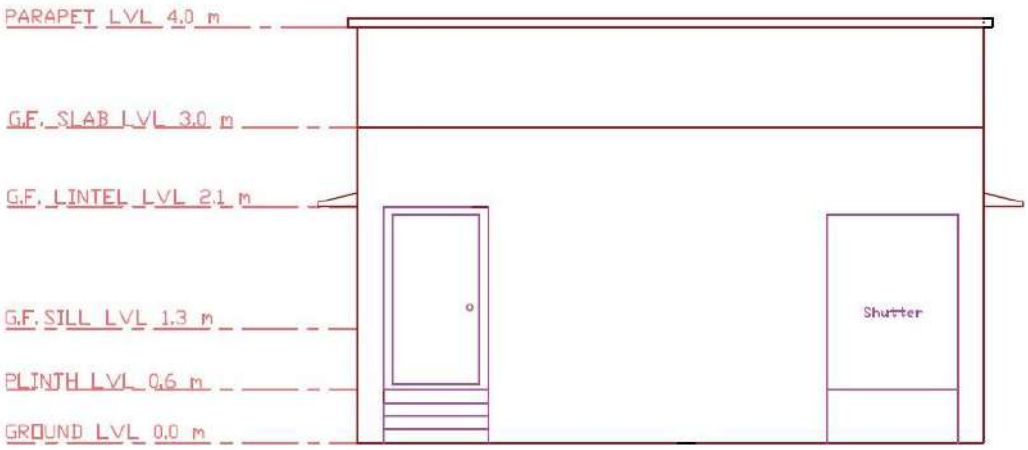


ELEVATION

Design Proposal: KRISHI KENDRA
Approximate Cost: 4,75,765

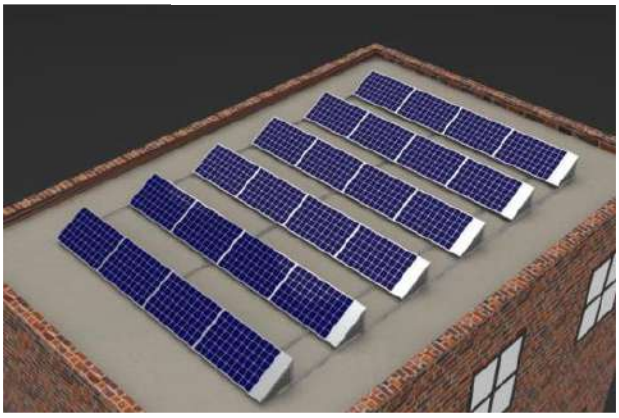


PLAN



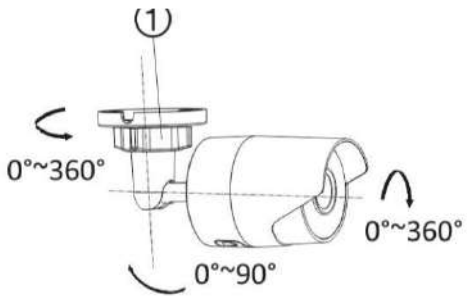
ELEVATION

Design Proposal: Solar panel for Cyber Café
Approximate Cost:1,85,159.00



PLAN

Design Proposal: CAMERA SYSTEM
Approximate Cost: 2,09,000



PLAN

Design Proposal: LED light for play ground
Approximate Cost: 10,000

SPECIAL FEATURES OF VY PHASE VIII

HIGHLIGHTS

GTU VY section had already planned the work action plan for both part I and II. The new format has been given to students in advance to enhance the knowledge and criteria.

- Orientation programs to understand the aim, objectives and scope of the Vishwakarma Yojana have been organized at GTU.
- In phase VIII students have directed to study and observe the ideal village then the VY section had allotted the different villages to team.
- Techno economic and smart village forms had been filled by the students for the data collection and the GAP analysis.
- In part – II, SAGY form is introduced to students for the planning the suitable proposed design in priorities. In part I & II students has to provide the following designs after data collections:

- Sustainable design (civil)
- Physical design (civil)
- Social design (civil)
- Socio – Cultural design (civil)
- Smart Village design (civil, Electrical)
- Heritage Village design (civil, Electrical)

CONCLUSION

We visited villages and held a complete survey of allocated village "Chapad", smart village "Ankodiya" and ideal village "Bil". After analysing the data, conclusion arrived that, there are primary infrastructure in which requires some maintenance in them. On that note, we have proposed some designs. Our goal is to develop the allocated village with the beauty of the ideal village and have technological elements same as there in smart village. On conducting gap analysis and taking support from the past survey of the project, we came across the problems and the work we had to design so as to give the village a sustainable and a developed rural area, an area with clean and green environment and full of prosperity and knowledge.

After visiting these two villages, we visit our Chapad Village. We saw the huge difference between the local bodies and villagers. Major issue for rural development particularly in India is the Political issues. All are working for themselves. They only want to develop them self instead of village. Villages need long term planning proposals in terms of master plan.

From our study we conclude that providing facilities is not the solution of rural development. All villages in Gujarat are now become very well compare to past. But we should focus on improvement on existing facilities. Villagers and also Gram Panchayats are not focusing on the existing facilities. Due to this villager try to discarding for its use. Also villagers are not aware about new technologies, which make them a better one. We should try to aware them.

PHOTOGRAPHS OF EXISTING CONDITION OF VILLAGE

Allocated Village- Chapad Village	
	
Gram Pamchayat	**Primary School**
	
Bank & ATM	**Water Tank**
	
Aanganvadi	**Aanganvadi**

Bus Stand

Post Office

Main Entrance

Public Toilet

Health Centre

Community Hall

	
Pond	**Cremation Ground**
	
Door to Door	**Drainage System**
	
Internal Road	**Sarpanch of Chapad Village**

FEEDBACK FROM NODAL OFFICER

The Government of Gujarat has lunched "Vishwakarma Yojana" (a scheme) with motto of Rurbanization for the undeveloped villages. Keeping the rural soul with urban facility is the main objective of this Yojana.as we had worked for the phase IV, V, VI and VII with this project, we feel very proud and this project is very much helpful to the final year engineering students. The definition of Civil Engineering is satisfied with this project. In project students get the experience in communication skills, technical aspects and find the problems to the villagers.

The frequently arranged technical workshop by the GTU helps the student to expose their knowledge and ideas. It is a great platform for the students to interact, learn and solving the problems.

We really thankful to whole GTU Vishwakarma Yojana team for successful implementation of such a noteworthy project. We wish to express our sincere thanks to our HOD, Principal and Staff members for their continuous support

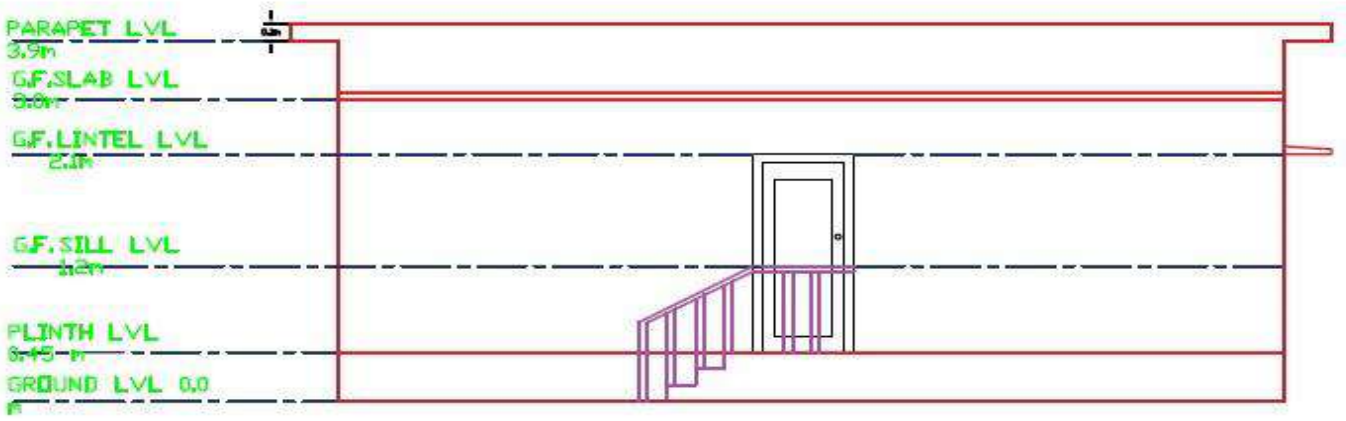
Thank You

Asst. Prof. Mr. Mayank B. Patel H.O.D. (Civil Engineering)

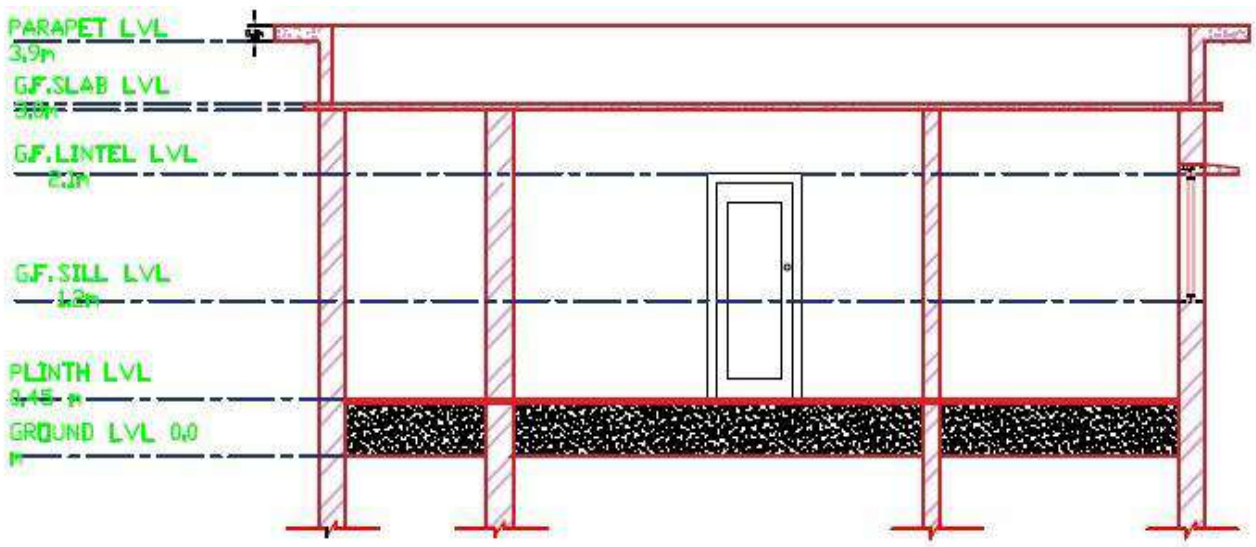
Asst. Prof. Mr. Yatin Patel H.O.D. (Electrical Engineering)

