DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
Visaman Village
Rajkot District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
Parmar Parth	Civil Engineering	180893106044
Parmar rushit	Civil Engineering	180893106046
Jaydeep Ghediya	Electric Engineering	180893109017

Shri Labhubhai Trivedi Institute
of Engineering & Technology
Kalavad Road, Rajkot.

Prof. Mehul M Chavda
Assistant Professor
Dept. of Civil Engineering

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

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CERTIFICATE

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

Detail Project Report for

VILLAGE : VISAMAN

DISTRICT : RAJKOT

Under

Vishwakarma Yojana: Phase-VIII

in partial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA

during the academic year 2020-21.

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

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Date of Report Submission:	
Principal Name and Signature:	**Dr. B.M. Ramani**
VY-Nodal Officer Name and Signature:	**Prof. Mehul M Chavda**
Internal(Evaluator) Guide Name and Signature:	**Prof. Mehul M Chavda**
College Name:	**Shri Labhubhai Trivedi Institute of Engineering and Technology**
College Stamp:	

ABSTRACT

Developing a village with a 'rural soul but with all urban amenities is that a city may have Vishwakarma Yojana is one of the initiatives towards GUJARAT TECHNOLOGICAL UNIVERSITY, Which was allotted a real time situation type of project provides to GTU. The students are meeting the people of village of and survey the existing facilities provided in village. The villages in Gujarat still not developed with respect to amenities required. The project will provide some Design and Recommendation of Various Infrastructure facilities for the development of Village. Visaman is a Village in Paddhari Taluka in Rajkot District of Gujarat State, India. It is located 35 KM towards west from District headquarters Rajkot. 9 KM from Paddhari. 280 KM from State capital Gandhinagar. Visaman Pin code is 360110 and postal head office is Paddhari. According to Census 2011 information the location code or village code of Visaman village is 512889. The total geographical area of village is 1708.14 hectares. Visaman has a total population of 2,030 peoples. There are about 426 houses in Visaman village. Visaman Local Language is Gujarati.

The condition of selected village is good enough. The village has facilities of primary school, healthcare centre, 4 temples. The conditions of road is not good enough and it's required some maintenance and street light. Village don't have proper drainage systems. Waste water disposal system is not good enough. Village don't have any separate hospital or ATM, bus stop, Petrol pumps, and super market and recreational center. For getting this facility they have to go nearest Taluka Paddhari which is 14 KM far from Visaman village.

It consists assessment of the infrastructure facilities like Water, Electricity, Drainage, Road, Soil waste management, renewable energy application. Telecommunication etc. and Social infrastructure facilities like Education Health Library. Community Hal. Recreation facilities and other Renewable energy like solar Street light, Rain water harvesting Biogas plant, & other for sustainable development.

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 digital by providing E-facilities. Also it is important to maintain the existing facilities rather than new development. We 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. As our village is heritage site and surrounded by other religious temples we can develop it as tourism clustered.

The main Aim of the project is to provide urban amenities in rural areas and maintaining the rural soul. The project will help in developing villages sustainable manner, reduce migration from villages and communication for city.

Keywords: Development of road and highway, public toilets, recreational center, ATM, transportation facilities etc.

ACKNOWLEDGEMENT

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

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

We also express our gratitude to **Dr. K.N.Kher**, **Registrar, Gujarat Technological University-Ahmedabad** for giving us complete support.

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

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We are also thankful to our **Prof**. **Dr. B.M. Ramani Principal**, faculties of our colleges for their encouragement and support to complete this project work.

An act of gratitude is expressed to our internal guide / Evaluator / Nodal Officer, **Prof. Mehul M Chavda from college Shri Labhubhai Trivedi Institute of Engineering and Technology** 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.)Jigar Sevalia**, 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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Above all we would like to thank our Parents, family members and Friends for their encouragement and support rendered in completion of the present this work.

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ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
HVAC	Heating Ventilation and Air conditioning systems
ATMS	Advanced traffic management system
LCPD	Litter capita per day
SWM	SWATCH BHARAT MISSION
PHC	Primary Healthcare Centre
CLPR	Child labour prohibition and regulation
DRDA	District Rural Development Agency (drda)
UNICEF	United Nations children's Fund
IRDP	Integrated Rural Development Program
FWP	Factory Wholesale price
NREP	National Rural Employment Program
JRY	Jawahar Rozgar Yojana
TRYSEM	Training of Rural Youth for Self-Employment
URDPFI	Urban and Regional Development Plan Formulation and Implementation
AMPC	Agricultural Product Market Committee
NGO	Non-Governmental Organization
HVAC	Heating, Ventilation and Air Conditioning
CBD	Central Business Districts
LCPD	Litre Capita Per Day
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
GEB	Gujarat Electricity Board
ATMS	Advance traffic management system
ATM	Automated trailer machine
GSRTC	Gujarat State Road Transport Corporation
RO	Reverse osmosis
PGVCL	Paschim Gujarat village company Ltd
KM	Kilometre
BMTPC	Building material & technology promotion council
PWD	Public works department
SOR	Schedule of rates

Chapter : 1

Ideal village visit from District of Gujarat State

1.1 Background and study area location

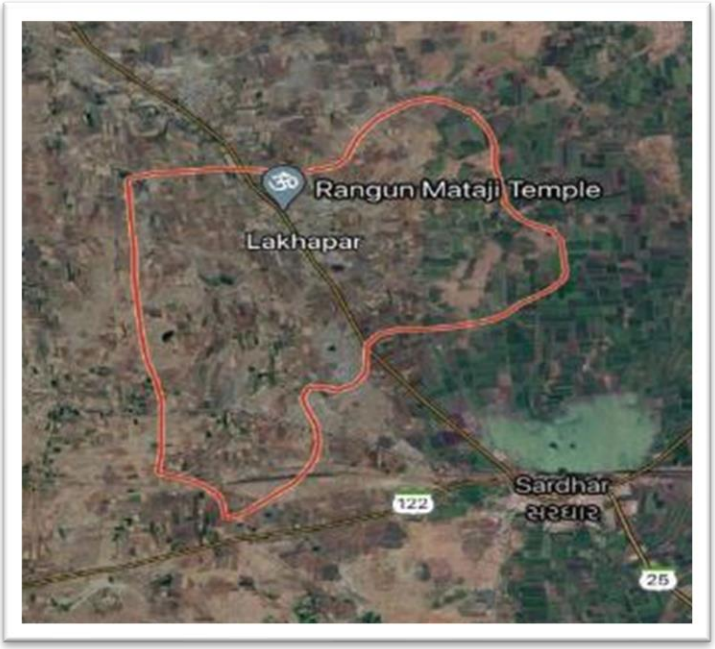
Background :

Ideal village is a concept adopted by national, state and local governments of India, as a focused on holistic rural development, derived from Mahatma Gandhi's vision of Adarsh Gram (ideal village).

It is very unfortunate that villages which have so many things to offer are still very backward. Poverty, lack of education and lack of even the basic needs are washing away the charm, of the villages.

study area location:

- According to Census 2011 information the location code or village code of Lakhapar village is 512987.
- Lakhapar village is located in Rajkot Tehsil of Rajkot district in Gujarat, India.
- It is situated 24km away from Rajkot, which is both district & sub-district headquarter of Lakhapar village. As per 2009 stats, Lakhapar village is also a gram panchayat.
- The total geographical area of village is 627.04 hectares. Lakhapar has a total population of1,551 peoples.
- There are about 271 houses in Lakhapar village. As per 2019 stats, a Lakhapar village comes under Rajkot Rural assembly & Rajkot parliamentary constituency.
- Rajkot is nearest town to Lakhapar which is approximately 24km away.
- Sardhar has provided all the basic facility to Lakhapar village.



(Fig-1 Location of ideal village)

1.2 Concept: Ideal Village, Normal Village

The village having all the facilities like public health center, education center, recreation center drinking water, vegetable market, good housing, banking & ATM facilities, drainage, sanitation, transportation facilities, telecommunication system, polish station etc. This all the facilities reduce people's migration rate to the urban areas

1.2.1 Objective

- Raising the standard of living of people in rural areas
- Increase productivity in rural areas and reduce poverty.
- To provide physical infrastructure like water supply, Transport, Sewerage and Solid waste Management
- Provision of social infrastructure such as drinking water, health care, education, sanitation, housing, road and electrification.
- Maximum utilization of local resources without adversely affecting the environment.

1.2.2 Example / Live Case studies of ideal village

- Shri. Shardaben kanjibhai kumarkhariya is the current Sarpanch and savanbhai is a current talati of lakhapar village
- There are about 271 houses in Lakhapar village. As per 2019 stats, a Lakhapar village comes under Rajkot Rural assembly & Rajkot parliamentary constituency.
- Sardhar has provided all the basic facility to Lakhapar village.
- A village has good irrigation facility, primary school, water tank, panchayat building and other basic facilities like health, education drainage, are on par with urban standards.
- The total geographical area of village is 627.04 hectares. Lakhapar has a total population of 1,551 peoples.

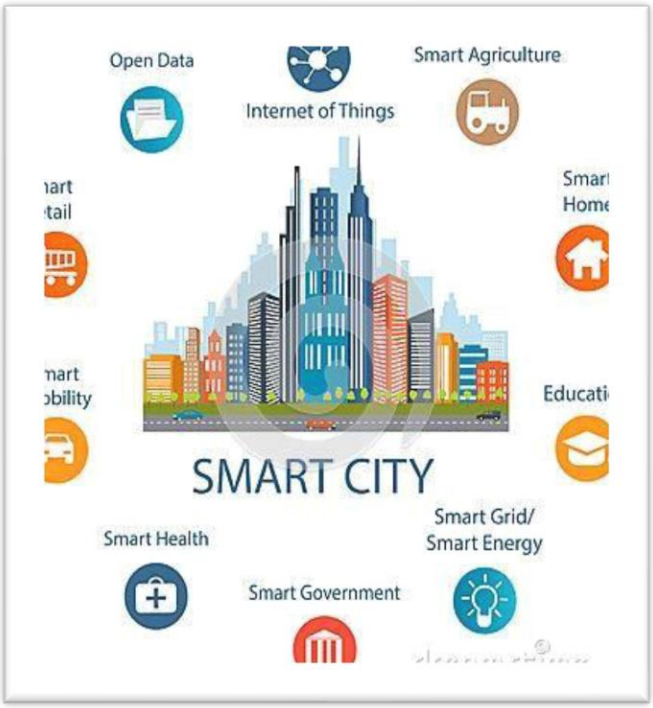
(Fig-2 Interaction with Ideal village talati)

1.2.3 The Idea of a mode

- It was the dream of Mahatma Gandhi to make the Indian villages smarter and ideal/model by improving them in all aspects like physical, economic and social etc.

- The ideas of "smart village" will also attention to multiple challenges such as unplanned urbanization, under development of village and smart villages.

- In smart village access sustainable energy services acts as a catalyst for development enabling the provision of good education and health care, access to clean water, sanitation and nutrition, the growth of productive enterprise to boost income and enhanced security



(Fig-3 Concept of smart city)

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

Civil engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and naturally built environment, including public works such as roads, bridges, canals, dams, airports, sewerage systems, pipelines, structural components of buildings, and railways.

Civil engineering is traditionally broken into a number of sub-disciplines. It is considered the second-oldest engineering discipline after military engineering, and it is defined to distinguish non-military engineering from military engineering. Civil engineering takes place in the public sector from municipal through to national governments, and in the private sector from individual homeowners through to international companies.

Around 2550 BC, Imhotep, the first documented engineer, built a famous stepped pyramid for King Djoser located at Saqqara Necropolis. With simple tools and mathematics, he created a monument that stands to this day. His greatest contribution to engineering was his discovery of the art of building with shaped stones. Those who followed him carried engineering to remarkable heights using skill and imagination.

1.3 Detail study :-

➢ Social economics: -

The population of village is record as 1338 n 2001. After 10 years it will increase and reach 1551 in which male have 785 and 766 females.

➢ Physical and demographic details: -

- Total area of village is 627.46 hectors.
- As per 2011 census total population is 1551 which includes 785 male and 766 females.
- There are about 271 houses in the village
- The forest area of village is 134.53 hectors.
- Total residential area is 7.43 hectors.

➢ infrastructure details: -

- Government authorized school building
- Panchayat building
- 90% village houses in pukka with personal toilet
- Transportation facilities
- Solar Street Light
- Water tank
- Anganwadi

(Fig-4 anganwadi)

(Fig-5 panchayat building)

(Fig-6 bus stop)

(Fig-7 school

1.4 SWOT analysis

Strengths	•Good Road network Drainage facility •Good education system •Recreation facility •Renewable sources
weakness	•No general market •No cinema/video hall
Opportunity	•Government scheme •Use Morden technology like water harvesting system
Threats	•No banking facility

(Table-1 SWOT analysis)

1.5 Future prospects of Development of the Ideal village / Smart Village

- The future prospects of village are to develop our allocated village.
- Provide the basic facilities to villager like Water, Drainage and Road network.
- Increase the living standard and education of people is living in village with the use of renewable source of energy.
- Serve telecom services around village.
- Good sanitation facility
- Sufficient power supply for domestic and agricultural use

1.6 Benefits of the visits of Ideal village

- The main benefit of the visit is the idea about a ideal village and the proper understanding the concept of ideal village.
- This visit is helping us for the development of allocated village
- learned which facilities are required for village and how to give urban facilities to village with rural soul.

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

Mainly the benefits for this village due to civil concept is on Agricultural sector and on water crises given below:

- Now the village uses remote sensing technique and geographic information system (GIS) to locate subsurface dykes to store water.
- Sufficient water available for irrigation purpose.
- Easy availability of drinking water.
- Natural underground water channels help in fast recharge of ground water

Chapter : 2

Literature review

2.1 Introduction: Urban & Rural village concept

Urban :-

An urban area is the region surrounding a city. Most people of urban areas have non-agricultural jobs. Urban areas are very developed, meaning there is a density of human structures such as houses, commercial buildings, roads, bridges, and railways. "Urban area" can refer to towns, cities, and sub-urban. According to census 2011, there are 7,935 towns, 4,041 statutory town and 3,894 census towns.

(Fig-8 urban area)

Rural :-

All the areas which are 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.

(Fig-9 ruler area)

2.2 Importance of the Rural development

Rural development is necessary not only for an over-whelming majority of the population living in villages but the development of rural activities is essential to accelerate the pace of over all economic development of the country.

It is a strategy package seeking to achieve enhanced rural production and productivity, greater socio-economic equity, and aspiration, balance in social and economic development.

- Education

- Public Health and Sanitation
- Women Empowerment
- Infrastructure Development (e.g. electricity, irrigation, etc.)
- Facilities for agriculture extension and research
- Employment opportunity.

2.3 Ancient Villages / Different Definition of: Rural Urban Villages

➢ RULER :-

- **UNITED STATES CENSUS (2000 CENSUS): -**
  A rural area as comprising open country and settlements with fewer than 2500 residents' areas designated as rural can have population densities as high as 999 per square mile as 1 person per square mile.

- **UNITED STATES DEVELOPMENT OF AGRICULTURE (2002 FORM BILL): -**
  A rural area as any area other than a city or town that has a population of greater than 50,000 inhabitants and the urbanized areas contiguous and adjacent to such town or a city.

- **NATIONAL GEOGRAPHIC SOCIETY: -**
  A rural area is an open swath of land that has few homes or other buildings and not very many people

➢ URBEN: -

- **NATIONAL GEOGRAPHIC SOCIETY: -**
  "Urban area" can refer to towns, cities, and suburbs. An urban area includes the city itself, as well as the surrounding areas. Many urban areas are called metropolitan areas, or "greater," as in Greater New York or Greater London.

- **UNITED STATES CENSUS (2000 CENSUS): -**
  An urban area as "core census block groups or blocks that have a population density of at least 1,000 people per square mile (386 per square kilometer) and surrounding census blocks that have an overall density of at least 500 people per square mile (193 per square kilometer)".

2.4 Scenario: Rural / Urban village of India population Growth

➢ INDIA :

- Agenda of census of India is to release of provisional population totals-Rural urban distribution. Population of Rural and Urban area.
- For the first in since independence, the absolute increase in population is more in urban areas that in rural areas

TABLE 2:POPULATION OF RURAL AND URBAN AREAS AS PER CENSUS 2001 AND 2011

INDIA	2001	2011	DIFREENCE
RULAR	74.3	83.3	9.0
URBEN	28.6	37.7	9.1

- Rural-urban distribution: 68.84% &31.16
- Level of urbanization increased from 27.81% in 2001 census to 31.16% in2011.

TABLE 3:LITERACY RATESOF RURAL AND URBAN AREAS AS PER CENSUS 2001 AND 2011

INDIA	2001	2011	DIFREENCE
RULAR	74.3	83.3	9.0
URBEN	28.6	37.7	9.1

- Literacy Rates (in%)
- The improvement in literacy rate in rural area is two times that in urban areas
- The rural urban literacy gap which was 21.2% points in 2001, has come down to 16.1% points in2011

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

- Out of total population of Gujarat, 42.60% people live in urban regions. The total figure of population living in urban areas is 25,745,083 of which 13,692,101 are males and while remaining 12,052,982 are females. The urban population in the last 10 years has increased by 42.60 percent.
- Sex Ratio in urban regions of Gujarat was 880 females per 1000 males. For child (0-6) sex ratio the figure for urban region stood at 852 girls per 1000 boys. Total children (0-6 age) living in urban areas of Gujarat were 2,952,359. Of total population in urban region, 11.47% were children (0-6).
- Ahmedabad is the most populated District in the State, with 7.20 million people, up 11.94% from 2001, followed by Surat with 6.07 million people, up 10.07%, as per Gujarat's Directorate of census operations.

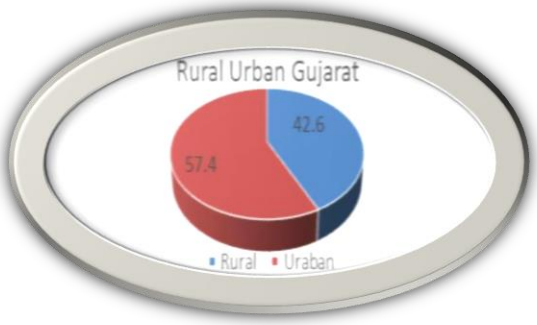


FIG.-10: POPULATION IN %

INDIA	2001	2011
Population	57.14%	42.60 %
Total population	34,694,609	25,745,083
Male population	17,799,159	13,692,101
Female population	6,895,450	12,052,982
Population growth	9.31 %	36.00 %
Sex ratio	949	880
Literates	21,420,842	19,672,516
Average literacy	71.71 %	

TABLE 4: DEMOGRAPHIC DATA OF GUJARATAS PER CENSUS 2011

2.6 Rural Development Issues - Concerns – Measures

- People are directly or indirectly dependent on agriculture and a large number of landowners have small and medium-sized land holding.
- Economy of the people living in rural areas is low.
- People have to migrate to the urban areas due to unavailability of education.
- The other rural problems are due to the fact that since the rural people do not live in concentrated masses, the availability of specialized service to them is minimum.
- Very less people are employed in the rural areas.
- Lack of physical facilities in rural areas.
- Migration of people to urban areas.
- Fragmentation of land due to high rate of growth of population.

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

TABLE 5: VARIOUS INFRASTRUCTURE & GUIDELINES FOR VILLAGE.

FACILITIES	PLANNING COMMISSION NORMS	REQUIRED AS PER NORMS
	EDUCATION	
Anganvadi	Each village	1
Primary school	Each village	1

Secondary school	Per 7,500 population	0
Higher Secondary school	Per 15,000 Population	0
Tech. Training institute	Per 100,000 Population	0
Agriculture Research center	Per 100,000 Population	0
	MEDICAL FACILITY	
Gov./panchayat Dispensary or sub phc or health center	Each village	1
Phc & chc	Per 20,000 population	0
Child Welfare and Maternity Home	Per 10,000 Population	1
Hospital	Per 100,000 Population	0
	TRANSPORTATION	
Pucca village Approach road	Each village	0
Bus/auto stand Provision	All Villages connected By	1
	DRINKING WATER	
Overhead tank	1/3 of total demand	1.6 lac cap
U/g sump	2/3 of total demand	3.2 lac cap
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	1
Apmc	Per 100,000 population	0
Fire station	Per 100,000 population	0
Police station	Per 15,000 population	0
Community hall	Per 10,000 population	1

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

Several ancient writers, such as Pliny the elder and acrimonious larges, attested to the numbing effect of electric shocks delivered by electric caddish and electric rays, and knew that such shocks could travel along conducting objects.

- Use of renewable energy.
- Smart security.
- Energy conservation.
- Solar street light

2.9 Other Projects / Schemes of Gujarat / Indian Government

➢ MGNREGA:(mahatma Gandhi national rural employment guarantee)

Mgnrega 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 program but also a regime of rights. The national rural employment guarantee act, 2005 (nrega) guarantees 100 days of employment in a financial year to.

➢ PMGSY : (Pradhan Mantri Gram Sadak Yojana)

Pradhan Mantri Gram sadak yojana (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 program 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.

➢ IAY : (Indira Awas Yojana)

Housing is one of the basic requirements for human survival. For a normal citizen owning a house provides significant economic security and status in society. For a shelter less person, a house brings about a profound social change in his existence, endowing him with an identity, thus integrating him with his immediate social background.

➢ PPP:(Public-Private-Partnership)

Public-Private-Partnership or PPP is a mode of implementing government programmers /schemes in partnership with the private sector. The term private in PPP encompasses all non-government Agencies such as the corporate sector, voluntary organizations, self-help groups, partnership firms, individuals and community-based organizations, PPP, moreover, subsumes all the objectives of the service being provided earlier by the government, and is not intended to compromise on them. Essentially, the

shift in emphasis is from delivering services directly, to service management and Coordination. The roles and responsibilities of the partners may vary from sector to sector. While in some schemes/projects, the private provider may have significant involvement in regard to all aspects of implementation; in others s/he may have only minor role.

- **Provision of Urban Amenities in Rural Areas (PURA) (2004):**

  The mission of this scheme was the holistic and accelerated development of compact areas around a potential growth center in a Gram Panchayat (or a group of Gram Panchayats) through Public Private Partnership (PPP) framework for providing livelihood opportunities and urban amenities to improve the quality of life in rural areas primary objective of this scheme is to provide good quality infrastructure and associate services in rural areas.

Chapter : 3

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

3.1 Introduction: Concepts, Definitions and Practices

The basic concept of smart village is to collect community efforts and strength of people from various streams and integrate it with information technology to provide benefits to the rural community. According to Mahatma Gandhi's philosophy and thoughts smart village project provides, "Global means to the local needs."

Its defines as an all requirements of village can fulfill with different facilities.

Our professional practice area contains a range of resources relating to Ethics in engineering o Health and safety.

FIG.-11: smart village

3.2 Vision-Goals, Standards and Performance Measurement Indicators

Vision For the village of village, the village panchayat will carry out its mission with a vision of programs and works to provide adequate and equal opportunity for the youth, Women, farmers, artisans, The backward and the underprivileged in the village.

- **Smart Cities standards in India:**

There are some standards activities for smart city which is kept in mind to develop any smart city and you should at least be aware of below things.

1. **Strategic – Aimed at the process of developing a clear and effective overall smart city strategy:**

ISO 37120: Sustainable development of communities — Indicators for city services and quality of life.

ISO 37101: Sustainable development & resilience of communities – Management systems General principles & requirements

2. **Process – Procuring and managing smart city projects:**

The development by the BIS of a Smart city framework standard (PAS 181) falls into the Process category: -It provides practical, how-to advice, reflecting current good practice as identified by a broad range of public, private and voluntary sector practitioners engaged in facilitating UK smart cities

- **Smart Cities Performance Measurement Indicators**

By analyze the existing facilities and key performance indicators we can measure performance of any smart city. The dimensions of Key Performance Indicators can be categorized as below:

- Uses of renewable sources like bio gas, solar etc. Smart primary health care 27 X7.
- Information and Communication Technology: Internet or Wi-Fi facility, mobile network, etc.
- Environmental sustainability: Air quality, CO2 emissions, Energy, Indoor pollution, water soil and noise
- Productivity: Capital investment, Employment, Inflation, Trade, Savings, Export/import, Household income/consumption, Innovation, Knowledge economy
- Quality of life: Education, Health, Safety, Convenience and comfort
- Physical infrastructure: piped water, sewage systems, electricity, waste management, knowledge infrastructure, health infrastructure, transport, roads, buildings

3.3 Technological Options

- **Smart energy:**

- Firewood
- Solar energy
- Solar Energy for cooking

- Solar energy for water heating
- Solar energy for creating electricity
- Hydroelectricity
- Hydro mechanical
- Wind energy
- Connection to the network

➢ **Smart transportation:**

Taxi, railways and rickshaw are the other major modes of transportation in ruler and urban area as reported by households.

Expenditures on bus/train auto rikshaw, taxi and train account for more than 90% of the total expenditure on transport both in ruler and urban areas.

➢ **Smart Infrastructure:**

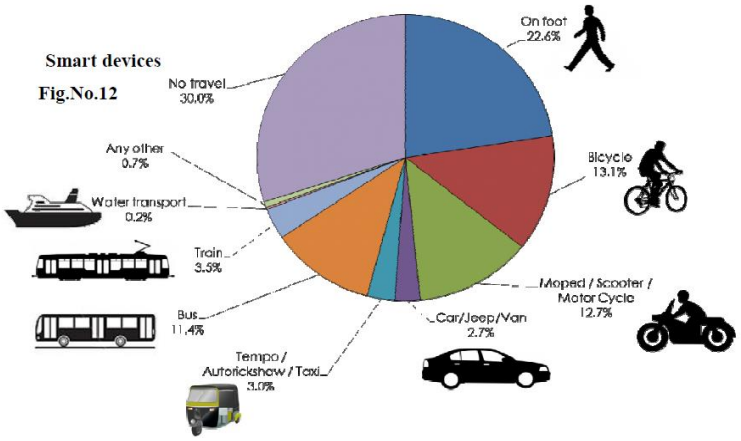
Smart Infrastructures comprise several operators from different domains of activity, such as energy, public transport, public safety.

They deploy and operate "cyber-physical systems", that are data collected equipment which interact physical world.

➢ **Information city:**

It collects local information and delivered them to the public portal; In that city, many inhabitants are able to live and even work on the Internet because they could obtain every information through IT infrastructures, using this approach, an information city could be an urban center both economically and socially speaking; the most important thing is the linkage among civic services, people interactions and government institutions.

➢ **Smart mobility**



(Fig no :11 smart mobility)

- **Renewable energy sources and solar energy:**

  Traditional sources of energy like wood, coal, diesel, petrol, oil, natural gas, etc are now on the verge of ending. Also, excessive use of these sources is polluting earth's environment and is responsible for remarkable adverse effects, like abrupt climate change, drought and flood situation, green house effects, melting of ice caps on poles, de-thickening of ozone layer in atmosphere collectively known as global warming.

  Due to fast growing development of urban civilization, forests are reducing with greater rate. By the 1990s, the excess use of traditional sources in developing countries was marked as a leading environmental threat, with negative impacts linked with deforestation, desertification and widespread soil erosion.

  Thus, to save our earth from the threat of global warming, alternative energy sources which burns less carbon are required to be invented and solar energy source can play vital role to overcome these global environmental effects.

3.4 Road Map and Safe Guards

This can be done by defining the benefits of such an initiative. Study the community to know the Citizens, the business's needs – know the citizens and the community's unique qualities, such as the age of the citizens, their education, hobbies, and attractions of the city. Develop a Smart City Policy: Develop a policy to drive the initiatives, where roles, responsibilities, objective, and goals, can be defined.

1.Vision	Develop the Smart City strategy and business cases.
2.Plan	Develop the project plans and quality objectives.
3.Design	Gather business requirements and design smart city services.
4.Build	Implement and test smart city services
5.Deliver	Prepare business transition for smart city services
6.Operate	Actual operation and support of smart city services

(TABLE 6: road map and safe guards.)

3.5 Issues & Challenges

Urban Water and Sanitation Challenges

More than 90% of the urban population has access to drinking water, and more than 60% of the population has access to basic sanitation. However, access to reliable, sustainable, and affordable water supply and sanitation (WSS) service is lagging behind. Operations and maintenance cost recovery through user charges is hardly 30-40%.

Education / Job Opportunity Development

Education is a basic determinant of the quality of life of individuals, people with limited skills and competencies are excluded from good jobs and have fewer prospects for economic prosperity. Higher levels of educational attainment are generally linked to better occupational prospects and higher income for individuals, hence having a positive effect on their quality of life.

Lack of Centre-State Co-ordination:

Fruitful implementation of a project can be done only if there is a co-ordination between various government bodies. There is a need of proper regulation when it comes to planning for the development of smart cities. Both horizontal and vertical co- ordination is the requisite right now.

Availability of Master Plan:

Most cities in India do not have their master plans and development plans in place. This is a tragic situation if we talk about developing them into smart cities. The presence of both the requisites is the key to the implementation and encapsulation of the smart city project as that is where the changes would be monitored and there is no other way to make it simple, better and efficient. Unfortunately, most cities in India lack the presence of it.

3.6 Smart Infrastructure - Intelligent Traffic Management

The infrastructure of a city is the key to its development. It not only improves the live ability quotient of the city, but also makes housing and working conditions comfortable. The government is now providing a thrust to infrastructure through various initiatives which in turn will provide a larger push to the real estate sector.

Smart security

A smart city should be covered by CCTV cameras for round-the-clock surveillance. Advanced surveillance techniques with facial recognition and video processing should be implemented to track would-be criminals.

Social infrastructure :-

A well-developed social infrastructure ensures better live ability for citizens as they don't have to go far for basic amenities. This includes education facilities such as schools and colleges, good quality healthcare facilities and entertainment facilities that make people happy.

Smart industry :-

Smart cities are employment oriented. They should follow guidelines given by 'Ease of Doing Business Index' to facilitate industrial development. They should provide 'single window clearance' system for industries. Fuel pipelines and dedicated high tension electricity lines should be provided for uninterrupted supply of energy.

Solid waste management :-

Solid waste must be mandatorily segregated into dry and wet waste and collected through separate channels that handle all activities from collection to disposal.

Smart housing :-

Smart houses are built as per the codes of the Indian Green Building Council (IGBC) guidelines. All houses in smart cities are connected with a network of fiber optic cables to provide telephone and broadband connectivity. There should be rain water harvesting to conserve water, five star appliances to save power, solar panels to use alternative sources of energy, low emissivity windows, reflective paints, native plants and more.

Smart sanitation :-

Sewage should be treated and must not be released in rivers or water bodies. The methane released from sewage should be captured and used as fuel and it's residue can be used as a bio-fertilizer.

Smart Living:

This refers to the advancements that improve lifestyles and quality of life in the urban area.

3.7 Cyber Security or any other concept as per the (ANNEXURE 1)

Cyber security, also referred to as information technology security, focuses on protecting computers, networks, programs, and data from unintended or unauthorized access, change, or destruction.

Cyber Security is important because government, military, corporate, financial, and medical organizations collect, process, and store unprecedented amounts of data on computers and other devices.

For an effective cyber security, an organization needs to coordinate its efforts throughout its entire information system. **Elements of cyber** encompass all of the following:

- Network security

- Application security
- Endpoint security
- Data security
- Identity management
- Database and infrastructure security
- Mobile security

(Fig no :12 cyber security)

- **SMART DATA CENTRE**

Smart Data Centre Facilities Solution provides a modern foundation for distributed cloud applications.

(Fig no :13 smart data centre)

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling

Retrofitting: -

Development of an existing built area greater than 500 acres so as to achieve the objective of smart cities mission to make it more efficient and livable e.g. Local Area Development

Depending on the existing level of infrastructure services in the identified area and the vision of the residents, the cities will prepare a strategy to become smart. Since existing structures are largely to remain intact in this model, it is expected that more intensive infrastructure service levels and a large number of smart applications will be packed into the retrofitted smart city. This strategy may also be completed in a shorter time frame, leading to its replication in another part of the city.

Redevelopment: -

Replace existing built environment in an area of more than 50 acres and enable co-creation of a new layout, especially enhanced infrastructure, mixed land use and increased density.

Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizens. For instance, a new layout plan of the identified area will be prepared with mixed land-use, higher FSI and high ground coverage.

Greenfield: -

Develop a previously vacant area of more than 250 acres using innovative planning, plan financing and plan implementation tools with provision for affordable housing, especially for the poor

Greenfield developments are required around cities in order to address the needs of the expanding population. One well known example is the GIFT City in Gujarat. Unlike retrofitting and redevelopment

3.9 Strategic Options for Fast Development

For developing smarter city, city and national leaders need to plan a comprehensive urbanization strategy, taking advantage of the latest developments in technology, creating employment opportunities, and supporting economic activities that will improve quality of life for citizens.

Redevelopment will affect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density.

Some technologies that are promoted as essential are really just nice-to-haves, but there are two technologies for succeeding with open sensor data that are undeniably must-haves.

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

- Climate change is predicted to cause significant in precipitation and temperature patterns, affecting the availability of water.
- Population growth and urbanization are enforcing rapid changes leading to a dramatic
- increase in high-quality water consumption. Frequently, this demand for water cannot be satisfied by the locally available water resources More than 40% of the world's population lacks improved sanitation facilities, and India's urban sanitation coverage rate is only 50%. Consequences of poor sanitation are devastating on human health and the environment.
- The government has taken various steps to create awareness among the masses for keeping the area surrounding them neat and clean.
- Swatch Bharat Abhiyaan was launched by Prime Minister of India on 2nd October 2015, which caught attention of everybody not only in India, but also in the world.
- Government is also paying special attention for cleaning of rivers, railway stations, tourist destinations and other public places.

Role of Indigenous Technologies:

- Indigenous is associated with people originating or developing naturally in a particular land, region, or environment. So, the technology evolved by indigenous people is indigenous technology. Indigenous technology of India will be the technological development caused by an Indian.

3.11 Initiatives in village development by local self-government

The village local self-government is the village or gram-Panchayats. The Zilla Parishad also belongs to this category. Gram Panchayat is an excellent example of Democratic set-up of India. The elected representative of Gram Panchayat is known as Sarpanch.

There is also a reservation of women in Gram Panchayats. The main source of revenue of Gram Panchayat includes property and other taxes, and grants from the State government and Zilla Parishad.

The local self-government often makes residential arrangements for the elderly people or hostel accommodation for the handicapped students which may be considered as discriminatory services

In the past "government as provider" approach, the priorities were to secure budget allocations and develop. Projects

3.12 Smart Initiatives by District Municipal Corporation

Rajkot has been selected in the list of 100 Smart cities under the Smart City Mission of Ministry of Urban Development (MOUD), Government of India launched in June 2015. Moving forward the city is in the process of preparing a Smart City Proposal (SCP) as a requirement to participate in the Smart City Challenge.

Under the Smart City Challenge, top 20 cities will be selected from 100 shortlisted cities based on the SCP.

The process of SCP preparation would be driven by intense citizen engagement at multiple levels in the city, for which Rajkot Municipal Corporation (RMC) has prepared an extensive Stakeholder Consultation Plan. RMC will carry out three rounds of stakeholder consultations over the period of next two months.

RMC has completed the Round 1 consultation where Citizen's views and suggestions were called for to arrive at City's Vision and define goals in terms of their aspiration to see their city in next 5,10 or 20 years followed by strategies to achieve these goals.

The stakeholders are expected to highlight suggestions/ideas on improvement of city services such as water supply, transportation system, sanitation, housing, health, education, energy, open spaces, air quality, safety etc. In the next stage i.e. Round 2 of stakeholder consultations, which will be carried out during the month of October, RMC will seek similar kind of feedback from citizens on area development and pan city smart solutions.

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

Scheme	Sector	Provision
Schools	Government	Providing schools up to 12th in the rural area.
Agriculture related schemes	Government	Implementing agriculture related programmers for motivation of agricultural products
Solar system scheme	Government	Provisions taken for development of solar energy conversation for street lights
Road development scheme	Government	Provisions adopted for the road developing in the rural areas (cement concrete road
Dangra nali sinchay yojna	Government	Measures taken to provide water for 24hrs and possibility of providing pure drinking water.
Janani suraksha yojna	Government	
Kishori shakti yojna	Government	
Balika samriddhi yojna	Government	
Sanjiv Gandhi niradhar yojna	Government	
Prime minister rojgar yojna (PMRY)	Government	

TABLE 7: Projects contributed working by Government

3.14 How to implement other Countries smart villages projects in Indian village context (Regarding Environment, Employment)

- Smart Village is a concept adopted by national, state and local governments of India, as an initiative focused on holistic rural development, derived from Mahatma Gandhi's vision of Adarsh Gram (Ideal Village) and Swaraj (Self Reliance).

- The health, educational and civil facilities are also either absent or not up to the mark. Making such villages as 'Smart Villages' is surely a noble program announced by Government".

- The villages do not have enough electricity supply and all those work dependents on electricity, is affected.

- But no one in villages has seen what exactly, in the Indian conditions, smart village means. However, the government seems to have clarity of vision and the initiatives is coming from the Government through the scheme called "***Shyama Prasad Mukherji Rurban Mission [SPMRM]"***.

3.15 Electrical concept (Design Ideal and Prototype model)

Analysis on requirement of achieving smart power in a smart city: **C**ontinuous power supply is a major element in the smart city development. For a continuous supply of power in the smart city it is very essential to have strong and smart transmission and distribution (T&D) systems but today's T&D systems seems to be inadequate to meet the increasing power demand therefore leaving a question on T&D's ability to supply adequate power to the upcoming smart cities. Supplying power to the smart cities will be a challenging task and how the masters of the power sector are going to address these challenges will be a thing to watch. On this note, the article will discuss about the requirements of achieving smart power in a smart city. It will also inform about ways to address the T&D challenges.