NODAL OFFICER

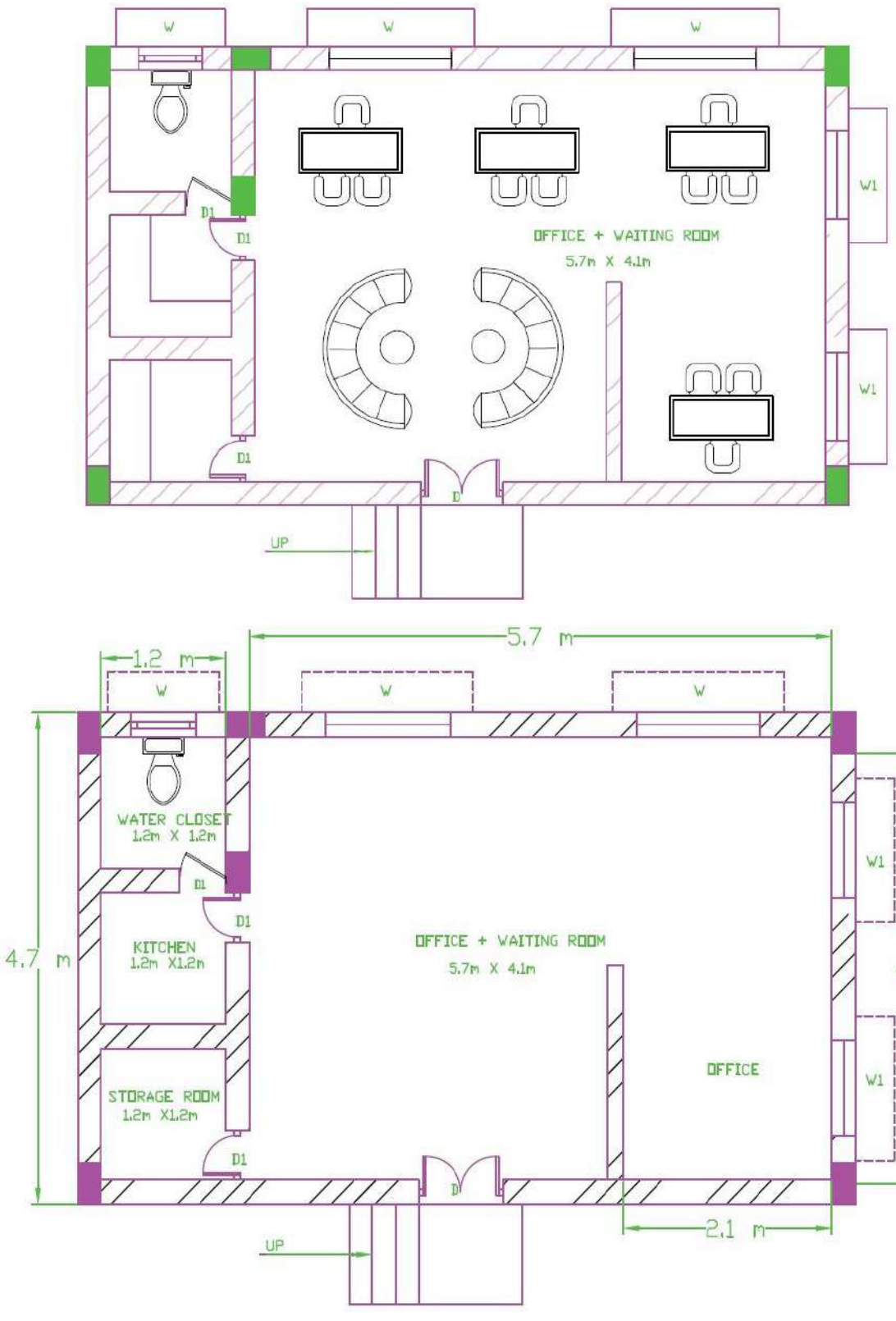
KJ INSTITUTE OF ENGG & TECHNOLOGY



ELEVATION



SECTION



PLAN

GENERAL NOTES:-

- All dimensions are in meters unless stated otherwise.
- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

Schedule of Opening			
Sr.No	Legend	Size (m)	No.
1.	D	1.2 X 2.1	1
2.	D1	1.0 X 2.1	2
3.	D2	0.8 x 2.1	1
4.	W	1.2 x 1.2	2
5.	W1	1.0 X 1.2	4
6.	V	0.8 x 0.8	1

To:-

Vishwakarma Yojana Phase VIII
Gujarat Technological University
Ahmedabad.

Design Name:-

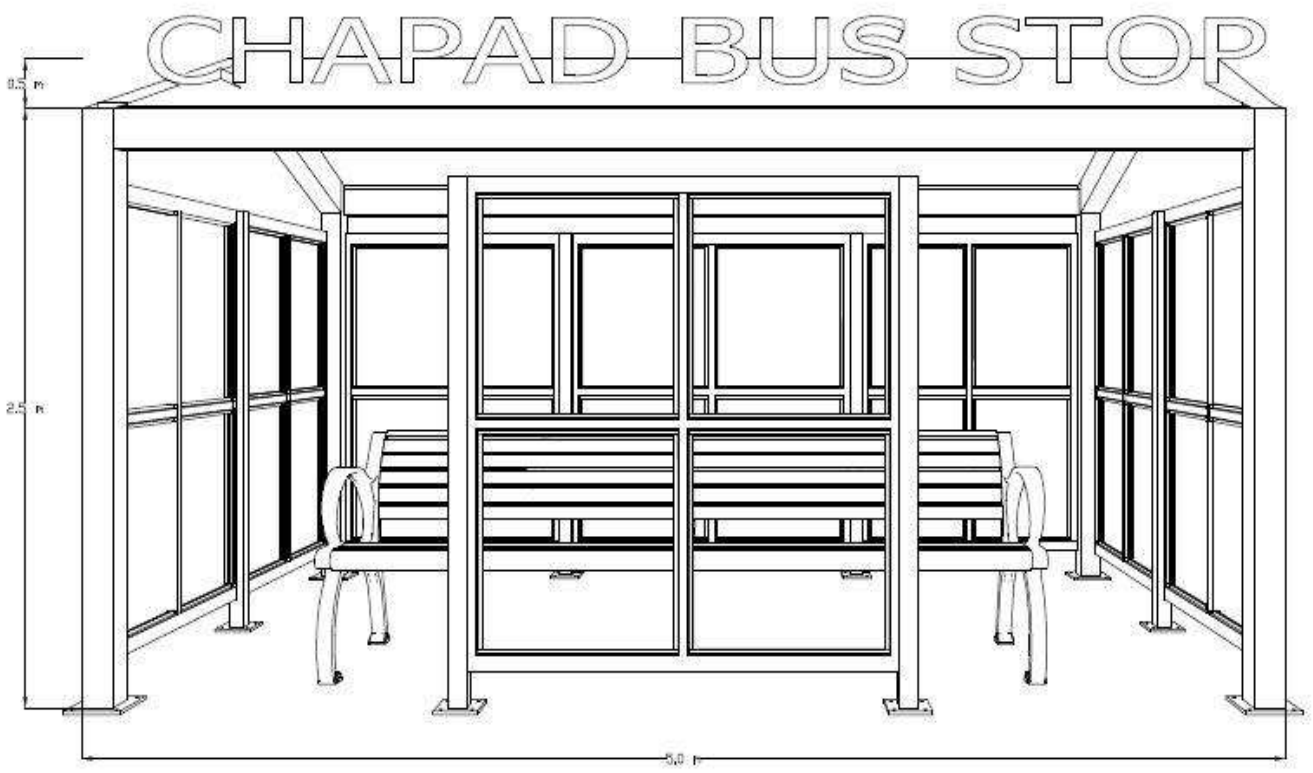
Design of Post Office at Chapad Village
(Vadodara District)

Design by:-

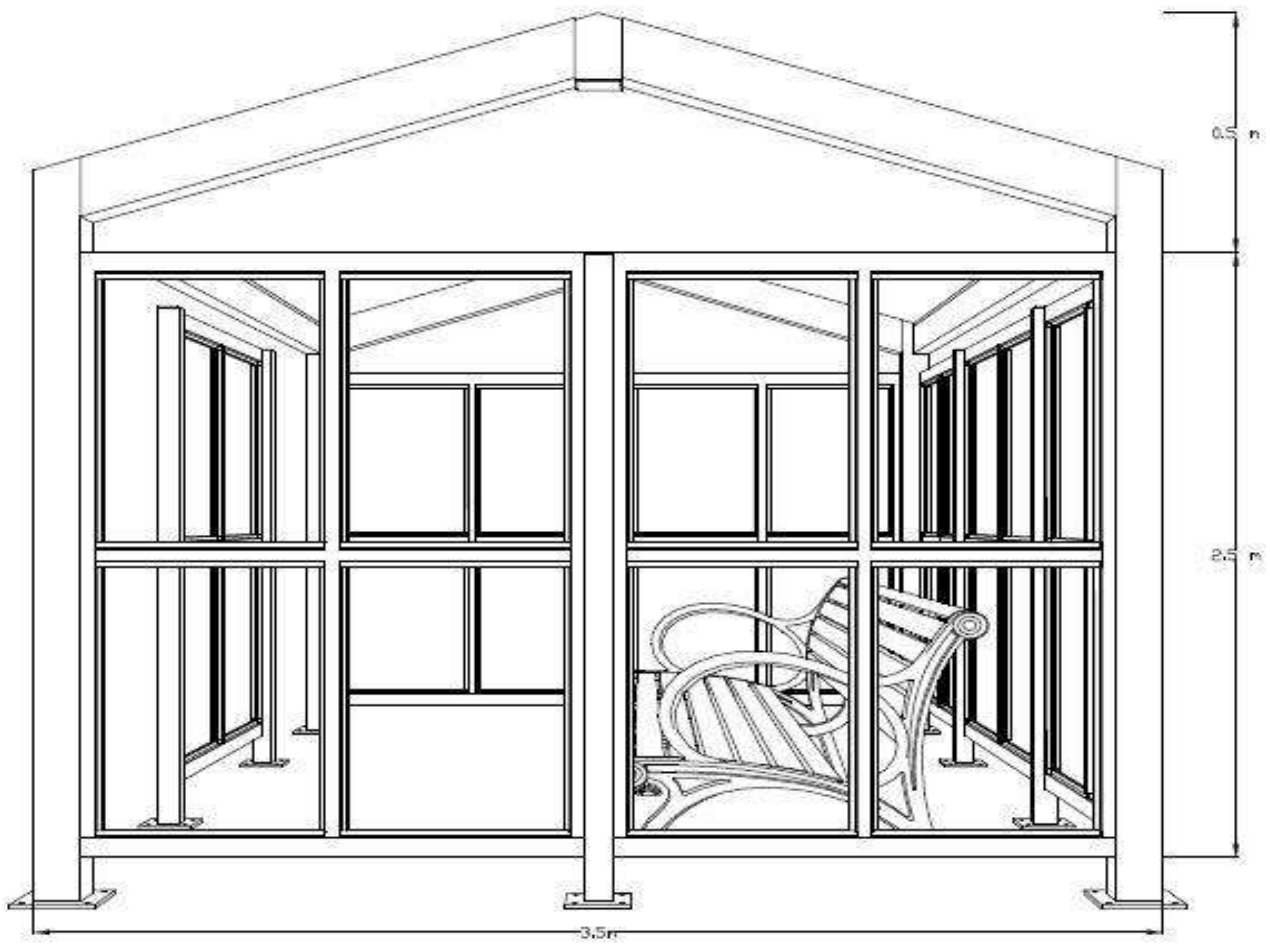
Prajapati Mehali M.
Patel Shweta S.

KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

Sheet No: - 1



ELEVATION



SECTION

GENERAL NOTES:-

- All dimensions are in meters unless stated otherwise.
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- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

To:-

Vishwakarma Yojana Phase VIII
Gujarat Technological University
Ahmedabad.

Design Name:-

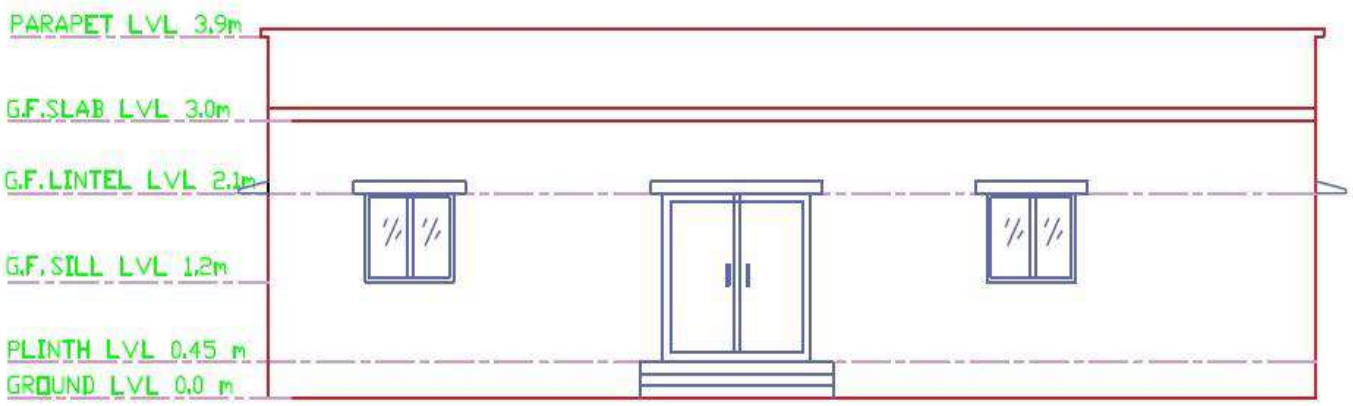
Design of Bus Stand at Chapad Village
(Vadodara District)

Design by:-

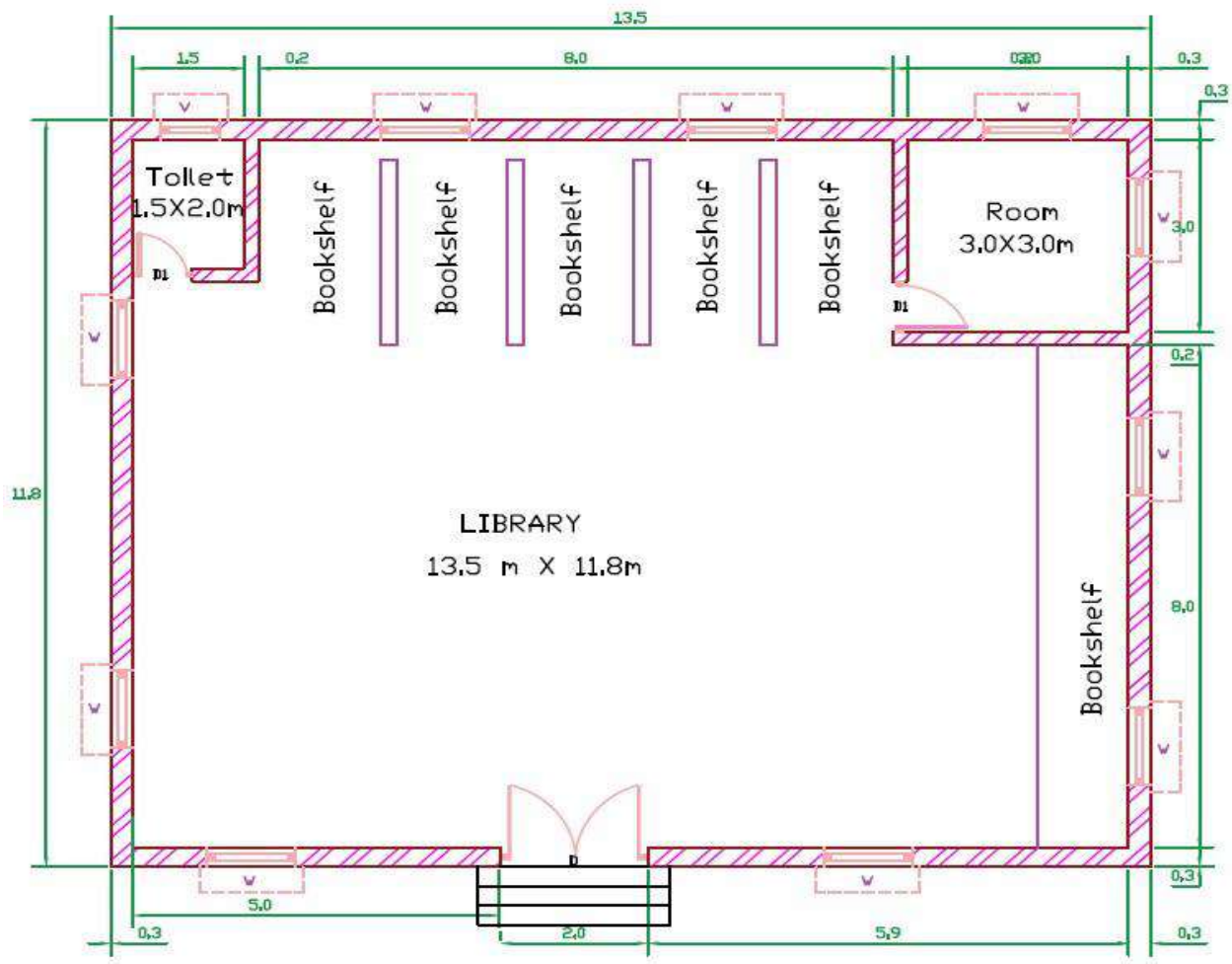
Prajapati Mehali M.
Patel Shweta S.

KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

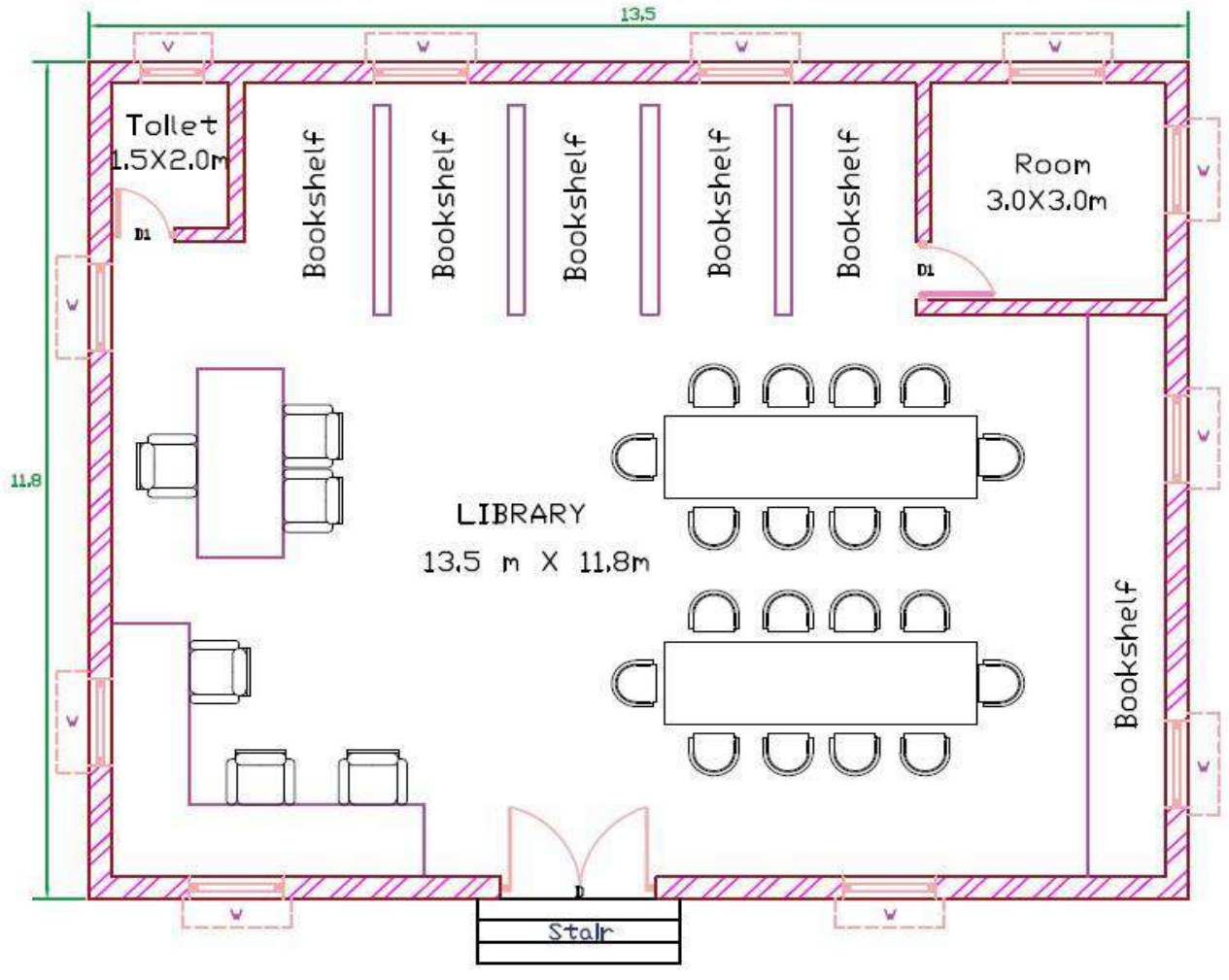
Sheet No: - 2



ELEVATION



PLAN



LAYOUT PLAN

GENERAL NOTES:-

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- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

Schedule of Opening			
Sr.No	Legend	Size (m)	No.
1.	D	1.2 X 2.1	1
2.	W1	1.2 x 1.2	3

To:-

Vishwakarma Yojana Phase VIII
Gujarat Technological University
Ahmedabad.

Design Name:-

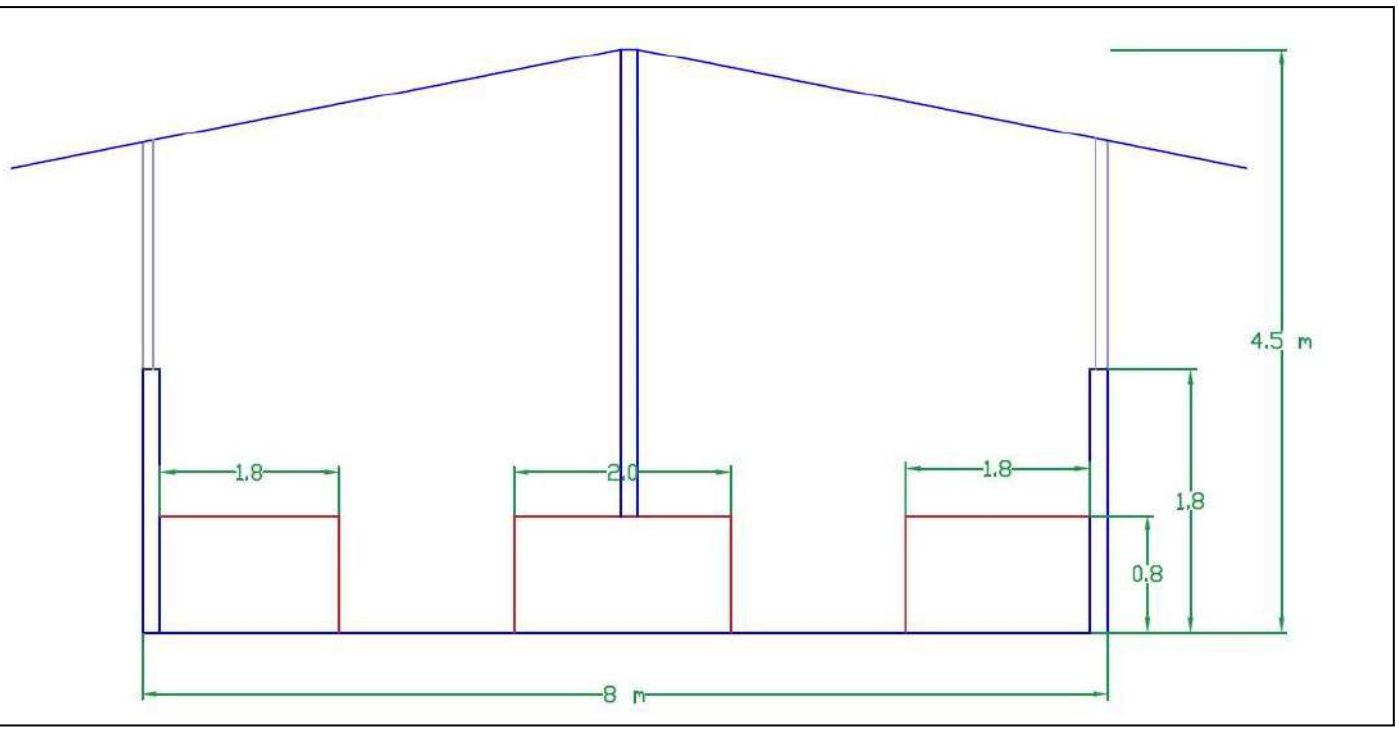
Design of Library at Chapad Village
(Vadodara District)