Chapter : 4

About allocated Village – VISAMAN

4.1 Introduction

4.1.1 Introduction About VISAMAN Village details:

- Visaman is a Village in Paddhari Taluka in Rajkot District of Gujarat State, India.
- It is located 35 KM towards west from District headquarters Rajkot. 9 KM from Paddhari. 280 KM from State capital Gandhinagar.
- According to Census 2011 information the location code or village code of Visaman village is 512889.
- The total geographical area of village is 1708.14 hectares.
- Visaman has a total population of 2,030 peoples.
- There are about 426 houses in Visaman village. Visaman Local Language is Gujarati.

4.1.2 Justification/ need of the study:

- "Vishwakarma Yojana" has provided the platform for real world experience to engineering students and simultaneously apply their technical knowledge in the rural infrastructure development.

- Physical infrastructure facilities (Water, Drainage, Road, Electricity, Solid waste Management, Storm Water Network, Telecommunication & other), Social infrastructure facilities (Education, Health, Sanitation), Socio- Cultural Facilities (Community Hall, Library, Recreation Facilities &other) and Sustainable Infrastructures (Rain water harvesting, Biogas plant, Eco Toilets, Solar Street lights & other) for effective development of Villages.

- The developmental work in villages that could under taken as per the need of the village in particular includes**.**

- 65% of the population of the country lives on agriculture which contributes only 15 % to the country 's GDP.

- If we compare this with China which has a similar sector contribution to the GDP, only 30% of people depend on agriculture whereas in country like USA just 2% of the people are dependent on agriculture

4.1.3 Study Area (Broadly define)

Gujarat:-

Gujarat is a state in Western India and Northwest India with an area of 196,024 km2(75,685 sq mi), a coastline of 1,600 km (990 mi)–most of which lies on the Kathiawar peninsula, and a population in excess of 60 million. It is bordered by Rajasthan to the northeast, Daman and Diu to the south, Dadra and Nagar Haveli and Maharashtra to the southeast, Madhya Pradesh to the east, and the Arabian Sea and the Pakistani province of Sindh to the west. Its capital city is Gandhinagar, while its largest city is Ahmedabad

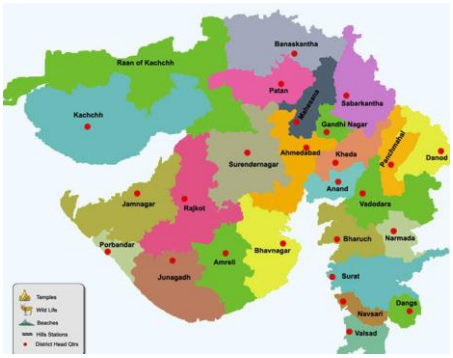


Fig 15. Location map of Gujarat

Rajkot:

Rajkot is the fourth-largest city in the state of Gujarat, India, after Ahmedabad, Surat and Vadodara and is in the center of the Saurashtra region of Gujarat. Rajkot is the 35th-largest urban agglomeration in India, with a population of more than 1.8 million as of 2018 Rajkot is the ninth-cleanest city of India, and is the 22th-fastest-growing city in the world as of July 2019. The city contains the administrative headquarters of the Rajkot District, 245 km from the state capital Gandhinagar, and is located on the banks of the Aji and Nyari rivers. Rajkot was the capital of the Saurashtra State from 15 April 1948 to 31 October 1956, before its merger with Bombay State on 1 November 1956.

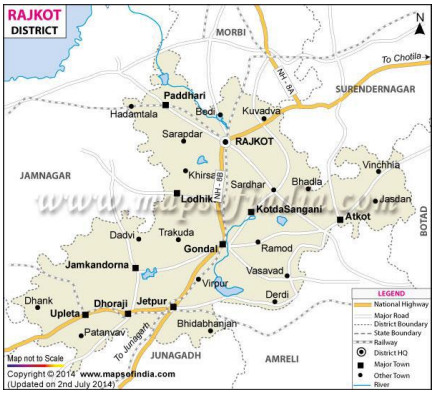


Fig 16. Map of Rajkot district

Visaman :

As we got visaman village for VY Phase-8, it became our study area. We studied/ observed multiple things related to the infrastructure of the village so that we can identify problems there and we can solve those problems as a civil engineer. We also visited the surrounding area, so that we can find out facilities that can be provided.

Visaman is a Village in Paddhari Taluka in Rajkot District of Gujarat State, India. It is located 35 KM towards west from District headquarters Rajkot. 9 KM from Paddhari. 280 KM from State capital Gandhinagar.

The conditions of road is not good enough and it's required some maintenance and street light. The condition of selected village is good enough. The village has facilities of primary school, healthcare centre, 4 temples. For getting this facility they have to go nearest Taluka Paddhari which is 14 KM far from Visaman village.

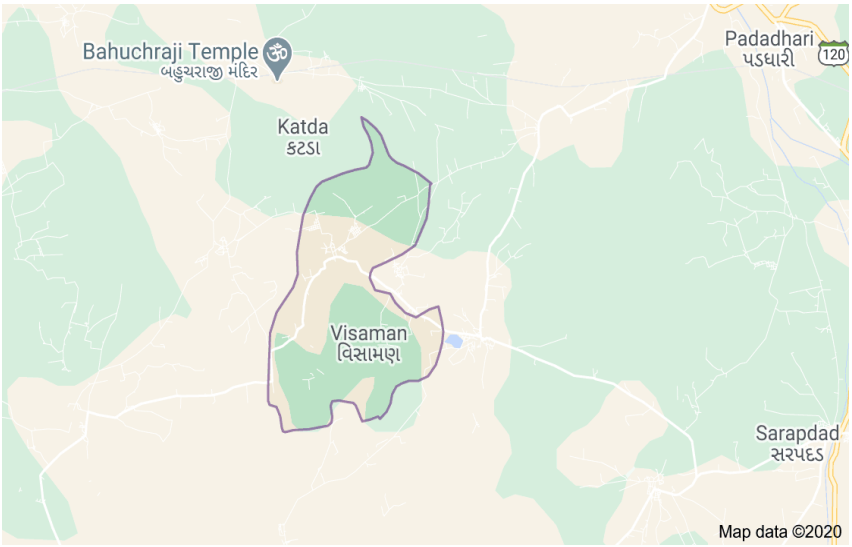


Fig 17. Google Map of visaman

Visaman Local Language is Gujarati. Visaman Village Total population is 2030 and number of houses are 426. Female Population is 51.0%. Village literacy rate is 69.4% and the Female Literacy rate is 31.6%.

Census Parameter	Census Data
Total Population	2030
Total No of Houses	426
Female Population %	51.0 % (1035)
Total Literacy rate %	69.4 % (1408)
Female Literacy rate	31.6 % (641)
Scheduled Tribes Population %	0.0 % (0)
Scheduled Caste Population %	17.5 % (355)
Working Population %	51.2 %
Child(0 -6) Population by 2011	166
Girl Child(0 -6) Population % by 2011	47.0 % (78)

TABLE 8: population census parameter

4.1.4 Objectives of the study

Our objectives for this study are:

- To find problems/ faults/ deficiencies in existing infrastructures
- To find missing amenities in the village
- To provide solutions to different problems.

- To develop new infrastructure for visaman village
- To improve the lifestyle of visaman village
- In short, our objective is Rurbanisation of visaman Village.

4.1.5 Scope of the Study

The main object of the study is to identify the village in all aspects.

- Raising the standard of living of people in rural areas.
- Increase productivity in rural areas and reduce poverty.
- To provide physical infrastructure like water supply, Transport, Sewerage and Solid waste management.
- Provision of social infrastructure such as drinking water, health care, education, sanitation, housing, road and electrification.
- Maximum utilization of local resources without adversely affecting the environment.

4.1.6 Methodology Frame Work for development of your village

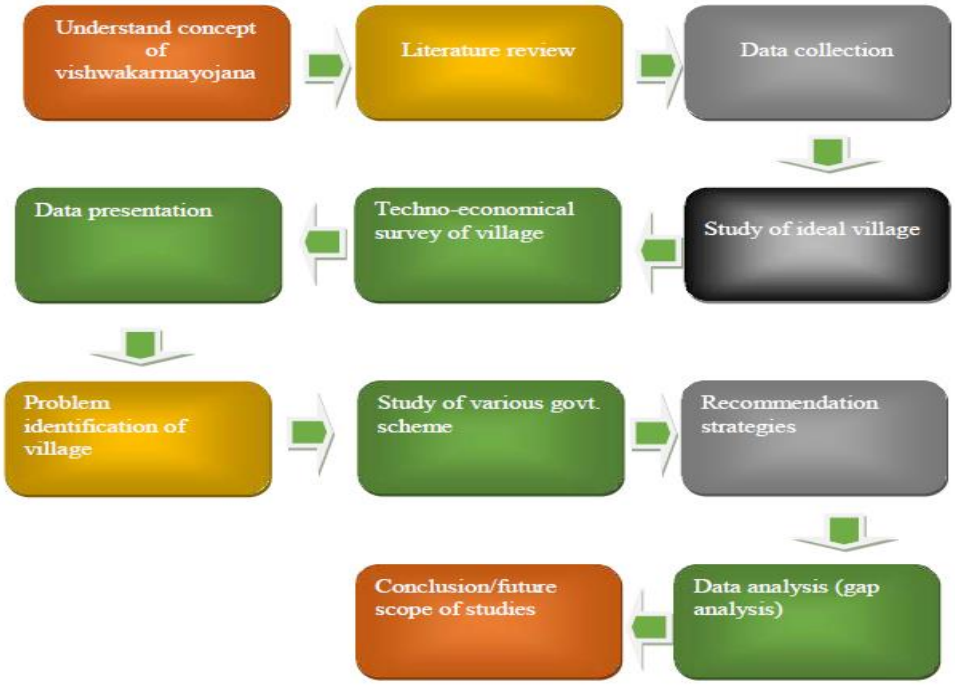


TABLE 9: Methodology Frame Work for development of your village

4.1.7 Available Methodology for development of related to Civil/Electrical

➢ Civil

- Creation of infrastructure - connectivity, civic and social infrastructure along with Provision of alternative livelihood generation is the key pillars.

- Basic Physical Infrastructure − Water Supply, Transportation, Sewerage, public Toilet and Solid Waste collection and Management should be the priority focus and be provided.
- Basic Social Infrastructure − Health and Education facilities should be provided and ensure proper delivery of facilities to village dwellers.
- Promote integrated development of rural areas with provision of quality hour, better connectivity, employment opportunities and supporting physical and social infrastructure.
- Reduce migration from rural to urban areas due to lack of basic services and sufficient economic activities in rural areas.

4.2 Visaman Study Area Profile

4.2.1 Study Area Location with brief History land use details

description	detail
Locality Name :	Visaman
Taluka Name :	Paddhari
District :	Rajkot
State :	Gujarat
Language :	Gujarati
Elevation / Altitude:	70 meters
Time zone:	IST (UTC+5:30)

TABLE10: study area details

Visaman is a Village in Paddhari Taluka in Rajkot District of Gujarat State, India. It is located 35 KM towards west from District headquarters Rajkot. 9 KM from Paddhari. 280 KM from State capital Gandhinagar.

Sub Villages in Visaman

- Ambavadi
- Madhavnagar
- Vaniyavadi

description	detail
Area of village	1708.14
Forest area	-
Agriculture land area	720.60
Residential area	06.00
Other area	618.00

TABLE11: study area details with description

4.2.2 Base Location map, Land Map, Gram Tal Map

Fig 18. Index map of visaman

Fig 19. Base map of visaman

4.2.3 Physical & Demographical Growth

(Table-12: Physical growth of visaman village)

description	detail

Source of water	1. 1 Nos. of 200000 lit rested on ground water tank 2. 1 Nos. of bore well 3. 1 Nos. of overhead water tank
Road network	1. Village approach road is made by bituminous 2. All internal road are C.C. Road
Transportation Facility	1. Nearest railway station 7.2km. 2. Nearest bus station within 13km. 3. Local transportation facility are available
Sanitation	1. Public toilet facility available 2. No any Solid waste disposal facility 3. Underground drainage with good condition
Electricity	1. GEB power supply more than 6 hr. 2. Only road street light available 3. Available electricity for Domestic and Agriculture use
Housing Condition	1. 70% houses in village are pucca house 2. All houses with good ventilation and electricity.

(Table-13 Demographical data of visaman village)

Sr. no	Census	Population	Male	Female	house hold
1.	2001	2157	1013	1144	389
2.	2011	2030	995	1035	426

4.2.4 Economic generation profile / Banks

- In visaman village mostly people are connects with agriculture brick manufacturing and labour work.
- Major crops in village is wheat and cotton
- Bank and Atm is available at visaman village.

Fig 20. Bank in visaman

4.2.5 Actual Problem faced by Villagers and smart solution After surveying village we found some problem and we try to apply best and smart solution for that problems.

- The village don't have any solid waste collection facilities.
- For solution of this problem Solid waste management is done by door to door collection dustbin at some specific interval.
- Road and other means of communication in the village should be improved.
- Mass education should be spread by establishing more primary and secondary school. It must be made both compulsory and free
- Village doesn't have any community hall and recreational centre for that we decide to give design of garden.
- Electrical point of view we will give design of solar street light and CCTV system etc.
- In village there is no any primary health centre. For the health purpose villagers have to nearest taluka paddhari so we decide to give design of primary health centre.
- Every block should have a hospital or a primary health centre for priding medical aids to the villagers.

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine

We found that all citizens of this village are very much connect with today's technology environment and major working area and production is cotton, sorghum (juvar), chilly and wheat.

Village consist of a cluster of house along a central street. A temple, village has two part new & old, a few shops, a lake are found in village.

In This Village All People Are Enjoying All Festivals Like Diwali, Janmastmi, Ide, Dhulet, and Rakshabandahn.

4.2.7 Migration Reasons / Trends

4.2.8

- Now a day's people are migrating due to low facility of people.
- Unable to provide Morden lifestyle.
- Unemployment is big problem for migrate.

4.3 Data Collection of visaman (Photograph/Graphs/Charts/Table)

4.3.1 Describe Methods for data collection

- **These are the general methods for collecting data**
- Primary data
- Secondary data

- Observation method
- Interview method
- Schedule method
- Other method

Due to covid-19 pandemic situation we collect some data from internet. After unlock of lockdown we get permeation to visit of village.

During visit We Are Conducted Techno Economic Survey for Data Collection Of visaman Village. We Are Met with Sarpanch, Talati Mantri And Dweller of Village and Understand Village Actual Situation, Condition And Existing Structure Of Village.

Available Facilities Are Listed as Below:

- Demographical details.
- Geographical details.
- Occupational details.
- Physical Infrastructure Facilities Like Sources of Water, Road Network, Sanitation Facility, and Housing Condition
- Social Infrastructure Facilities Like, Primary School.
- Socio Culture Facilities Like Community Hall, Village Ponds.
- Other Facilities Like Panchayat Building.

4.3.2 Primary details of survey details

The entire data collected by us is displayed in the form itself. A copy of the form is shown below which refers to the type of data collected and that the details in the form cover the facilities of the entire area of the village.

All the survey has been carried out by us via consulting proper authorities. A copy of the form in Annexure -1 is shown below showing the type of survey carried out by us.

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

- as per census data of 2011, in which male population is 995 and female population is 1035.
- Total geographical area of Visaman village is 1708.14 Hectares. Population density of Visaman is 1 person per Hectares.
- There are 886 girls per 1000 boys under 6 years of age in the village.
- There are about 426 houses in visaman village and average family size is 4members.

4.3.4 No of Human being in One House

- There are about 426 houses in visaman village and average family size is 4members.

Fig 21. Residence in visaman

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

- visaman village is used concrete, reinforcement and bricks are used for construction and wooden also available for furniture works.
- Some houses are pucca which is made of Brick masonry and roof is of GI sheet.

4.3.6 Geographical Detail

(Table-14 geographical detail of visaman village)

description	deatail
Area of village	1708.14
Forest area	-
Agriculture land area	720.60
Residential area	06.00
Other area	618.00

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

(Table-15 population detail of visaman village)

Sr. no	Census	Population	Male	Female	house hold

1.	**2001**	**2157**	**1013**	**1144**	**389**
2.	**2011**	**2030**	**995**	**1035**	**426**

total poplation total 2030 people in Visaman Village are literate, among them 995 are male and 1035 are female in the village.

Total literacy rate of of Visaman is 75.54%, for male literacy is 84.56% and for female literacy rate is 66.98%

4.3.8 Occupational Detail - Occupation wise Details / Majority business

- In visaman village there are two major occupation group
  - Agriculture work
  - Labor work

- Major crops grown in the village
  - Wheat
  - Cotton

4.3.9 Agricultural Details / Organic Farming / Fishery

The village has sufficient water from the nearby river and tube well; from that, the agricultural work allows people to earn money for survival.

People here mostly prefer to grow two crops per year. The main crops grown here are Cotton, wheat, etc.

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses

- Grampanchayat building
- Old post office
- Electric facility
- Underground drainage
- Water tank
- Well

Fig 22. Panchayat building in visaman

4.3.11 Tourism development available in the village for attracting theorist

In visaman village there is no tourism cluster.

4.4 Infrastructure Details (With Exiting Village Photograph)

4.4.1 Drinking Water / Water Management Facilities

In our village there is no water treatment plant but water supply by water tank in the village. The water demand of the village visaman is fulfilled by 2 water tanks having capacity of 200000L over head water tank and 20000L under ground water tank each.

There is also one sump available near surpanch building.

Fig 23. Water tank in visaman

4.4.2 Drainage Network / Sanitation Facilities

- In village well maintain Underground drainage facility is available.
- In village Underground drainage facility is available but it is inadequate in village.
- There is public toilet and community toilet available in visaman village. But 20% houses don't have their own privet toilet.

4.4.3 Transportation & Road Network

- All the main road of village is constructed by cement concrete (C.C.).
- there is no bus stand available.
- for easy transportation and privet vehicles also available like rickshaw, private vehicle, etc.

Fig 24. Road network

4.4.4 Housing condition

House in visaman village has poor condition, near about 70% pucca house and 30% kutcha houses in village.

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

Health Facilities :-

There is no sub Health center in village. if anyone falls sick in village, then he/she has to go 14 km away from district paddhari.

Education Facilities :-
In village has well maintain Primary school & high school, Village has also Anganwadi.

Community Hall :-
There is no community hall in village.

Public Library :-
There is no public library in the village.

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

Water tank:

- The condition of overhead water tank is good enough.
- Capacity of overhead water tank is 200000L
- ground water sump is also 200000L which is good enough for village people.

Road network:

- All the main road of village is constructed by cement concrete (C.C.).
- Street of the village is made of paving block.
- The condition is good but streets of village is nerrow.
- Village also have panchayat building, primary school, high school, bank, kishan seva center and the condition of all building is good enough.

4.4.7 Technology Mobile/ WIFI / Internet Usage Details

There is no telephone booth in visaman village and there is no WIFI and internet facility present in visaman, In this village 95% houses are having mobile phone.

4.4.8 Sports Activity as Gram Panchayat

In the village of visaman, no sports activity has been approved by the gram panchayat.

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

There is no any Socio-Cultural Facilities, Public Garden, Park or any other recreation facilities.

4.4.10 Any other details

For guide village people there is visaman sahkari mandli is available.

4.4.11 Any other details

- Two nos. of water tank is sufficient to water supply.
- There is no any ATM and Bank.

4.5 Electrical Concept

Electrical energy 24 hours in this village and electrical power is provide by substation.

Renewable energy source planning particularly for villages

Which Renewable Energy Technology Holds the Most Promises
Solar Power: - Solar energy has an unlimited power source in the sun.

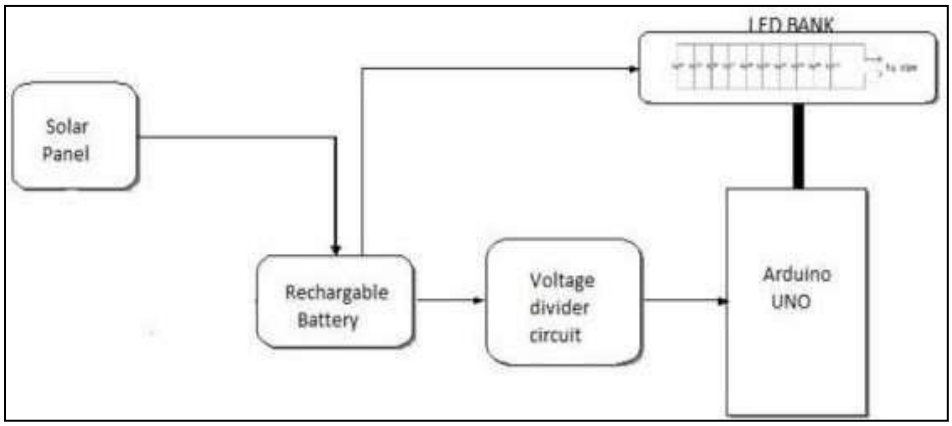
- Hydropower: -As the name implies, hydropower generates electricity from the movement Of water
- Geothermal
- Bio-power
- Wind Power

Decentralized renewable energy systems are promising options to cope with the challenge of Balancing local production and energy consumption. At the system level, they can range from single buildings, such as multi-family homes, to groups of buildings within Neighborhoods, communities or city quarters

4.5.1 Renewable energy source planning particularly for villages

Auto Intensity Controlled Solar LED Street Lights/High Power LED

The solar powered LED Street light with auto intensity control which provides different intensities at different times of night using pulse width modulation technique. The system consists of light dependent resistor (LDR) which is also known as photo resistor made of cadmium sulfide is used for precise switching operation and an Atmega328P microcontroller which is programmed using Arduino programming language to act as a pulse width modulator. The program can be rewritable according to the requirements needed.



Explanations of Each Block

Solar Panel

A solar panel is a collection of solar cells. The solar panel converts the solar energy into electrical energy. Output of the solar panel is its power which is measured in terms of Watts or Kilo watts. Solar power uses multiple reflectors to collect more sun's thermal energy. Thermal energy collected through the day to perform different operations. Performance of the solar panel depends on a number of factors like climate, conditions of the sky, orientation of the panel, intensity and duration of sunlight and its wiring connections.

Rechargeable Battery

A rechargeable battery is a type of electrical battery which can be charged, discharged into a load, and recharged many times, while a non-rechargeable or primary battery is supplied fully charged, and discarded once discharged. Several different combinations of electrode materials and electrolytes are used, including lead– acid, nickel cadmium (Ni-Cd), nickel metal hydride (Ni-MH), lithium ion (Li-ion), and lithium-ion polymer (Li-ion polymer).

Voltage Divider circuit

A voltage divider is a simple circuit which turns a large voltage into a smaller one. Using just two series resistors and an input voltage, we can create an output voltage that is a fraction of the input. Voltage dividers are one of the most fundamental circuits in electronics equation of circuit.

Arduino UNO

Micro-controller will control the intensity of light at different time slots. Micro controller circuit
will generate PWM waves to provide different intensities. This system provide sets of digital and analog I/O pins that can be interfaced to the street light circuit. Operating voltage of Arduino UNO is 5v so that we will convert 12v from Battery to 5v.

LDR

The theoretical concept of the light sensor lies behind, which is used in this circuit as a darkness detector. The LDR is a resistor and its resistance varies according to the amount of light falling on its surface. When the LDR detect light its resistance will get decreased, thus if it detects darkness its resistance will increase.

WORKING

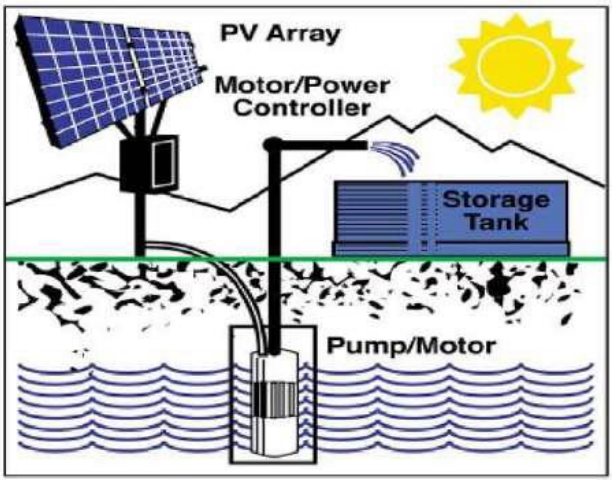
The experimental setup involves the following working principle. The solar panels convert the sun light into electrical energy. This obtained electrical energy during the day time is stored in the rechargeable battery and used during the night time. The solar street light draws the power from the battery. The LDR is used for precise switching operation of street light at the dusk and dawn. Light dependent resistor makes the street light switch on during sunset and switch off during the sunrise automatically. A programmable Microcontroller Atmega328P of Arduino is engaged to provide different intensities at the different times of night using PWM technique for saving the energy.

4.5.2 Irrigation Facilities

Solar Powered Water Pump for Agriculture

Introduction

Photovoltaic (PV) panels are often used for agricultural operations, especially in remote areas or where the use of an alternative energy source is desired. In particular, they have been demonstrated time and time again to reliably produce sufficient electricity directly from solar radiation (sunlight) to power livestock and irrigation watering systems. A benefit of using solar energy to power agricultural water pump systems is that increased water requirements for livestock and irrigation tend to coincide with the seasonal increase of incoming solar energy. When properly designed, these PV systems can also result in significant long-term cost savings and a smaller environmental footprint compared to conventional power systems. The volume of water pumped by a solar- powered system in a given interval depends on the total amount of solar energy available in that time period. Specifically, the flow rate of the water pumped is determined by both the intensity of the solar energy available and the size of the PV array used to convert that solar energy into direct current (DC) electricity. The principle components in a solar-powered water pump system (shown in Figure) include The PV array and its support structure, electrical controller and electric-powered pump. It is important that the components be designed as part of an integrated system to ensure that all the equipment is compatible and that the system operates as intended. It is therefore recommended that all components be obtained from a single supplier to ensure their compatibility.



The following information is required to design a PV-powered pump

The volume of water required in a given period of time for livestock or irrigation purposes, as well as for storage. (A storage volume equal to a three-day water requirement is normally recommended for livestock operations as a backup for the system's safety features and cloudy days.)

The total dynamic head (TDH) for the pump. The quantity and quality of available water. The system's proposed layout and hydraulic criteria.

Electrical controllers

Electrical controllers and safety devices are incorporated into PV-powered water pump systems to control the electric power input to the pump and to provide necessary electrical protection and switching. A PV system may incorporate storage batteries that can be charged when incoming solar energy exceeds the pumping power requirement. The batteries can then be used to power the pump when the pumping requirement exceeds the solar power input. The battery charge and discharge will be regulated by the control unit. The use of batteries, however, does require a more complex control system and can significantly increase the cost and maintenance of the Powered system. Remember, the first goal of a solar-powered water pump system is to store water,

not electricity. The use of batteries should therefore be discouraged unless absolutely necessary since the added expense and complexity usually outweighs any advantages. Pumps that use PV systems are normally powered by DC motors. These motors use the DC output from the PV panels directly. Alternating current (AC) motors are sometimes used, but they require more complex control systems. They also result in less total energy availability due to the electrical losses caused when an inverter is used to convert the DC to AC electricity. Because DC motors do not require an inverter, utilize a less complex control system, and result in more total energy availability, they are most commonly paired with solar-powered pumps.

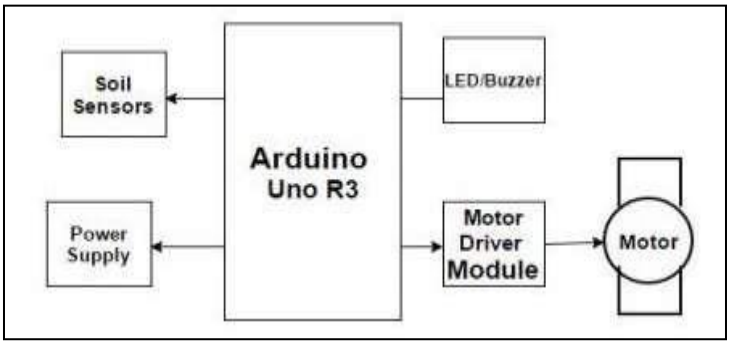
The type of pump configuration and mounting can be either submersible, surface mount, or floating, depending on the water source. Solar-powered pumps are characterized as either positive displacement pumps (e.g., diaphragm, piston, or helical rotor) or centrifugal pumps. Positive displacement pumps are typically used when the TDH is high and the flow rate (measured in GPM) required is low. Conversely, centrifugal pumps are typically used for low TDH and high flow rates. This is important when considering the placement of the panels and controller relative to the location of the pump. A general rule of thumb is that if the array consists of four or more panels and is located more than 50 feet away from the pump, the use of a higher voltage pump should be considered.

4.5.3 Electricity Facilities with Area

Automatic Water Plant System

Introduction

This system is used to provide water to the plants or gardening automatically using microcontroller (Arduino Uno). We can automatically watering the plants when we are going on vacation or don't we have to bother my neighbors, Sometimes the neighbors do too much of watering and the plants end up dying anyway. There are time based devices available in India which waters the soil on set interval. They do not sense the soil moisture and the ambient temperature to know if the soil actually needs watering or not.



Block diagram

There are two functional components. They are the moisture sensors module and the motor driver for motor pump. Thus the Arduino Board is programmed using the Arduino IDE software. The function of the moisture sensor is to sense the temperature content present in the soil, and also it measure moisture level in the soil. The motor driver interrupts the signal to, water pump supplies water to the plants. This project uses microcontroller Arduino Uno board to controls the motor and monitor soil moisture. Follow the schematic to connect the Arduino to the motor driver, and the driver to the water pump. The motor can be driven by a 5 volt battery, we can also supplies power from external source or from Arduino board. The Arduino Board is programmed using the Arduino IDE software.

Working

An automatic plant watering system using Arduino microcontroller UNO R3 is programmed such that it gives the interrupt signals to the motor via the motor driver module. Soil sensor is connected to the A0 pin to the Arduino board which senses the moisture content present in the soil. Whenever the soil moisture content values goes down, the sensor senses the humidity change, giving signal to the microcontroller so that the pump (motor) can be activated. This concept can be used for automatic plant watering system. The circuit comprises an Arduino UNO board, a soil moisture sensor, a 5V motor pump, a Motor driver L293D (IC1), motor driver IC to run the water pump. You can power the Arduino board using a 5V to 9V wall wart or plugin adaptor or solar panel. You need a separate 5V to 9v battery for the pump motor. Hence, the moisture sensors measure the moisture level (water content) of the different plants. If the moisture level is goes to be below the desired and limited level, the moisture sensor sends the signal to the Arduino board which triggers the Water Pump to turn ON and supply the water to respective plant using the Rotating Platform/Sprinkler. When the desired moisture level is reached, the system halts on its own and the water Pump is turned OFF.

4.6 Existing Institution like - Village Administration – Detail Profile

4.6.1 Bachat Mandali

- In visaman village there is no any bachat mandli avalible.

4.6.2 Dudh Mandali

- In visaman village there is no any dudh mandli avalible.

4.6.3 Mahila forum

- In visaman village there is kisori shakti yojana and Balika samridhi yojana is avalible.

4.6.4 Plantation for the Air Pollution

- In visaman village has no type of plantation for the air pollution.

4.6.5 Rain Water Harvesting – Waste Water Recycling

- In this village people are not collect rain water for future purpose

4.6.6 Agricultural Development

- In this village have a many agriculture development. Because people are engaged with farming so people are focuses in agriculture development.
- In this village one agriculture co-operative society are available

4.6.7 Any Other

- Prime minister rojgar yojana
- Sanjay Gandhi niradhar yojana
- For guide village people there is visaman sahkari mandli is available

Chapter : 5

Technical Options with Case Studies

5.1 Concept (Civil)

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying

In India tremendous environmental problems are arising in construction industry due to rapid urbanization. Increase in demand of residential dwelling units which leads to consume more energy, resources, raw materials which are responsible for the rise in the carbon footprint.

All metros are already facing environmental impact issues such as change in weather pattern, destruction of ecology. The solution lies in the sustainable development use of sustainable materials & technologies.

With green building becoming a critical part of today's world, more and more new construction technologies are being developed to keep upwash this escalating shift to sustainability.

The following list is the commonly adopted some of the techniques recognized in sustainable construction:

1.Low volatile organic compounds (V.O.C.)
2.Plywood processed without using formaldehyde.
3.Install big windows that provide plenty of fresh air and natural light.
4.Install energy and water efficient appliances.
5. Install low-emitting carpet.
6.Proper site selection and prevention of pollution on the construction site.
7.Water Systems Store, Recycle, Reuse
8.Heating, Cooling, and Ventilation
9.Indoor Air Quality
10.Use Sustainable Building Materials
11.Cool Roof

5.1.2 Soil Liquefaction

Liquefaction is the phenomena when there is loss of strength in saturated and cohesion-less soils because of increased pore water pressures and hence reduced effective stresses due to dynamic

loading. It is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading.

Liquefaction occurs in saturated, saturated soils are the soils in which the space between individual particles is completely filled with water. This water exerts a pressure on the soil particles that. The water pressure is however relatively low before the occurrence of earthquake. But earthquake shaking can cause the water pressure to increase to the point at which the soil particles can readily move with respect to one another.

Definition: -

"A Phenomenon where by a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, usually earthquake Shaking or other sudden change in stress condition, causing it to behave like a liquid" is called Soil Liquefaction

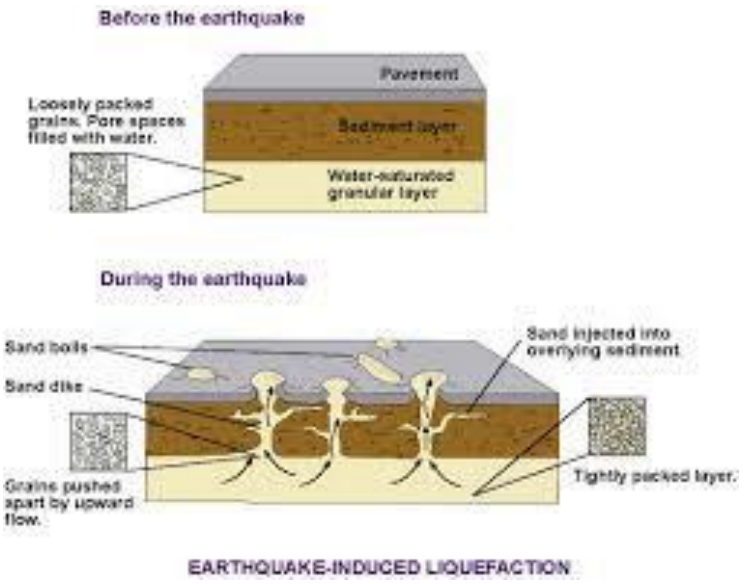


Fig 26. Soil liquefication

FACTORS AFFECTING SOIL LIQUEFACTION: -

1. Sail Type
2 Grain size and its distribution
3. Initial relative density
4. Vibration characteristics
5. Location of drainage and dimension of deposit
6. Surcharge load
7. Method of soil formation
8. Period under sustained load
9. Previous strain history
10. Trapped Air

- **MITIGATION METHODS: -**

a) Improving soil properties by:

- Vibro-compaction
- Dynamic compaction
- Compacting grouting
- Stone columns

b) Lowering ground water table:

- Vibro-compaction
- Dynamic compaction

5.1.3 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 waste water collection methods, transportation or conveyance of waste, treatment, and reuse or disposal.

The Sustainable sanitation includes five features 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.

The purpose of sustainable sanitation is the same as sanitation in general: to protect human health. However, "sustainable sanitation" attends to all processes of the system: This includes methods of collecting, transporting, treating and the disposal of waste.

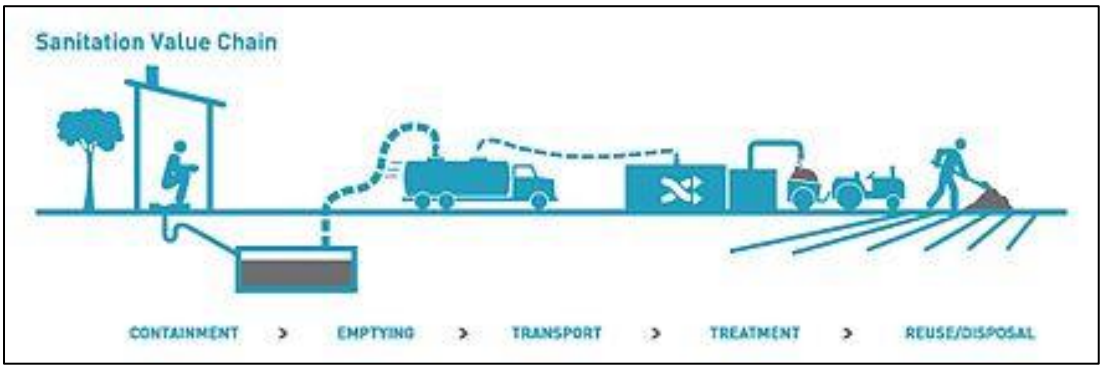


Fig 27. Sanitation chain

5.1.4 Transport Infrastructure / system

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.

They are often built on challenging and sensitive environments and over unexpected geotechnical conditions. Whether it's rural or urban roads, freight or passenger rail, commercial ports and airports or small regional or private operations – we have worked on transport infrastructure projects around the globe.

Concrete road:

Concrete pavements are designed to act like a beam and use the bending strength of the slabs to carry the load. Therefore load transfer across cracks and joints is important, especially on roads with heavy truck and bus traffic.

Fig 28. Concrete and bitumen road

Bitumen road:

In this type of bituminous road the aggregates are bound together by grouting bitumen into the voids of the compacted aggregates. This type of bituminous road is generally adopted for the thickness of 50 and 75 mm.

5.1.5 Vertical Farming

Vertical farming is the practice of growing crops in vertically stacked layers It often incorporates , controlled, environment agriculture which aims to optimize plant growth, and soilless farming techniques such as Hydroponics, aquaponics, and aeroponics. Some common choices of structures to house vertical farming systems include buildings, shipping containers, tunnels, and abandoned mine shafts. As of 2020, there is the equivalent of about 30 ha (74 acres) of operational vertical farmland in the world.

In vertical farming, crops are grown indoors, under artificial conditions of light and temperature.

Crops are grown indoors, under artificial conditions of light and temperature. It aims at higher productivity in smaller spaces. It uses soil-less methods such as hydroponics, aquaponics and aeroponics.

Vertical farming uses significantly less water and pesticides than traditional agricultural methods. Being indoors, the crops aren't subject to seasons and hence give high productivity year-round. Lettuces, tomatoes and green crops can be produced through this practice.

Fig 29 vertical farming

Fig 30. Building base vertical farming

Type of vertical farming

- Building-based vertical farms
- Shipping-container vertical farms
- Deep farms

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

Corrosion mechanism

Reinforced concrete uses steel to provide the tensile properties that are needed in structural concrete. It prevents the failure of concrete structures which are subjected to tensile and flexural stresses due to traffic, winds, dead loads, and thermal cycling. Standard terminology defines corrosion as “the chemical or electrochemical reaction between a material, usually a metal, and its environment that produces a deterioration of the material and its properties.”

When reinforcement corrodes, the formation of rust leads to a loss of bond between the steel and the concrete and subsequently delimitation and swelling.

If left unchecked, the integrity of the structure can be affected. Reduction in the cross sectional area of steel reduces its strength capacity.

Prevention

Corrosion prevention
1. Barrier coating:
2. Hot-Dip Galvanization
3. Alloyed steel (Stainless)
4. Cathode protection

Corrosion Repair :-

- We want to establish its “proper” condition that is, resistant to corrosion.
- In other words, to rehabilitate the structure we may need to improve it compared to its original condition.
- To repair is merely fixing the damage. This implies that deterioration may continue. Patch repairs are just what they say. They repair the damaged concrete.
- They will not stop future deterioration and may accelerate it.
- Coatings and barriers can also rehabilitate if applied well at the correct time.

5.1.7 Sewage treatment plant

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 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).

Types of Sewage treatment plans

- Activated sludge plant (ASP)
- Rotating disc system.
- Submerged aerated filter (SAF)
- Suspended Media Filters (SMF)

- Sequencing batch reactor (SBR)
- Non-electric filter.
- Trickling filter

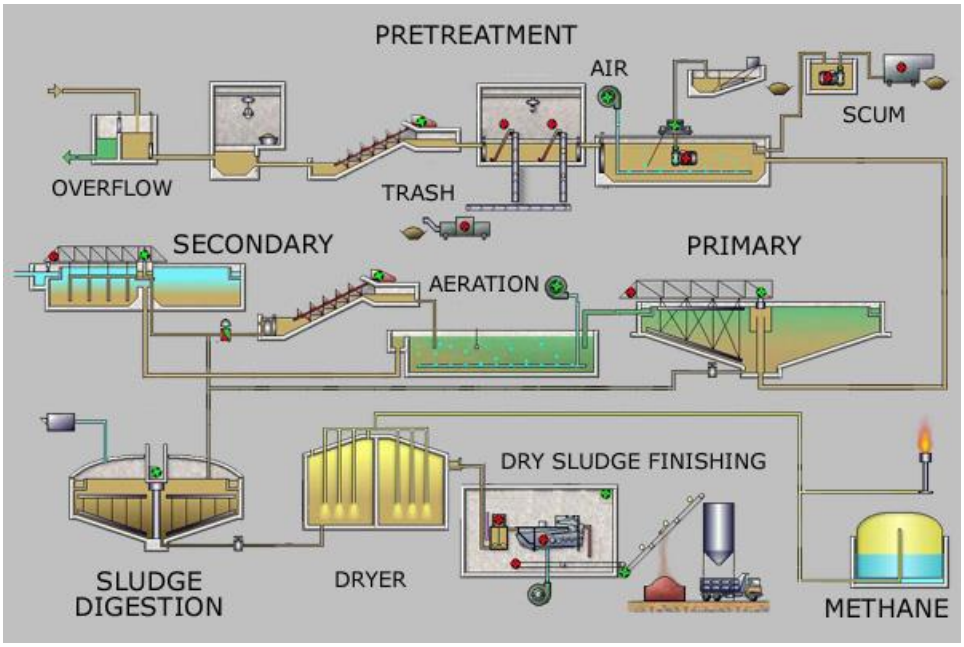


Fig 31 pretreatment

Treatment Steps

Step 1: Screening and Pumping

The incoming wastewater passes through screening equipment where objects such as rags, wood fragments, plastics, and grease are removed. The material removed is washed and pressed and disposed of in a landfill. The screened wastewater is then pumped to the next step: grit removal.

Step 2: Grit Removal

In this step, heavy but fine material such as sand and gravel is removed from the wastewater. This material is also disposed of in a landfill.

Step 3: Primary Settling

The material, which will settle, but at a slower rate than step two, is taken out using large circular tanks called clarifiers. The settled material, called primary sludge, is pumped off the bottom and the wastewater exits the tank from the top. Floating debris such as grease is skimmed off the top and sent with the settled material to digesters. In this step, chemicals are also added to remove phosphorus.

Step 4: Aeration / Activated Sludge

In this step, the wastewater receives most of its treatment. Through biological degradation, the pollutants are consumed by microorganisms and transformed into cell tissue, water, and nitrogen. The biological activity occurring in this step is very similar to what occurs at the bottom of lakes and rivers, but in these areas the degradation takes years to accomplish.

Step 5: Secondary Settling.

Large circular tanks called secondary clarifiers allow the treated wastewater to separate from the biology from the aeration tanks at this step, yielding an effluent, which is now over 90% treated. The biology (activated sludge) is continuously pumped from the bottom of the clarifiers and returned to the aeration tanks in step four.

Step 6: Filtration

The clarified effluent is polished in this step by filtering through 10 micron polyester media. The material captured on the surface of the disc filters is periodically backwashed and returned to the head of the plant for treatment.

Step 7: Disinfection

To assure the treated wastewater is virtually free of bacteria, ultraviolet disinfection is used after the filtration step. The ultraviolet treatment process kills remaining bacteria to levels within our discharge permit.

Step 8: Oxygen Uptake

The treated water, now in a very stabilized high quality state, is aerated if necessary to bring the dissolved oxygen up to permit level. After this step, the treated water passes through the effluent outfall where it joins the Oconomowoc River. The water discharged to the river must meet stringent requirements set by the DNR. Pollutant removal is maintained at 98% or greater.

Summary and conclusions :-

The successful implementation of wastewater reuse options in a water resources management programe requires careful planning, economic and financial analyses, and the effective design, operation, and management of wastewater reclamation, storage, and distribution facilities. Technologies for wastewater reclamation and purification have developed to the point where it is technically feasible to produce water of almost any quality, and advances continue to be made. Current water reclamation strategies incorporate multiple measures to minimize the health and environmental risks associated with various reuse applications.

A combination of source control, advanced treatment process flow schemes, and other engineering controls provides a sound basis for increased implementation of water reuse applications. The

feasibility of producing reclaimed water of a specified quality to fulfil multiple water use objectives is now a reality owing to the progressive evolution of technologies and the understanding of health and environmental risks.

Through integrated water reuse planning, as discussed in this chapter, the use of reclaimed wastewater will provide sufficient flexibility to allow a water agency to satisfy short-term needs as well as to increase water supply reliability. With an increasing emphasis on the planning and implementation of wastewater reclamation and reuse facilities, accurate cost data are essential. Thus, cost information was presented, although there are significant variations in wastewater reclamation and reuse costs.

5.1.8 Technical Case Study on "Chhatrapati Shivaji International Airport":

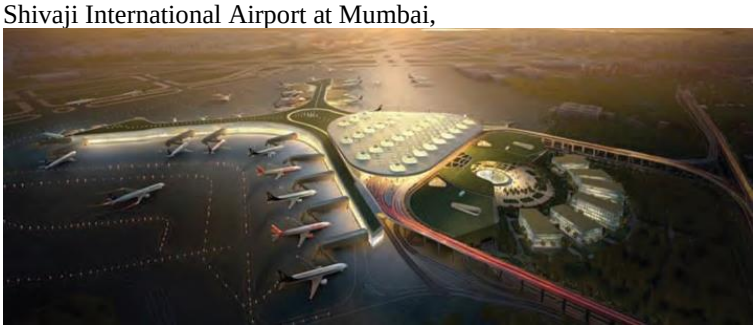
The Chhatrapati Shivaji International Airport in Mumbai, India recently opened the new T2 terminal, which will see more than 40 million visitors annually. The terminal sets a new precedent for functionality and aesthetics with decorated carpets, an art museum and bold architectural details.

As part of the innovative terminal design, a 4.8-kilometer (km) wall was decorated with perforated stainless steel panels, which required backlighting for an artistic silhouette and powerful visual that is reflective and consistent with the airport's overall design.

The new Integrate ed Terminal Building at Mumbai's Chhatrapati Shivaji International Airport combines international and domestic operations at one of the busiest airports in India. The 410 000 m2 building, being constructed at the site of the existing terminal, will achieve a capacity of 40 million passengers per annum upon completion in 2014. The primary design feature of the building is a long-span roof covering a total of 70 000 m2 over various functional requirements, making it one of the largest roofs in the world without an expansion joint. The Headhouse Roof, supported by only 30 columns spaced at 64 m in the North–South direction and at 34 m in the East–West direction, produces a large column free space ideal for an airport. By increasing the depth of the trusses near the columns and running trusses in both an orthogonal grid and a 45° grid, large spacing and cantilevers of 40 m along the perimeter are achieved with an overall truss depth of only 4 m.

Location & View:

Mumbai International Airport Limited, owner-operator of Chhatrapati Shivaji International Airport at Mumbai,



Challenge:

To achieve the desired visual effect, designers needed a solution that could uniformly illuminate the 6-meter high by 4.8 km long wall. Additionally, to solidify the airport's commitment to sustainability, the design team was seeking a lighting solution that would contribute to Leadership in Energy and Environmental Design (LEED) Certification for the terminal the solution needed high energy-efficiency to conform to power density restrictions and to reduce operating costs through reliable performance and reduced energy consumption. Additional requirements included remote accessibility to easily address maintenance issues and adherence to strict regional testing standards for robust protection against dust, insects, moisture and water. Further, to optimize energy consumption, the lighting fixtures needed to provide flexible adjustability for precise illumination.

Solution :

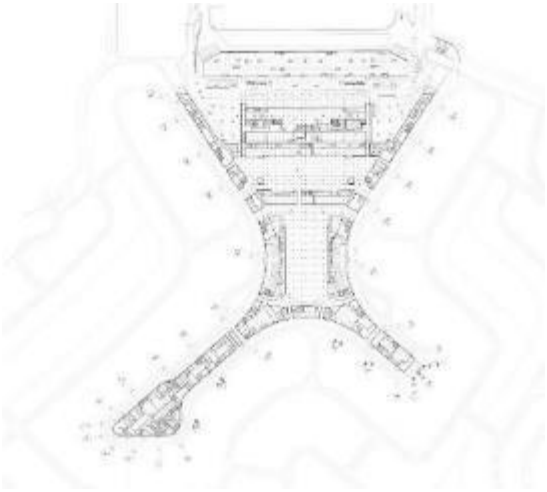
Following extensive light system modelling, the Chhatrapati Shivaji design team identified Eaton's Cooper Lighting io light-emitting diode (LED) line series 2.0 as the only solution capable of uniformly lighting the wall from floor to ceiling while providing ideal energy efficiency. Designed specifically for wall grazing applications, the io LED luminaire's patented optical assembly delivers a powerful 5-degree projection of light. Its award-winning blend of energy efficiency and optical performance excellence, as well as the fixture's adjustability for precise aiming helps highlight the unique architectural elements of the new terminal. Optimal illumination was achieved through the luminaire's superior 5-degree optical design that produces maximum upward projection without waste due to engineered efficacy. The fixtures also deliver a specified quantity of low angle illumination to ensure vertical uniformity across the entire length of the wall. A result no other light fixture could deliver. Further, the io LED solution incorporated a framed lens to eliminate light spillage, as well as a remote drive location to easily address maintenance issues. The Eaton team also worked with the airport to meet strict testing standards, including an IP66 rating to extend equipment life by protecting against environmental conditions, insects and dust accumulation.

Results:-

Compared to competing solutions, Eaton's Cooper Lighting io LED solution was the only luminaire capable of sufficiently lighting both the lower and upper portion of the perforated wall – contributing to aesthetically pleasing, three-dimensional lighting. "Our new terminal will not only be a high-traffic destination for travellers, but also a unique architectural design area packed full of high-performing, energy efficient products, like the Eato io LED fixtures," said Saurabh Singh, assistant vice president–contracts at GVK–Mumbai International Airport Pvt. Ltd. Additionally, because reduced power consumption and energy savings is a main component of LEED certification scoring, the io LED luminaires allowed the airport to underline its commitment to sustainability by contributing to the certification.

The lighting solution also added to the airport's LEED certification credentials by aiding in the 'Thermal Comfort Design' category by reducing heat waste and required electrical loads. Further, by utilizing the modern LED design that mitigates the use of environmentally harmful gasses and materials commonly found in fluorescent lighting, the airport was also able to add 'Innovation in Design' credits to contribute to its LEED Gold ranking.

Design :-



The limited land with no scope of expansion on any side posed the biggest challenge to the SOM. Among the other challenges were to increase the capacity of the existing airport to three times, that too without interfering in, or stopping its daily operations. The SOM's integrated team of airport planners, architects, and engineers with its determination, dedication, and devotion was able to overcome all these challenges.

Keeping in view the site constraints, and the projected requirement of three times capacity, the SOM developed a unique X-shaped plan for the new airport building. The length of the two piers of the terminal however, is not the same as the eastern pier remains truncated due to non-clearance of slums in the adjoining plot. As a result, the X-shaped terminal gives an asymmetrical look in its aerial view.

The shape of the plan ensured maximum aircraft gates due to wide spreading concourses. Some common facilities like retail, dining, and elaborated baggage handling system have been accommodated at the narrow centre of the X-shaped plan. The central location of these facilities make them easily accessible from all parts of concourses.

Unlike most of the airports where international and domestic retail areas are placed side-by-side, here all the retail areas are stacked vertically with international retail service above the domestic service. This arrangement though is unconventional yet quite efficient with regard to saving in large covered area. Apart from this, it ensured airport to operate concourses to serve either domestic or international flights depending upon demand.

The airport's arrivals and departures area has been planned on the northern side, sandwiched between the eastern and western piers. All the international and domestic travelers enter the terminal on the fourth floor through a sweeping elevated road. At the entrance, this approach road has been sufficiently widened to provide space for drop-offs curbs. The entire arrivals roadway has been covered with a huge

cantilevered roof of the terminal building thus protecting the passengers and their accompanying guests from Mumbai's scorching heat and unpredictable monsoons

The hallmark of the design is a long-span roof of the terminal building which covers 70,000 square metres without an expansion joint thus making it one of the world's largest roofs. The roof is supported on 30 massive steel columns spaced at 64 metres in the north-south direction, and at 34 metres in the east-west direction. The designers increased the depth of the steel trusses near the columns, and ran trusses in both an orthogonal grid, and 45-degree grid, resulting in generous spacing, and cantilevers of 40 metres along the perimeter.

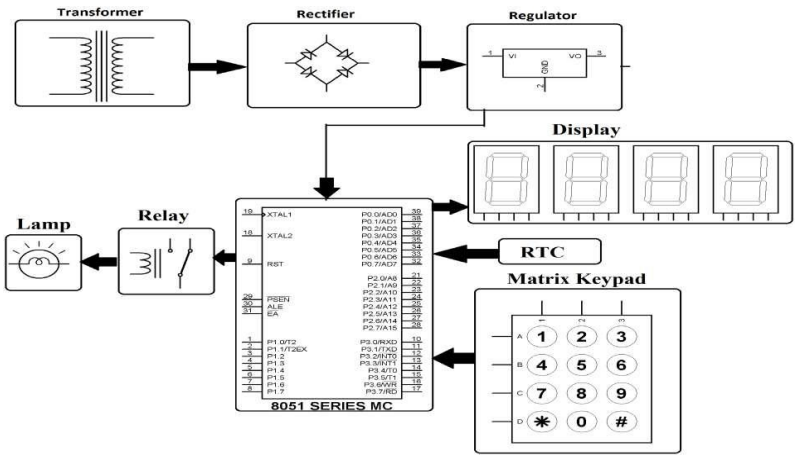
All the mega steel columns and a network of trusses have been artistically clad in thousands of precision-made glass-fibre-reinforced concrete panels on the exteriors, and glass-fibre-reinforced gypsum panels in the interiors. Due to curvilinear form of mushroom columns and roof, the size and shape of all these coffered panels vary from place to place. As a result, each panel has been custom made with computerized precision.

The design of the motif for the moulded coffered panels has been derived from teardrop-shaped eye of the peacock which is India's national bird. At the centre of each of the coffered panels is a round aperture for natural and electric light to pass. In each aperture is a laminated lens that produces two colours, depending on the angle at which light strikes it. About the effect of these lights on the ambiance, the designers have very rightly said, "When the light is right, the whole airport looks like a Rajasthan palace filled with coloured glass."

5.2 Smart security system for Indian rail wagons using IOT

5.2.1Programmable Load Shedding

In today's world, there is a continuous need for automatic appliances with the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life. The project is designed to operate an electrical load multiple number of times as per the program. It overcomes the difficulties of



switching the load ON/OFF manually. This proposed has an inbuilt real time clock (RTC) to keep tracking the time and thus to switch ON/OFF the load accordingly. Load shedding is what electric utilities do when there is a huge demand for electricity that exceeds the supply. Thus in a distribution system it needs to be precisely controlled for specific period of time. Programmable load shedding time management system is a reliable circuit that takes over the manual task of switch ON/OFF the electrical devices with respect to time. It uses real time clock (RTC) interfaced to a microcontroller of 8051 family. While the set time equals to the real time, then microcontroller gives command to the corresponding relay to turn ON the load and then another command to switch OFF as per the program. Multiple ON/OFF time entry is the biggest advantage with this project. A matrix keypad helps enter.

BLOCK DIAGRAM EXPLANATION

The various blocks in the circuit are

1. Transformer 2. Regulator 3. LCD display 4. Microcontroller 5. RTC 6. Keypad 7. Output relay

Microcontroller

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes ofin-system programmable Flash memory. The device is manufactured using. Atmel's high-density nonvolatile memory technology and is compatible with the industry standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with insystem programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, **timer**/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

Transformer

A transformer is a static electric that transfers energy by inactive coupling between its winding circuits. A varying current in the primary winding creates a varying magnetic flux in the transformer's core and thus a varying magnetic flux through the secondary winding. This varying magnetic flux induces a varying electromotive force (EMF).

Regulator

A regulator is a system used to maintain a steady voltage. The resistance of the regulator varies in accordance with the load resulting in a constant output voltage. The regulating device is made to act like a variable resistor, continuously adjusting a voltage divider network to maintain a constant output voltage, and continually dissipating the difference between the input and regulated voltages as waste heat. By contrast, as witching regulator uses an active device that switches on and off to maintain an average value of output. Because the regulated voltage of a

linear regulator must always be lower than input voltage, efficiency is limited and the input voltage must be high enough to always allow the active device to drop some voltage.

RTC

The DS12885, DS12887, and DS12C887 real-time clocks (RTCs) are designed to be direct replacements for the DS1285 and DS1287. The devices provide a real-time clock/calendar, one time-of-day alarm, three mask able interrupts with a common interrupt output, a programmable square wave, and 114 bytes of battery- backed static RAM (113 bytes in the DS12C887 and DS12C887A). The DS12887 integrates a quartz crystal and lithium energy source into a 24-pin encapsulated DIP package. The DS12C887 adds a century byte at address 32h. For all devices, the date at the end of the month is automatically adjusted for months with fewer than 31 days, including correction for leap years. The devices also operate in either 24-hour or 12-hour format with an AM/PM indicator. A precision temperature-compensated circuit monitors the status of VCC. If a primary power failure is detected, the device automatically switches to a backup supply. A lithium coin-cell battery can be connected to the VBAT input pin on the DS12885 to maintain time and date operation when primary power is absent. The device is accessed through a multiplexed byte-wide interface, which sup- ports both Intel and Motorola modes.

LCD

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on **the** LCD. The data is the ASCII value of the character to be displayed on the LCD

KEY PAD

Matrix keyboards are common as an input device in microcontroller-based projects. A conventional way of connecting a matrix keyboard to a microcontroller is to use multiple I/O pins of the MCU. The MCU then uses a scanning algorithm to identify which keys are pressed. A drawback of this method is that it requires a large number of the MCU's I/O pins to connect the keyboard. For example, to connect a 4×3 keyboard requires seven digital I/O pins. It scans row and column to know what is the input.

Output relay

Relay is used to obtain the output. From the output of the relay, the control goes to the main power supply. The whole system acts as an automatic switch.

Circuit Operation

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

IC, relay, a Crystal oscillator. The 7805 voltage regulator converts the input voltage to 5V and is given to the VCC (pin: 40) of the 8952 microcontroller. This voltage is necessary to enable the microcontroller .A DS12887 RTC interfaces with port0 of the microcontroller i.e., from pins 32 to 39.The RTC shows the real time at every instant. Once the RTC is programmed, it will work continuously even though the power goes off in between. The keypad is interfaced with port2 of the microcontroller i.e. from pins21 to28.The keypad is used to set the real time, the time for load shedding time and the time duration. The 16*2 LCD is interfaced to port1of the microcontroller i.e. from pins 1 to 8.The crystal oscillator helps to provide the working frequency 11.059MHz for the microcontroller. The microcontroller programmed in such a way that we can set the actual time and load shedding time. Using the program we can monitor both real time and load shedding time. Program always check the equality and whenever it get matched output relay turn off. Then it began to check equality with target time and real time, whenever it get matched relay turns on.
There are many advantages for this circuit. Some of them are.

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

PROPOSED SYSTEM FEATURES

⇒ Automatic Load shedding is possible.
⇒ Differs from current system we can program the Load shedding process.
⇒ RTC provides the real time.
⇒ LCD provides the real time and Load shedding timings.
⇒ KEYPAD to set the time.
⇒ Easy to set up.
⇒ Economical and reliable

5.2.2Railway Security System using IoT

Abstract. The objective of this project is to create a Security System for the goods that are carried in open top freight trains. The most efficient way to secure anything from thieves is to have a continuous observation. So for continuous observation of the open top freight train, Camera module2 has been used. Passive Infrared Sensor (PIR) 1 has been used to detect the motion or to sense movement of people, animals, or any object. So whenever a motion is detected by the PIR sensor, the Camera takes a picture of that particular instance. That picture will be send to the Raspberry PI which does Skin Detection Algorithm and specifies whether that motion was created by a human or not. If a human makes it, then that picture will send to the drop box. Any Official can have a look at the same. The existing system has a CCTV installed at various critical locations like bridges, railway stations etc. but they does not provide a continuous observation. This paper describes about the Security System that provides continuous observation for open top freight trains so that goods can be carried safely to its destination.

Introduction

There are many cases reported for coal mines thief near the rural areas when the train halts for some time. This has affected a lot in the Indian railways economy. So this paper devices a new technique for Indian railways to remotely monitor the system. The proposed model has a motion detection sensor which detects the motion of the object which performs skin detection and then sends the image to the railway server using IoT. So that immediately an action can be taken to avoid coal thief. The conceptual diagram is given in the Figure 1

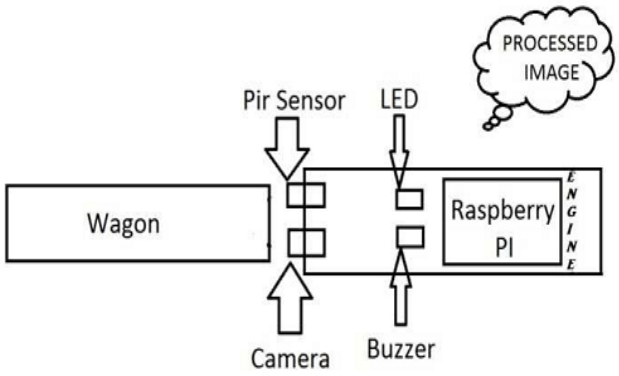


Fig 32 conceptual diagram

Related works:-

Design and development of an integrated and heterogeneous network was proposed by SandroChiocchio et al [1] and which concentrates on board communication through an 868 MHz Wireless Sensor Network component, data communications across a mobile network through M2M (Machineto-Machine) communication, data collection on the Cloud for processing and detection of anomalies.

To reduce the energy consumption to values sustainable by energy harvesters without penalizing the quality of service, a bi-periodic communication scheme for the local wireless transmission was proposed by Alessandro et al [2] with a dynamic management and consumption model of receiver and GPRS transceiver, which optimize the sleep modes. The proposed solutions are compared and the theoretical predictions are validated by measurements using different operating conditions

System integration: -

After testing the modules mentioned above individually, they have been integrated together with the Raspberry PI. Now, as soon as the motion is detected by the PIR Raspberry PI invokes the camera to take an image of that instance. Once the image is taken the Rasp Image Processing i.e. Skin Detection Algorithm to make out whether the image captured is a human. If it was a human then that picture will be uploaded to the drop box and also images are sent to railway node using IOT. Any official can have a look at that picture provided if he has internet connection. So using this system it will become easy for the officials to carry out further investigation.

.Hardware and software

1 *Hardware*

The Components used are microcontroller Raspberry pi 3b, PIR sensor, Camera module2, led,
buzzer and power supply for Raspberry pi.

1 *Raspberry pi 3b*

It is a device where all the processing of information takes place. It is used to process the PIR sensor data, perform the skin detection algorithm and is a communication device that sends images to the

Fig 33 raspberry pi

railway server in anomalies. The microcontroller Raspberry pi used in the project is shown in Figure 2 with the specification as follows

Implementation and results: -

Drop box software is used to store files in cloud storage. It offers cloud storage, file synchronization and client software. For auto uploading the pictures, we have installed Drop box up loader onto the Raspberry PI. And then we have created an account in the Drop box Developers. After logging in to Drop box account we have created an app to store the pictures in the cloud storage. Whenever the motion is detected, the picture of that instance is taken by the camera will get uploaded to the Drop box. Figure 5 shows the detected images that were auto uploaded to the Drop box app. Images are auto uploaded to the Drop box App provided the Skin Detection Algorithm. The Algorithm confirms that the skin has been detected and it is human as shown in Figure 6. This project helps Railway officials to carry further investigation. It also prevents theft of goods from the open top freight trains. Any Railway Officials can access that images that would be uploaded to the app provided if he has an internet connection. Memory is sufficiently available as cloud storage platform has been used videos can also get auto uploaded to the Drop box App.

5.2.3 Management through Energy Harvesting Concept:

Energy harvesting is the process by which ambient energy is captured and converted into electricity for small autonomous devices, such as satellites, laptops and nodes in sensor networks without the need for battery power. Energy harvesting applications reach from vehicles to the smart grid. With electronic circuits now capable of operating at microwatt levels, it is feasible to power them from non-traditional sources. This has led to energy harvesting, which provides the power to charge, supplement or replace batteries in systems where battery use is inconvenient, impractical, expensive or dangerous. It can also eliminate the need for wires to carry power or to transmit data Energy harvesting can power smart wireless sensor networks to monitor and optimize complex industrial processes, remote field installations and building HVAC. In addition, otherwise wasted energy from industrial processes, solar panels, or internal combustion engines, can be harvested for useful purposes. A key component in energy harvesting is a power converter that can operate with ultralow voltage inputs. Now that we have described why it is feasible and what it can do, how does energy harvesting actually work?

Put simply, it is a process that:
- Captures minute amounts of energy
- Accumulates that energy
- Stores the energy
- Maintains the stored energy as a power source

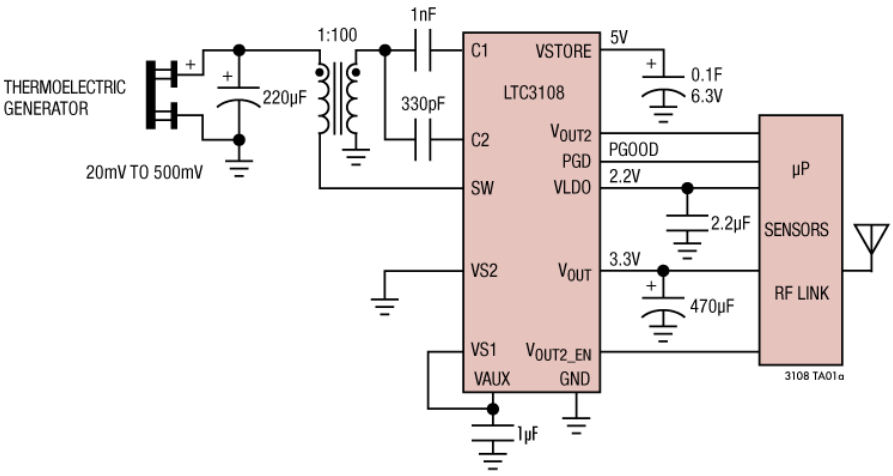
Typical energy harvesting inputs include:
- Solar power
- Thermal energy
- Wind energy
- Salinity gradients
- Kinetic energy

Today, energy harvesters do not usually produce enough energy to perform mechanical work, however they provide small amounts of power to support low-energy electronics. In most cases, the "fuel" for energy harvesters is naturally present and may be considered free. Using natural sources in remote areas for energy harvesting is an attractive alternative to inconvenient utility and battery power. These natural energy sources may be available maintenance-free for a lifetime. Energy harvesting can also be an alternative energy source that supplements the primary power source and enhances its reliability.

Energy harvesters are intended for applications requiring very low average power, but require periodic pulses of higher load current. For example, in many wireless sensor applications the circuitry is only powered to make measurements and transmit data periodically at a low duty cycle. Energy harvesting is becoming more feasible today because of the increased efficiency of devices capable of capturing, storing, and producing electrical energy. This can be accomplished with the help of very efficient, very low-voltage input step-up converters. Also, improved low-voltage, high-efficiency microprocessors may allow them to become participants in energy harvesting systems.

Energy Harvesting IC

Linear Technology's LTC3108, a highly integrated dc-dc converter is intended for energy harvesting. It can harvest and manage surplus energy from extremely low-input voltage sources such as TEG (thermoelectric generators), thermopiles, and small solar cells. The circuit in Fig. uses a small step-up transformer to boost the input voltage to an LTC3108 that provides a complete power-management solution for wireless sensing and data acquisition. It can harvest small temperature differences and generate system power instead of using traditional battery power. The LTC3108 is available in a small, thermally enhanced12-lead (4mm × 3mm) DFN and a 16-lead SSOP packages.



(Fig- LTC3108 provides power management for wireless sensing and data acquisition)

The LTC3108 utilizes a MOSFET switch to form a resonant step-up oscillator using an external step-up transformer and a small coupling capacitor. This allows it to boost input voltages as low as 20mV, high enough to provide multiple regulated output voltages for powering other circuits The frequency of oscillation is determined by the inductance of the transformer secondary winding and is typically in the range of 20kHz to 200kHz. For input voltages as low as 20mV, a

primary secondary turns ratio of about 1:100 is recommended. For higher input voltages, this ratio can be lower. The ac voltage produced on the secondary winding of the transformer is boosted and rectified using an external-charge pump capacitor (from the secondary winding to pin C1) and the rectifiers internal to the LTC3108. The rectifier circuit feeds current into the VAUX pin, providing charge to the external VAUX capacitor and the other outputs. As listed in Table 13-1 above, the main output is pin-selectable via VS1 and VS2 for one of four fixed voltages (2.35V, 3.3V, 4.1V, or 5V) to power a wireless transmitter or sensors. A second switched output can be enabled by the host to power devices that do not have a micropower shutdown capability. The addition of a storage capacitor provides continuous power even when the input energy source is unavailable.

A power-good comparator monitors VOUT. The PGD pin is an open-drain output with a weak pull-up (1MΩ) to the LDO voltage. Once V_{OUT} charges to within 7% of its regulated voltage, the PGOOD output goes high. If V_{OUT} drops more than 9% from its regulated voltage, PGD goes low. The PGD output is designed to drive a microprocessor or other chip I/O and is not intended to drive a higher current load such as an LED. Pulling PGOOD up externally to a voltage greater than VLDO will cause a small current to be sourced into VLDO. PGOOD can be pulled low in a wire- OR configuration with other circuitry. V_{OUT2} is an output that can be turned on and off by the host, using the V_{OUT2}_EN pin. When enabled, V_{OUT2} is connected to V_{OUT} through a 1.3Ω P-channel MOSFET switch. This output, controlled by a host processor, can be used to power external circuits such as sensors and amplifiers that do not have a low power sleep or shutdown capability. VOUT2 can be used to power these circuits only when they are needed.

5.2.4 Moisture Monitoring System

Sensing Soil Moisture Content by Auto Irrigation System
Introduction

Continuous increasing demand of food requires the control in highly specialized greenhouse vegetable rapid improvement in food production technology. In a production and it is a simple, precise method for country like India, where the economy is mainly based on irrigation. It also helps in time saving, removal of human agriculture and the climatic conditions are isotropic, still error in adjusting available soil moisture levels and to we are not able to make full use of agricultural resources. Maximize their net profits. The main reason is the lack of rains & scarcity of land Irrigation is the artificial application of water to the soil reservoir water. The continuous extraction of water from usually for assisting in growing crops.

Localized irrigation in modern drip irrigation systems, the most significant Drip Irrigation advantage is that water is supplied near the root zone of sprinkler irrigation. The plants drip by drip due to which a large quantity of water is saved. The main aim of provide water to the plants or gardening automatically using microcontroller (Arduino Uno). We can automatically water the plants when we are going on vacation or don't, we have to bother my neighbors, Sometimes the neighbors do too much of watering and the plants end up dying anyway. There are timer-based devices available in India which waters the soil on set interval. They do not sense the soil moisture and the ambient temperature to know if the soil actually needs watering or not. Assimilation is that the artificial application of water to the land or soil It is used to assist in the growing of agricultural

maintenance of landscapes, and re vegetation of disturbed soils in dry areas and during periods of inadequate rainfall.

When a zone comes on, the water flows through the lateral lines and ultimately finally ends up at the irrigation electrode (drip) or mechanical device heads. Several sprinklers have pipe thread inlets on the lowest of them that permits a fitting and also the pipe to be connected to them. The sprinklers are usually used in the top of the head flush with the ground surface. As the method of dripping will reduce huge water losses it became a popular method by reducing the labor cost and increasing the yields. When the components are activated, all the components will read and gives the output signal to the controller, and the information will be displayed to the user (farmer). The sensor readings are analog in nature so the ADC pin in the controller will convert the analog signals into digital format. Then the controller will access information and when the motors are turned On/Off it will be displayed on the LCD Panel, and serial monitor windows. There are many systems are available to water savings in various crops, from basic ones to more technologically advanced ones. For instance, in one system plant watering status was monitored and irrigation scheduled based on temperature presents in soil content of the plant

Irrigation

Little water is lost to deep percolation if the proper amount is applied. Drip irrigation is popular because it can Irrigation system uses valves to turn irrigation ON and increase yields and decrease both water requirements and OFF. These valves may be easily automated by using labor. Controllers and solenoids. Automating farm or nursery Drip irrigation requires about half of the water needed by irrigation allows farmers to apply the right amount of sprinkler or surface irrigation. Lower operating pressures water at the right time, regardless of the availability of and flow rates result in reduced energy costs.

A higher labor to turn valves on and off. In addition, farmers using degree of water control is attainable. Automation equipment are able to reduce runoff from over Plants can be supplied with more precise amounts of watering saturated soils, avoid irrigating at the wrong time water. Disease and insect damage is reduced because plant of day, which will improve crop performance by ensuring foliage stays dry. Operating cost is usually reduced. Adequate water and nutrients when needed. Automatic Federations may continue during the irrigation process Drip Irrigation is a valuable tool for accurate soil moisture because rows between plants remain dry. The capacity of soil to retain water is a function of soil texture and structure. When removing a soil sample, the soil being evaluated is disturbed, so its water-holding capacity is altered. The new soil moisture sensor uses Immersion Gold which protects he nickel from oxidation. Electrodes nickel immersion Fig. Overview of Automated Irrigation System gold (ENIG) has several advantages over more conventional (and cheaper) surface plating such as The above fig 1 explains about important parameters to be HASL (solder), including excellent surface planarity measured for automation of irrigation system are soil (particularly helpful for PCB's with large BGA packages), moisture.