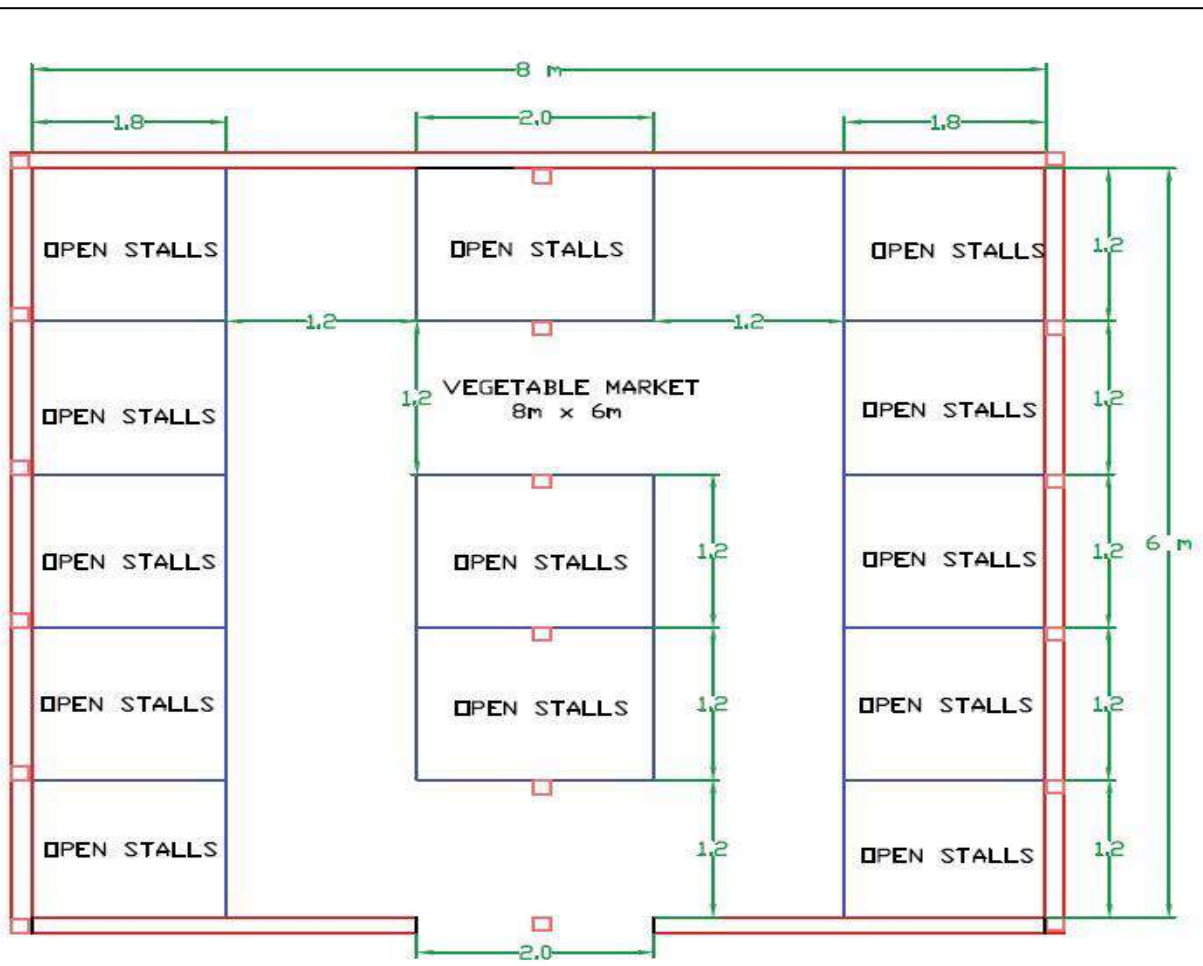
Design by:-

Prajapati Mehali M.
Patel Shweta S.

KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

Sheet No: - 3





PLAN

3D VIEW

GENERAL NOTES: -

- All dimensions are in meters unless stated otherwise.
- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

To: -

Vishwakarma Yojana Phase VIII
Gujarat Technological University
Ahmedabad.

Design Name: -

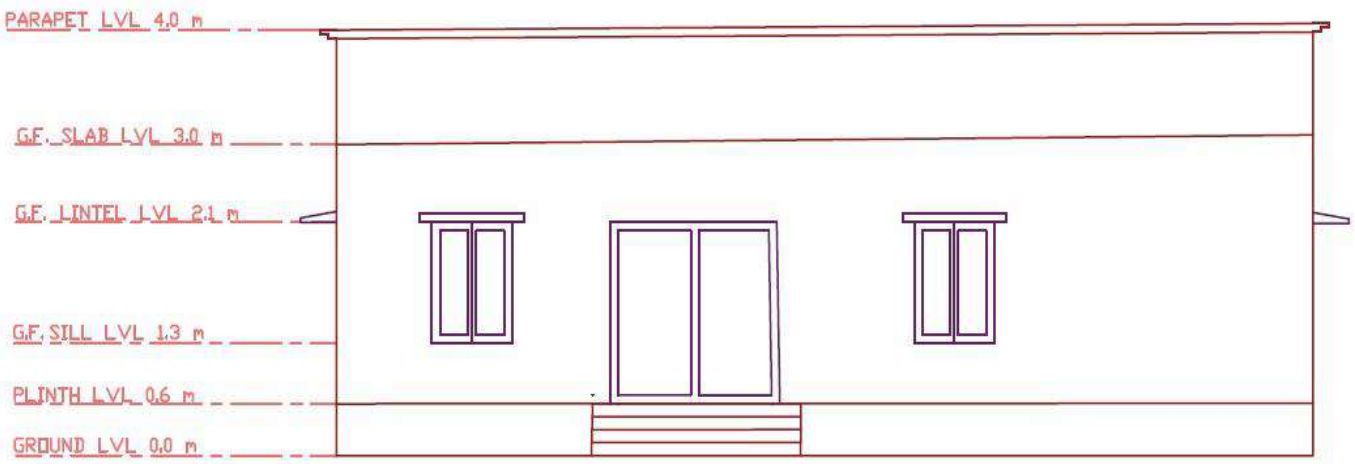
Design of Vegetable Market at Chapad Village
(Vadodara District)

Design by: -

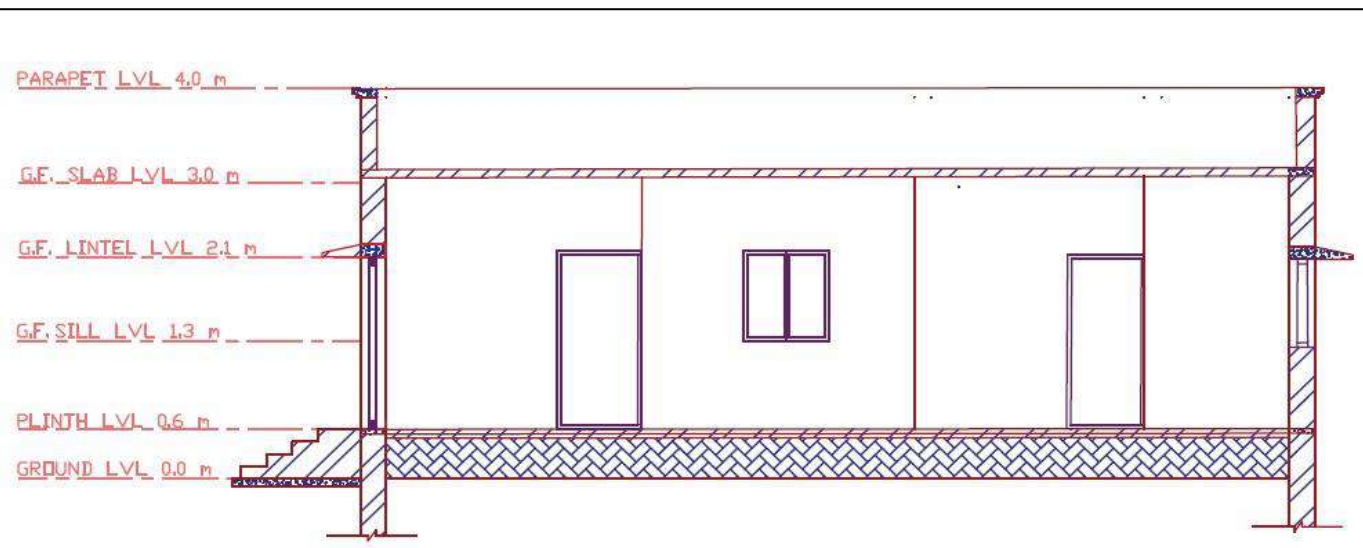
Prajapati Mehali M.
Patel Shweta S.

KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

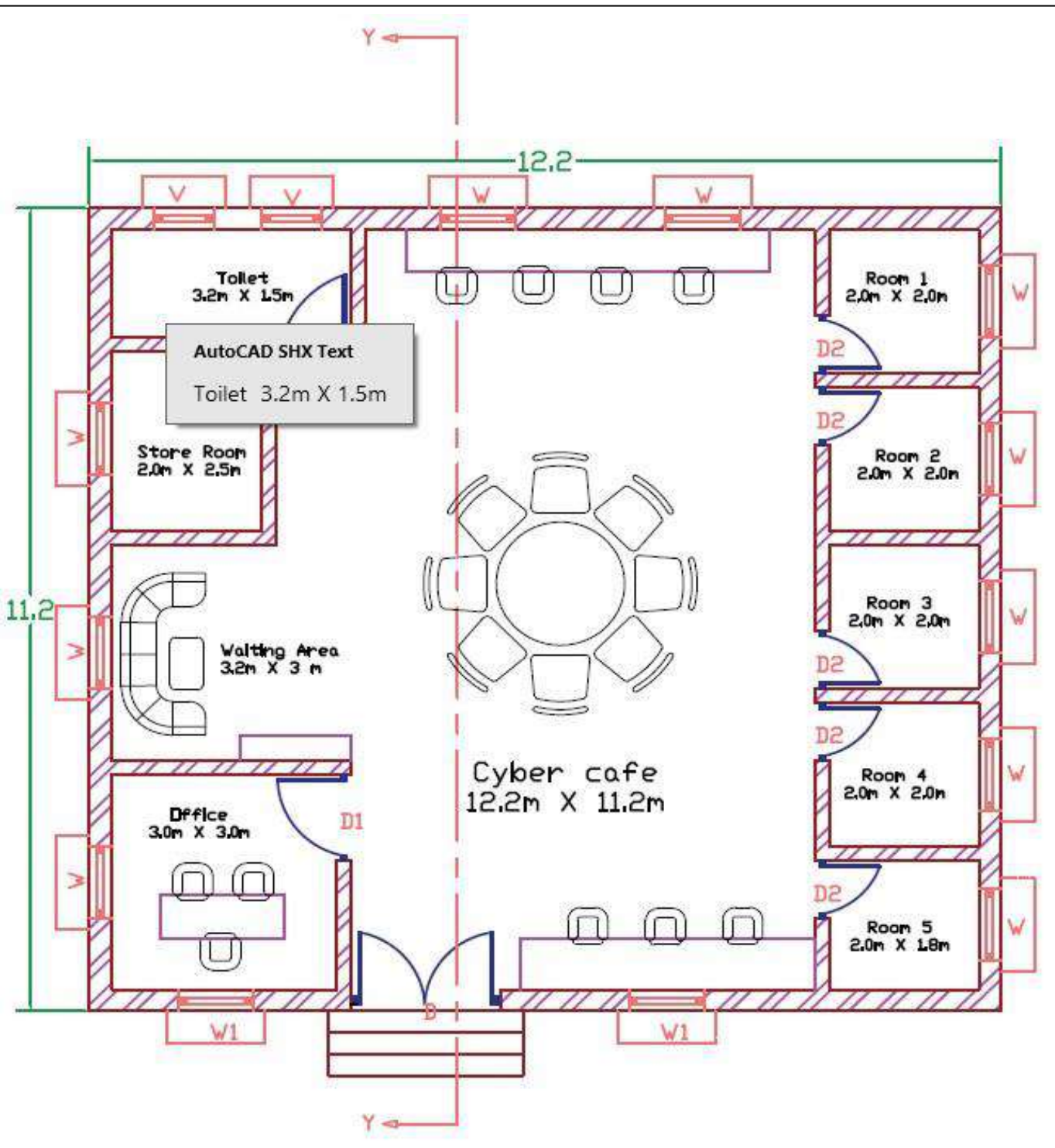
Sheet No: - 4



ELEVATION



SECTION



PLAN

GENERAL NOTES:-

- All dimensions are in meters unless stated otherwise.
- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

Schedule of Opening			
Sr.No	Legend	Size (m)	No.
1.	D	1.2 X 2.1	1
2.	W	1.2 x 1.2	3

To:-

Vishwakarma Yojana Phase VIII
Gujarat Technological University
Ahmedabad.