Soil Moisture

Soil moisture is an important component in the Atmospheric water cycle, both on a small agricultural scale and in large scale modelling of land/atmosphere interaction. Vegetation and crops always depend more on the moisture available at root level than on precipitation occurrence. Water budgeting for irrigation planning, as well as the actual scheduling of irrigation action, requires local soil moisture information. Knowledge of the degree of soil wetness helps to forecast

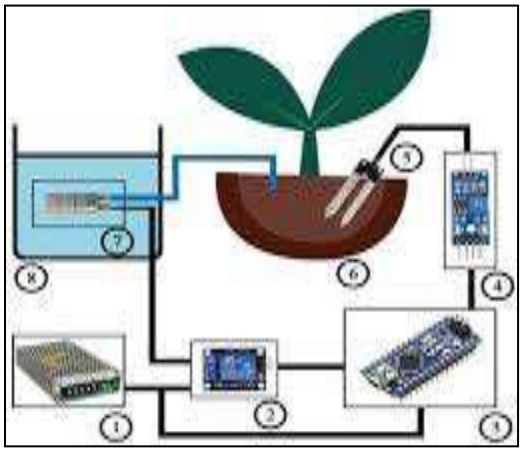
the risk of flash floods, or the occurrence of fog. The relation which monitors and controls all the activities of drip between content and potential is not universal and depends irrigation system efficiently. The present proposal is a on the characteristics of the local soil, such as soil density model to modernize the agriculture industries on a small and soil texture. Scale with optimum expenditure. Using this system, one the basic technique for measuring soil water content is the can save manpower, water to improve production and gravimetric method. Because this method is based on ultimately profit. Direct measurements, it is the standard with which all other methods are compared.

Working

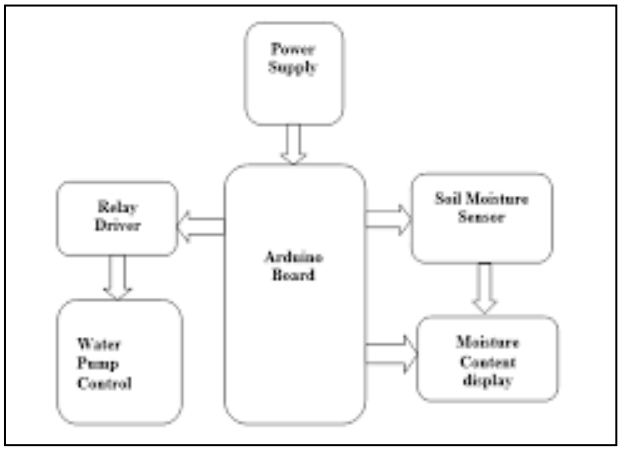
An automatic plant watering system using Arduino microcontroller UNO R3 is programmed such that it gives the interrupt signals to the motor via the motor driver module. Soil sensor is connected to the A0 pin to the Arduino board which senses the moisture content present in the soil. Whenever the soil moisture content values go down, the sensor senses the humidity change, giving signal to the microcontroller so that the pump (motor) can be activated. This concept can be used for automatic plant watering system. The circuit comprises an Arduino UNO board, a soil moisture sensor, a 5V motor pump, a Motor driver L293D (IC1), motor driver IC to run the water pump. You can power the Arduino board using a 5V to 9V wall wart or plugin adaptor or solar panel. You need a separate 5V to 9v battery for the pump motor.

Block Diagram

There are two functional components in this project. They are the moisture sensors module and the motor driver for motor pump. Thus, the Arduino Board is programmed using the Arduino IDE software. The function of the moisture sensor is to sense the temperature content present in the soil, and also it measures moisture level in the soil. The motor driver interrupts the signal to, water pump supplies water to the plants. This project uses microcontroller Arduino Uno board to controls the motor and monitor soil moisture. Follow the schematic to connect the Arduino to the motor driver, and the driver to the water pump. The motor can be driven by a 5-volt battery, we can also supply power from external source or from Arduino board. The Arduino Board is programmed using the Arduino IDE software



(Fig-Soil Moisture Block Diagram)



(Fig-Sensing Soil Moisture Component)

Component & Requirement

1. Power Supply
2. Relay module
3. Arduino Uno
4. Soil moisture Sensor
5. Amplifier circuit
6. Plant
7. Water pump
8. Water Tank

5.2.5 Home Automation using IoT / Any other methodology

IoT home automation: Getting started

Home automation has three major parts:

⇒ Hardware

⇒ Software/Apps

⇒ Communication protocols

Each of these parts is equally important in building a truly smart home experience for your customers. Having the right hardware enables the ability to develop your IoT prototype iteratively and respond to technology pivots with ease.

A protocol selected with the right testing and careful consideration helps your avoiding performance bottlenecks that otherwise would restrict the technology and device integration capabilities with sensors and IoT gateways.

Another important consideration is the firmware that resides in your hardware managing your data, managing data transfer, firmware OTA updates and performing other critical operations to make things talk.

Applications of home automation

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

⇒ Lighting control

⇒ HVAC

⇒ Lawn/Gardening management

⇒ Smart Home Appliances

⇒ Improved Home safety and security

⇒ Home air quality and water quality monitoring

⇒ Natural Language-based voice assistants

⇒ Better Infotainment delivery

⇒ AI-driven digital experiences

Home automation components

We have talked about them before, but, let's clearly separate them into components that would finally help you build a realistic model of what major components are involved in building a smart home. The major components can be broken into:

⇒ IoT Sensors
⇒ IoT Gateways
⇒ IoT Protocols
⇒ IoT Firmware
⇒ IoT Cloud and Databases
⇒ IoT Middleware (if required)

IoT sensors involved in home automation are in thousands, and there are hundreds of home automation gateways as well. Most of the firmware is either written in C, Python, Node.Js, or any other programming language. The biggest players in IoT cloud can be divided into a platform as a service (PaaS) and infrastructure as a service (LaaS).

Major IoT platform as a service provider:

⇒ AWS IoT, Azure IoT, Thingworx, Ubidots , Thingspeak, Carriots, Konekt, TempoIQ, Xively, IBM Bluemix

Home Automation Sensors

There are probably thousands of such sensors out there that can be a part of this list. Since this is an introduction towards smart home technology, we will keep it brief. We will break down IoT sensors for home automation by their sensing capabilities:

⇒ Temperature sensors, Lux sensors, Water level sensors
⇒ Air composition sensors, Video cameras for surveillance
⇒ Voice/Sound sensors, Pressure sensors
⇒ Humidity sensors, Accelerometers
⇒ Infrared sensors, Vibrations sensors, Ultrasonic sensors

Depending upon what you need you may use one or many of these to build a truly smart home IoT product. Let's have a look at some of the most commonly used home automation sensors.

Home Automation Protocols

One of the most important parts of building a home automation product is to think about protocols, protocols that your device would use to communicate to gateways, servers, and sensors. A few years ago, the only way to do so was by either using Bluetooth, wifi or GSM. But due to added expenses on cellular sim cards, and low performance of Wifi, most such solutions didn't work. A few years ago, the only way to do so was by either using Bluetooth, wifi or GSM. But due to added expenses on cellular sim cards, and low performance of Wifi, most such solutions didn't work. Bluetooth survived and later evolved as Bluetooth Smart or Bluetooth low energy. This helped bring a lot of connectivity in the "mobile server powered economy", in this essentially your phone would act as a middleware to fetch data from BLE powered sensors and sent it over to the internet.

When looking at the major home automation protocols, the following tops the list:

⇒ Bluetooth low energy or Bluetooth Smart: Wireless protocol with mesh capabilities, security, data encryption algorithms and much more. Ideal for IoT-based products for smart homes.

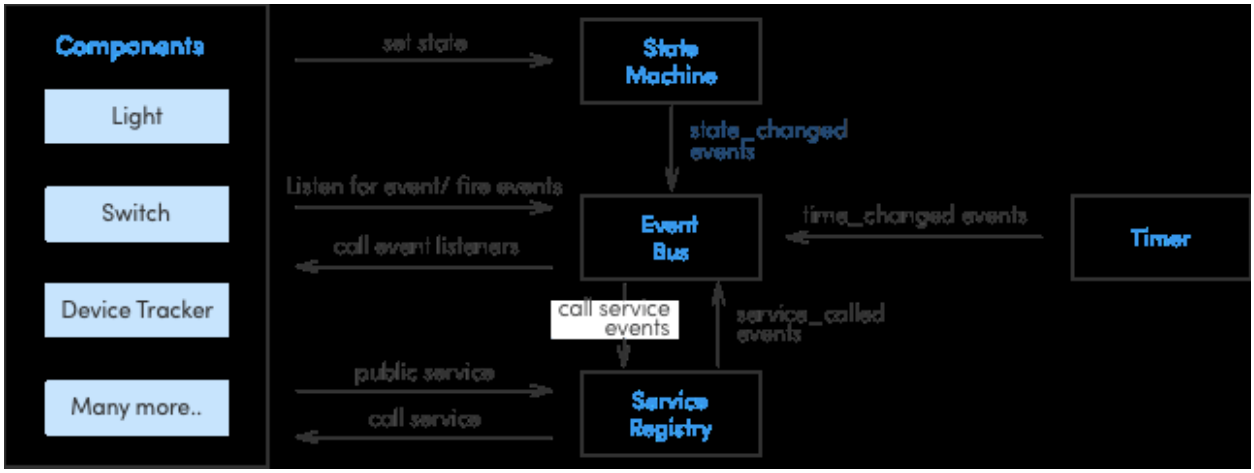
⇒ ZigBee: Low cost, mesh networked and low power radio frequency based protocol for IoT. Different ZigBee versions don't talk to each other.
⇒ X10: A legacy protocol that utilizes power line wiring for signaling and control
⇒ Insteon: Communicates with devices both wirelessly and with wires
⇒ Z-wave: Specializes in home automation with an emphasis on security
⇒ Wi-Fi: Needs no explanation
⇒ UPB: Uses existing power lines installed in a home, reduces costs
⇒ Thread: A royalty-free protocol for smart home automation, uses a 6lowpan
⇒ ANT: An ultra-low power protocol helping developers build low-powered sensors with a mesh distribution capabilities

Home Automation Architecture
This architecture supports the following considerations for home automation solutions:
⇒ End to end security mechanisms involving multilevel authentication
⇒ End to end data encryption, including the link layer
⇒ Flexible and configurable access and authorization control
⇒ Powerful cloud infrastructure
⇒ Network agnostic with built-in feedback loops
⇒ Configurable cloud-based rules engine
⇒ API endpoints
⇒ Data scalability
⇒ NoSQL databases

Home Assistant for smart home development:
Supports RaspberryPi, uses Python with OS as Hassbian. It has simplified automation rules that developers can use to build their home automation product saving them thousands of lines of code. Home Assistant supports the following:
How home assistant works involve the following:
⇒ Home control responsible for collecting information and storing devices
⇒ Home automation triggers commands based on user configurations
⇒ Smart home triggers based on past user behavior As developers, it is very important for us to understand the architecture of Home Assistant for us

(Fig- Home Assistant for smart home development build high-performing products on top of it.)
Let's have a look at Home control's architecture that makes control and information flow possible. Home control consists of five components:
⇒ Components
⇒ State machine
⇒ Event bus
⇒ Service registry
⇒ Timer
The core architecture of Home Assistant
All of these components working together create a seamless asynchronous system for smart home IoT. In the earlier version of Home Assistant core, the core often had to stop while looking for new device information.

But, with the new versions of home assistant, a backward compatible API, and ansyn core have been introduced making things a lot faster for IoT applications.
The best part about home assistant's core architecture is how carefully it has been designed and developed to support IoT at home.



(Fig- The core architecture of Home Assistant)

Calaos for Home Automation

Calaos was developed initially by a company that was closed back in 2013, but the home automation since then has lived and is being maintained and upgraded by developers. While now being open source, it facilitates premade source code to:

⇒ Create sweet home environment
⇒ Control music
⇒ Automation rules that focus on time, mood or ambiance
⇒ Easy configuration
⇒ Calaos supports the following hardware:
⇒ Premoboard
⇒ Cubieboard
⇒ RaspberryPi
⇒ Intel-based machines

Their lack of support towards developing private IoT applications restricts their usage by developers to build high-quality solutions for consumers.

Domoticz for Home Automation

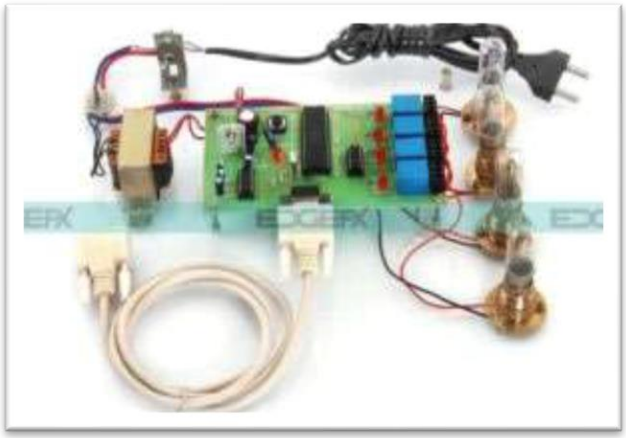
Domoticz allows you to monitor and configure your devices and sensors with the simplest possible design. Impressive enough that the entire project is extremely lightweight, it further is backed by high integrability with third parties and features like auto learning switches.
This platform has been designed to work with operating systems like Linux and Windows.
Protocol capabilities of Domoticz include: Z-wave, Bluetooth, Apple Homekit, X10 and MQTT
Hardware integration capabilities of Domoticz:
⇒ RFXCOM Transceiver

⇒ ESP2866 Wifi module
⇒ P1 smart meter
⇒ Youless meter
⇒ Pulse counters
⇒ 1-Wire
⇒ Philips Hue
⇒ Essent E thermostat

Domoticz architecture
Currently, very few people know about the architecture of Domoticz, making it extremely difficult to build applications on it without taking unnecessary risks in building the product itself.
For example, the entire design of general architecture feels a little weird when you look at the concept of a sensor to control to an actuator. It seems to be missing.
Building advanced application with Domoticz can be done using C++, lula, PHP, shell, etc.

Blockchain in IoT for connected home
Consumers, especially those who grew up in the digital era understand the importance of privacy and security more than millennials. With the evolution of IoT, security has taken center stage for realistic deployment scenarios.
Deployment of Blockchain into home networks can easily be done with a $35 raspberry pi. A blockchain secured layer between devices and gateways can be implemented without massive revamp of the existing code base. Simply put, blockchain as a technology that would be an implementation that most users won't even know about, but will play a huge role in future to reassure them with revolutionary and new business models like dynamic renting for Airbnb. So far, interoperability issues and broken protocols seemed to have hampered the growth of IoTbased smart homes. But, as technology is progressing and more and more computing power can be generated with very low powered devices, home automation will gradually become a technology that will easy for us to build and develop for on a daily basis.

5.2.6 PC Based Electrical Load Control

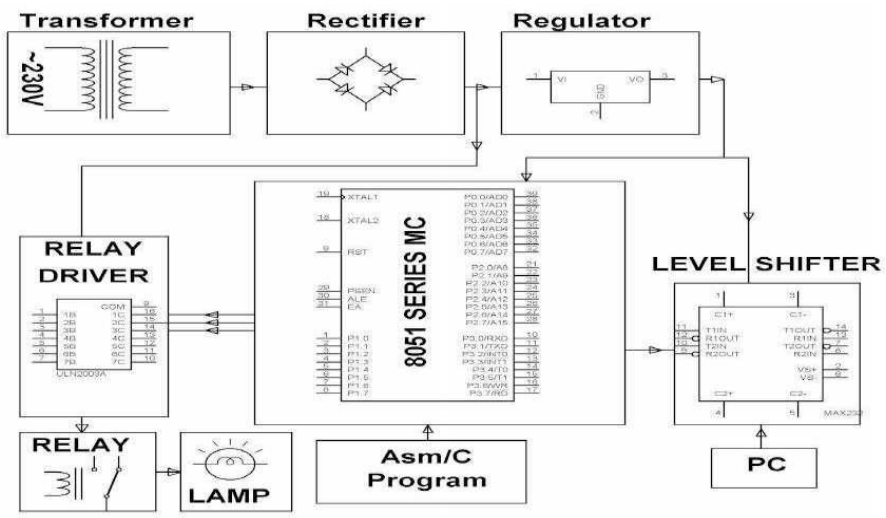


Automation system is mostly depending upon the power systems in industrial, residential or commercial, which needs remote controlling and monitoring. By employing wireless technologies, it is more competent to execute a suitable technology depending upon the requirements of theproposed system like speed,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

PC Based Electrical Load Control System

The PC based electrical load control system can be built with 8051 series Microcontroller, Level Shifter IC, DB Connector, Relays, Relay Driver, Transformer, Diodes, Capacitors, Resistors, LED, Crystal, Lamps, Keil compiler and Language: Embedded C or Assembly. Keil an ARM Company makes C compilers, macro assemblers, real-time kernels, debuggers, simulators, integrated environments, evaluation boards, and emulators for ARM7/ARM9/Cortex- M3, XC16x/C16x/ST10, 251, and 8051 MCU families. Compilers are programs used to convert a High Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors.



(Fig- PC Based Electrical Load Control System Block Diagram)

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.

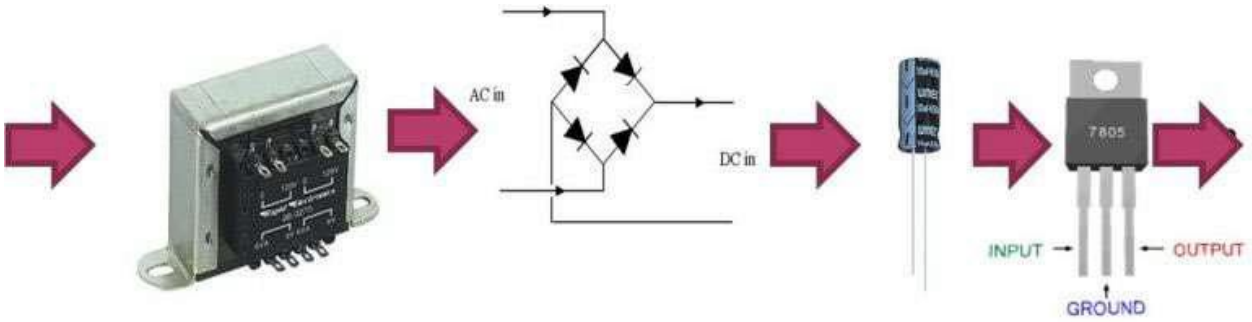
Power Supply

· The 230V AC supply is first stepped down to 12V AC using a step down transformer.

⇒ This is then converted to DC using bridge rectifier.

⇒ The AC ripples is filtered out by using a capacitor and given to the input pin of voltage regulator 7805.

⇒ At output pin of this regulator we get a constant 5V DC which is used for MC and other ICs in this project



(Fig- Power Suply)

Microcontroller

It is a smaller computer; it has on-chip RAM, ROM, I/O ports. The features of this microcontroller include the following.

⇒ 8K Bytes of In-System Programmable (ISP) Flash Memory
⇒ 4.0V to 5.5V Operating Range
⇒ Fully Static Operation: 0 Hz to 33 MHz
⇒ 256 x 8-bit Internal RAM
⇒ 32 Programmable I/O Lines
⇒ Three 16-bit Timer/Counters
⇒ Eight Interrupt Sources
⇒ Full Duplex UART Serial Channel

Relay

⇒ A relay is an electrically operated switch.
⇒ Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts.
⇒ The coil current can be on or off so relays have two switch positions and have double throw (changeover) switch contacts as shown in the diagram.
⇒ Relays allow one circuit to switch a second circuit which can be completely separate from the first.
⇒ For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit.
⇒ There is no electrical connection inside the relay between the two circuits, the link is magnetic and mechanical.
⇒ To drive relay through MC ULN2003 relay driver IC is used.
⇒ Relay Driver ULN2003

ULN is Relay Driver Application

⇒ The ULN2003 is a monolithic high voltage and high current Darlington transistor arrays.
⇒ It consists of seven NPN Darlington pairs that feature high-voltage outputs with common cathode clamp diode for switching inductive loads.
⇒ The collector-current rating of a single Darlington pair is 500mA.
⇒ The Darlington pairs may be paralleled for higher current capability.
⇒ The ULN functions as an inverter.
⇒ If the logic at input 1B is high then the output at its corresponding pin 1C will be low

Project Working

The main goal of this project is to control the electrical load through a PC (personal computer). For example, lighting in the theatre can be controlled form the PC for superior stage management. At present, they are physically controlled which makes it complex to organize the lighting with the particular scene. By employing this system, one can manage the electrical load ON/OFF by just being seated at one place using a PC. This system is incorporated with the electrical loads and also associated to the PC where centralized control takes place. It uses an MAX 232 protocol from the microcontroller to communicate with the PC.

To switch the appliances, we employ Hyper Terminal on personal computer. Once the connection is established with the PC, then the system begins working. The 8051 family microcontroller is used in this project. Further, this project can be improved by implementing a GUI based control board on the PC with suitable embedded system software. The power control can also be integrated using power electronics devices.

5.2.7 Electrical Parameters Measurements

THE SYSTEM PLATFORM

The whole system is depicted in Figure, incorporating a high-frequency energy generator and an electrical parameters measurement system. The former is to generate on biological tissues a high frequency energy of 450 kHz with the biggest power as high as 150 w. And the system converts the high-frequency voltage and current into measured values within the range of 0 - 2 V respectively corresponding to the real voltage and current effective values. Also it provides the controller with feedback, and the controller does a fitting and adjusting of the feedback information for the real values and on this basis realizes the control of constant power and real time judgment of biological impedance. To determine a super fitting strategy for the controller, the detected values are acquired by DAQ data cards and delivered to LabVIEW program for processing and display. A series of detected values are acquired in the cases of varying load and recorded as *i* and *iVII*. Meanwhile, oscilloscope is applied for the measurement of the effective values of the output voltage and current from the energy generator, recorded as *rms* and *rmsV*. Between the detected values and real values, there exists a correspondence. Fitting these detected values by different methods can help decide an optimized scheme that can well adjust the measured values into real effective values. Finally, the controller assisted by such an optimized scheme can obtain a set of feedback data reflecting the effective values of the real-time voltage and current and then complete the controlling of constant power and an in-time judgment of impedance.

Isolated Inductive Circuits and the Conditioning Circuit

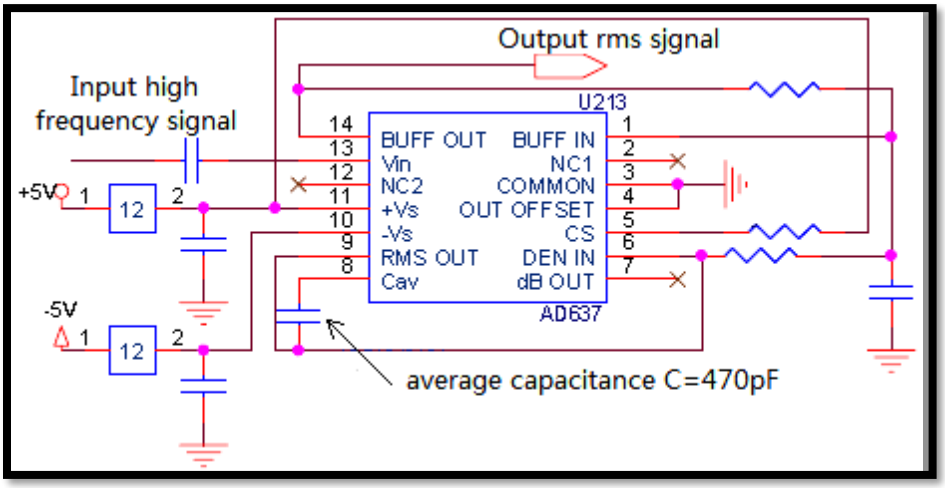
A transformer must be applied for isolated induction of the voltage and current from the high frequency energy generator, as displayed in Figure. Given that the energy to be measured is a high frequency signal of 450 kHz, ferrite functioning in high frequency environment can be chosen as the magnetic material for the trans- former. To prevent it from saturation, for the voltage isolation circuit, resistors must be connected in series to divide the voltage. Then, the reduced voltage is delivered to the primary side of the voltage transformer, which is made of winding ferrite and holds a transformation ratio of 60:10. As for the current inductive transformer, there are two schemes. The first is to use self-made ferrite annular core, with a transformation ratio of 1:100,

while the second is to apply the PA1005.100NL current sensor designed by Pulse Company. A narration of the differences between the two is available in the part of Experiment Design and Results.

Here is the operating principle of the conditioning circuit: to lessen the load effect, signals detected from the voltage and current sensors first go through a voltage follower and then a low pass filter to filter out the higher harmonics. After that, the two different signals are converted into single-end signals by AD8251. Finally, the conversion chip AD637 is applied to transform them into effective values, which are 0 - 2 V direct current signals. For conditioning circuit, to get a precise effective value from the conversion, there are two key points [5]: one is to enhance the total gain of the isolated inductive and conditioning circuits so as to maintain the input signal of AD637 within the range of 1 - 2 V, because when the AD637 input signal is below 100 mV, its bandwidth will be less than 200 kHz, and in this case the high frequency output signals from the energy generator will be distorted. The second is the rational allocation of the AD637 peripheral circuit, particularly the peripheral average capacitance C. According to a lot of experimental verification, when C = 470 pF, a good result of precise effective value conversion can be achieved. Figure is a display of the conversion circuit.

EXPERIMENT DESIGN AND RESULTS

A self-regulating power generator is used in the experiment and the output energy from it operated on the load targets after transiting through the electrical parameters-measurement system. After converted by Data Acquisition (DAQ) Cards, detection values were transmitted to the PC and processed in LabVIEW. The detailed hardware structure is shown in Figure.



(Fig- Effective values conversion circuit.)

Electrical Units of Measure

Electrical Units of Measurement are used to express standard electrical units along with their prefixes when the units are too small or too large to express as a base unit. 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.

Multiples and Sub-multiples

There is a huge range of values encountered in electrical and electronic engineering between a maximum value and a minimum value of a standard electrical unit. For example, resistance can be lower than 0.01Ω or higher than 1,000,000Ω. By using multiples and submultiple's of the standard unit we can avoid having to write too many zero's to define the position of the decimal point.

So to display the units or multiples of units for either Resistance, Current or Voltage we would use as an example:

⇒ 1kV = 1 kilo-volt – which is equal to 1,000 Volts.

⇒ 1mA = 1 milli-amp – which is equal to one thousandths (1/1000) of an Ampere.

⇒ 47kΩ = 47 kilo-ohms – which is equal to 47 thousand Ohms.

⇒ 100uF = 100 micro-farads – which is equal to 100 millionths (100/1,000,000) of a Farad.

⇒ 1kW = 1 kilo-watt – which is equal to 1,000 Watts.

⇒ 1MHz = 1 mega-hertz – which is equal to one million Hertz.

To convert from one prefix to another it is necessary to either multiply or divide by the difference between the two values. For example, convert 1MHz into kHz. Well we know from above that 1MHz is equal to one million (1,000,000) hertz and that 1kHz is equal to one thousand (1,000) hertz, so one 1MHz is one thousand times bigger than 1kHz. Then to convert Mega-hertz into Kilo-hertz we need to multiply mega-hertz by one thousand, as 1MHz is equal to 1000 kHz. Likewise, if we needed to convert kilo-hertz into mega-hertz we would need to divide by one thousand. A much simpler and quicker method would be to move the decimal point either left or right depending upon whether you need to multiply or divide. As well as the "Standard "electrical units of measure shown above, other units are also used in electrical engineering to denote other values and quantities such as

Wh – **The Watt-Hour**,

The amount of electrical energy consumed by a circuit over a period of time. Eg, a light bulb consumes one hundred watts of electrical power for one hour. It is commonly used in the form of: **Wh** (watt-hours), **kWh** (Kilowatt-hour) which is 1,000 watthours or **MWh** (Megawatt-hour) which is 1,000,000 watt-hours.

dB – **The Decibel**,

The decibel is a one tenth unit of the Bel (symbol B) and is used to represent gain either in voltage, current or power. It is a logarithmic unit expressed in **dB** and is commonly used to represent the ratio of input to output in amplifier, audio circuits or loudspeaker systems. For example, the dB ratio of an input voltage (VIN) to an output voltage (VOUT) is expressed as 20log10 (Vout/Vin). The value in dB can be either positive (20dB) representing gain or negative (-20dB) representing loss with unity, ie input = output expressed as 0dB.

Phase Angle,

The Phase Angle is the difference in degrees between the voltage waveform and the current waveform having the same periodic time. It is a time difference or time shift and depending upon the circuit element can have a "leading" or "lagging" value. The phase angle of a waveform is measured in degrees or radians.

Angular Frequency

Another unit which is mainly used in a.c. circuits to represent the Phasor Relationship between two or more waveforms is called Angular Frequency, symbol **ω**. This is a rotational unit of angular frequency $\mathbf{2\pi f}$ with units in *radians per second*, **rads/s**. The complete revolution of one cycle is 360 degrees or 2π, therefore, half a revolution is given as 180 degrees or π rad.

Time Constant,

The Time Constant of an impedance circuit or linear first-order system is the time it takes for the output to reach 63.7% of its maximum or minimum output value when subjected to a Step Response nput. It is a measure of reaction time.

Chapter : 6

Swatchh Bharat Abhiyan (Clean India)

6.1 Swatchhta needed in allocated village -Existing Situation with photograph

- The villager are themselves very clear about the importance of waste management and maintaining swatchhta in the village.
- The student/youth of the village are also very concern about maintaining cleanliness in the village. They know the harmful effects of bad waste management on their health.
- If the villager ‘s get proper knowledge about the waste management that will be more helpful for the village development.
- Their is no separate garbage collection point in the village though they are able to maintain cleanliness in the village which the best part of our village.
- Public toilet facilities is available In visaman village.
- In visaman village there is no any avalibility to collect waste garbage collection.
- People also told that if there are no garbage bins in the area, commuters or devotees would throw away trash anywhere.

Problem

Fig 34. Dustbin point

Solution

Fig 35. Dustbin

6.2 Guidelines - Implementation in allocated village with Photograph

The Swachh Bharat Mission is split into two sub Missions Swachh Bharat Mission (Gramin) and Swachh Bharat Mission (Urban).

Swachh Bharat Mission (Garmin), Gram Panchayats and Zilla Parishads will work on war footing to make sure that all households in all villages have functional water supply and toilet facilities. Productive use of night soil as bio-fertilizers is also on the cards.

Implementation of SBM (G) is proposed with 'District's the base unit, with the goal of creating ODF GPs. The District Collectors/Magistrates/CEOs of Zilla Panchayat are expected to lead the Mission themselves, so as to facilitate district wide planning of the Mission and optimum utilization of resources. The Baseline Survey data of 2013 collected byStatesandenteredontheIMISofMDWSby31.1.2015willbeconsideredasthebasefor States where the survey is complete. For other States the data entered on completion of the Survey will be taken as the base data.

A project proposal shall be prepared by the District, scrutinized and consolidated by the State Government into a State Plan. The State Plan with district wise details will be shared with the Government of India (Swachh Bharat Mission-Ministry of Drinking Water and Sanitation). This Plan will include a 5-year Plan along with 5 independent Annual Plans which merge into the 5 year Plan.

These plans shall be approved by the Ministry each year. On the basis of formative research and consultation rounds, the State shall develop a tailor- made Communication Strategy, a Communication Plan, and material and will train community mobilisers to use these tools.

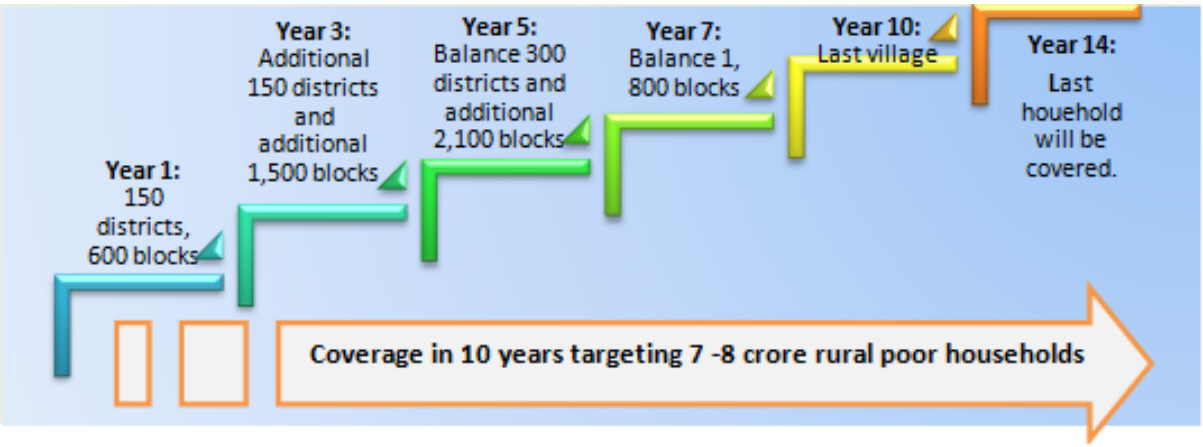


Fig 36. Guild lines for the process implementation

6.3 Any other steps taken by the students / villagers

As we all see garbage and waste materials thrown on streets, public places, almost everywhere. Want to know simple steps to keep our city or village clean, then, few simple steps are discussed here

Steps to be taken by government:

- Rules should be made and action should be taken if someone breaks the rules.
- Dustbin should be kept at proper distance on roads.

- Proper waste containers should be kept area.
- Dustbin should be kept at all public places like bus- stand, railway station, gardens.

The following Action should be taken for making village clean:

- While travelling doesn't throw any wrapper paper or any dry waste on road, keep it your bag or pocket.
- Don’t dispose garbage in open area
- Follow government’s rules and regulations. Proper waste containers should be kept in every area.
- Rules should be made and action should be taken if someone breaks the rule.
- Daily cleaning of public places is necessary.
- after effects of not keeping it clean (like diseases).
- Proper public toilets are to be made and they should be maintained regularly.

Chapter : 7

Swatchh Village condition due to Covid-19

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

In visaman village in covid-19 situation all villagers are follow all rules given by government and also follow social distancing. In village many circles create around the shop and after follow the villagers shopping happily. Villagers also wear a mask and use sanitizer after do all work, also in shop or any other homes, Panchayat set a sanitizer stand.

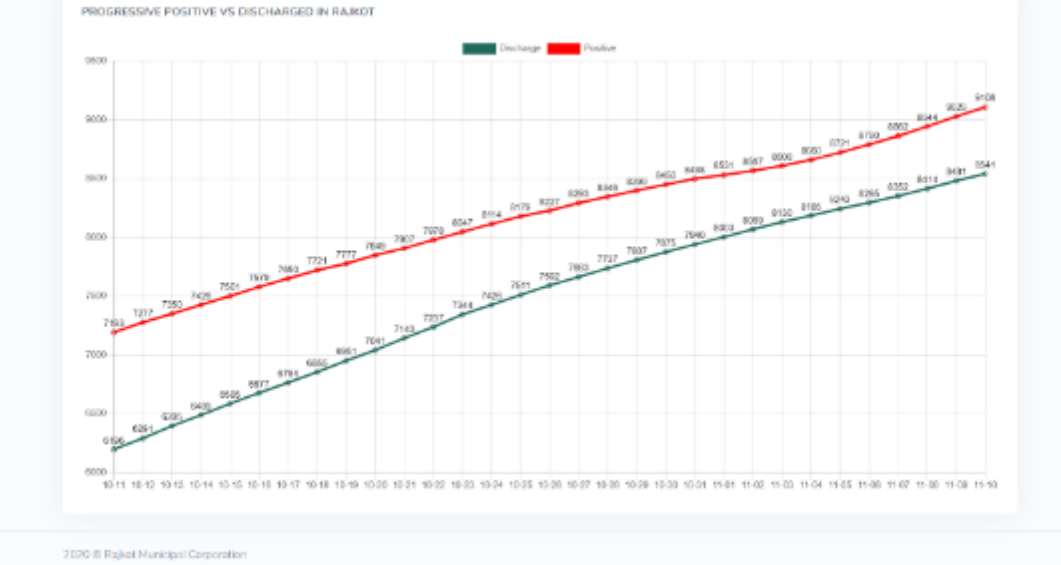


Fig 37. positive vs discharged in Rajkot

Fig 38 covid-19 notice

7.2 Activities Done by Students for allocated village Clean with Photograph

As we all see garbage and waste materials thrown on streets, public places, almost everywhere. Want to know simple steps to keep our city or village clean, then, few simple steps are discussed here

Steps to be taken by government:

- Rules should be made and action should be taken if someone breaks the rules.
- Dustbin should be kept at proper distance on roads.
- Proper waste containers should be kept area..

39. prevention & safety

7.3 Any other steps taken by the students / villagers

- If you have any symptoms of cough, cold, fever, weakness; visit nearby urban health center or contact 104
- Always wear mask while going out, wash your hands frequently
- Maintaining social distancing is important
- Always cover your face while coughing and sneezing
- Keep distance from high-risk people (Senior Citizens, Infants, People having High BP, Diabetes & other co-morbidities
- Consume hygienic food and drink plenty of water
- Consume ayurvedic and homeopathic immunity boosters
- Avoid going out without any important work

Chapter : 8

Sustainable Design Planning Proposal (Prototype Design)- Part- I

(Scenario / Existing Situation / Proposed Design in Auto cad / Recapitulation Sheet / Measurement Sheet / Abstract Sheet / Sustainability of Proposal / Any other software)

8.1 Design Proposals

Existing facilities in visaman village as below.

➢ Physical Infrastructure facility:

- Piped water supply to dweller
- Water tank
- Underground drainage
- Cement concrete road and bituminous road
- Electricity distribution

➢ Social Infrastructure facility:

- Anganwadi
- Primary school

➢ Socio-culture Infrastructure facility:

- 3 Temple

➢ Sustainable infrastructure facility:

- Solar street light

8.1.1 Sustainable Design (Civil): Compost pit

Compost pit:

Compost is the partially decomposed remains of plants. In its final state of decomposition, it is referred to as humus.

- Composting is a microbial process that converts plant materials to organic soil amendment or mulch.
- Decomposed materials have some nitrogen, phosphorous, and potassium content even though in small amounts.
- The plants are best materials used for composting.

- Other than that coffee grounds, vegetable refuse, small tree limbs and shrubs, etc can be used.
- Avoid composting meat products, or materials contaminated with chemicals.
- Avoid composting diseased plant, weeds with seeds.

➢ **Advantages:**

- We can produce homemade fertilizers for our garden.
- We can reuse the waste material that we don't need any longer.
- We can get this material free from the neighbours and friends and family or on streets were trash bags are kept.
- Preparing our own fertilizer is very eco-friendly.

➢ **Disadvantages:**

- It is dirty.
- It produces foul smell.
- It may attract rats, snakes and bugs.
- Needs monitoring.
- Composting takes time.
- It may spread disease if kept open

Compost pit : - PLAN

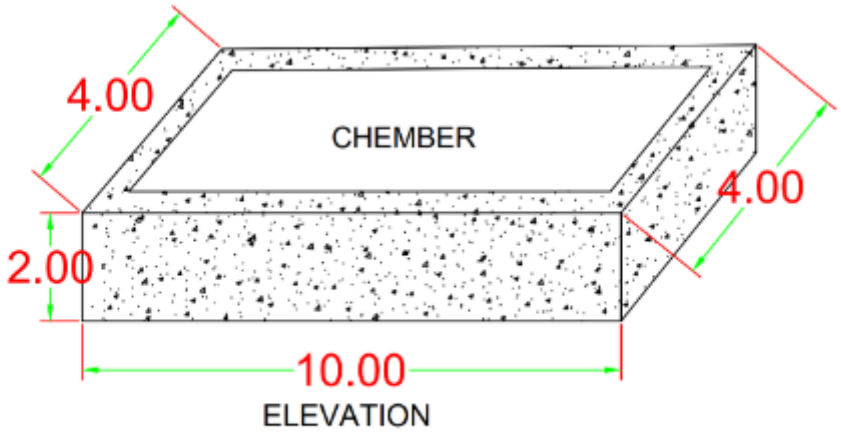


Fig 40. Elevation of compost pit

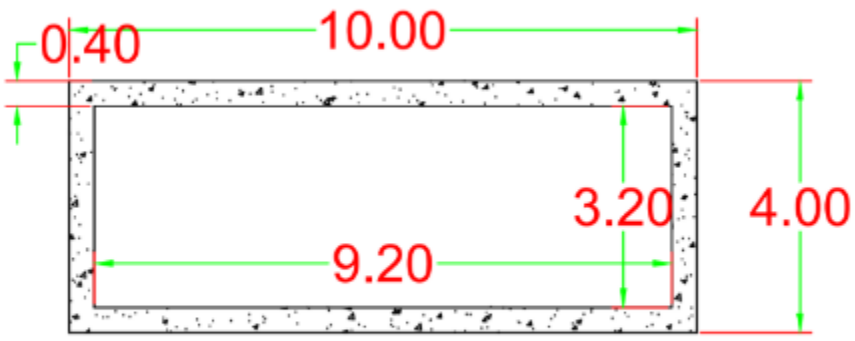


Fig 41. plan of compost pit

(Table-16 quantity sheet on compost pit)

quantity sheet						
Sr. No	**Description**	**No.**	**L (m)**	**B (m)**	**H (m)**	**Qty(m^3)**
1	Excavation in foundation L= 10+(2*0.5) = 11 m B= 04+(2*.05) =5 m H= 2+0.4=2.4 m	1	11	5	2.4	132m^3
2	RCC flooring (1:3:6) L= 11m B= 5m H = 2.4 m	1	11	5	0.1	5.5 m^3
3	Brick masonry for wall L= 11-(2*0.5) =10 m B = 0.2 m H = 1 m	4	10	0.2	1	8 m^3

(Table-17 abstract sheet on compost pit)

Abstract sheet

Item no.	Particular of items	Qty	Per	rate	Amount
1	Excavation in foundation	132.00	m^3	80	10560
2	P.C.C in foundation	5.5	m^3	3200	17600
3	Brick work in walls	8	m^3	3200	25600
				Total	53760

Add 10% of contingency charge = 5376
Add 1.5 % of water charges. = 806
Total = 59,942 RS.

(Rate according to USE R&B SOR of year 2015-2016.)

8.1.2 Physical design (Civil): Public garden

A public garden is an institution that maintains collections of plants for the purposes of public education and enjoyment, in addition to research, conservation, and higher learning. It must be open to the public and the garden's resources and accommodations must be made to all visitors. Public gardens are staffed by professionals trained in their given areas of expertise and maintain active plant records systems.

Public gardens have always enjoyed the respect of the communities in which they are located. They are resources for recreation, as well as education and research opportunities. Public gardens can play very significant roles in sustainable community development

Objectives

- To secure attractive ground.
- To provide natural, easy and safe approach.
- To provide convenient well-arranged attractive area.
- To harmonize home building, various areas, walks, drives, gardens and other utility areas in to one unit.

Types of public garden: -

- Alpine garden.
- Cactus garden.
- Flower garden.
- Orchard.
- Bog garden.
- Fernery.
- Kitchen garden.
- Physic garden.

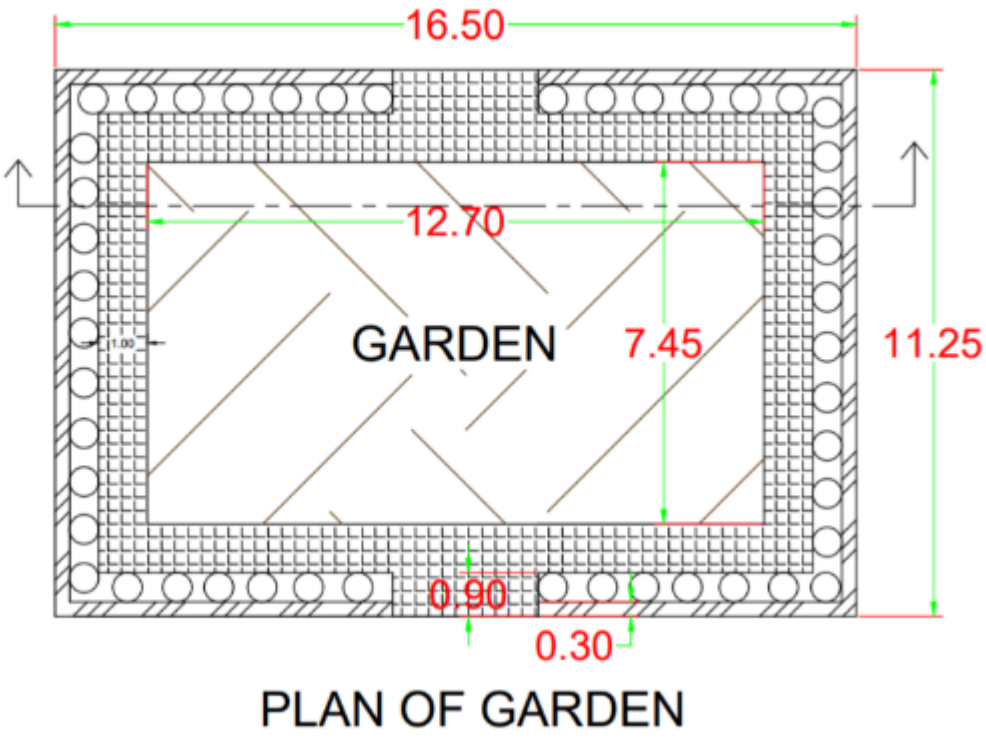


Fig 42. plan of public garden

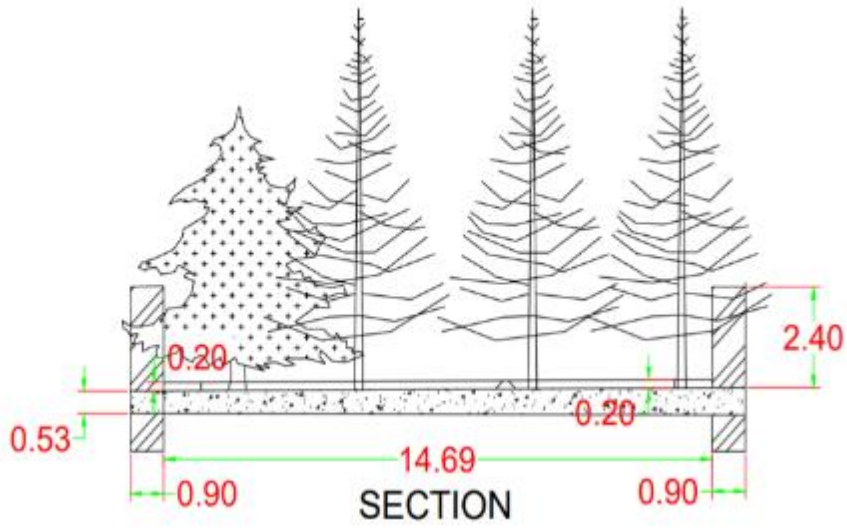


Fig 43. Section of public garden
(Table-18 quantity sheet of public garden)

quantity sheet						
Sr. No	**Description**	**No.**	**L (m)**	**B (m)**	**H (m)**	**Qty(m^3)**
1	Excavation for foundation	1	164.9	0.9	1.1	163.25
2	PCC for foundation	1	164.9	0.9	0.3	44.52
3	Brick masonry up to G.L,					
	Step-1	1	164.6	0.6	0.2	19.75
	Step-2	1	164.65	0.5	0.2	16.46
	Step-3	1	164.7	0.4	0.2	13.18
	Step-4	1	164.75	0.3	0.2	9.88
						59.27
4	Sand filling up to G.L					59.46
		1	164.75	0.3	0.6	2.16
5	Deduction of doors	4	3	0.3	0.6	2.16
						27.54
6	Plaster					
	External	1	165.4		0.6	99.24
	Internal	1	164.75		0.6	98.85
	Deduction of doors	2	4		0.6	4.8
						193.29
7	Fencing	1	164.75		1.5	247.12
8	Sand filling for children	1	3155		0.45	1419.75

(Table-19 abstract sheet of public garden)

Abstract sheet					
Item no.	**Particular**	**Qty**	**Per**	**rate**	**Amount**
1	Excavation	163.25	m^3	110	17957.5
2	PCC	44.52	m^3	965	42961.5
3	Sand filling	59.46	m^3	90	5351.4
4	B/W	27.54	m^3	1250	34425
5	Plaster	193.29	m^3	150	28993.5

6	Bench	31 nos	m^3	1500	46500
7	Fountain	1 nos	m^3		50000
	Total				226188.4/- RS

(Rate according to USE R&B SOR of year 2015-2016.)

8.1.3 Social design (Civil): solid waste management

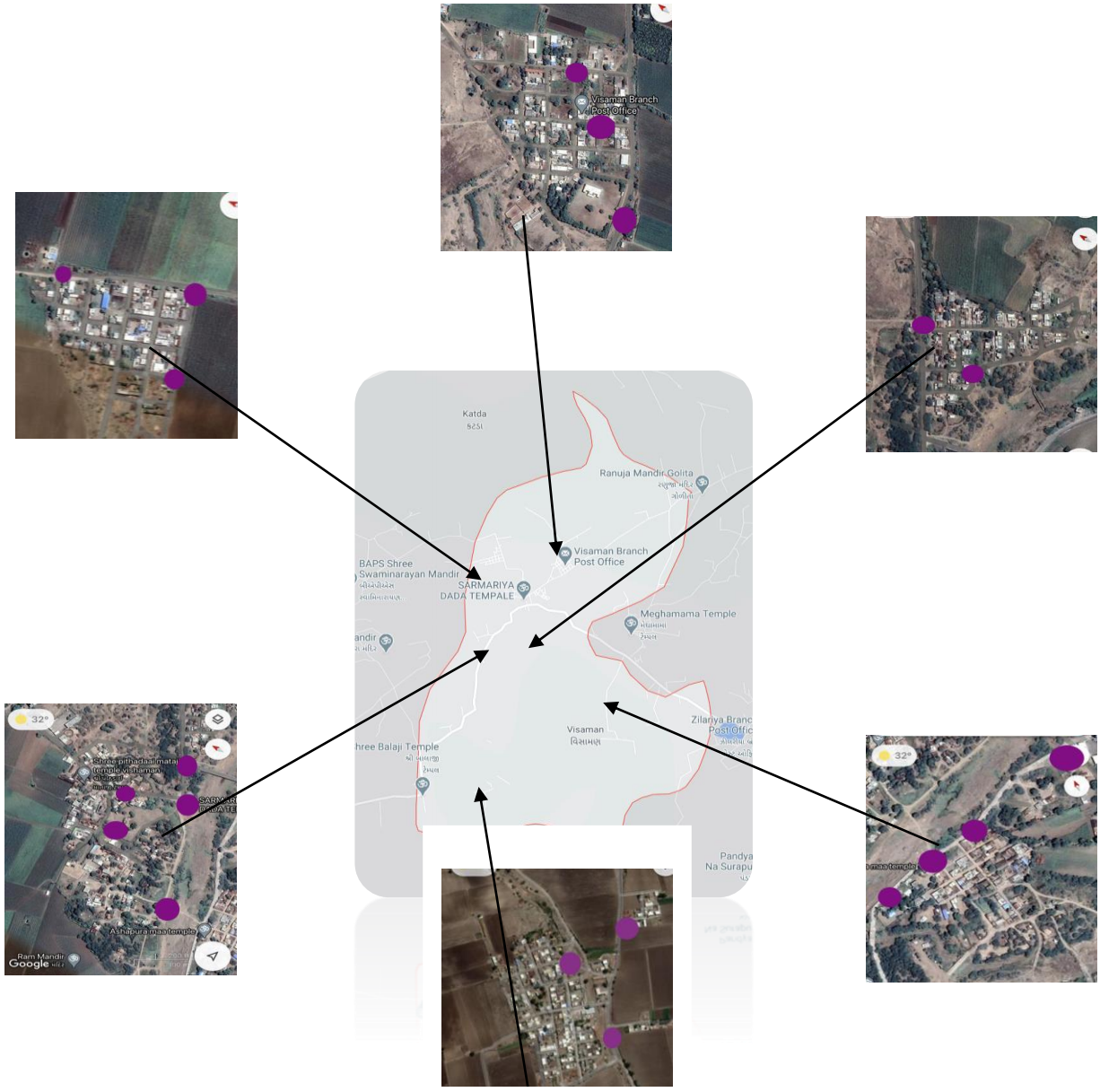


Fig 44. plan of solid waste management

Sanitation is a hygienic means of promoting health by preventing human contact with waste. As such, safe removal and disposal of municipal solid waste within a community is critical in the environmental sanitation. A number of small waste collection trucks such as tricycles are in use in Ghana and other developing countries

Once collected, municipal solid waste may be treated in order to reduce the total volume and weight of material that requires final disposal.

The village visaman is divided into smaller society. So we define various place for dustbin and mark on map as show in fig. 44.

type of collection system

- Refuse Collection Systems
- Recyclable Material Collection
- Commercial Waste Collection

Equipment used:-

Vehicles and Containers are required
Average life of vehicles: 7-10 yrs.
Public Dustbin

Fig 45. Tricycle for solid waste management

Fig 46. Public dustbin

(Table-20 abstract sheet of solid waste management)

Abstract Sheet					
Estimate of : Solid waste collection system					
Sr. No.	Description	Qty.	RATE	PER	AMOUNT

PURCHESE COST					
1	Public dustbin	20	1500	NOS.	30000.0
2	Waste collection tricycle	2.00	12000	NOS.	24000.00
MAINTENANCE COST					
3	Man required for waste collection	2X30	400	NOS.	24000.00
INTIAL COST : Rs. 54,000					
MAINTENANCE COST : Rs. 24,000					

(Rate according to USE R&B SOR of year 2015-2016.)

8.1.4 Socio-Cultural design (Civil): Chabutra

Chabutro or **Chabutaro** or **Chabutra** is a structure mostly found india. They are a tower-like structure with octagonal or pentagonal shaped enclosures at the top. In the upper enclosure are several holes, wherein birds can make their nests.

In Gujarat these are constructed at the entrance's villages, especially for use and breeding of pigeons. Inside this structure mostly pigeons reside and breed. Mostly such monuments are found in village centers or at village entrances in the Gujarat & kutch in India. At the base of the structure a sitting platform is usually made. The base and the surrounding area of this structure serves as a gathering place for villagers and as a playing area for children.

Another type of Chabutro, which can be seen in Gujarat & Rajasthan have different design and are built only for feeding & resting place for birds & not for breeding purpose. The upper enclosure of such Chabutra are artistically craved and designed like a window of house with conical dome.

In English it can vaguely be defined as "Pigeon-Tower" or "Pigeon-hole-tower". Actually, chabutro is a word of gujarati language. In Gujarati language Pigeon is called Kabutar. The word Chabutro has arrived from word Kabutar, since Chabutaro is specially constructed for use and breeding of Pigeons only in Gujarat, especially kutch. People and specially ladies of Gujarat, belonging to hindu faith, consider it auspicious to feed Pigeons. Therefore, this structure is made in villages, where pigeons can live

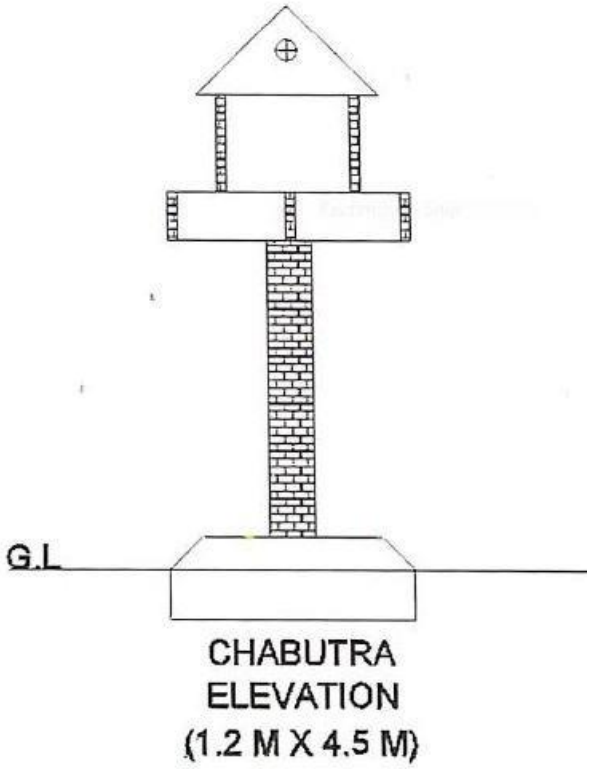


Fig 47. Elevation of chabutra

(Table-21 quantity sheet of chabutra)

quantity sheet						
Sr. No	**Description**	**No.**	**L (m)**	**B (m)**	**H (m)**	**Qty(m^3)**
1	Earthwork in excavation for foundation	-	1.5	1.5	0.5	1.125 m^3
2	R.C.C in foundation (1:2:3)	-	1.5	1.5	0.4	0.9 m^3
3	P.C.C in foundation	-	1.5	1.5	0.10	0.225 m^3
4	Footing R.C.C step above (G.L)	-	1.2	1.2	0.20	0.288 m^3
5	Brick work for partition wall	3	1.5	0.10	0.6	0.27 m^3
6	Wall for upper partition	2	1.2	0.10	0.4	0.096 m^3
7	Marble for flooring	2	1.5	1.5	-	2.25 m^3
8	Wood work for shed.	4	(1/2x1.5- 1.5x0.03)			0.0337 m^3
9	Concrete in trapezoidal Vol. of trapezoidal					

	=H/3*(a1+a2+(√a1+a2) =0.2/3*(2.25+1.44+(√2.25+1.44) =0.066*(3.69*2.94) = 0.7160	1	-	-	0.2	0.7160 m^3

(Table-22 abstract sheet of chabutra)

Abstract sheet					
No.	**Particular of items**	**Qty**	**Per**	**Rate**	**Amount**
1	Excavation in foundation	1.125	m^3	250	281.25
2	RCC in foundation	0.9	m^3	4450	4005
3	PCC in foundation	0.225	m^3	2600	585
4	Footing RCC (above GL)	0.288	m^3	3700	1065.6
5	Brickwork for partition wall	0.27	m^3	400	108
6	Wall for upper partition	0.096	m^3	400	38.4
7	Marble flooring	2.25	m^3	55	1331
	Woodwork for shed	2.25	m^3	500	1125
	Concrete in trapezoid	0.7160	m^3	3700	2649.2
				Total	11188.45

Add 10% of contingency charge = 1118.84

Add 1.5 % of water charges. = 167.82

Total = 12475.11 RS.

(Rate according to USE R&B SOR of year 2015-2016.)

8.1.5 Smart Village Design (Civil): Shopping mall

shopping centers have come into existence, grown in size, and increased in number not because they offer new products or better stores than are to be found in central business districts, but because they are convenient. Metropolitan areas have grown rapidly in recent years, but the growth has taken place for the most part outside of the central city. Central business districts which were relatively adequate to handle the number (taking their income into account) of people in metropolitan areas a decade and a half ago, are now cramped, crowded and clogged with street traffic.

Shopping centers in suburban areas are nearer the population they serve offer a relatively large (if sometimes inadequate) amount of conveniently located off-street parking, and fit in with the patterns of suburban living described by Burgess and other urban sociologists as long as twenty-five years ago. The farther out from the center of the city that a family lives, the less time the man of the family spends at home.

Whatever the social consequences of this situation, it results also in greater dependence on the woman to maintain the day-to-day life of the family. She must run the household and do the shopping, and cannot afford the longer trip to the center of the city a trip which may have to be taken on slow and crowded public transportation, or by car over congested and hazardous roads with no guarantee that there will be a place to park the car once the central business district has been reached. Shopping center business is drawn almost entirely from people who live within a maximum of thirty minutes driving time over local roads, and most customers live closer.

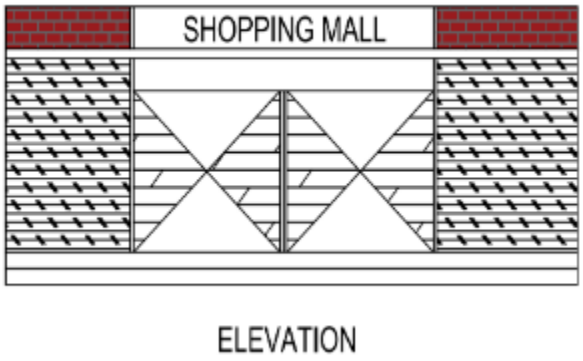


Fig 48. Elevation of shopping mall

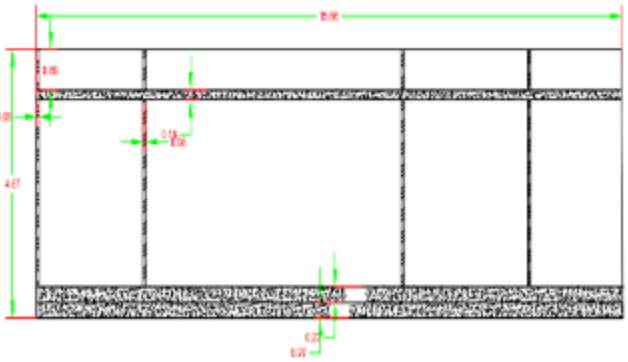


Fig 49. section of shopping mall

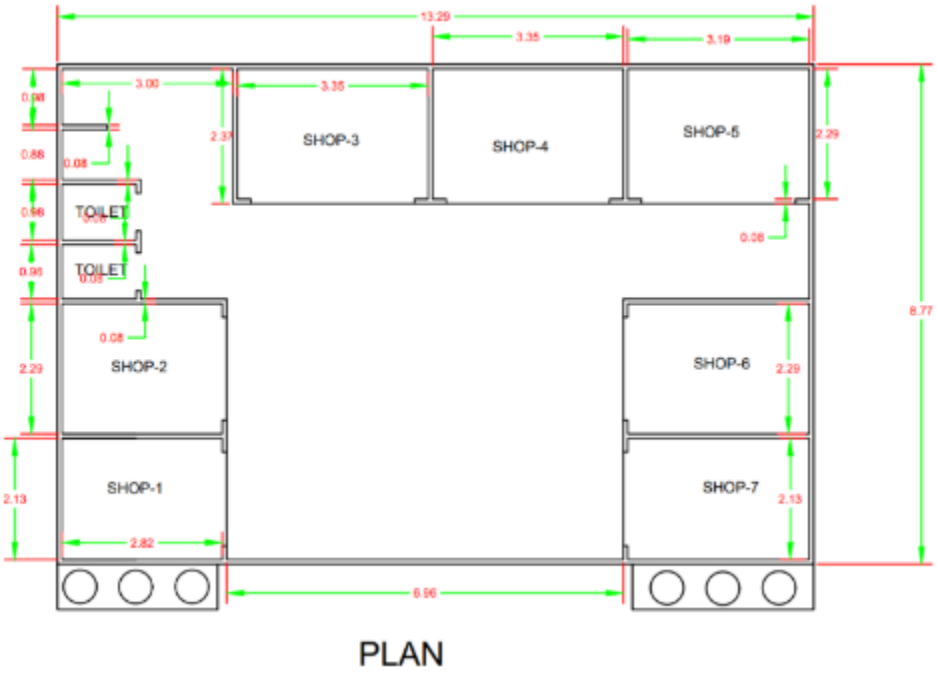


Fig 50. plan of shopping mall

(Table-23 quantity sheet of shopping mall)

quantity sheet						
Sr. No	**Description**	**No.**	**L (m)**	**B (m)**	**H (m)**	**Qty(m^3)**
1	Excavation for foundation	1	90.96	0.9	0.9	73.68
2	PCC for foundation	1	90.96	0.9	0.20	16.37
3	Brick masonry **in Foundation**					
	Step-1	1	86.46	0.50	0.30	12.97
	Step-2	1	87.36	0.40	0.30	10.48
	Step-3	1	88.26	0.30	0.85	22.51
						45.96
4	**DPC work**		90.96	0.05		**4.55**
	Brickwork in Lime	1	90.96	0.23	3.90	81.59
5	Deduction of doors	4	3	0.3	0.6	2.16
	D1	2	0.76	0.23	2.10	27.54
	D	7	3.35	0.23	2.10	17.26
	W1	4	0.60	0.23	0.60	0.33
	Lintel	1	90.96	0.23	0.20	4.18
6	Plaster					
	External	1	165.4		0.6	99.24
	Internal	1	164.75		0.6	98.85
	Deduction of doors	2	4		0.6	4.8
						193.29
7	**R. C. C. Work in Slab:**					17.50
8	**flooring**	1				**153.30**

(Table-24 abstract sheet of shopping mall)

Abstract sheet					
Item no.	**Particular of items**	**Qty**	**Per**	**rate**	**Amount**
1	Excavation	163.25	m^3	110	17957.5
2	Brick work up to plinth	44.52	m^3	965	42961.5
3	Sand filling	59.46	m^3	90	5351.4
4	cement concrete	27.54	m^3	1250	34425
5	Wall	193.29	m^3	150	28993.5
6	Slab (1:1.5:3)	31 nos	m^3	1500	46500
7	Plaster (1:3)	1 nos	m^3		50000
	Parapet				226188.4/-
	Door				
	Shutter				
	Ventilation				
	Total				**834345.40**

Total = 834345.40 RS.
Add 5% contingencies = 30900
Add 2% work charge establishment = 123607
Add 10% contractor profit = 61803
total = 834345 RS.

(Rate according to USE R&B SOR of year 2015-2016.)

8.1.6 Heritage Village Design (Civil): Community hall

village hall is usually a building which contains at least one large room (plus kitchen and toilets), is owned by a local government council or independent, and is run for the benefit of the local community.

Community hall are public locations where member of a community tend to geather for group activity, social support, public information, and other purpose

Such a hall is typically used for a variety of public and private functions, such as:

- Sports club function
- Local drama productions
- Dance
- Jumble sales
- Private parties such as birthday or wedding receptions
- As a place for cultural celebrations.
- As a place for affordable diverse and inclusive children's programs.
- As a place for affordable diverse and inclusive adult programming.
- As a place of work for possible community members.

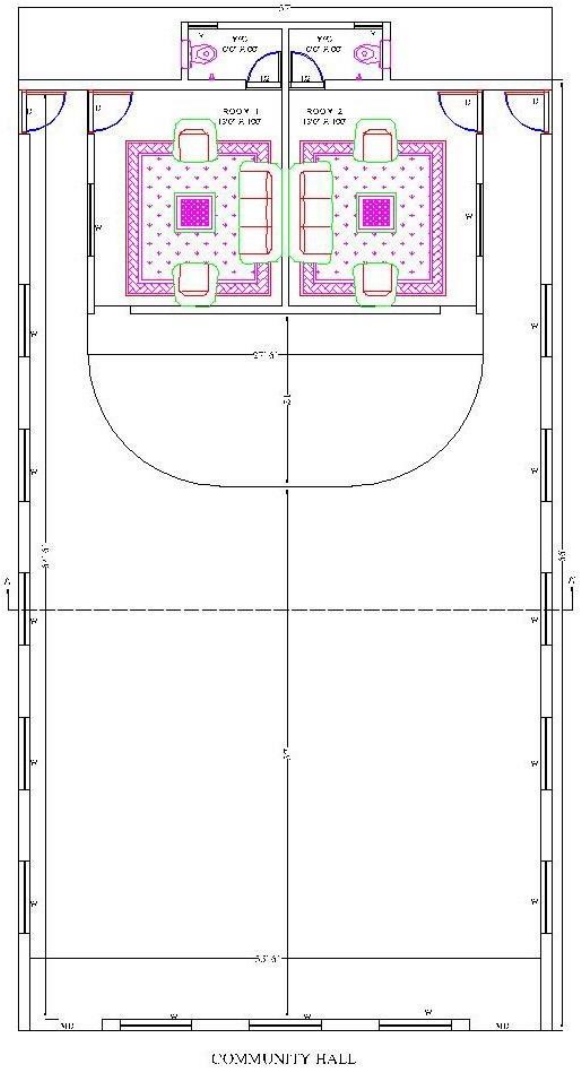


Fig 51. plan of community hall

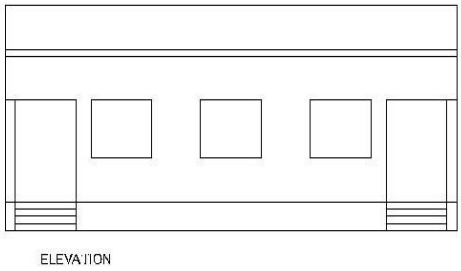


Fig 52. elevation of community hall

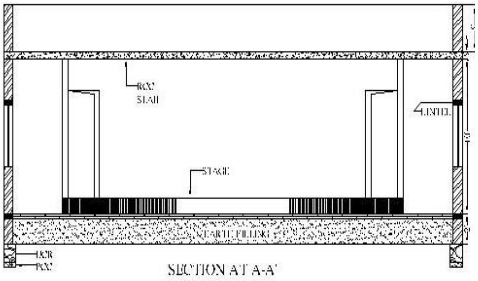


Fig 53. section of community hall

(Table-25 quantity sheet of community hall)

quantity sheet						
Sr. No	**Description**	**No.**	**L (m)**	**B (m)**	**H (m)**	**Qty(m^3)**
1	Excavation for foundation	2	20.420	0.6	1	24.504
		2	10.670	0.6	1	12.804
		1	4.400	0.6	1	2.640
		3	0.910	0.6	1	1.638
		3	5.150	0.6	1	9.270
		1	8.000	0.6	1	4.800
						55.656
2	PCC for foundation	2	20.420	0.6	0.15	3.676
		2	10.670	0.6	0.15	1.921
		1	4.400	0.6	0.15	0.396
		3	0.910	0.6	0.15	0.246
		3	5.150	0.6	0.15	1.391
		1	8.000	0.6	0.15	0.720
						8.348
3	Uncoursed Rubble Masonry	2	20.420	0.6	1.35	33.080
		2	10.670	0.6	1.35	17.285
		1	4.400	0.6	1.35	3.564
		3	0.910	0.6	1.35	2.211
		3	5.150	0.6	1.35	12.515
		1	8.000	0.6	1.35	6.480
						75.136
4	providing and laying cement concrete 1:2:4	2	20.420	0.6	0.15	3.676
		2	10.670	0.6	0.15	1.921
		1	4.400	0.6	0.15	0.396
		3	0.910	0.6	0.15	0.246
		3	5.150	0.6	0.15	1.391
		1	8.000	0.6	0.15	0.720
						8.348

5	White stone bela masonry block in course in super-structure	2	20.420	0.23	3.05	28.649
		2	10.670	0.23	3.05	14.970
		1	4.400	0.23	3.05	3.087
		3	1.060	0.23	3.05	2.231
		3	5.150	0.23	3.05	10.838
		1	8.000	0.23	3.05	5.612
						65.387
6	Deduction for opening	2	1.37	0.23	2.1	1.323
		4	0.91	0.23	2.1	1.758
		2	0.76	0.23	2.1	0.734
		2	0.6	0.23	0.6	0.166
		15	1.52	0.23	1.2	6.293
						10.274
	NET QTY.					55.113
7	Filling in foundations and plinth	1	20.42	10.67	0.6	130.729
		1	0.91	4.5	0.6	2.457
						133.186
8	Providing and fixing thick shutter for door	2	1.37		2.1	5.754
		4	0.91		2.1	7.644
		2	0.76		2.1	3.192
		2	0.6		0.6	0.720
		15	1.52		1.2	27.360
						44.670
9	R.C.C work	1	20.42	10.67	0.15	32.682
		1	0.91	4.5	0.15	0.614
						33.296
10	reinforcement for R.C.C.work	33.29				
		33.29	100	0.8	1	2663.717
11	mild steel reinforcement for R.C.C. work					
		33.3				

		33.3	100	0.2	1	665.929
12	cement plaster	2	20.420		3.05	124.562
		2	10.670		3.05	65.087
		1	4.400		3.05	13.420
		3	0.910		3.050	8.327
		3	5.150		3.05	47.123
		1	8.000		3.05	24.400
		1	20.42	10.67		217.88
		1	4.4	0.91		4.004
						504.803
	Deduction for door window	1			10.274	10.274
						494.529
13	toilet block	2				2000
	Vitreous tiles	1	20.42	10.67		217.881
8	Sand filling for children	1	4.4	0.9		3.960
						221.841

(Table-26 abstract sheet of community hall}

Abstract sheet					
Item no.	**Particular of items**	**Qty**	**Per**	**rate**	**Amount**
1	Excavation	55.660	m^3	100	5566.000
2	PCC	8.350	m^3	1200	10020.000
3	Uncoursed Rubble	75.136	m^3	90	112710.000
4	providing and laying cement	8.350	m^3	2000	16700.000
5	White stone bela	55.110	m^3	3000	165330.000
6	Filling in foundations	133.190	m^3	125	16648.750
7	shutter for door windows	44.680	m^3	2500	111700.000
8	R.C.C work	33.300	m^3	2000	66600.000

9	H.Y.S.D Bar reinforcement	2664.000	Kg	50	133200.000
10	mild steel reinforcement	665.929	kg	50	33296.450
11	cement plaster	494.530	m^2	125	61816.250
12	toilet block	2	nos	1200	2400.000
13	Vitriuos tiles	221.841	m^2	500	110920.500

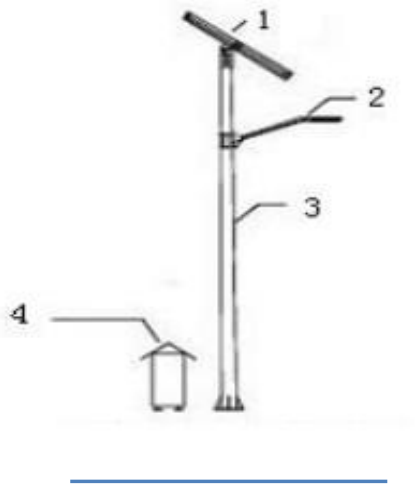
ADD 3% OF ELECTRIFICATION = 25418.039
ADD 5% OF PLUMBING & WATER SUPPLY = 42363.398
Say Rs. = **915000.000**

(Rate according to USE R&B SOR of year 2015-2016.)

8.1.7 Electrical Design 1: Solar Street light Installation Design

The solar street light does not need to set up the transmission line or route the cable, and no any special management and control are required.

It can be installed in the entire public place such as the square, the parking lot, the campus, the street or the highway etc.



We are going to design a Solar Street Light Installation for The main Street of our Allocated Village

Components required for a single Solar Street Light Pole:

(1) Solar cell
(2) LED lamp
(3) Light pole
(4) Control box (charger, controller, battery

Calculation for Solar Street Light Installation

As we seen above our basic components required are Solar Cell, LED Lamp, Light Pole and Control Box (It consists of Charger, Controller, and Battery).

Now these components are available in Different Ratings as per our requirement. And hence cost of that component also varies with the change in rating

Selection of Component Rating

So here are some calculation formulae which will help us know the rating of component to be used.