Design Name:-

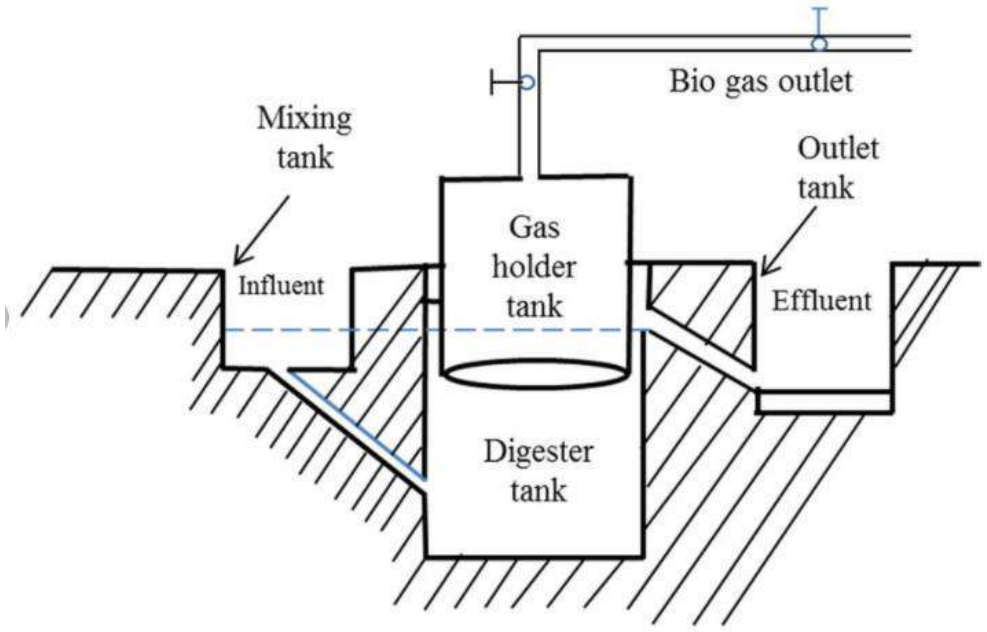
Design of Cyber Cafe at Chapad Village
(Vadodara District)

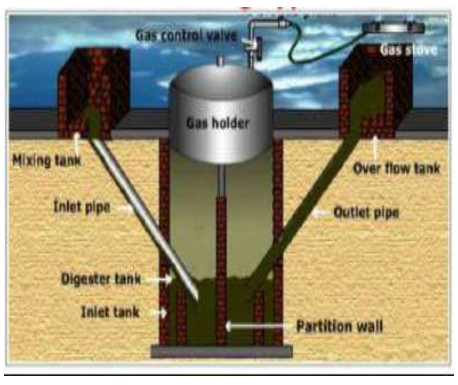
Design by:-

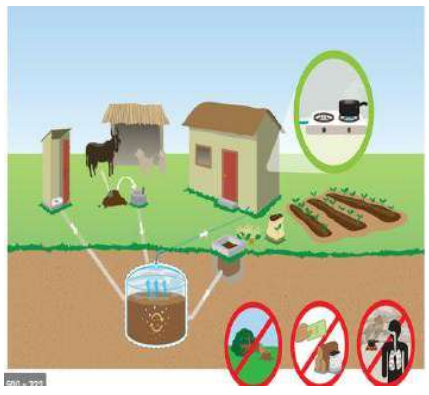
Prajapati Mehali M.
Patel Shweta S.

KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

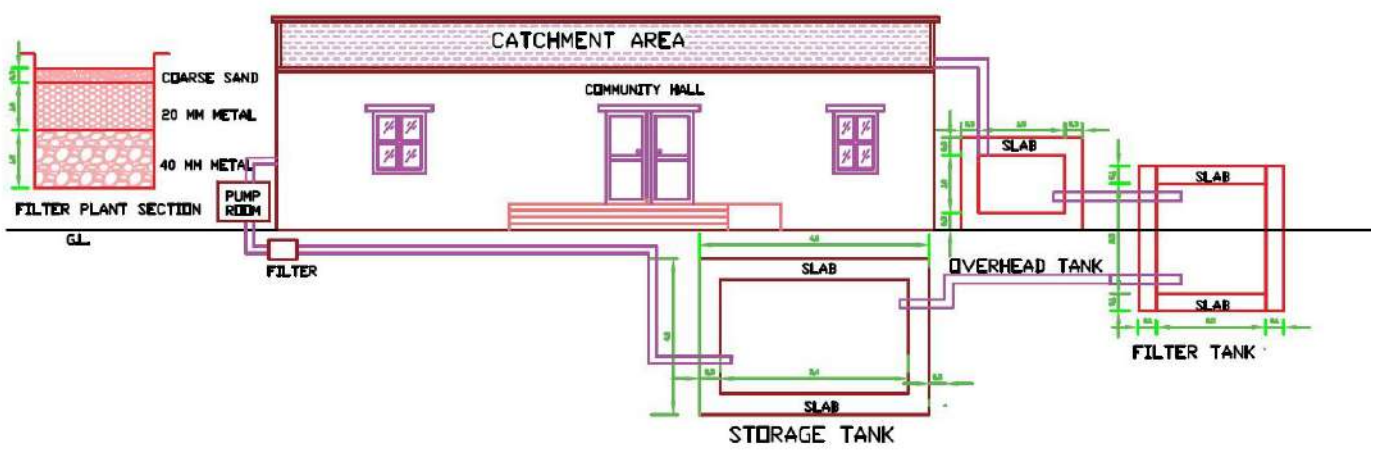
Sheet No: - 5

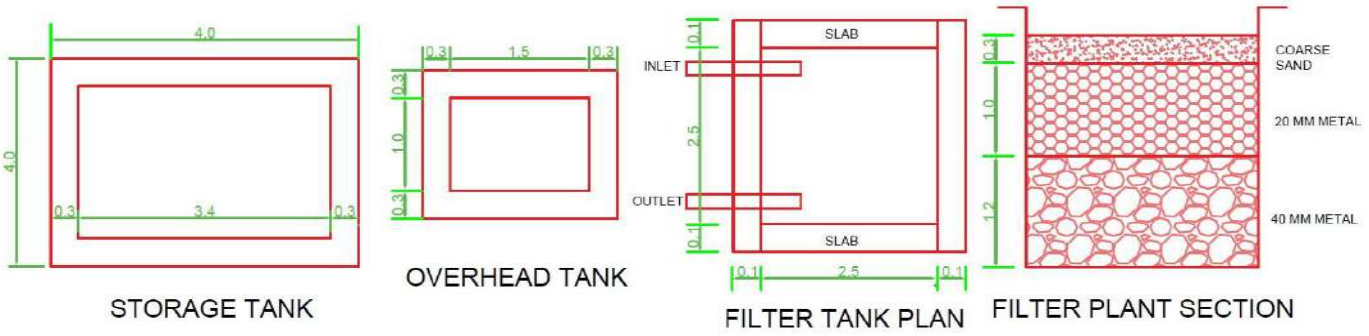


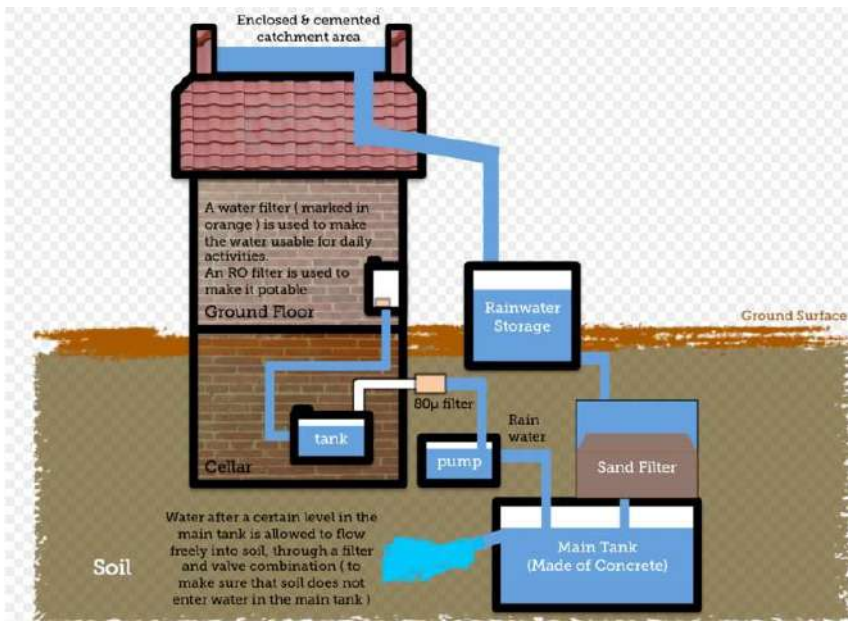




BIO GAS PLANT







RAIN WATER HARVESTING

GENERAL NOTES:-

- All dimensions are in meters unless stated otherwise.
- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

To:-

Vishwakarma Yojana Phase VIII
Gujarat Technological University
Ahmedabad.

Design Name:-

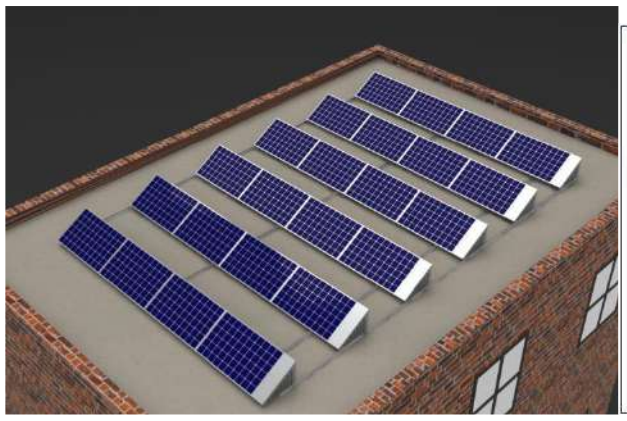
Design of Bio gas plant and Rain water harvesting
(Vadodara District)

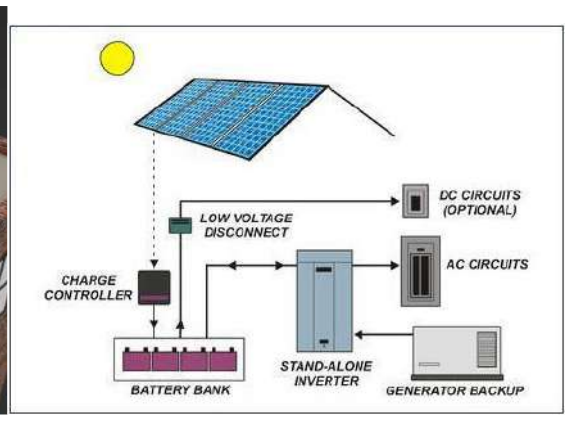
Design by:-

Prajapati Mehali M.
Patel Shweta S.

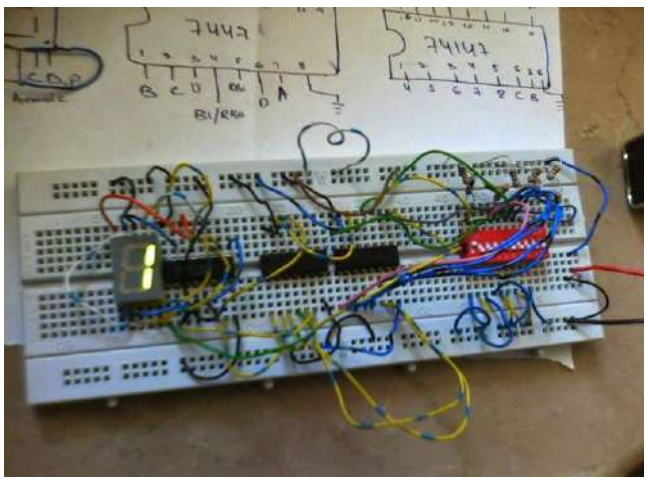
KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

Sheet No: - 6





Solar panel for cyber café



Seven Segment Display

LED street light

GENERAL NOTES:-

- All dimensions are in meters unless stated otherwise.
- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

To:-

Vishwakarma Yojana Phase VIII
Gujarat Technological University
Ahmedabad.