To calculate the power of Photovoltaic Cell required

$$P(pv) = 1/\,n1n2 \times Pled \times hled \,/\, h(pv) \times \mathbf{k}$$

Where

1 ---------- Charging efficiency of the battery
2 ---------- Efficiency of the LED driver circuit
PLED ---------- Power consumption of the LED (W)
HLED ---------- Daily lighted time of Lamps (h)
h(pv) ---------- Average of daily peak sunshine hours
k ---------- Loss coefficient of solar panel (for example, Dust obscured)

To calculate the capacity of Battery required
The capacity of the battery can be calculated by the following formula

$$\mathbf{C} = Q\,(D + 1)\,k1(1 - k2)$$

In the formula
C --------- Standard capacity of the battery.
Q --------- Power consumption per day of the lamps.
D --------- Maximum number of continuous rainy days.
k1 --------- Depth of discharge (DOD), generally the DOD of VRLA is 0.75. k2 --------- Loss electricity of the battery's self-discharge. (10%)

Selection of LED depends on the site area and the light pole generally used are of 9-12 m height.

Cost Calculation

Rating & costing of street light:

Type	Led ratting (Watt)	Battery size (AH)	Controller size (A)	Pole height (m)
1	**Lexom mini 8 watt**	**25-30**	**5**	**7**
Cost(Rs)	**3500-4000**	**4000-6000**	**1000-2000**	**2000-3000**

(Table-27 rating and costing of street light}

Mathematical parameters are as follows:
Capacity of solar panel= Rating of LED X no of running hours
No of charging hour

- Specific design parameters for **7meter** pole height:

Pole height	Pole height 7 meter
Thickness of pole	Top 2.5 meter: 3mm Bottom 4.5 meter: 4mm
Diameters of pole sections	Top 2.5 meter: at least 3 inch Bottom 4.5 meter: at least 4 inch
Weight of pole only	At least 75 kg

(Table-28 specification according to height}

- **Cost Estimation of single solar street light:**

Parameters	Cost in INR
LED Light	**4000**
Solar panel	3000
Charge controller	5000
Pole	10000
Wire	2000
Installation cost	5000
Battery	5000
Total approx. cost	**34000**

(Table-29 cost estimate of single street light pole}

Final Estimate cost for single pole: Approx. RS 34000

8.1.8 Electrical Design 1: Central Control Unit For Irrigation Water Pump construction

Introduction:

Here the automation process is done through the wireless GSM technology. Automation of water pump includes monitoring of availability of proper electric supply, water level inside the reservoir, flow rate of water through pump and also taking care of short circuit conditions related to irrigation pump.

The microcontroller ATMEGA 16 is the heart of this system. The design of this system is very much sensitive and should be handled with utmost care because the microcontroller is a 5 volts device and it is employed to control high voltage 3-phase irrigation water pump.

The major advantage of this device is, it is very user friendly as the status of the motor can be known by a simple LED indication and more over the device is very economical and can be brought available to the common man. Most of the figures included in this paper are simulated using proteus simulator. AVR studio is used for ATMEGA

Block Diagram:

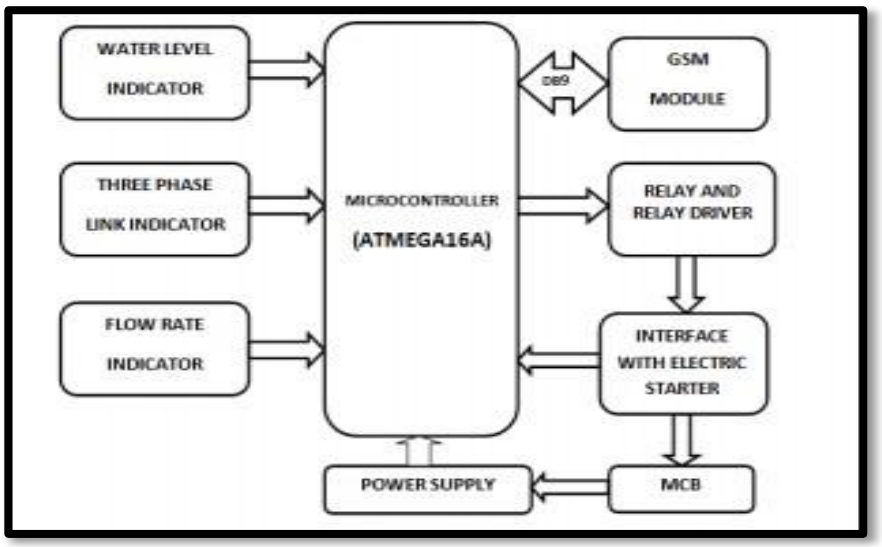


Fig 55. Block dia for automatic irrigation water supply

Working:

Microcontroller checks whether the call is coming from authenticated person, if it matches to the number of authenticated person it will start the motor. If the password doesn't match means some other person is calling then no action will be taken. In every stage it will send the status to the farmer (authenticated user).i.e. whether the motor is on or off by ring. If the motor is on by ring and the farmer needs to switch off he just needs to call back to the same no. the complete operation can be handled by sending SMS also, i.e. by sending ON motor gets on, and by sending OFF motor gets OFF. As the farmers don't have sufficient knowledge for sending SMS we implemented calling feature here. Similar action will be performed while checking the remaining all conditions i.e. level of water, flow rate of water and possibilities of shock absorption.

The design consists of three main systems: integrated hardware system, communication system, and control strategy. The integrated hardware system consists of power supply. system, microcontroller system, water level indication system, electricity indication system, flow rate system; pump switching system, GSM communication module The communication system

implements the communication protocol to facilitate data communication among the devices of the integrated hardware and also between the user and the controller system.

The control strategy on the other hand is responsible for measures for operating the irrigation system. The operational logic for control of the irrigation system is implemented on the microcontroller. The controller system on initialization checks for the control information and scheduling plan. The microcontroller controls the functions of the various devices that are interfaced to it and also manages the communication protocols required to execute specific tasks. This checking system includes first availability of electricity, water level, rate of flow of water and finally any short circuitry.

The GSM module also serves as the medium for system data transfer from the controller system to the user and also requests (conditions and operations) from the user to the controller system via SMS. Description of each circuit interfaced to ATMEGA 16 is given in next section.

Electricity Phase Link Indicator:

It consists of three- transformers, bridge rectifier, regulators, switches and resistors. The integrated hardware system consists of step down transformer; it converts 230V AC to 5V AC. Then it will be given to bridge rectifier which converts AC to pulsating DC and capacitor filter will converts into pure DC signal. To maintain continuous 5V signal it will pass through regulator IC i.e. 7805.The output from this IC which is 5V given to the microcontroller as input to port A. The output from this whole system consists of three signals to visualize the concept of three phase line i. e R, Y, B respectively. This output is indicated by one LED which is connected at output port C. When three phase supply is available then this output LED will be on and motor will also start to work. If any phase link gets open then LED will turn off and motor will gets automatically turns off. When motor gets turn off, simultaneously alert message will be send to the authorized user. This message includes Motor turn off due to link open. Then user comes to know that motor turned off due to failure in three phase link not in mains power supply.

Water Level Indicator:

This water level indicator monitors the level of the overhead tank and automatically switches off the water pump whenever the level goes below a preset limit. The level of the overhead tank is indicated using 3 LEDs and the pump is switched on when the overhead tank is filled. The pump is not allowed to start if the water level in the tank is low and also the pump is switched off when the level inside the tank goes low during a pumping cycle. The integrated hardware system consists of three op-amps in non- inverting configuration acts as a comparator. Here, 1V reference voltage, to inverting terminal which is common for all op-amp is that obtained from voltage divider circuit. Another input to non-inverting terminal is different water levels which are high, medium, and low respectively. The output of these three levels of op-amp is given as input to the microcontroller at port A. The outputs of these three levels are indicated by three LEDs at the output port C. When tank is full of water then there is contact between all three levels. Then all three output LEDs are turns on. When a water level in tank goes below high level then first LED turns off, when water level goes below medium level then first and second LEDs turns off, when water level goes below low level then all three LEDs gets turns off. When water level goes below low level then motor will gets automatically turn off and alert message will send to the authorized user. This message includes Motor turned off due to water reached below low level.

Water Flow Rate Indicator:

It consists of pressure sensor FL40L0 interfaced to Microcontroller ATMEGA 16.Flow switch works on principle of Hall Effect. It provides output in the form of pulses between 0 to 5V when water flows through it. The frequency of these pulses is high when flow rate of water is high and low when flow rate of water is low. This output is given as a input to microcontroller through optocoupler. Opto-coupler is used for isolation purpose. When flow rate goes below preset limit

due to some blockage at foot valve then alert message will be send to the authorized user. After the person receives a message the he can ON/OFF the water pump according to his requirement by passing a simple message.

8.1.9 Electrical Design 1: Central Control Unit For Irrigation Water Pump construction

The Design of post office is as shown in the previous fig.

❖ **Steps for load calculation & cost estimation:**

- Identifying basic components
- Rating of components
- Cost of individuals
- Summation of cost

❖ **Different electrical component Involved:**

- **Primary component**
  - Cables
  - Fuses
  - Sockets
  - Switch-boards
  - sockets
  - fire alarm

- **Externally Installed components**
  - fan
  - LED Bulb
  - Tube Light
  - Computer & printer
  - Water purifier (only if necessary)& so on

Entire cost estimation with including costing of different components:

❖ **Ratings of different components**

Component	Rating	No of Component
Fan	60W	4
Tube light	40 W	5
LED Bulb	18 W	6
Computer	150 W	According to requirement
printer	100 W	According to requirement
Fire alarm	15 W	2
Basic socket	5A	According to requirement
High Rating socket	15A	According to requirement
Protective devices	5,15A	According to requirement of power

(Table-30 rating for component water pump}

- **Cost of individuals component**

Component	Rating(in watt)	Cost of individuals
Fan	60	1500
Tube light	40	400
LED Bulb	18	70
Computer	150	According to requirement
printer	100	According to requirement
Fire alarm	15	-

(Table-31 cost of individuals}

Load calculation of Externally connected devices:

Load = Rating of individual X no of component

Component	Rating	No of Component	Load
Fan	60W	4	240W
Tube light	40 W	5	200W
LED Bulb	18 W	6	108W
Computer	150 W	According to requirement (for n=4)	600W
printer	100 W	According to requirement (for n=2)	200W
Total load of externally connected devices			1348W

(Table-32 load calculation}

Approximate Estimation of cost of complete electrical installation:

Name of Component	No of Component	Price of Individual (In INR)	Cost (In INR)
Fan	4	1500	60000
Tube light	5	400	2000
LED Bulb	6	70	420
Computer	4	30000	120
Printer	2	10000	20000
Switch Board	8	100	800
Switch	40	10	400
Regulator	4	50	200
Holder	7	30	210
Cable (for single phase)	1(430m)	11000	11000
Nut,Bolts etc.	10 set	50	500
Fuse	5	50	2500
Piping	50m	25	1250

Labour cost	5000
Total Approximate cost	1,00,400

(Table-33 estimation of electrical installation}

8.2 Reason for Students Recommending this Design

- As by gap analysis done by as we found the requirement of proposed designs.
- In village no any provision for sustainable facilities. So we design the compost pit. As a sustainable infrastructure facility.
- There is not public garden is available for recreation purpose. So we design the public garden for recreation. As a physical infrastructure deigns.
- There is no provision of solid waste collection method. All villagers are disposing the solid waste on free space available on road. So, we design solid waste collection method. As a socio-cultural infrastructure design.
- In village we design the chabutra as a Socio-Cultural design.
- In village we design shopping mall as a Smart Village Design so people can get wide variety of product available in one space.
- Many small town do not have a meeting place. Whether it be a corporate event, or a fundraiser provide a convenient place to gather. So we decide to design community hall as a Heritage Village Design.

8.3 About designs Suggestions / Benefit of the villagers

- There are so many visions for providing compost pit design.
- We can produce homemade fertilizers for our garden.
- We can reuse the waste material that we don't need any longer.
- We can get this material free from the neighbours and friends and family or on streets were trash bags are kept.
- Preparing our own fertilizer is very eco-friendly.

- In village no any provision for recreation purpose so we design the public garden as a recreation purpose.
- In village we design shopping mall as a Smart Village Design so people can get wide variety of product available in one space.
- There is no provision of solid waste collection method. All villagers are disposing the solid waste on free space available on road. So, we design solid waste collection method. As a socio-cultural infrastructure design.

Chapter : 9

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

- According to techno economical survey and gap analysis of part 1, almost required design of the village is do. First, basic requirement of the village should be full fill, therefore the design in part one is do according to that.
- The village need some of unique or different design in order to make the village attractive and smart.
- Future scope would be study over other unusual urban facilities that would be sustainable in rural areas of Gujarat.
- The village still lacks in preservation of the building and a variety of structures. Taking this into reflection the judgment of its treatment with other necessary facilities will be designed in the next semester.
- Identify people's needs and priorities.
- Define activities that can mobilize the complete community.

bio-gas plant : Able to produce renewable energy constantly in the form of a gas, biogas can deliver energy in the form most needed – whether that's baseload electricity and heat, or gas to fuel those areas that are harder to decarbonize, such as heating homes or fuelling heavy goods vehicles.

PHC : A primary care physician is essential to help an individual navigate to good health and stay healthy; preventing disease by identifying risk factors; coordinating and managing chronic disease care for longevity and a better quality of life. We are going to design of public health centre. It will help to villagers protect from various disease.

Rain water harvesting : Harvesting rainwater allows the collection of large amounts of water and mitigates the effects of drought. Most rooftops provide the necessary platform for collecting water. Rainwater is mostly free from harmful chemicals, which makes it suitable for irrigation purpose

Public Library : Public library plays an important role in people's lives as a source of accessing information and a place for knowledge creation. It has shown that public libraries are important informational, educational, cultural, and social institutions. One of the public libraries' significant and fundamental roles is education

ATM : Automated Teller Machines, popularly referred to as ATMs, are one of the most useful advancements in the banking sector. ATMs allow banking customers to avail quick self-serviced transactions, such as cash withdrawal, deposit, and fund transfers.

ROAD : Road as an essential public asset contributes to minimizing extreme poverty and improving quality of life through improving rural communities' access to basic rural infrastructure and amenities like safe drinking water, electrification, sanitation, hygiene, hospital, education and market.

Department	part I	part II
Civil	Compost pit	bio-gas plant
	public garden	PHC
	solid waste management	Rain water harvesting
	chabutro	Public Library
	shopping mall	ATM
	community hall	ROAD
Electrical	pizo electricity generation	solar street light
	smart energy meter	irrigation water pump
	solar tree	Wiring of Post office

Chapter : 10

Conclusion of the Entire Village Activities of the Project

An approach towards **Rurbanization**. Name Itself indicates to provide primary and mandatory facilities to village which cities may have starting of the project we have visited the ideal village **visaman**. Ideal village terms as village should have facilities like primary school building, good water supply, well managed drainage system, cleanness of the village, should be connect with nearer city by transportation system, good education facilities.

"Developing village with a rural soul but with all smart urban amenities that a city may have" This should guide to some rethinking about the import of efficiency further than the normal conceptions of economic or technical efficiency. In fact, employment growth is at least as significant as growth in productivity. In a sense, both represent the utilization of labor as a resource. This will help in developing Smart villages in sustainable way, reduce relocation from villages and avoid the cities from the urban force.

We did techno economic survey with the help of the Gov. Officer of **visaman** village & based on that we collected data of Necessary things, which are required in village, and things must be mend immediately.

After did the techno economic survey we did the gap analysis which is the given by the standard of the governance of the India as we can found that particular thinks which is required in the development of **visaman** village.

In **visaman** village no renewable energy sources is use until now and the people are not aware for electric energy conservation and advantages of renewable sources. It is need to aware people from both the stuffs and people should also aware from the other government's schemes and subsidy related to it so, villagers can start using renewable energy sources, save electricity, and implement both for their personal uses.

By providing required amenities to village, development of village can be possible. So ultimately, migration to the city from village will be reduce and livelihood of villagers will increase.

Comparison with smart village data and gap analysis we proposed detail design of certain amenities which may be use full for the growth of village and other advantage of **visaman** can be facilitated as like as other smart villages.

India is developing country and GDP is highly depended on farming. As the development of village would be possible, farming techniques will increase and percentage of GDP will increase.

Chapter : 11

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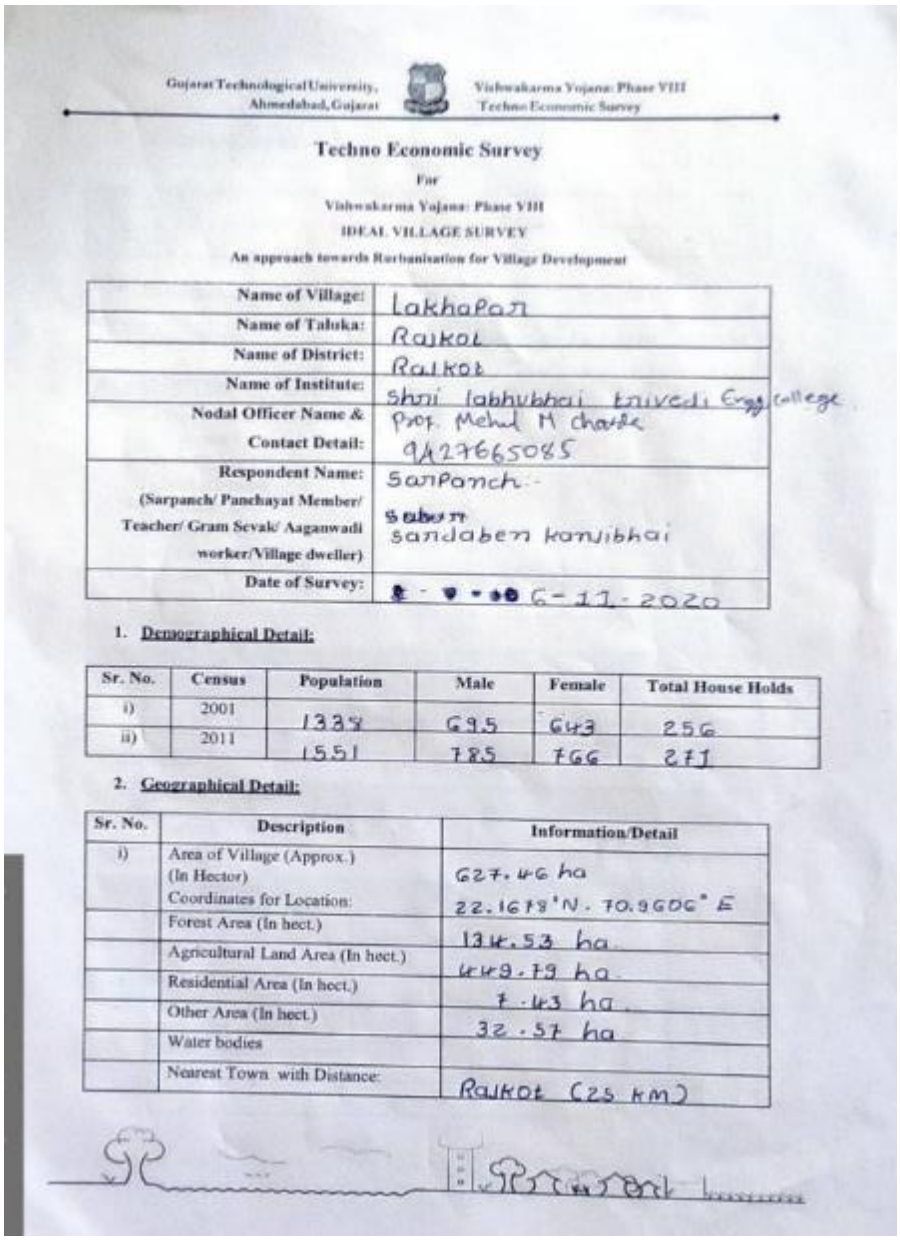
Chapter : 12

Annexure attachment

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



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For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	Lakhapar
Name of Taluka:	Rajkot
Name of District:	Rajkot
Name of Institute:	Shri labhubhai trivedi Engg college
Nodal Officer Name & Contact Detail:	Prof. Mehul M Chavda 9427665085
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch Sabeera sandaben kanjibhai
Date of Survey:	6-11-2020

1. Demographical Detail:

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	1334	695	643	256
ii)	2011	1551	785	766	271

2. Geographical Detail:

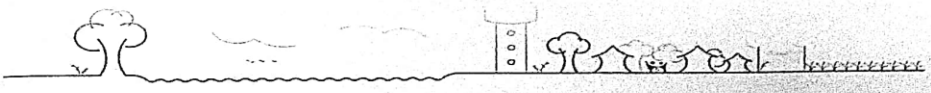
Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	627.46 ha 22.1678°N. 70.9606° E
	Forest Area (In hect.)	134.53 ha
	Agricultural Land Area (In hect.)	449.79 ha
	Residential Area (In hect.)	7.43 ha
	Other Area (In hect.)	32.57 ha
	Water bodies	
	Nearest Town with Distance:	Rajkot (25 KM)

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1. farming 2. Labour 3.

4. **Physical Infrastructure Facilities:**

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



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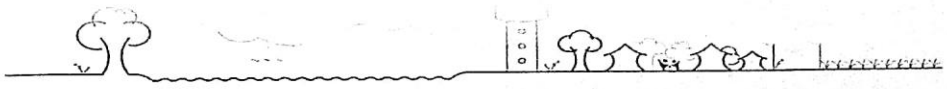
E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	bituminous	✓		
	Main road	C.C	✓		
	Internal streets	C.C	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	M.D.R	Rajkot-bhavnagar highway - 0 km		
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	NO			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	all type of transportation available.	✓		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Govt	✓		
	Power supply for Domestic Use		✓		
	Power supply for Agricultural Use		✓		
	Power supply for Commercial Use		✓		
	Road/ Street Lights		✓		



	Electrification in Government Buildings/ Schools/ Hospitals		✓		
	Renewable Energy Source Facilities (Y/ N)	NO		✓	
	LED Facilities	NO		✓	
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	NO			
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	NO			
	Solid & liquid waste Disposal system available	NO			
	Any facility for Waste collection from road	NO			
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	River well tubewell	✓		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	10 : 90			

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	NO		✓	
	Private Clinic/Private Hospital/ Nursing Home	NO		✓	
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
L.	**Education Facilities:**				
	Aaganwadi/ Play group		✓		
	Primary School		✓		
	Secondary school			✓	
	Higher sec. School			✓	
	ITI college/ vocational Training Center			✓	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	R.K University Rajkot - 7KM NO			
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
M.	**Socio- Culture Facilities**				
	Community Hall (With or without TV) Location:		✓		

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	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	NO		✓	
	Public Garden Location: Condition:	NO		✓	
	Village Pond Location: Condition:	NO		✓	
	Recreation Center Location: Condition:	NO		✓	
	Cinema/ Video Hall Location: Condition:	NO		✓	
	Assembly Polling Station Location: Condition:	NO		✓	
	Birth & Death Registration Office Location: Condition:	yes gram Panchayat	✓		
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	NO		✓	
	Telecommunication Network/ STD booth	NO		✓	

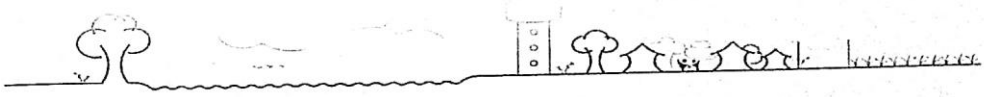
	General Market			✓	
	Shops (Public Distribution System)			✓	
	Panchayat Building		✓		
	Pharmacy/Medical Shop			✓	
	Bank & ATM Facility			✓	
	Agriculture Co-operative Society			✓	
	Milk Co-operative Soc.		✓		
	Small Scale Industries			✓	
	Internet Cafes/ Common Service Center/Wi Fi			✓	
	Other Facility			✓	
Suggestions if any:					

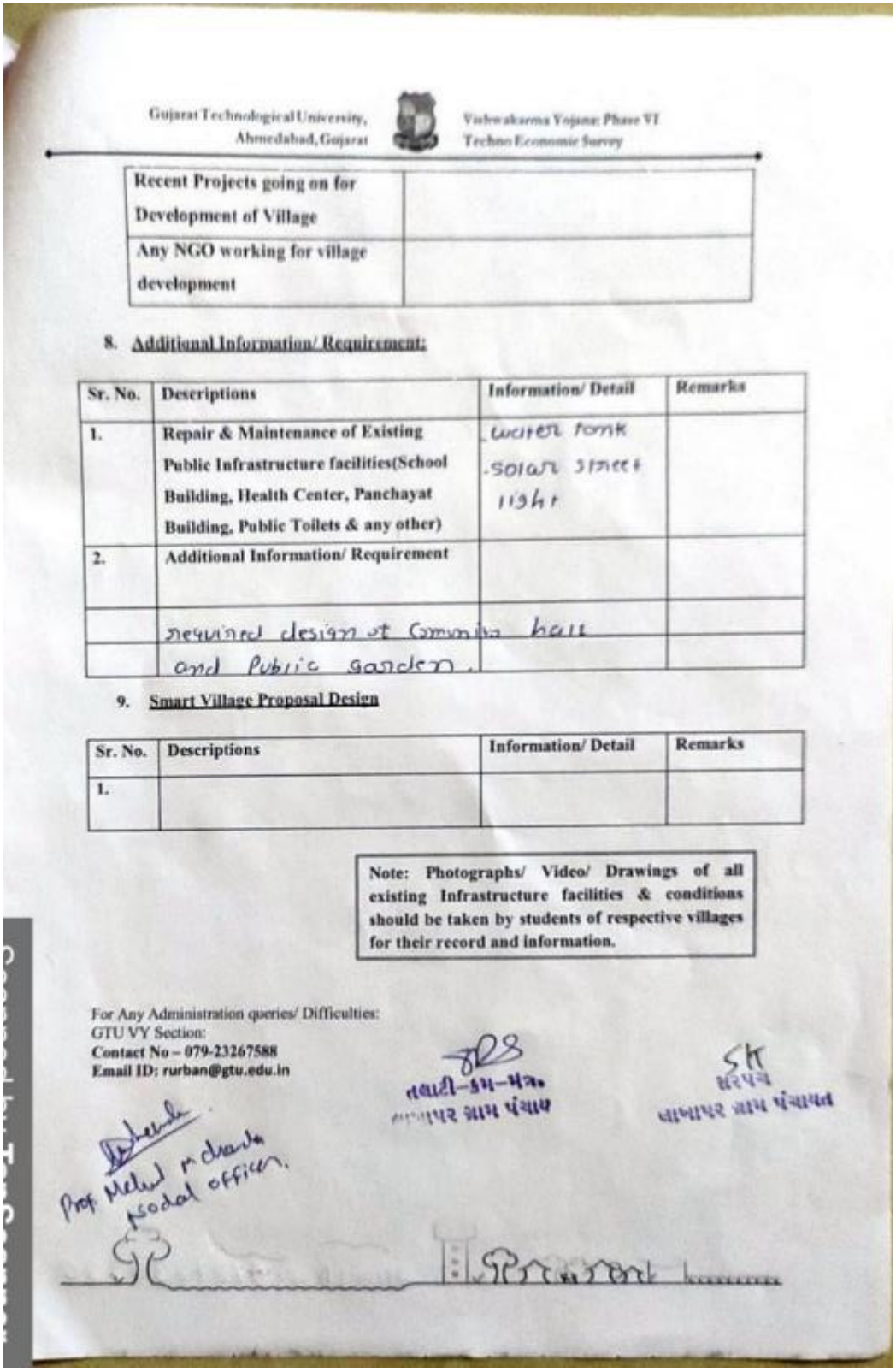
6. **Sustainable /Green Infrastructure Facilities:**

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

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	





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

8. Additional Information/ Requirement:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities(School Building, Health Center, Panchayat Building, Public Toilets & any other)	water tank solar street light	
2.	Additional Information/ Requirement		
	required design of Community hall		
	and Public garden.		

9. Smart Village Proposal Design

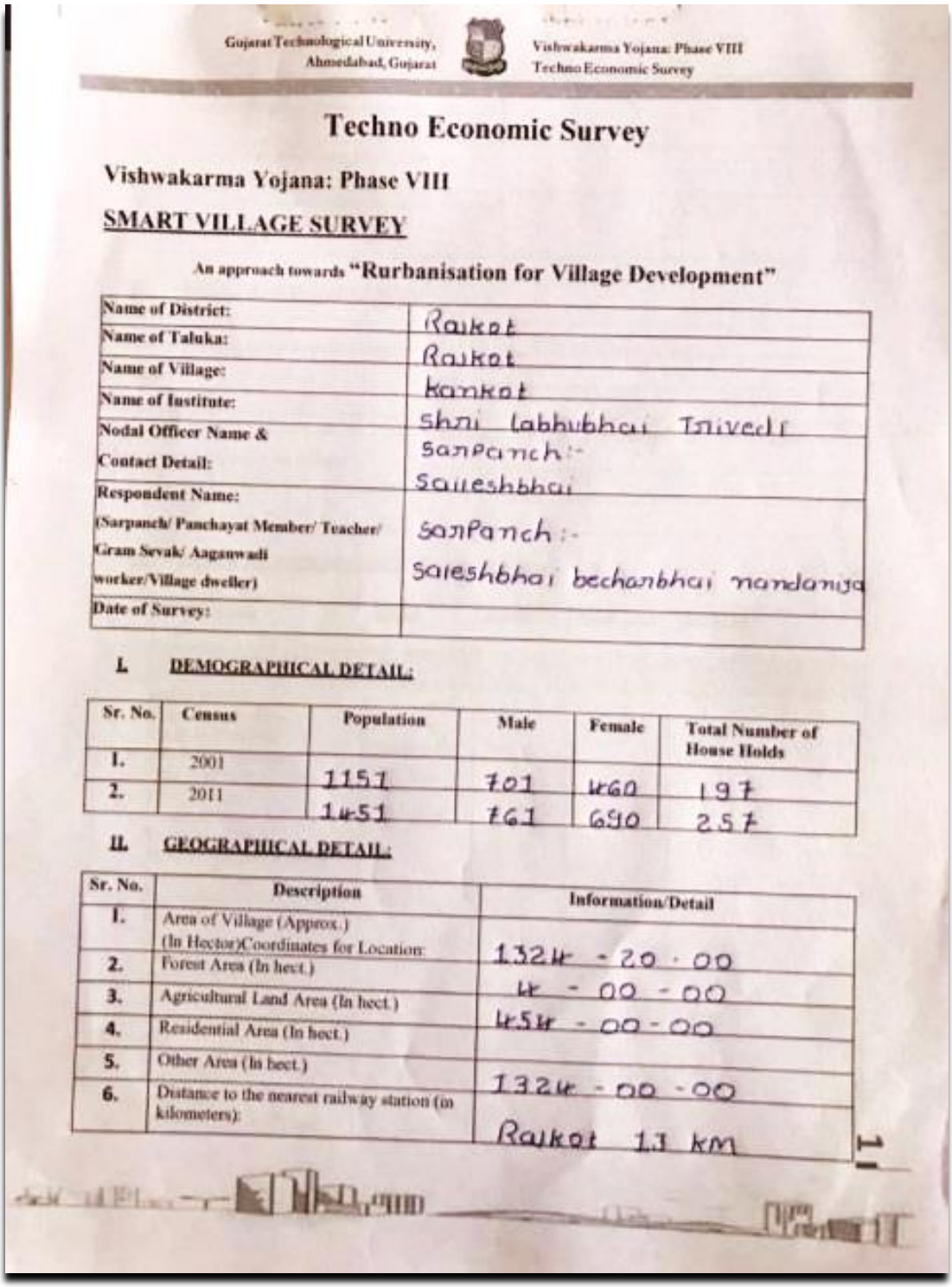
Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

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

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

Prof Mehul Pandya
Nodal officer.

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



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SMART VILLAGE SURVEY

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

Name of District:	Rajkot
Name of Taluka:	Rajkot
Name of Village:	Kankot
Name of Institute:	Shri Labhubhai Trivedi
Nodal Officer Name & Contact Detail:	sarpanch:- Saileshbhai
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	sarpanch:- saileshbhai bechanbhai nandaniya
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	1151	701	460	197
2.	2011	1451	761	690	257

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1324 - 20 - 00
2.	Forest Area (In hect.)	4 - 00 - 00
3.	Agricultural Land Area (In hect.)	45 - 00 - 00
4.	Residential Area (In hect.)	
5.	Other Area (In hect.)	1324 - 00 - 00
6.	Distance to the nearest railway station (in kilometers):	Rajkot 13 KM

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

III. OCCUPATIONAL DETAILS:

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

Major crops grown in the village:	1.
	2.
	3.

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

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Suggestions if any:						
B.	**Water Tank Facility**					
	Overhead Tank	Capacity:	5000			
	Underground Sump	Capacity:				
Suggestions if any:						
C.	**The Type of Drainage Facility**					
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	under ground	yes NO	–		
Suggestions if any:						
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**					
	Village approach road	All weather				
	Main road	C.C. roads				
	Internal streets	C.C roads				
	Nearest NH/SH/MDR/ODR Dist. in kms.	Rajkot - kalavad highway. State - highway 5 KM.				
Suggestions if any:						
E.	**Transport Facility**					
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO (9.1 KM)				
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Stop fast	yes city bus			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	All type	yes. of transport		facility on state high way.	
Suggestions if any:						
F.	**Electricity Distribution**					
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	more than 6hr.	yes.			

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	Power supply for Domestic Use		yes		
	Power supply for Agricultural Use		yes		
	Power supply for Commercial Use		yes		
	Road/ Street Lights		yes		
	Electrification in Government Buildings/ Schools/ Hospitals		yes		
	Renewable Energy Source Facilities (Y/ N)			NO	
	LED Facilities		yes	Nos	
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	-			
	Location Condition	-			
	Community Toilet (With bath/ without bath facilities)	-			
	Solid & liquid waste Disposal system available	-			
	Any facility for Waste collection from road	yes	Rajkot taken	urban development storage every 3rd day	
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL. OTHER (SPECIFY)	Borewell & well	yes		
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Kutchha - 20% Pucca - 80%			

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)				
	Sub-Centre				
	PHC				
	BLOCK PHC	NO			
	CHC/RH				
	District/ Govt. Hospital	Nearest			
	Govt. Dispensary	Morbi			
	Private Clinic	Morbi			
	Private Hospital/	Yes			
	Nursing Home				
	AYUSH Health Facility				
	sonography /ultrasound facility				
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group		Yes		
	Primary School		Yes		
	Secondary school	-			
	Higher sec. School		Rajkot		Rajkot 8 KM
	ITI college/ vocational Training Center				
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities		Yes		
	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)			yes	
	Public Library (With daily newspaper supply: Y/N)			NO	
	Public Garden	good		yes	
	Village Pond			yes	
	Recreation Center			NO	
	Cinema/ Video Hall			NO	
	Assembly Polling Station	good.	Pri. school	yes	
	Birth & Death Registration	good	Pancha yat	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	Good		yes.	
	Telecommunication Network/ STD booth			yes	
	General Market			N	NO
	Shops (Public Distribution System)			yes.	
	Panchayat Building			yes	
	Pharmacy/Medical Shop				NO
	Bank & ATM Facility			yes	
	Agriculture Co-operative Society				NO
	Milk Co-operative Soc.				NO
	Small Scale Industries				NO
	Internet Cafes/ Common Service Center/Wi Fi			yes.	
	Youth Club				NO
	Mahila Mandal				NO

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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) 9. National Food for work Programme (NFFWP) 10. National Social Assistance Programme 11. Sanitation Programme (SP) 12. Rajiv Gandhi National Drinking Water Mission 13. Swarnjayanti Gram Swarozgar Yojana 14. Minimum Needs Programme (MNP) 15. National Rural Employment Programme 16. Employee Guarantee Scheme (EGS) 17. Prime Minister Rojgar Yojana (PMRY) 18. Jawahar Rozgar Yojana (JRY) 19. Indira Awas Yaojna (IAY) 20. Samagra Awas Yojana (SAY) 21. Sanjay Gandhi Niradhar Yojana (SGNY) 22. Jawahar Gram Samridhi Yojana (JGSY) 23. Other (SPECIFY)				

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

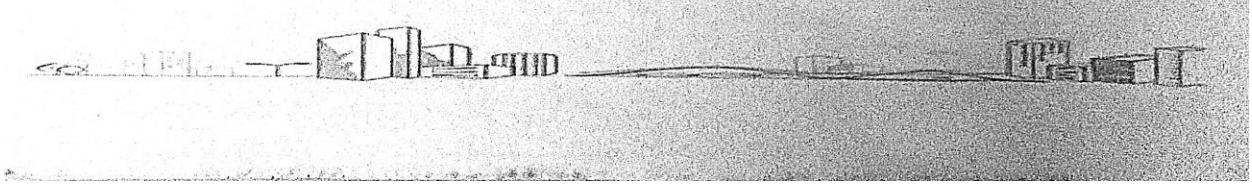
Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	NO			
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	NO			
3.	Any Other	–			

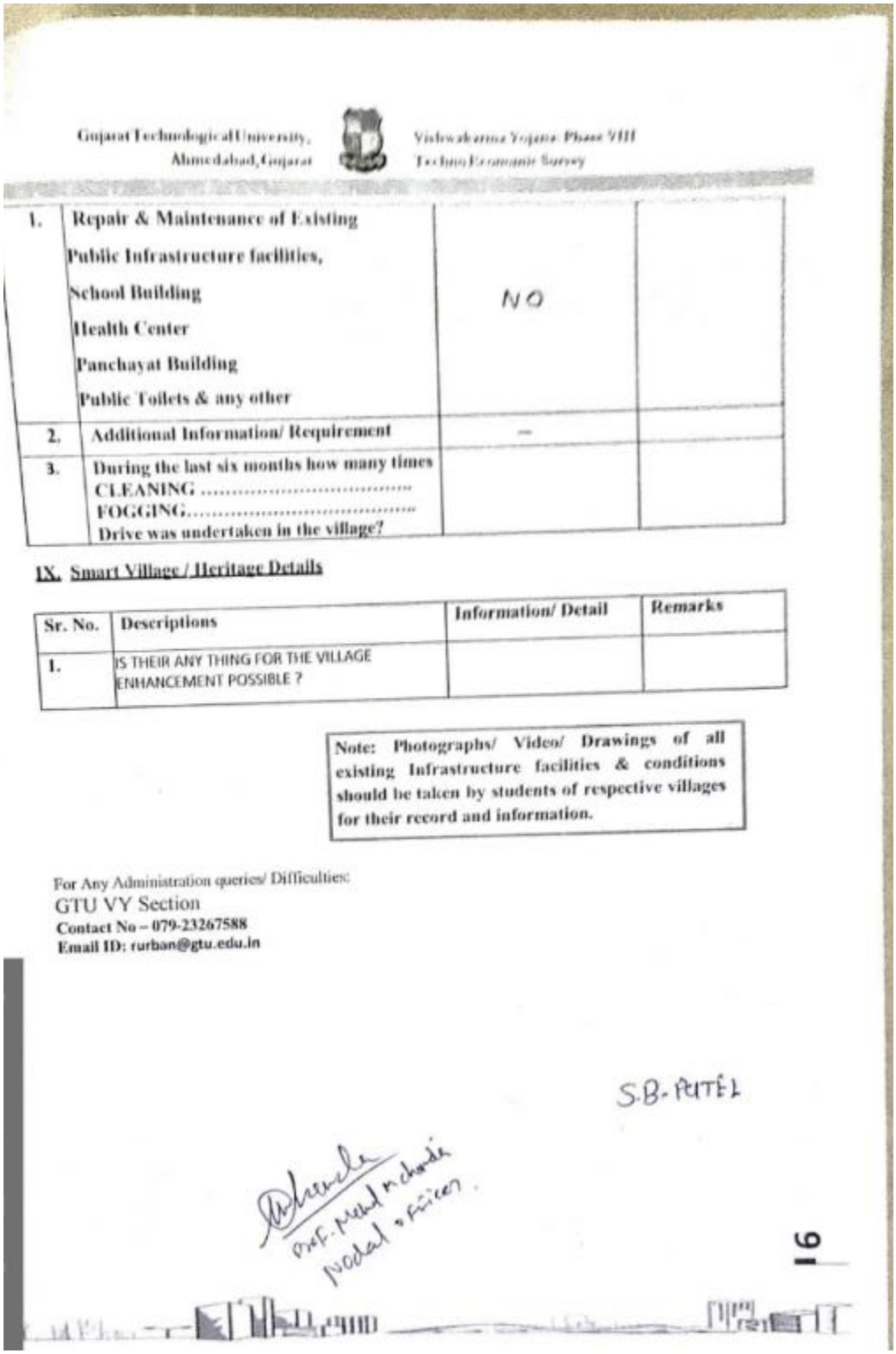
VII. DATA COLLECTION FROM VILLAGE

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

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks





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1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	NO	
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.

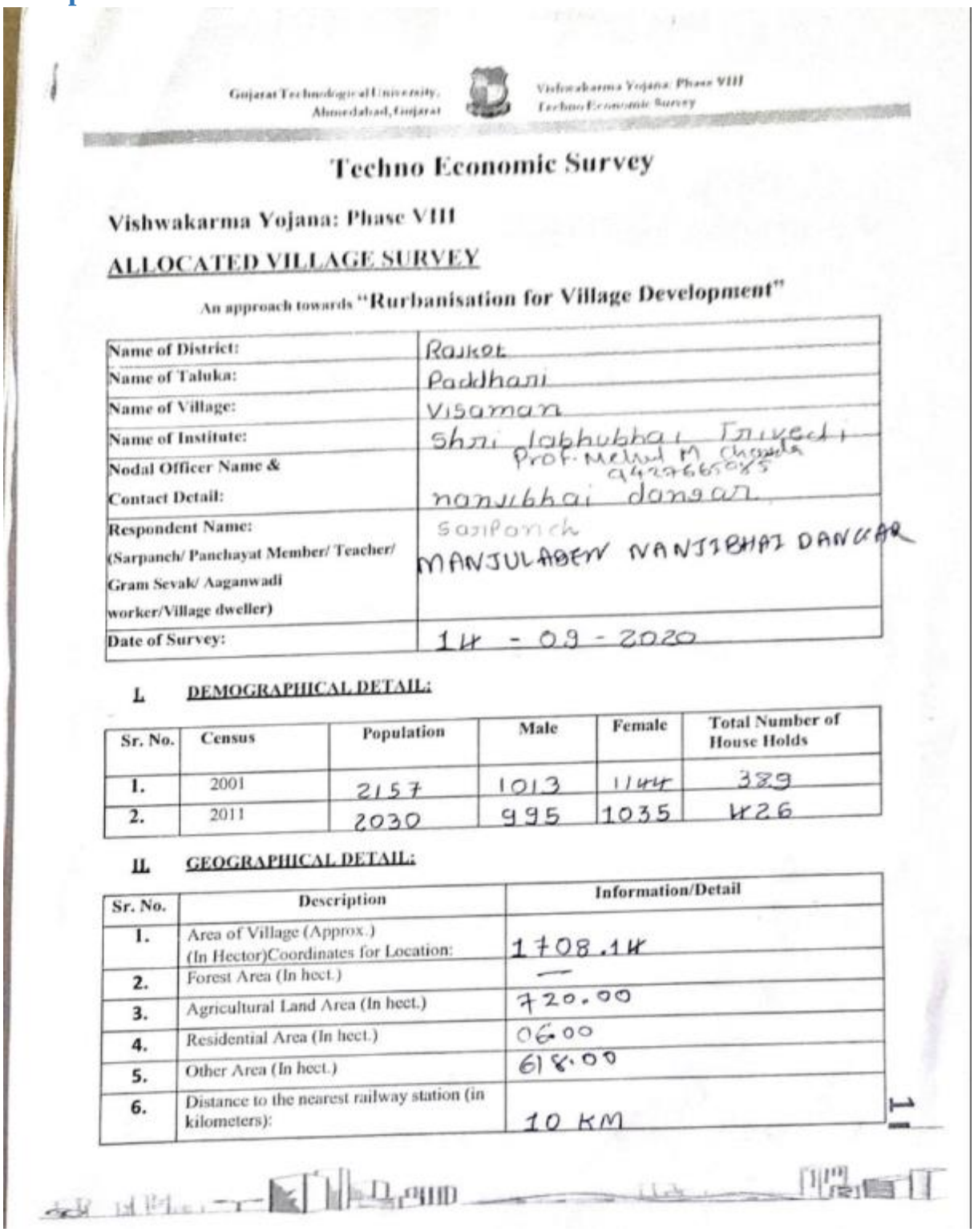
For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

S.B. PATEL

Prof. Head Incharge
Nodal Officer

16

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



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Techno Economic Survey

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Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Name of District:	Rajkot
Name of Taluka:	Paddhari
Name of Village:	Visaman
Name of Institute:	Shri labhubhai Trivedi
Nodal Officer Name & Contact Detail:	Prof. Mehul M Chavda 9427665085 nanjibhai dangar
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch MANJULABEN NANJIBHAI DANGAR
Date of Survey:	14 - 09 - 2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	2157	1013	1144	389
2.	2011	2030	995	1035	426

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1708.1H
2.	Forest Area (In hect.)	—
3.	Agricultural Land Area (In hect.)	720.00
4.	Residential Area (In hect.)	06.00
5.	Other Area (In hect.)	618.00
6.	Distance to the nearest railway station (in kilometers):	10 KM

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7.	Name of Nearest Town with Distance:	Rajkot , 35 KM
8.	Distance to the nearest bus station (in kilometers):	Paddhari bus station, 13KM
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.	farming
	2.	Agriculture workers
	3.	

Major crops grown in the village:	1.	
	2.	
	3.	

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

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	Other(Specify)Lake/ Pond				Dantiya nali sinchay yojna
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:			1 lakh lit, 2 lakh
	Underground Sump	Capacity:	✓		Underground sump
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1		✓		
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road				
	Main road				
	Internal streets				
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH 15 KM	✓		
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	N chanol 7.2 KM	✓		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	N Paddhari 13 KM	✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	-chhakda -Private vehicles		✓	
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Govt. more then 6 hr.	✓		

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	Power supply for Domestic Use		✓		
	Power supply for Agricultural Use		✓		
	Power supply for Commercial Use			✓	
	Road/ Street Lights			✓	
	Electrification in Government Buildings/ Schools/ Hospitals		✓		
	Renewable Energy Source Facilities (Y/ N)				
	LED Facilities				
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.		✓		
	Location Condition				
	Community Toilet (With bath/ without bath facilities)				
	Solid & liquid waste Disposal system available				
	Any facility for Waste collection from road				
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL. OTHER (SPECIFY)	bore well & wells.			
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Kutchha - 30 % Pucca - 70 %			

V. SOCIAL INFRASTRUCTURAL FACILITIES:

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

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	If any of the above Facility is not available in village than approx. distance from village: ..13....kms. Paddhari.
Suggestions if any:	

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

If any of the above Facility is not available in village than approx. distance from village: ..13....kms. Paddhari.

Suggestions if any:

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

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

Suggestions if any:

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

VI. SUSTAINABLE/GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

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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	secondary school buildins .	
2.	Additional Information/ Requirement	RO water, street light, road maintenance	
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.

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

14.9.2020

Prof. Nehulbhai Nodal officer.

12.4 Gap Analysis of the Allocated Village

(Table-34 gap analysis)

VILLAGE GAP Analysis					
Village Facilities	Planning Commission/UDPFI Norms	Village Name:	Visaman.		
		Population:2030			
		Existing	Required as per Norms	Smart Village / Cities / Heritage Future Projection Design	Gap
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	1	1	-	0
Primary School	Each Per 2500 population	1	1	-	0
Secondary School	Per 7,500 population	1	0	-	0
Higher Secondary School	Per 15,000 Population	1	0	-	0
College	Per 125,000 Population	0	0	-	0
Tech. Training Institute	Per 100000 Population	0	0	-	0
Agriculture Research Centre	Per 100000 Population	0	0	-	0
Skill Development Center	Per 100000 Population	0	0	-	0
Health Facility					
Govt/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	0	1	-	1
Primary Health & Child Health Center	Per 20,000 population	0	0	-	0
Child Welfare and Maternity Home	Per 10,000 population	0	0	-	0
Multispeciality Hospital	Per 100000 Population	0	0	-	0
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	8	-	1
Physical Infrastructure Facilities					
Transportation		**Inadequate**	1	-	1
Pucca Village Approach Road	Each village	**Adequate**	1	-	0
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	**Inadequate**	1	-	1
Drinking Water (Minimum 70 lpcd)		**Adequate**	1	-	0
Over Head Tank	1/3 of Total Demand	**Adequate**	0	-	0
U/G Sump	2/3 of Total Demand	**Adequate**	1	-	0
Drainage Network - Open		**Inadequate**	0	-	1
Drainage Network - Cover		**Adequate**	1	-	0
Waste Management System		**Inadequate**	0	-	1
Socio-Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	0	1	-	1
community hall and Public Library	Per 15000 Population	0	1	-	1
Cremation Ground	Per 20,000 population	1	1	-	0
Post Office	Per 10,000 population	1	1	-	0
Gram Panchayat Building	Each individual/group panchayat	1	1	-	0
APMC	Per 100000 Population	0	0	-	0
Fire Station	Per 100000 Population	0	0	-	0
Public Garden	Per village	0	1	-	1
Police post	Per 40,000Population	0	1	-	1
Shopping Mall					
Electrical Design					

Electricity Network		Adequate	1	-	1
Any Smart Village Facility					
Technology					
		ESR cap	0	-	0
		Sump cap	0	-	0
		Lat	0	-	0

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

(Table-35 summary detail of all the village design)

S.L.T.I.E.T. COLLEGE OF ENGINEERING & TECHONOLOGY SUMMARY OF DESIGN PROPOSAL				
Sr. no	**Village**	**Department**	**part I**	**part II**
1	Visaman	Civil	Compost pit	bio-gas plant
			public garden	PHC
			solid waste management	Rain water harvesting
			chabutro	Public Library
			shopping mall	ATM
			community hall	ROAD
		Electrical	pizo electricity generation	solar street light
			smart energy meter	irrigation water pump
			solar tree	Wiring of Post office
2	Nagar pipaliya	Civil	Community hall+ Library	INTERNAL ROAD
			Post Office	PUBLIC GARDEN
			Panchayat Building	BIOGAS PLANT
			Public Toilet Block	GENRAL MARKET
			Skill Development Centre	CANTEEN FOR OLD
			Animal Shelter	FIRESTATION
		Electrical	Automatic on-off switch for water tank	COMMUNITY HALL WIRING
			photovoice water pump	SOLAR CLEANING
			Solar Water Purifier	STREET LIGHT
3	khorana	Civil	public toilet	ATM
			bus stand	POST OFFICE
			community hall	STP
			PHC center	BANK
			public garden	RAIN WATER
			public library	HALL PAVER BLOCK
		Electrical	solar roof top	solar panel
			street light	power generate by river water
			solar pump	wind farm

4	Derdi kumbhaji	Civil	PHC	Rain water harvesting
			Public Library	Cyber cafe
			Community Hall	Skill development center
			Public Garden	Gym
			Police Station	Soil testing laboratory
			Batchat Mandli	Agriculture Store
		Electrical	Solar street light installation design	cctv
			Solar Pump System	Solar Rooftop Installation Design
			Piezoelectric speed braker power generation design	Purification Water Plant
5	Isra	Civil	Biogas plant	Community Hall
			Garden	Solid waste collection
			Public Toilet	Library
			Post Office	Internal road
			Water Harvesting	Recreation center
			Waste water treatment plant	Police station
		Electrical	Solar panel fitting	Small hydropower station
			Solar street light	Temperature control fan
			Solar cleaning system	Water level indicators
6	jaliya	Civil	Chanakya library	soil testing laboratory
			panchayat building	garden
			pay and use	reaction center
			general market	biogas plant
			bus stand	Aganwadi
			community hall	solid waste collection
		Electrical	solar street lights	smart garden
			solar rooftop	solar laboratory
			solar cleaning system	irrigation by solar
7	moviya	Civil	PUBLIC GARDEN	General Market
			COMMUNITY HALL	Anganwadi
			PUBLIC LIBRARY	Post Office
			BUS STAND	Police Station
			PANCHAYAT BUILDING	Godown For Agriculture
			PUBLIC TOILET	ATM
		Electrical	House wiring	solar library
			street light	Commercial wiring
			Solar rooft top	Solar street light

8	Meta khambhadiya	Civil	Public Library	Godown
			community hall	Rain water harvesting
			Garden	Bank
			water tank	Play Ground
			solid waste collection	Biogas plant
			public toilet	Chabutro

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

Attached at the end of report

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

Ideal Village Photos (lakahapar)

Fig 56. Ideal village photos




Smart Village Photos (kankot)

Fig 57. smart village photos





Allocated Village (visaman)

Fig 58. allocated village photos





12.8 Village Interaction with sarpanch Report with the photograph


12.9 Sarpanch Letter giving information about the village development

MAHATMA GANDHI CHARITABLE TRUST MANAGED
SHRI LABHUBHAI TRIVEDI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved by AICTE, New Delhi & Affiliated to GTU, Ahmedabad (Degree & Diploma)

Date:7/10/2020

To,
DDO,
Rajkot

Subject: Permission for Village Survey and data collection for study (project) purpose.

As per Vishwakarma Yojana Phase VIII guidelines, students of Shri Labhubhai Trivedi institute of engineering and technology selected different villages of Rajkot district as a part of project of GTU. Vishwakarma Yojana Phase VIII project is offered by GTU to the final year engineering students in which smart, developed and allocated village actual data are collected by students by taking visit of villages and students will gives the designs with a detail Design Plan, Estimation and Coasting of various units in the village.

The following villages are allocated to students for their projects.

1. KHORANA
2. MOVIYA
3. JALIYA
4. META KHAMBHALIYA
5. VISAMAN
6. NAGAR PIPALIYA
7. DERDI KUMBHAJI
8. ISRA

I request you to provide us permission letter so that Talati Mantri/Sarpanch can allow and help students by giving actual information and data about villages.

I request you to kindly support our project students. Be assuring that this project is allocated by **Government of Gujarat** to **Gujarat Technological University**. So, we are proposing the design for study purpose only.

For the development of village under "Vishwakarma Yojana Phase-8" project, we are expecting positive approach by you.

for 7/10/20
Prof. Mehul M Chavda
VY-Nodal officer,
SLTIET, Rajkot
Mo.9427665085

S.L.T.I.E.T. RAJKOT

7/10/2020
Dr. B M Ramani
Principal,
SLTIET, Rajkot
Mo.9825779590

Principal
Shri Labhubhai Trivedi Institute
of Engineering and Technology
Kalawad Road-Rajkot.

Mavdi, Nr. Government Engineering College, Kalawad Road, Rajkot - 360005,
Tel: (0281) 6564011-16, Fax: (0281) 2466150, Mob. : 99045 44407,
Web: www.ltiet.com, Mail: info@ltiet.com

12.10 Comprehensive report preparation as per format

Developing a village with a 'rural soul but with all urban amenities is that a city may have Vishwakarma Yojana is one of the initiatives towards GUJARAT TECHNOLOGICAL UNIVERSITY,

Vishwakarma Yojana is one of the initiatives towards Urbanization that is village development by the government of Gujarat, which was allotted as a real time situation type project provides to GTU. Vishwakarma Yojana is provides special scheme for development of village by GTU and Government of Gujarat in which students work together and collect data and information regards village development with the help of gram panchayat and stake holders.

Vishwakarma Yojana is provides special scheme for development of village by GTU and Government of Gujarat in which students work together and collect data and information regards village development with the help of gram panchayat and stake holders.

Village have some basic facilities likes drinking water, drainage system, pucca road, and other facilities like primary school, primary health center, community hall, library, public latrine block, are sufficient so that village can develop. So, we will give proposal regarding sustainable energy sources and solution related to infrastructure problems.

Efforts have been made in this project work to identify and plan some of the below facilities for sustainable development of village and to meet need of future population.
Vishwakarma Yojana is one of the initiatives towards Rurbanization that is village development by the government of Gujarat, which was allotted as a real time situation type project provides to GTU.

It is one of the strategies 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. In this project the students meet the relevant citizens of village and survey the existing facilities. Then design of the sustainable infrastructure which is to be modified is carried out for the village.

This includes implementation of engineering skills to prepare detailed project reports for village as a part of the final year project work. By this project certain experiences recreates a real work and need of application of an individual technical knowledge on any existing problems. Based on survey we tried to give design of basic facilities to fulfill their needs.

By providing these basic facilities to village for reduce urban city pressure and decrease migration rate, which is ultimate aim of Vishwakarma.

Chapter : 13

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

13.1 Design Proposals

13.1.1 Civil Design 1 : bio-gas plant

Able to produce renewable energy constantly in the form of a gas, biogas can deliver energy in the form most needed – whether that's baseload electricity and heat, or gas to fuel those areas that are harder to decarbonize, such as heating homes or fuelling heavy goods vehicles.

It mainly comprises of hydro-carbon which is combustible and can produce heat and energy when burnt. Bio-gas is produced through a bio-chemical process in which certain types of bacteria convert the biological wastes into useful bio-gas. Since the useful gas originates from biological process, it has been termed as bio-gas. Methane gas is the main constituent of biogas.

Process :-

The process of bio-gas production is anaerobic in nature and takes place in two stages. The two stages have been termed as acid formation stage and methane formation stage. In the acid formation stage, the bio-degradable complex organic compounds present in the waste materials are acted upon by a group of acid forming bacteria present in the dung. Since the organic acids are the main products in this stage, it is known as acid forming stage. In the second stage, groups of methanogenic bacteria act upon the organic acids to produce methane gas.

Raw material :-

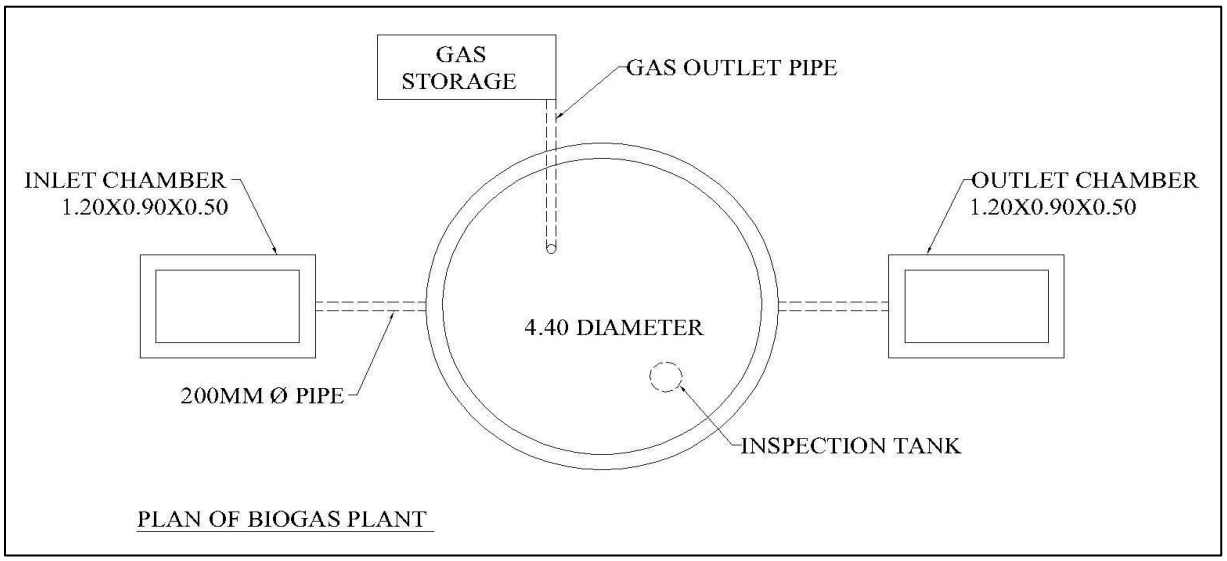
Although, cattle dung has been recognized as the chief raw material for bio-gas plants, other materials like night-soil, poultry litter and agricultural wastes can also be used.

Advantages :-

- It is a eco-friendly fuel.
- The required raw materials for biogas production are available abundantly in villages.
- It not only produces biogas, but also gives us nutrient rich slurry that can be used for crop production.
- It prevents the health hazards of smoke in poorly ventilated rural households that use dung cake and fire-wood for cooking.
- It helps to keep the environment clean, as there would be no open heap of dung or other waste materials that attract flies, insects and infections
- Availability of biogas would reduce the use of firewood and hence trees could be saved.

Component :-

- Mixing tank - The feed material (dung) is collected in the mixing tank. Sufficient water is added and the material is thoroughly mixed till a homogeneous slurry is formed.
- Inlet pipe - The substrate is discharged into the digester through the inlet pipe/tank.
- Digester - The slurry is fermented inside the digester and biogas is produced through bacterial action.
- Gas holder or gas storage dome - The biogas gets collected in the gas holder, which holds the gas until the time of consumption.
- Outlet pipe - The digested slurry is discharged into the outlet tank either through the outlet pipe or the opening provided in the digester.



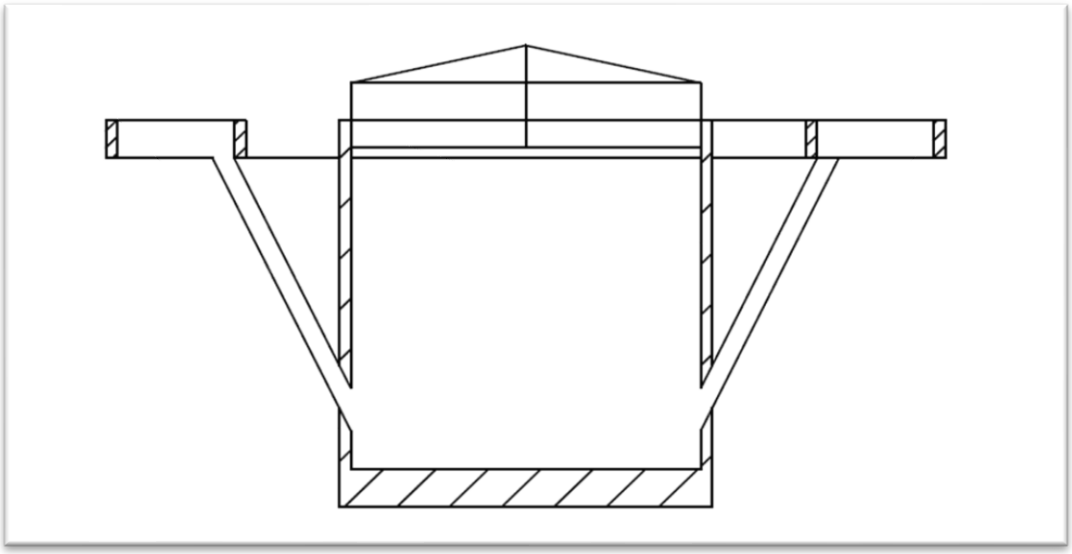


Fig 60. Design of biogas plant

13.1.2 Civil Design 2 : Primary health center

The primary health centre (PHC) is the basic structural and functional unit of the public health services in developing countries, to provide accessible, affordable, and available primary health care to people. OR "Primary health centres some times referred to as public health centers

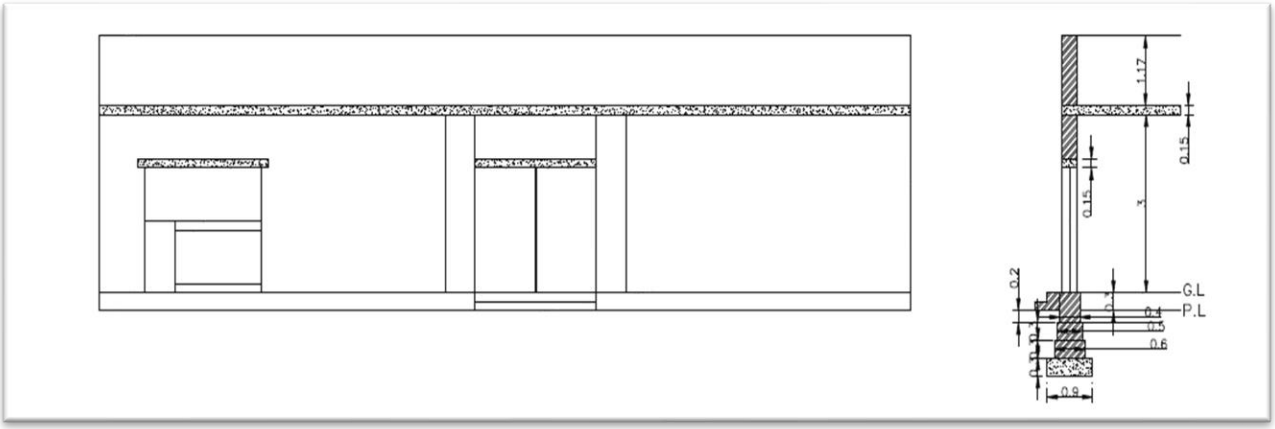
A primary care physician is essential to help an individual navigate to good health and stay healthy; preventing disease by identifying risk factors; coordinating and managing chronic disease care for longevity and a better quality of life. We are going to design of public health centre. It will help to villagers protect from various disease.

FUNCTIONS OF PHC Medical care Treatment and prevention of endemic disease Maternal and child health care Health education Referral services Basic laboratory test National health programmes Training of ANM , ASHA paramedics Collection and reporting of vital events

- Primary health centres are the corner stone of rural health services.
- It act as a referral unit for 6 sub centres and refer out cases to CHCs.
- It covers a population of 30,000 in plain area and 20,000 in hilly and tribal area.
- There are 4-6 beds for patients and some diagnostic facilities are also available.
- Prevention and control of locally endemic disease.
- Collection and reporting of vital events
- Health education and behaviour change communication.
- Other national health programmer
- Referral services
- Training
- Basic laboratory services

Summary : -

Primary health centre is the first contact point between the village community and the medical officer. it provides curative, preventive and promotive services to the peoples



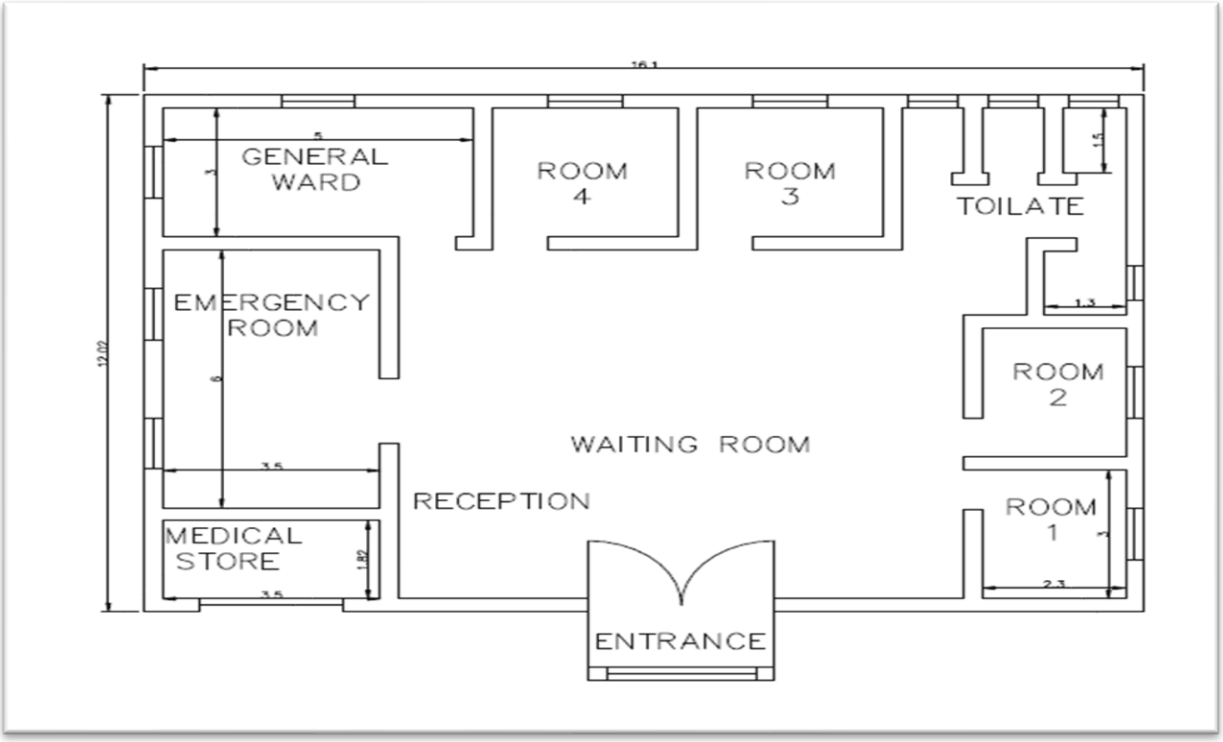


Fig 61. Design of PHC

Quality sheet						
SR.NO.	**Item description**	**No.**	**Length**	**Width**	**Hight**	**Quantity**
1	Exavation in foundation :					
	Total Centre Line (L) = 108.14m					
	L=108.14-(0.90/2)22					
	L=98.24m	1	98.24	0.9	1.1	97.27cu.m
2	Cement concrete in found. In PCC(1:4:8)					
	L=98.24m	1	98.24	0.9	0.3	26.52 cu.m
3	Brickwork in fond. & plinth					
	L=108.14-(0.60/2)22					
	1st Footing L=101.54m	1	101.54	0.6	0.3	18.277
	2rd Footing L=102.64m	1	102.64	0.5	0.3	15.396

	3th Footing L=103.74m	1	103.74	0.4	0.5	20.6
						54.273 cu.m
4	Earth filling in Plinth					
	Room-1	1	2.2	2.9	0.5	3.19
	Room-2	1	2.2	2.9	0.5	3.19
	Room-3	1	2.2	2.9	0.5	3.19
	Room-4	1	2.2	2.9	0.5	3.19
	Room-5	1	2.2	2.9	0.5	3.19
	General Ward	1	4.9	2.9	0.5	7.11
	Emergancy Ward	1	3.4	5.9	0.5	10.03
	Medical store	1	3.4	1.5	0.5	2.55
	Toilate & Bath	4	1.2	1.4	0.5	3.36
						39cu.m
5	Flooring(100mm)Thick (1:3:6)					
	Room-1	1	2.3	3	0.1	0.69
	Room-2	1	2.3	3	0.1	0.69
	Room-3	1	2.3	3	0.1	0.69
	Room-4	1	2.3	3	0.1	0.69
	Room-5	1	2.3	3	0.1	0.69
	General Ward	1	5	3	0.1	1.5
	Emergancy Ward	1	3.5	6	0.1	2.1
	Medical store	1	3.5	1.62	0.1	0.57
	Toilate & Bath	4	1.3	1.5	0.1	0.78
						7.495cu.m
6	D.P.C					
	L=108.14-(0.3/2)22					
	L=104.84m	1	104.84	0.3	0.05	1.573cu.m
7	Brickwork for Super Structure					
	L=108.14-(0.30/2)22					
	L=104.84m	1	104.84	0.3	3	94.356cu.m
8	Deduction (-)					

	DOOR	10	1.2	0.3	2.1	7.56
	WINDOW	8	1.2	0.3	1.4	4.032
	VENTILATION	4	0.6	0.3	0.79	0.57
	ENTRANCE DOOR	1	1.8	0.3	3	1.62
	Deduction for Lintel (150mm) (-)					
	DOOR	10	1.5	0.3	0.15	0.675
	WINDOW	8	1.5	0.3	0.15	0.54
						(-) 14.997
	TOTAL BRICK WORK=					79.359cu.m
9	RCC Slab					
		1	16.1	12.02	0.15	28.98cu.m
10	Chajja on Window (70mm thick)					
	L=1.2+0.15+1.5 =1.5m	8	1.5	0.6	0.15	1.08cu.m
11	Brick work in Parapet					
		1	86.6	0.3	1	25.98cu.m

(Table-38 Quantity sheet of PHC)

Abstract sheet				
SR.NO.	**NAME OF ITEM**	**QUANTITY**	**RATE**	**AMOUNT**
		cu.m		
1	Exavation in foundation :	97.27	200	19454
2	Cement concrete in found. In PCC(1:4:8)	26.52	3000	79560
3	Earth filling in Plinth	39	1000	39000
4	Flooring(100mm)Thick (1:3:6)	7.495	800	5996
5	D.P.C	1.573	100	157
6	Brickwork for Super Structure	79.359m	3500	277757
7	RCC Slab & Lintel	28.98	10000	289800

8	Brick work in Parapet	25.98	3200	83136
9	Wooden Door	10	1000	10000
10	Window	8	600	4800
			TOTAL=	809660
			5%	404830
				RS. 1214490

(Table-39 Abstract sheet of PHC)

13.1.3 Civil Design 3 : Rain water harvesting

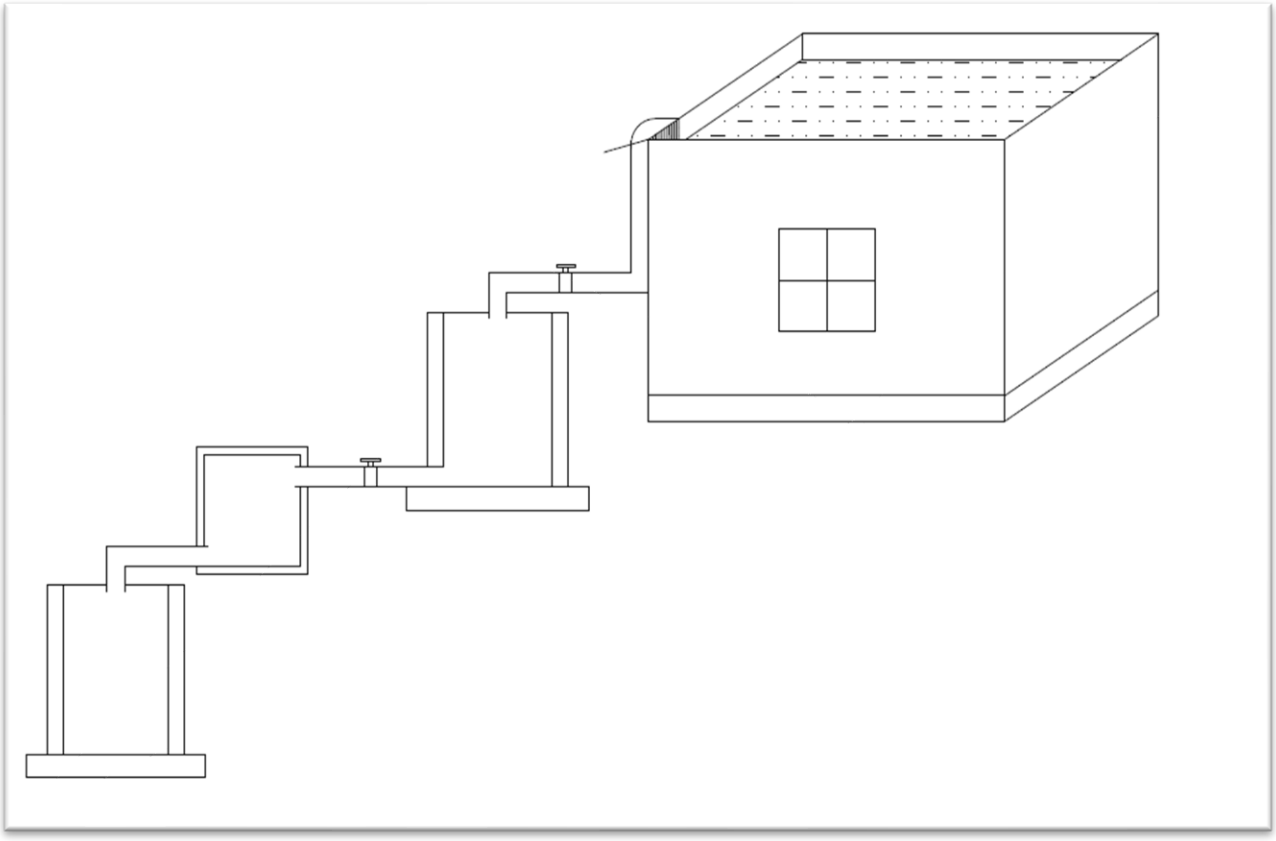
Harvesting rainwater allows the collection of large amounts of water and mitigates the effects of drought. Most rooftops provide the necessary platform for collecting. Rainwater is mostly free from harmful chemicals, which makes it suitable for irrigation purpose

For our water requirement we entirely depend upon rivers, lakes and ground water. However rain is the ultimate source that feeds all these sources.