Design Name:-

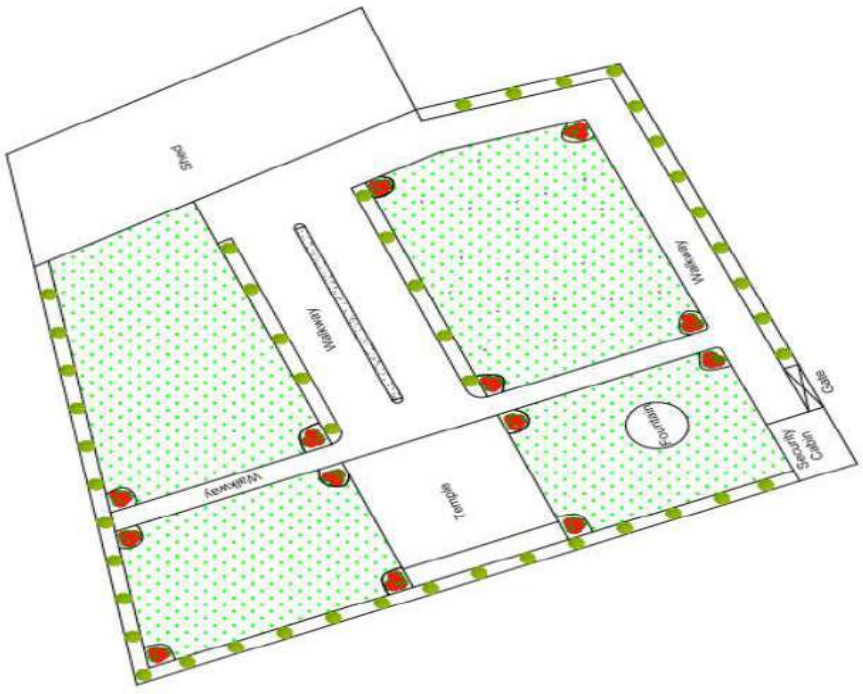
Design of Solar panel for cyber café, Seven segment display and LED street light
(Vadodara District)

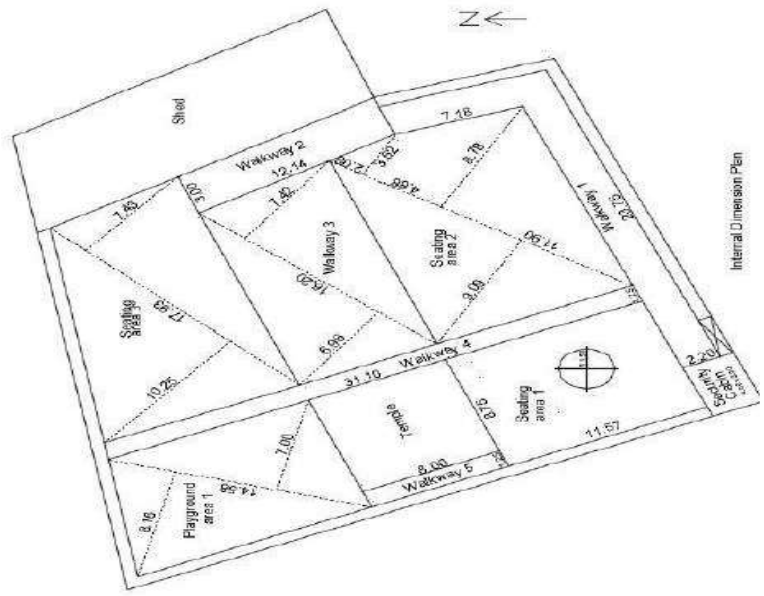
Design by:-

Panchal Kautul

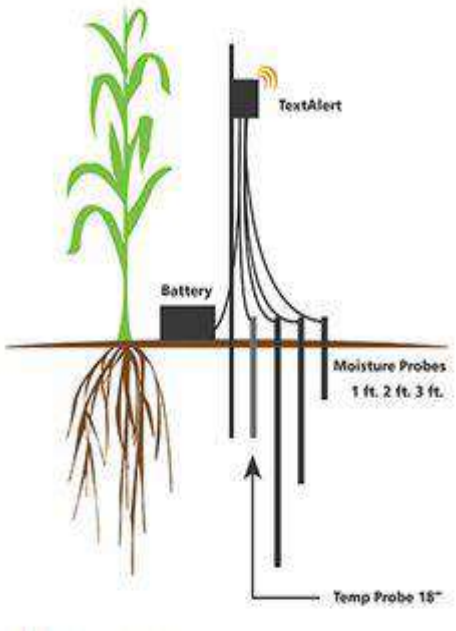
KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

Sheet No: - 7





PLAN and Automatic Light Control System Using LOR In Public Garden



Smart Plant Monitoring System Using IOT

GENERAL NOTES:-

- All dimensions are in meters unless stated otherwise.
- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

To:-

Vishwakarma Yojana Phase VIII
Gujarat TechnologicalUniversity
Ahmedabad.

Design Name:-

Design of Public Garden at Chapad Village and Automatic Light Control System Using LOR in Public Garden

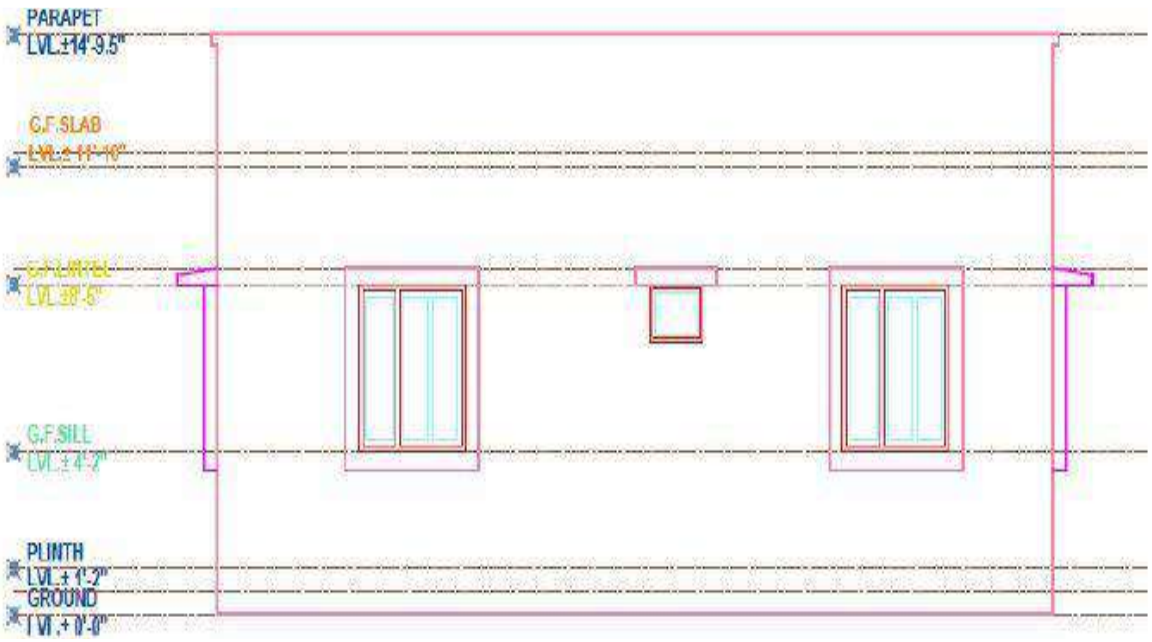
Smart Plant Monitoring System Using IOT
(Vadodara District)

Design by:-

Prajapati Mehali M.
Patel Shweta S.
Panchal kautul

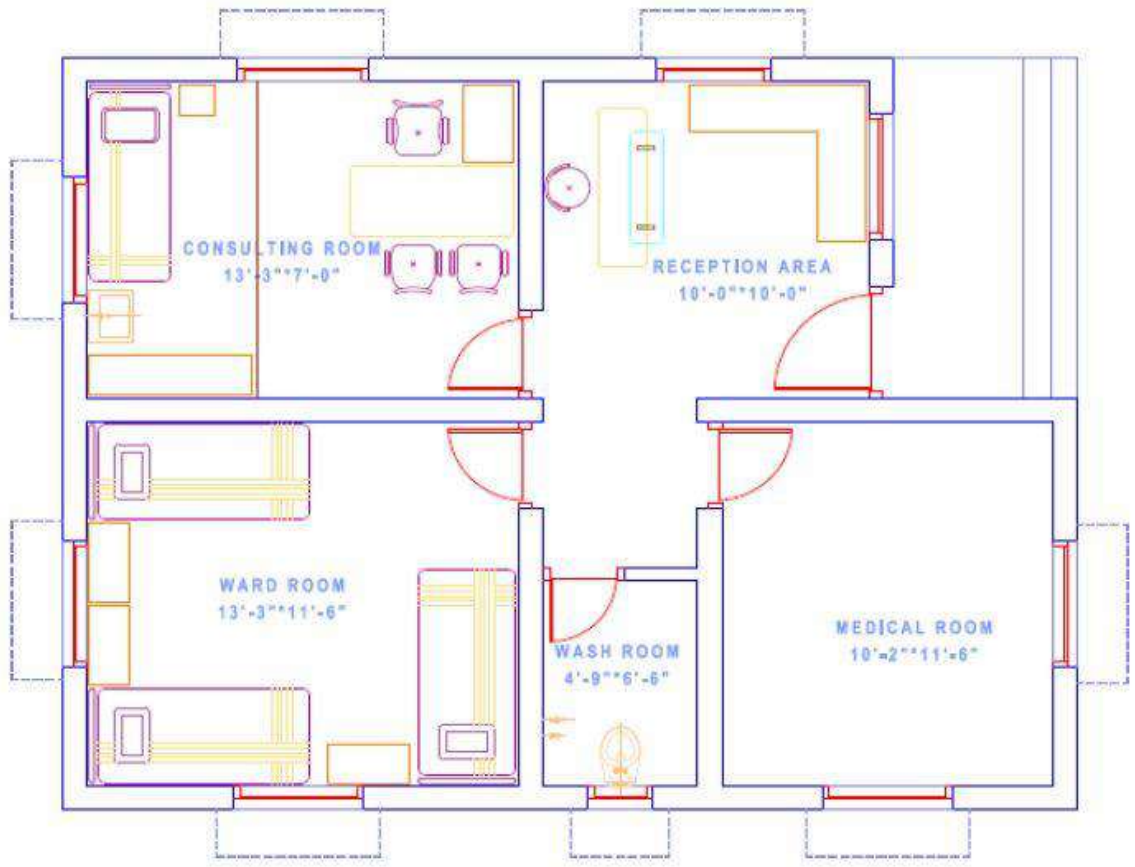
KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

Sheet No: - 8



ELEVATION

3D VIEW



PLAN

GENERAL NOTES:-

- All dimensions are in feet and inches unless stated otherwise.
- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

Schedule of Opening			
Sr.No	Legend	Size (m)	No
1.	D	1.5 X 2.1	1
2.	D1	1.2 X 2.1	4
3.	D2	1.0 x 2.1	1
4.	D3	0.8 X 2.1	5
4.	W	1.2 x 1.0	4
5.	W1	1.0 X 1.0	6
6.	V	0.4 x 0.4	5

To:-

VishwakarmaYojana Phase VIII Gujarat Technological UniversityAhmedabad.

Design Name:-

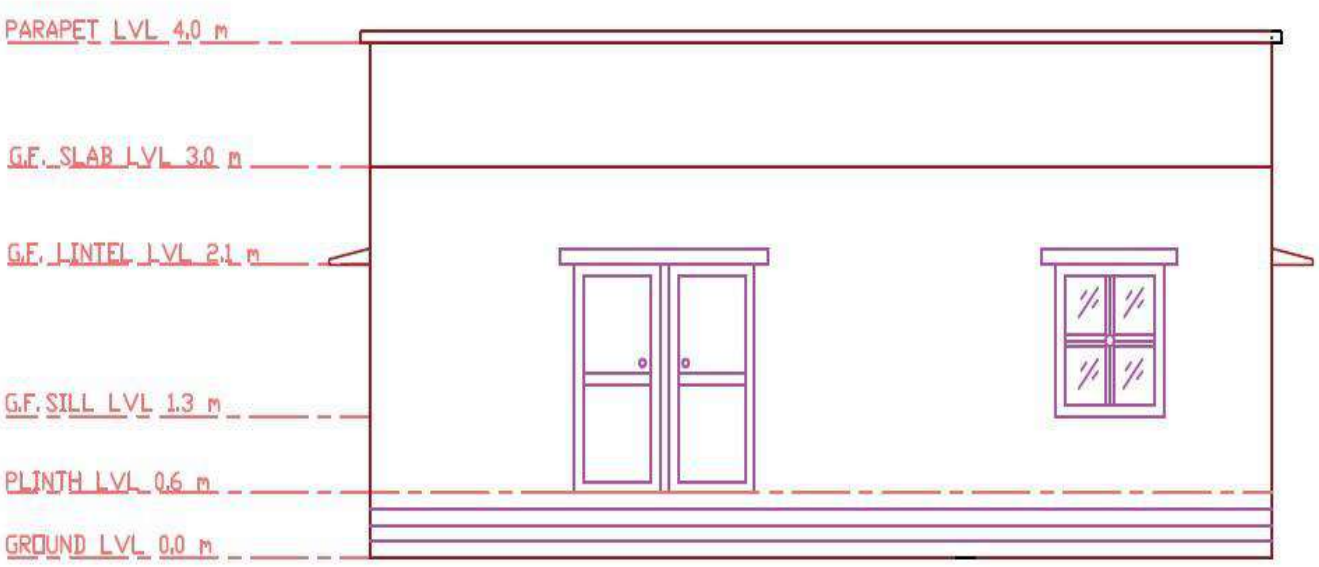
Design of Public Health centre at Chapad Village
(Vadodara District)

Design by:-

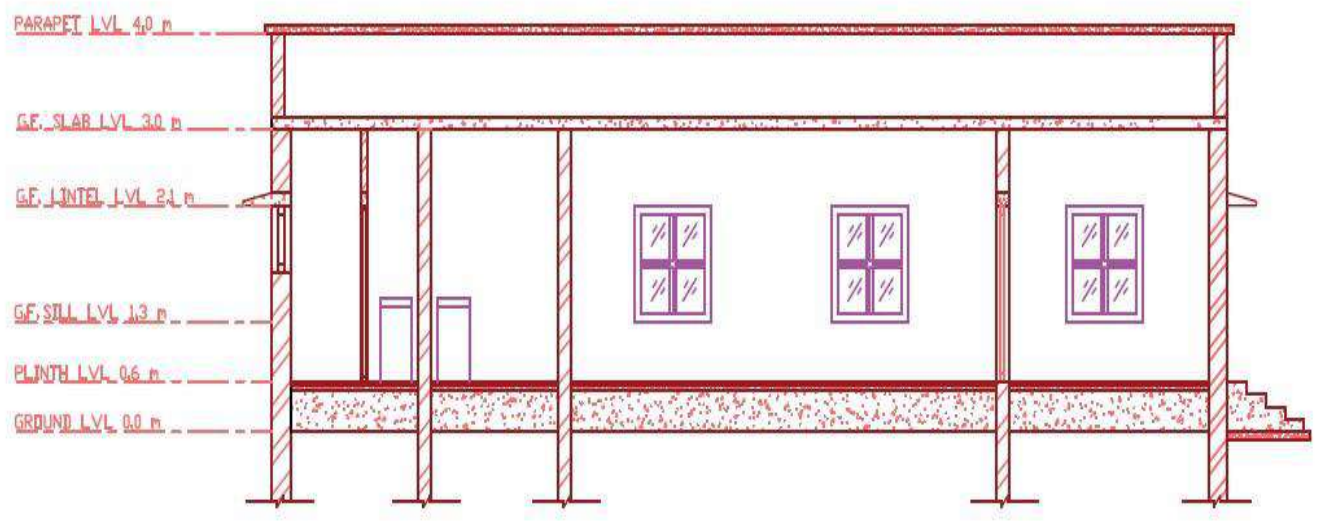
PrajapatiMehali M.
Patel Shweta S.

KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

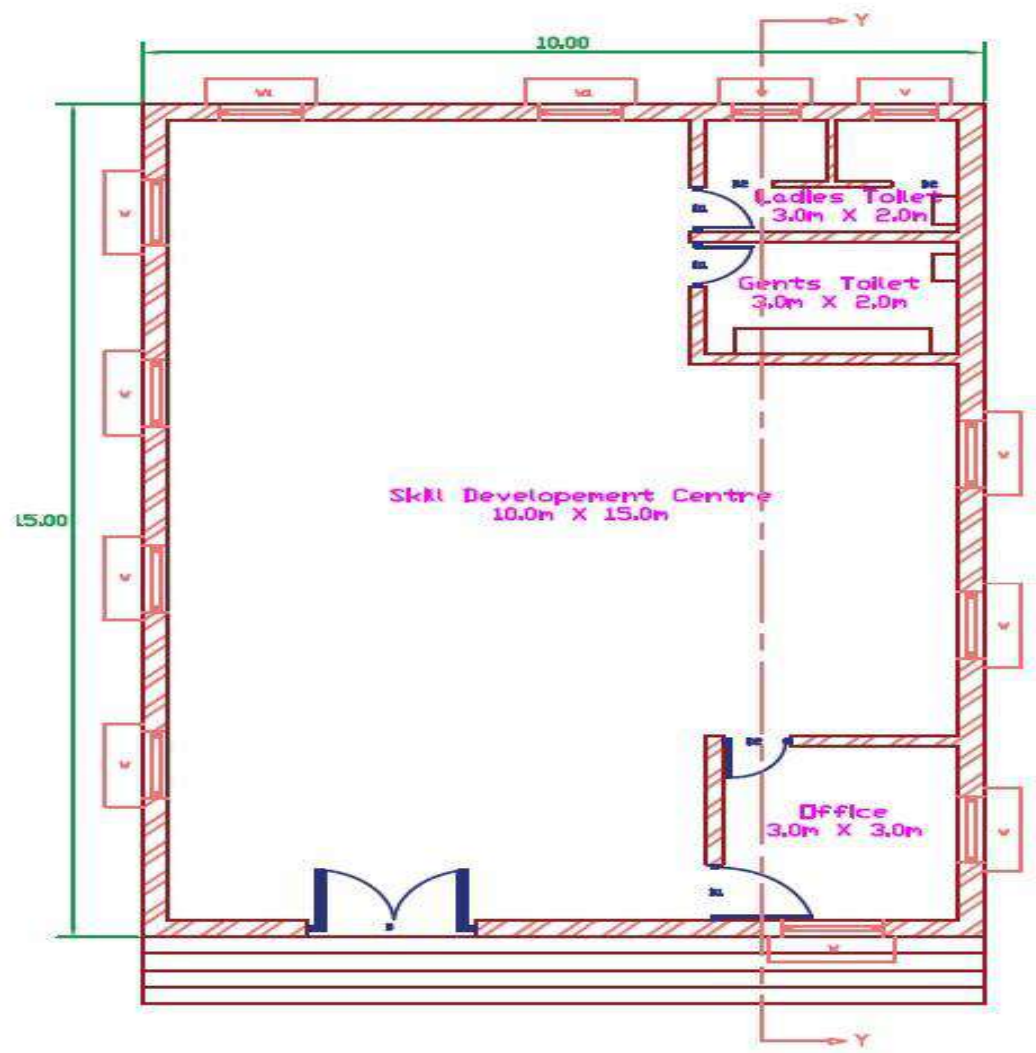
Sheet No: - 9



ELEVATION



SECTION



PLAN

GENERAL NOTES:-

- All dimensions are in meters unless stated otherwise.
- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

Schedule of Opening			
Sr.No	Legend	Size (m)	No.
1.	D	2.0 X 2.1	1
2.	D1	1.0 X2.1	3
3.	D2	0.8 X 2.1	3
4.	W	1.2 X 1.2	8
5.	W1	1.0 X 1.2	2
6.	V	0.8 X 0.8	2

To:-

VishwakarmaYojana Phase VIII Gujarat Technological UniversityAhmedabad.

Design Name:-

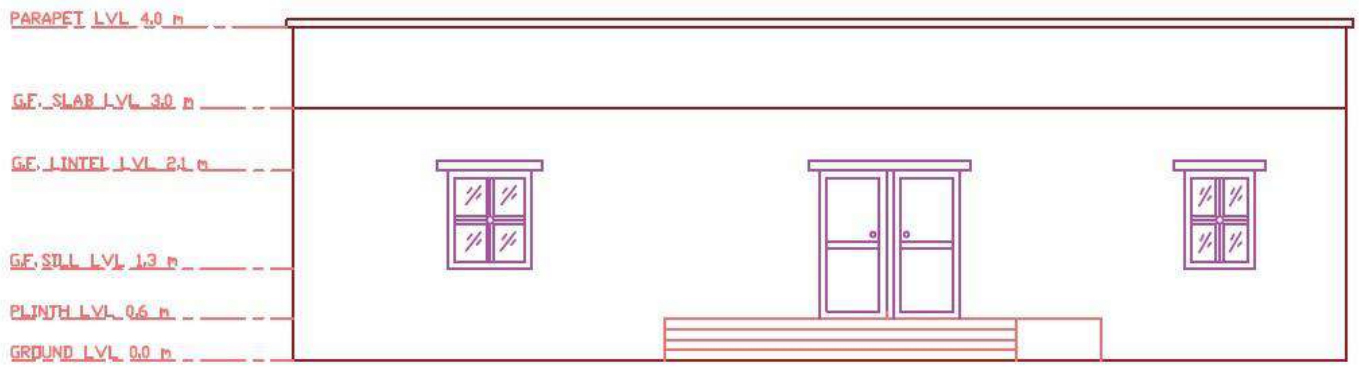
Design of Skill Development Centre at Chapad Village (Vadodara District)

Design by:-

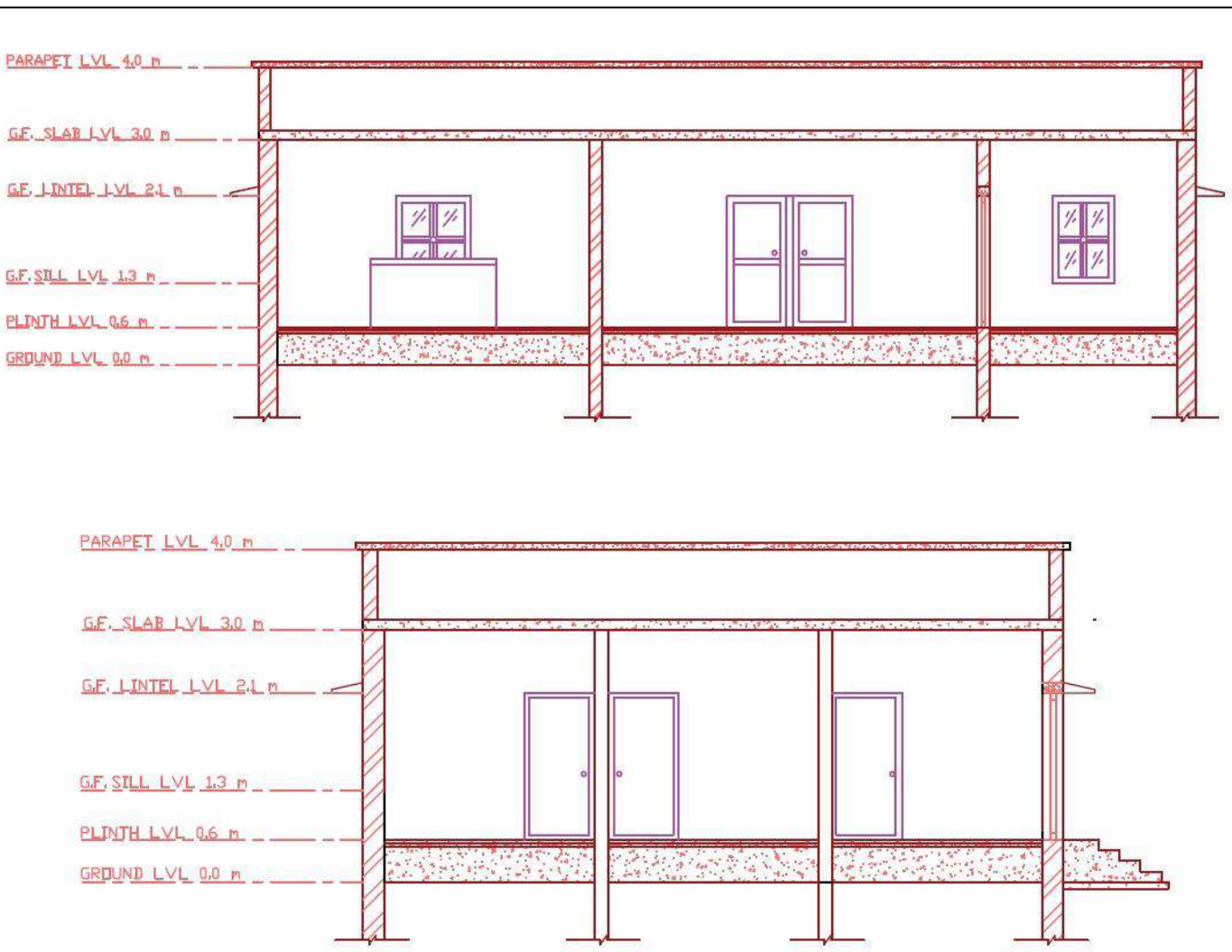
PrajapatiMehali M.
Patel Shweta S.

KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

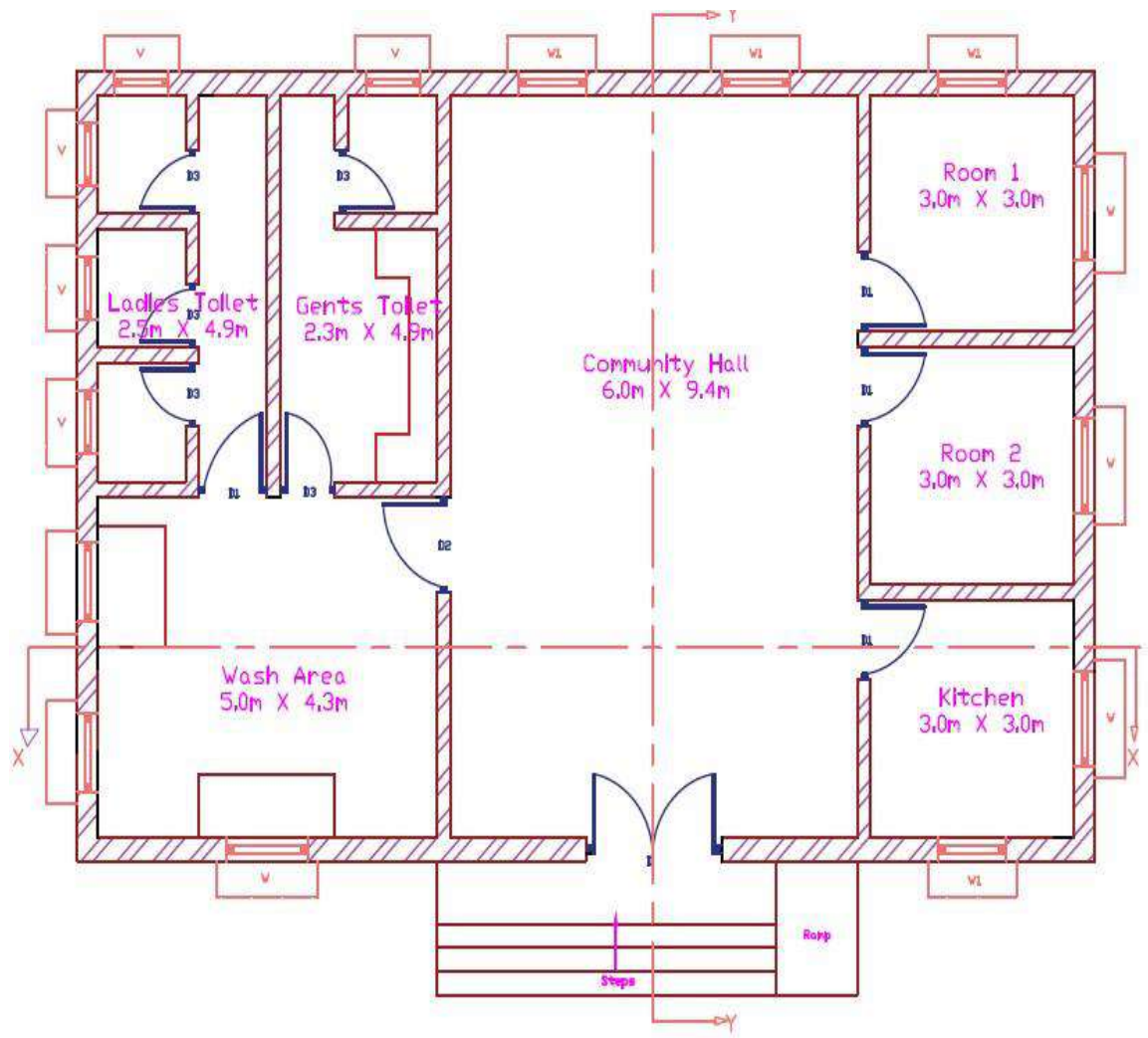
Sheet No: - 10



ELEVATION



SECTION



PLAN

GENERAL NOTES:-

- All dimensions are in meters unless stated otherwise.
- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot dimensions.

Schedule of Opening			
Sr.No	Legend	Size (m)	No.
1.	D	1.5 X 2.1	1
2.	D1	1.2 X 2.1	4
3.	D2	1.0 x 2.1	1
4.	D3	0.8 X 2.1	5
4.	W	1.2 x 1.0	4
5.	W1	1.0 X 1.0	6
6.	V	0.4 x 0.4	5

To:-

VishwakarmaYojana Phase VIII
Gujarat Technological UniversityAhmedabad.

Design Name:-

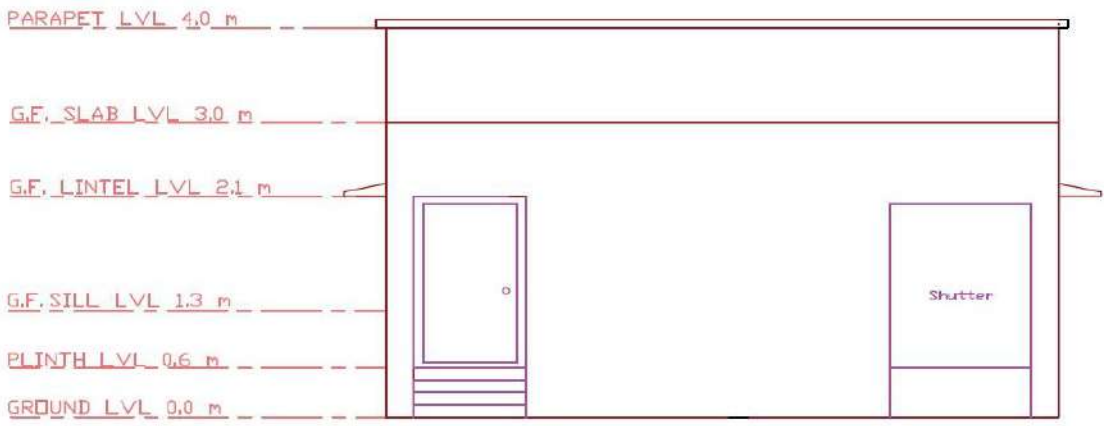
Design of Community hall at Chapad Village
(Vadodara District)

Design by:-

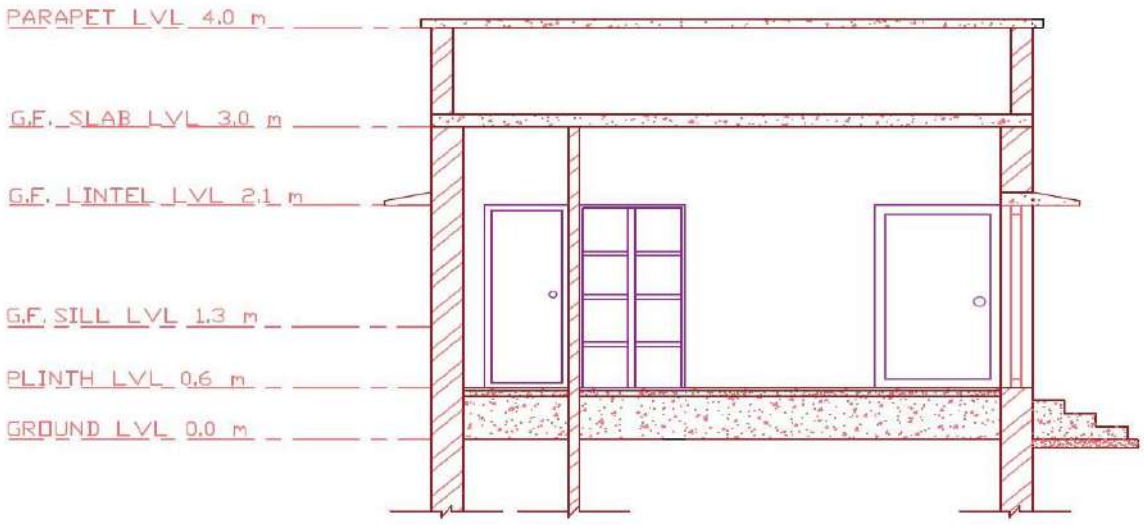
PrajapatiMehali M.
Patel Shweta S.

KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

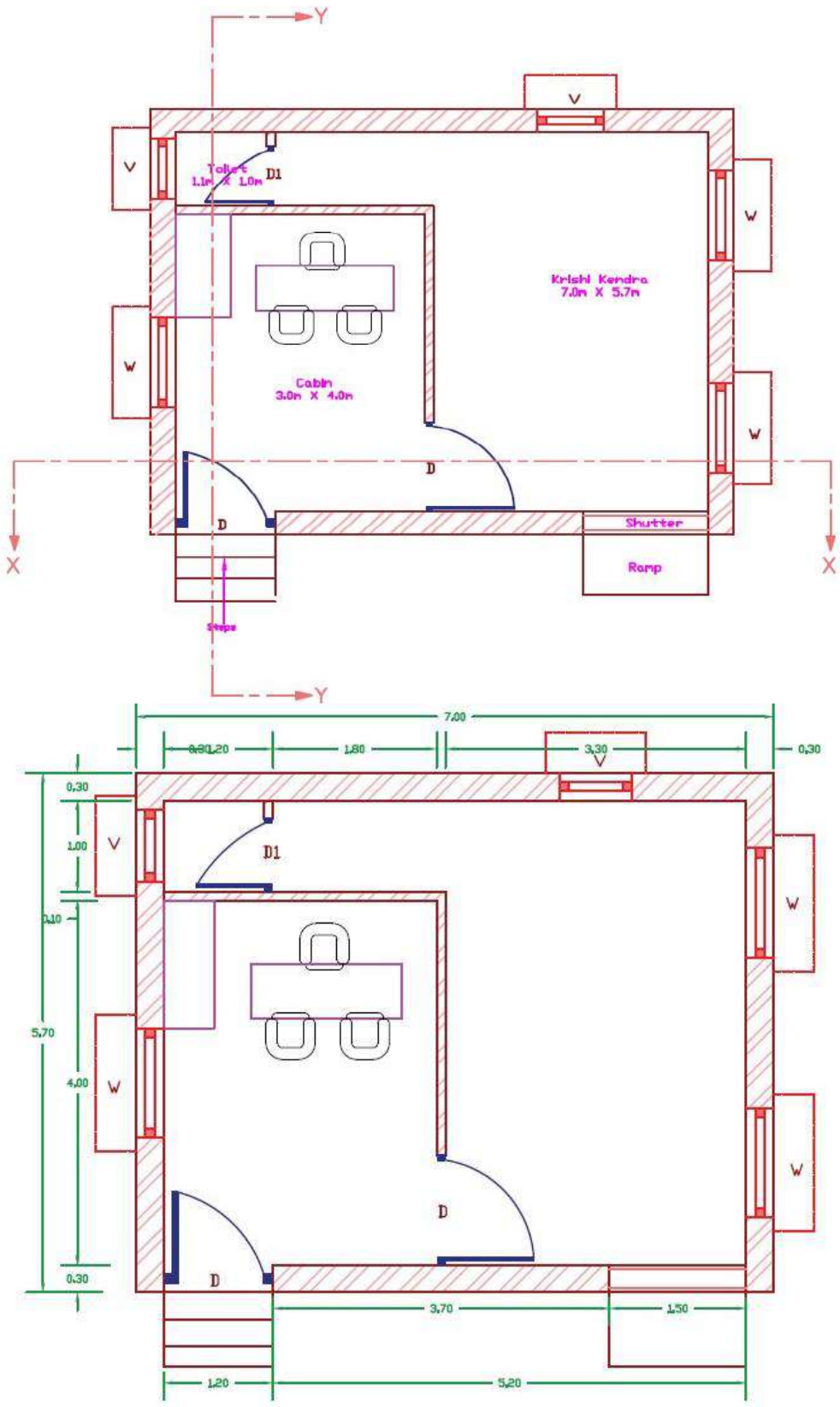
Sheet No: - 11



ELEVATION



SECTION



PLAN

GENERAL NOTES:-

- All dimensions are in meters unless stated otherwise.
- Drawing should be read not to scale.
- Consider all level as finished floor level.
- Before commencement of work various service i.e. plumbing, electrical, fire services should consider.
- Design is prepared only for education purpose. Correctness of all data must be check before use.
- Designer is not responsible for any kind of wrong data.
- Minimum grade of concrete is M20 unless shown otherwise and all steel grade is FE500.
- Check first the plot

Schedule of Opening			
Sr.No	Legend	Size (m)	No.
1.	D	1.2 X 2.1	2
2.	D1	0.9 X 2.1	1
3.	W	1.0 x 1.0	3
4.	Shutter	1.5 X 2.1	1
5.	V	0.8 x 0.4	2

To:-

VishwakarmaYojana Phase VIII
Gujarat Technological
UniversityAhmedabad.

Design Name:-

Design of Krishi Kendra at Chapad Village
(Vadodara District)

Design by: -

PrajapatiMehali M.
Patel Shweta S.

KJ INSTITUTE OF ENGINEERING AND TECHNOLOGY

Sheet No: - 12