Rain water harvesting means to make optimum use of rain water at the place where it falls i.e. conserve it and not allow to drain away and cause floods elsewhere

Advantages of rain water harvesting :-

- Promotes adequacy of underground water
- Mitigates the effect of drought
- Reduces soil erosion as surface run-off is reduced
- Decreases load on storm water disposal system
- Reduces flood hazards
- Improves ground water quality / decreases salinity (by dilution)
- Prevents ingress of sea water in subsurface aquifers in coastal areas
- Improves ground water table, thus saving energy (to lift water)
- The cost of recharging subsurface aquifer is lower than surface reservoirs
- The subsurface aquifer also serves as storage and distribution system
- No land is wasted for storage purpose and no population displacement is involved
- Storing water underground is environment friendly.



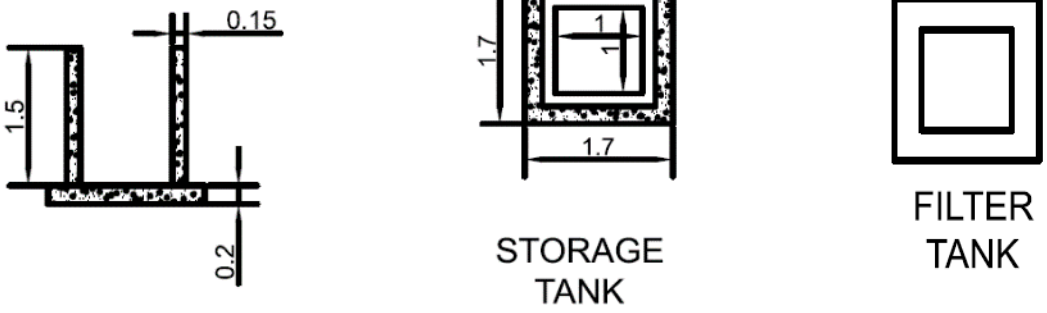


Fig 62. Design of Rain Water Harvesting

Quality sheet						
SR.NO	**ITEM OF DESCRIPTION**	**NO.**	**LENGTH**	**WIDTH**	**HIGHT**	**QUANTITY**
	TORAGE TANK - 1					
1	**Exavation in foundation :**					
		1	2.3	2.3	2	10.58cu.m

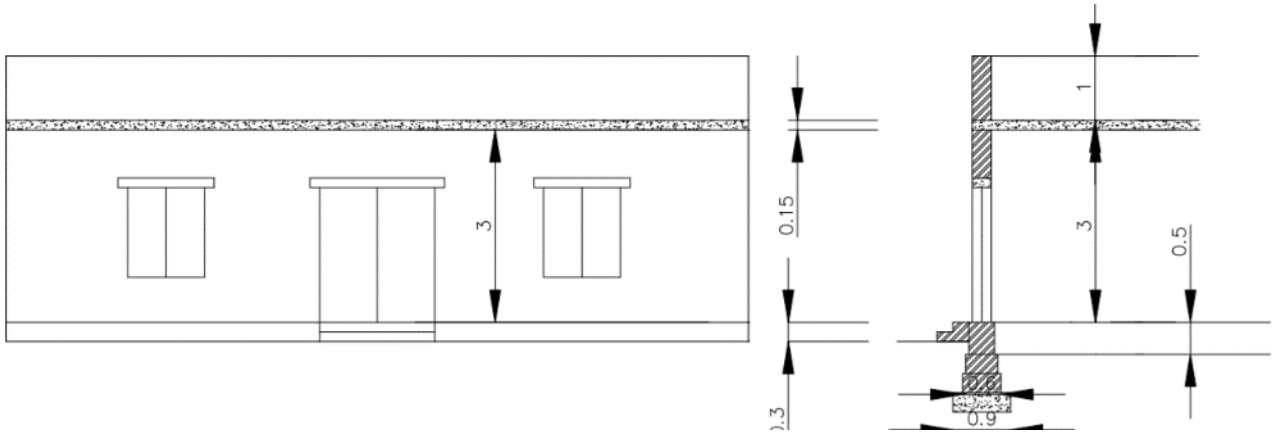
2	**Bottom Raft**	1	1.7	1.7	0.2	0.578cu.m
3	**Outer Rectangle**					
	volume=(1+0.15+0.15)x(1+0.15+0.15)					
	V=1.69m2					
4	**Iner RCC wall**					
	V = 1x1 = 1m2					
5	**Area of RCC wall**					
	A=1.69-1					
	A=0.69m2		0.69		1.5	1.035cu.m
6	**Bottom Raft & RCC wall**					
	0.578+1.035					
	1.613cu.m					1.613cu.m
	TORAGE TANK - 2					
	TOTAL VOLUME = 1.613X2					3.226cu.m

(Table-40 Quantity sheet of Rain water harvesting)

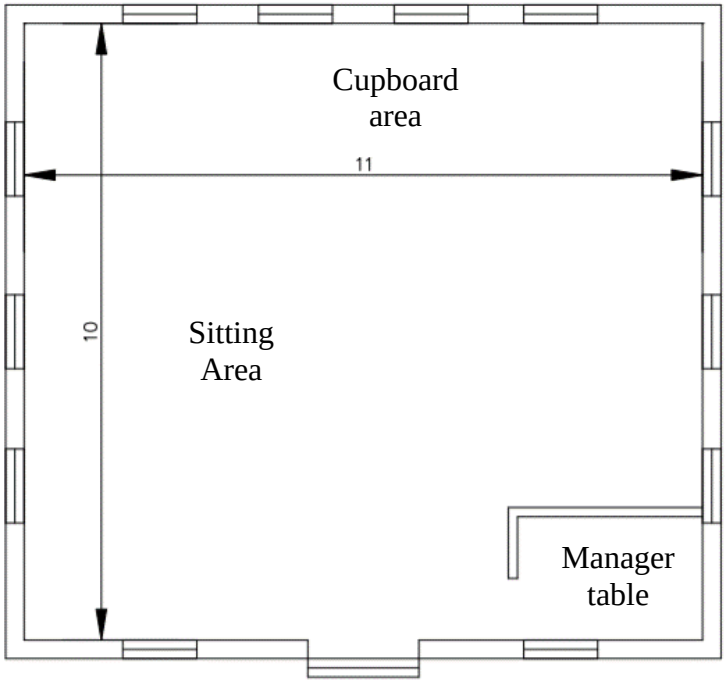
Abstract sheet				
SR.NO.	**NAME OF ITEM**	**QAUNTITY**	**RATE**	**AMOUNT**
1	Exavation in foundation :	10.58	200	2116
2	RCC RAFT & WALL	3.226	9000	29034
			TOTAL=	31150

(Table-41 abstract sheet of Rain water harvesting)

13.1.4 Civil Design 4 : Public Library



Elevation **section**



Plan

Fig 63. Design of public library

Quality sheet						
SR.NO.	**ITEM DECRIPTION**	**NO.**	**LENGTH**	**WIDTH**	**HIGHT**	**QUANTIY**
1	Exavation in foundation :					

	Center Line (L) = 43.1m	1	43.1	0.9	1.1	42.67cu.m
2	PPC (1:4:8) for foundation :					
	L = 43.1m	1	43.1	0.9	0.3	11.64cu.m
3	Brickwork in foundation & plinth :					
	1st step	1	43.1	0.6	0.3	7.76
	2nd step	1	43.1	0.5	0.3	6.46
	3rd step (G.l to plinth)	1	43.1	0.4	0.5	8.62
						22.84cu.m
4	Brick work in super-structure :					
	L = 43.1m	1	43.1	0.3	3	38.79
	DEDUCTION					
	DOOR	1	1.8	0.3	2.1	1.134
	WINDOW	12	1.2	0.3	1.4	6.048
						31.608cu.m
5	RCC Slab :	1	11.6	10.6	0.15	18.44
6	Brickwork in parapet wall :	1	44.4	0.3	1	13.32
7	Inside plaster					
	12mm thick					
	Wall	2	11		3	66
		2	10		3	60
	Ceeling	1	11	10		110
	DEDUCTION					
	DOOR	0.5	1.8		2.1	1.89
	WINDOW	6	1.2		1.4	10.08
						224.03m2
	Plaster on Parapet wall	2	11		1	22
		2	10		1	20

						42m2
	Outside plaster :					
		2	11.6		4.15	96.28
		2	10.6		4.15	87.98
	DEDUCTION					
	DOOR	0.5	1.8		2.1	1.89
	WINDOW	6	1.2		1.4	10.08
						169.29m2
8	Painting work :					
	Inside	2	11		3	66
		2	10		3	60
	DEDUCTION					
	DOOR	0.5	1.8		2.1	1.89
	WINDOW	6	1.2		1.4	10.08
						114.03m2
9	Wood work :					
	DOOR	1	1.8		2.1	3.78
	WINDOW	12	1.2		1.4	20.16
						23.94

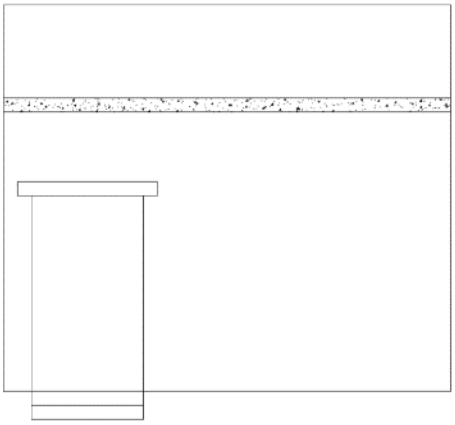
(Table-42 Quantity sheet of public library)

Abstract sheet				
SR.NO.	NAME OF ITEM	QAUNTITY	RATE	AMOUNT(RS.)
1	Exavation in foundation :	42.67	85	3626.95
2	PPC (1:4:8) for foundation :	11.64	3000	34920
3	Brickwork in foundation & plinth :	22.84	3200	73088
4	Brick work in super-structure :	31.608	3500	110628

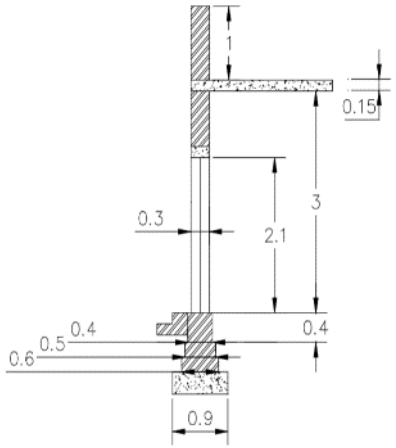
5	Brickwork in parapet wall :	13.32	3500	46620
6	RCC Slab :	18.44	10000	184400
7	Inside & Outside plaster :	435.32	150	65298
8	Wood work :	23.94	7800	186732
			TOTAL=	705312
		ADD 5% cotigencies =		352656
			TOTAL COST=	1057968

(Table-43 abstract sheet of public library)

13.1.5 Civil Design 5 : ATM



Elevation



Section

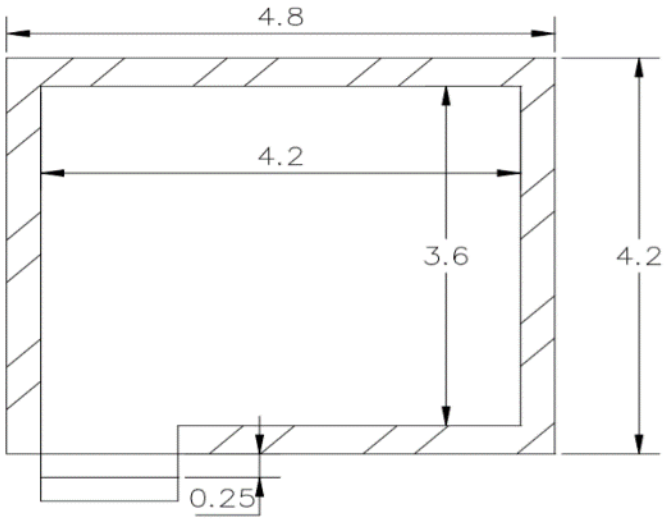


Fig 64. Design of Atm

Quality sheet						
SR..No.	**Item description**	**NO.**	**Length**	**Width**	**Hight**	**Quantity**
			(m)	(m)	(m)	
1	Exavation in foundation :					
	Centre Line (L) = 16.80m	1	16.8	0.9	0.6	9.07
2	PPC (1:4:8) for foundation :					
	L = 16.80m	1	16.8	0.9	0.2	3.02
3	Brick work in foundation and					
	plinth :					
	1st steep	1	16.8	0.6	0.2	2.016
	2nd steep	1	16.8	0.5	0.2	1.68
	3rd steep (G.l to plinth)	1	16.8	0.4	0.2	2.688
					TOTAL=	6.384
4	Brick work in super-structure					
	L = 16.80m	1	16.8	0.3	3	15.12
	DEDUCTION :					
	Door	1	1.2	0.3	2.1	0.756

	lintel	1	1.5	0.3	0.15	0.06
					TOTAL=	0.816
						14.30cu.m
5	RCC Work for					
	Slab	1	4.8	4.2	0.15	3.024
	Lintel :					
	D	1	1.5	0.3	0.15	0.0675
	RCC Chajja :					
	D	1	1.5	0.6	0.1	0.09
						3.1815
6	Brick masonary up to					
	parapet wall	1	16.8	0.3	1	5.04
	TOTAL BRICK WORK :					**25.72**
7	Inside Plaster					
	12mm thick	2	4.2		3	25.2
		2	3.6		3	21.6
	Celling	1	4.2	3.6		15.12
	DEDUCTION :					
	D	0.5	1.2		2.1	1.26
	Plaster on parapet	2	4.2		1	8.4
		2	3.6		1	7.2
	Outside plaster	2	4.8		4.15	39.84
		2	4.2		4.15	34.86
	DEDUCTION :					
	D	0.5	1.2		2.1	1.26
8	Painting work	2	4.2		3	25.2
		2	3.6		3	21.6
	DEDUCTION :					
	D	0.5	1.2		2.1	1.26
		0.5	**1.2**	**#DIV/0!**	**2.1**	

(Table-46 Quantity sheet of ATM)

Abstract sheet				
SR.NO.	**NAME OF ITEM**	**QAUNTITY**	**RATE**	**AMOUNT(RS.)**
1	Excavation	9.07 m3	300	2721
2	PCC (1:4:8) for foundation	3.02 m3	3500	10570
3	Brick work	25.72 m3	1250	32150
4	Door	1 m3	1000	1000
5	RCC Slab & lintel	3.1815 m3	10000	31815
6	Inside & outside plaster (12mm)	149.7 m3	150	22455
			TOTAL =	100711
			Add 5% =	5035.55
			Grand total =	105746.55

(Table-47 abstract sheet of ATM)

13.1.6 Civil Design 6 : WBM Road

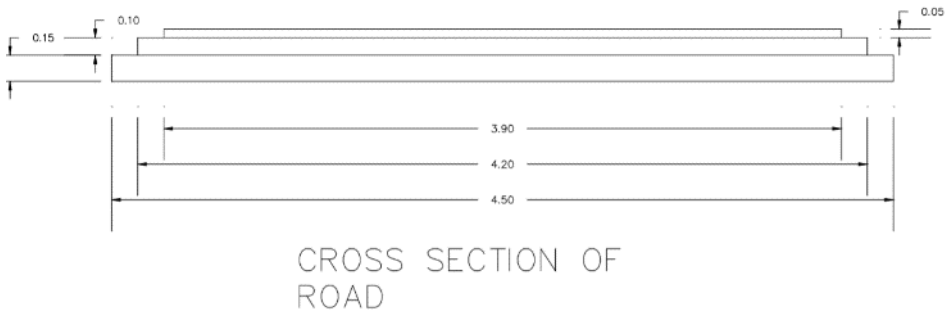


Fig 65. Design of WBM road

Quality sheet						
SR.NO.	**DESCRIPTION**	**NO.**	**L (M)**	**B (M)**	**H (M)**	**QUANTITY**
						CU.M
1	Preparing sub grade	1	1000	4.5	0.15	675

2	Preparing base course	1	1000	4.2	0.1	420
3	Preparing wearing course	1	1000	3.9	0.5	1950

(Table-47 Quantity sheet of WBM road)

Abstract sheet			
ITEM DESCRIPTION	**QUANTITY**	**RATE**	**AMOUNT**
Preparing sub grade	675	800	540000
Preparing base course	420	700	294000
Preparing wearing course	1950	900	1755000
		TOTAL=	2589000
10% Profit of Contractor =	258900		

(Table-48 abstract sheet of WBM road)

13.1.7 Electrical Design 1 : solar tree

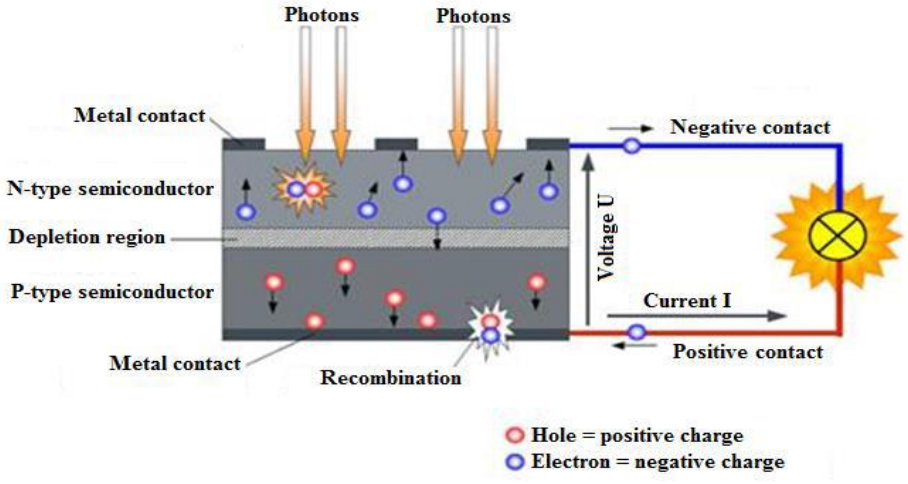
Introduction:-

Solar tree represents a metal construction that resembles a real tree. Solar panels are put on top of its “branches”. Utilizing the sunlight energy, solar panels produce electric energy which is then used for charging batteries of mobile phones, tablets, laptops etc. and, additionally, as an element of street lighting. Its attractive and modern design will complement the public areas of our campus and it’ll be integrated completely into the architectural design of the Faculty of Electrical Engineering (ETF) at the University of Sarajevo, thus allowing all students and visitors on campus to freely use its resources. Alongside the promotion of renewable sources of energy, Solar tree also promotes the use of energy efficient technologies, ie. LED street lighting.

Characteristics and Design :-

It is a known fact that everyone today can utilize solar energy. Sunlight reaches Earth’s surface regardless of weather conditions, but its intensity is reduced by passing through the clouds

(we call it diffused light or indirect radiation). Direct radiation is a lot stronger, as sunlight reaches Earth's surface without being blocked by the clouds. Enough sunlight reaches Earth's surface to be used for electric energy production even at locations with a lot of foggy days.



One photovoltaic cell is compromised of two or more thin layers of semiconducting material, usually made of silicon (Si). Under the silicon layer, there is a thin conducting layer made of metal. When silicon is exposed to sunlight, electrons are knocked loose from their atoms, causing electric potential difference. As a result, direct current (DC) starts to flow through the material in order to cancel out the potential difference (Figure 1).

Due to the special composition of solar cells, the electrons are only allowed to move in a single direction. Photovoltaic modules will also function during cloudy days, but with reduced output power Each branch ending will serve as a mechanical support for a number of monocrystalline solar panels, summing up to 10 overall. Single panel has an output of 80 W, and the diameter of each panel is 1.02 m. This type of panel is able to convert 1000 W/m2 of the sun's irradiation into 140W on every square meter of its surface.

Panels are pointed to the south and their declination is 34° because these are the optimal settings for maximum efficiency at the current location. Yearly production of the solar three is approximately 1200 kWh/m2. This is based on the available research on the subject of solar irradiance and solar electricity potential in Bosnia and Herzegovina, more precisely in Sarajevo, where the solar tree will be located.

The design of this solar tree is solely developed by the students of the Faculty of Electrical Engineering, University of Sarajevo. Figures 2. and 3. show 3D rendering of the design in daylight and at night, respectively

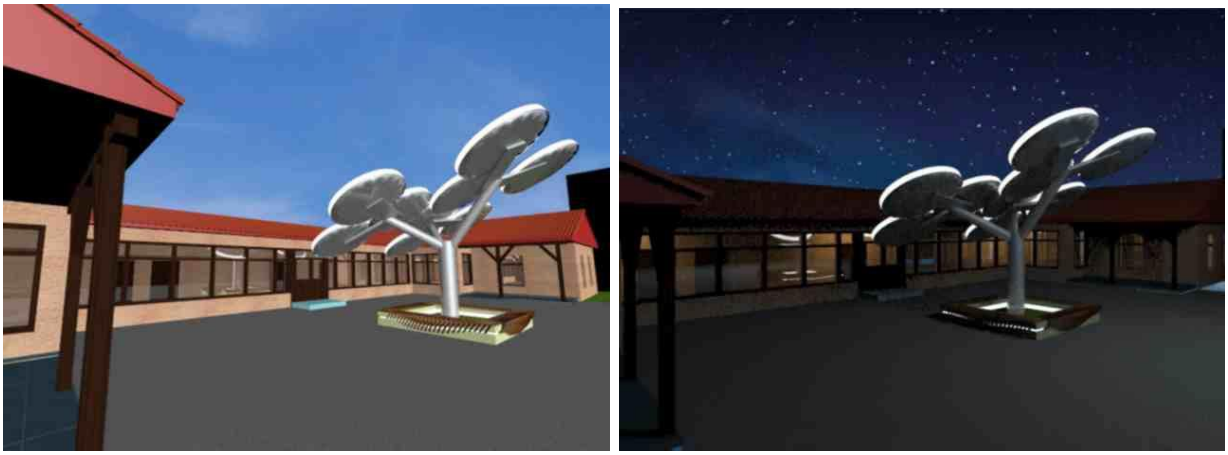


Fig 66. Rendering day time variant

Solar tree will be compromised of 10 solar panels, spread across 3 symmetrical branches, 120° apart from each other. Each branch will have 3 panels mounted on top of it. One branch will be located at the center of the construction and it will support one additional panel. Table I shows efficiency calculation and predictions of the consumption, as well as the list of parts that will be used during the construction of the solar tree.

Specification of equipment that will be used for the project :-

Panels: · 10 x 80 W = 800 W · Connection type: 2 panels from every branch in series, then all 5 branches in parallel to achieve a 24 V output · Output: 25 A, 24 V
Batteries: · 4 x 110 Ah (12V), high deep discharge · Connection type: 2 in series, then those groups of two in parallel · Output: 24 V, 220 Ah
Regulator: · PUBC 30 A with display
Inverter: · 24V/900W
Cabling: · Cable 2x4mm2, cca. 150 m · Safety fuse gPV 10A and breaker switch · Cable 1x16 mm2 · Load switch 32A/500 VDC · Other small installation equipment (boxes, plugs etc.)

Control switchbox: · Monitoring of the generation and consumption on the basis of the ARDUINO platform · Display showing current readings · Remote control via GSM module
Other: · Installation of Wi-Fi hotspot · LED

13.1.8 Electrical Design 2 : Piezoelectric Speed Breaker Power Generator Design:

Piezoelectricity is the appearance of an electrical potential across the sides of a crystal when subjected to mechanical stress. Many vehicles move over the roads frequently and each vehicle has enough kinetic energy that is lost when it impacts speed breakers. We can capture this kinetic energy which is then converted to potential energy.

We can tap the energy generated and produce power by using the speed breaker as power generating unit. The kinetic energy of the moving vehicle can be converted into electrical energy by embedding a piezoelectric generator in the speed breakers.

In our Village we can Construct Piezoelectric Speed Breakers at the main entrance of Village where the migration of vehicles and people is maximum and By applying the Kinetic Energy on Piezoelectric Sensor. A speed breaker is designed with spring module cantilever with piezoelectric module and electrical energy converter circuit.

It includes the modifications of the speed breaker to comply with government regulation the spring characteristics the cantilever knocking mechanism and the mechanical coupling system.

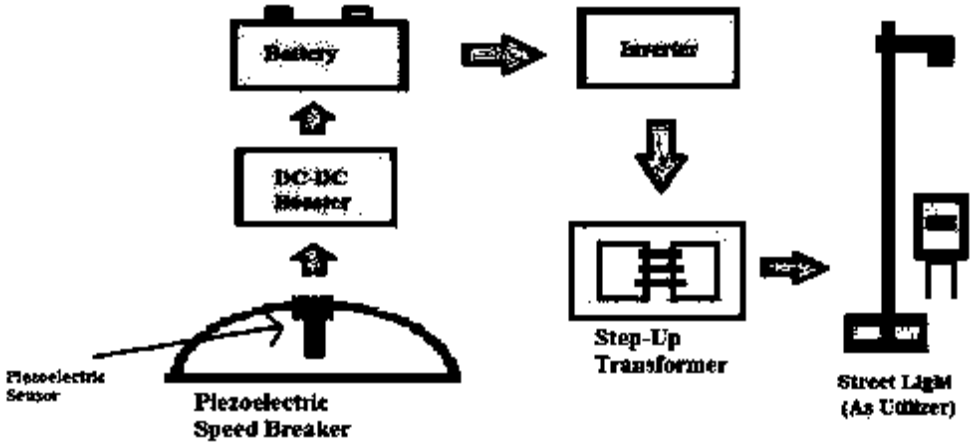


Fig 67. Block Diagram of piezoelectric speed breaker

Calculation For Piezoelectric Speed Breaker Installation:

For Constructing a Piezoelectric Speed Breaker, We Need some Small Piezoelectric Sensors which are connected in Series or Parallel as per required current-Voltage Rating. We also need a DC-DC Booster Battery, Inverter, Step-up Transformer.

We can Construct an RCC, PVC and Rubber Speed Breaker or also We Can install a Private Safety Speed Breaker Inserting the Piezoelectric sensor on it. Output of the Speed Breaker Can Be Given to Equipment to be utilized.

Cost Calculation:

Sr. No.	Installations	Quantity	Cost/Qty	Total Cost (₹)
1	Piezoelectric Sensors	60	5	600
2	Speed Breaker	10 mtr.	2000	20000
3	DC-DC Booster	1no.	2000	2000
4	Inverter	1no.	6000	6000
5	Battery	1 no.	15000	15000
6	StepUpTransformer	1 no	5000	5000
7	Miscellaneous	-	-	3000
Total Cost Estimation				51600

(Table-46 Cost Estimation of Piezoelectric Speed Breaker)

13.1.9 Electrical Design 3 : Photovoltaic Water Pumping System Design

Introduction:-

Solar energy such as photovoltaic is the most important energy of the non-conventional energy sources which is capable to satisfy the energy needs of the isolated rural areas. This source of energy is kind a free. The water from the source is kept and pumped then it is stored in the tanks until its next use by dwellers. These water tanks can be bought directly from the market.
Photovoltaic pumping system is a standard system. Here the whole system is equipped with pump and an electric motor. This motor will be providing electrical energy by photovoltaic panels installed on the site. The main function of pump is to make water available to the reach of the dwellers.so pump water from the basement is accessible to users. There are mainly two types of photovoltaic water pumping systems are being used: the photovoltaic water pumping with 1)Batteries 2.) without batteries

Photovoltaic System :-

To draw the water surface there are two types of pumps can be used Pumps

1.) volumetric pumps and 2.) centrifugal pumps.
According to the physical location of the pump, there are two other characteristics at the pumps in relation to the pumped water: the suction system and stuffer one. They discharge pumps are submerged in water. Their motor is immersed in water with the pump and the discharge pipe placed after the pump can lift water to tons of meters to the storage tank depending to the engine's power. Afterward, the system is connected to a distribution network that delivers water to dwellers.

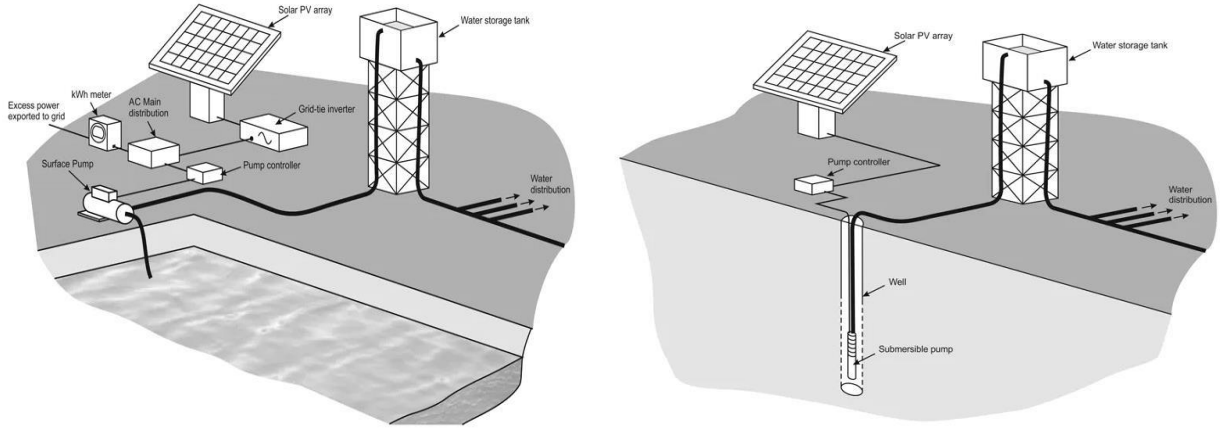


Fig 68. Photovoltaic water pumping with a tank to store water

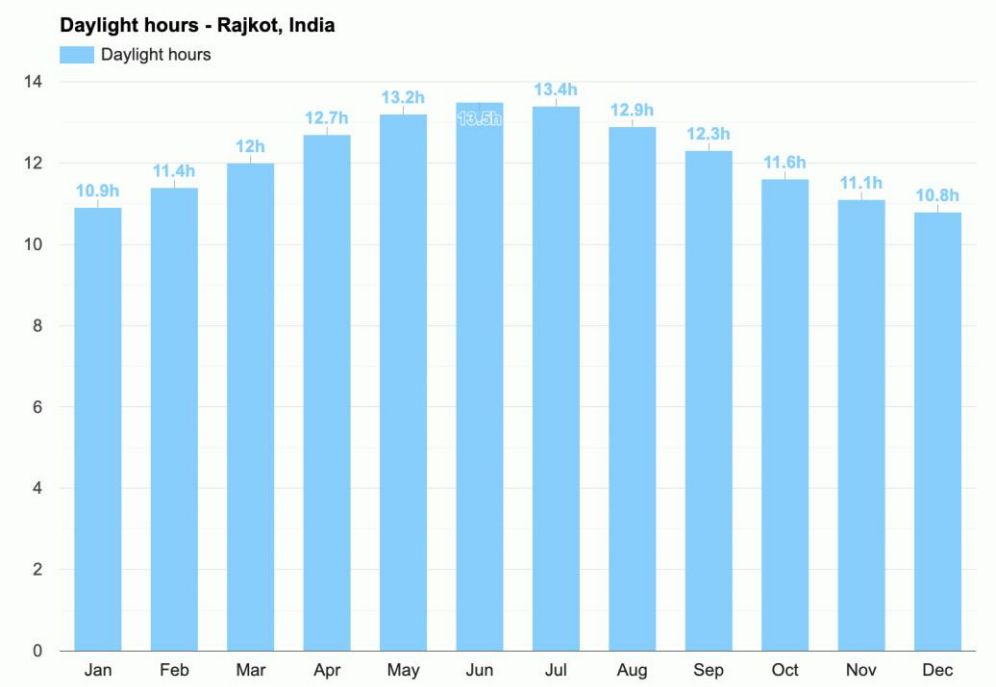
Solar photovoltaic panels are placed for converting solar energy into electrical energy so that we can generate the necessary energy to the motor of the pump, Panels will generate a direct current (DC), and therefore DC/AC converter to will be used to convert this direct current produced by the solar panels into alternative current (AC),so that AC motor can use this AC Power we generated.

On the other side, if we have the DC motor, Than we do not need this DC to AC conversion. The amount of energy will be generated can be used directly, also we can store that energy as well. If we want to use, In the case of an application for water pumping, it is more interesting to use the energy to raise the water in a castle that serves as hydraulic energy storage.

When pump is live on photovoltaic due to under sizing or over sizing there are chances that Pump get damaged or loosen the support, to prevent a dysfunction of the pump, the PV generator, an inverter is used to ensure the proper operation of the PV/pump system.

Solar Radiation at Gujarat :-

Solar energy can be used effectively if we have regulatory data and we can quantify that available solar energy to design a photovoltaic water pumping system. Therefore, it is very important to know the solar radiation of the locality. Solar radiation (kWh/m2) is the energy from the sun that reaches the earth. The earth receives a nearly constant of solar radiation at its outer atmosphere. The intensity of solar radiation varies along with the whether and geographic location as well.



(Table-47 Monthly average radiation of sunlight per month at Rajkot, Gujarat The most productive hours of sunlight are from 9:00 a.m. to 5:00 p.m

Sizing a Photovoltaic Water Pumping System:-

We need to have an assumption of desired amount for the use and in that case Sizing is really important. Photovoltaic water pump sizing is the determination of the power of the solar generator that will provide the desired amount of water.
The photovoltaic water pump sizing consists of:
a) Assessment of daily water needs of the population to know the rate flow required;
b) calculation of hydropower helpful;
c) determining of the available solar energy;
d) determining of the inclination of the photovoltaic generator which can be placed;
e) determination of the month sizing (the month in which the ratio between solar radiation and hydropower is minimum);
f) sizing of the PV generator (determination of the required electrical energy)

Determination of Hydropower Helpful :-

The average daily load i.e. hydropower helpful (kWh/day) required is expressed by:
$EH=g*\rho a*Qa*TH\eta P*3600 = CH*Qa*TH\eta P$ E1
Where,

- g is acceleration of gravity (9.81 m.s-2);
- ρa is water density (1000 kg/m3);
- Qa is daily water needs (m3/day);
- TH is the total head (m);
- ηP is pump system efficiency

The tank capacity is determined by the daily water needs and the autonomy of the system. Taking an example of daily the water needs: (50 liters/day/person), the water needs rises to 25 m3/day. With photovoltaic panels which have 3.5 A, we will have 3 modules in parallel.

The average daily load i.e. hydropower helpful (kWh/day) required is given by this expression :

EH=g*ρa*Qa*THηP*3 600 = CH*Qa*THηP
With g= 9.81 m.s-2
ρa= 1000 kg/m3
Qa= 25 m3/day
TH = 52 m
ηP= 50 %
It provides: EH=7085 Wh

The available solar energy:-

- Daily average radiation of sunlight varies from 5.7 to 5.8 kWh/m2/day
- To make sure to do a good sizing, we choose the minimum value of average radiance: 5.7 kWh/m2/day.
- The inclination to the horizontal plane of the photovoltaic panels is: β=15°N.
- The sizing month is: December, 4.7 hours/day.

Sizing of the PV generator :_-

Assuming a 25% loss due to the temperature and dust, the required electrical energy is given by this expression:
WPV = EHRadiance*(1−loss)
WPV=1260 Wc
The operating point of photovoltaic field is set around 120 volts due to the characteristics of the inverter. The photovoltaic field will be composed of 10 multiple modules in series. Generator power is 1260 Wc

Prediction of requirement :-

Suppose we have to run 2HP motor for irrigation. For that the energy required is:
2HP=1.5 Kw.
:. 1.5Kw = 1500 watt, Power = volt*current, V=240 v. So,
Current (I) =1500/240 = 6.25 A.
Requirement for rechargeable batteries of 120V:
Power = volt*current
1500 = N*volt*current
1500=N*240*6.25 (N=number of require batteries)
1500=N*240*6.25, N=2, (2 batteries are required)

Requirement for solar panels:

1 solar panel of 72 cells generates 200watts
Required power is 1500 watts.

: .1500/200=7.5
Nearly 8 solar panels are required

Cost Calculation of Solar based irrigation system:-

Components	Unit cost	Quantity	Total cost
Solar panel (72 cells)	24000	8	192,000
Water pumps	15000	1	15000
Battery (120 V)	20000	2	40000
Converter circuit	1000	1	1000
Overall cost			248000

Table-48 Cost Calculation of Solar based irrigation system

Chapter : 14

Technical Options with Case Studies

14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistant

Introduction: -

Whenever there is an earthquake related disaster in the news with collapsed disaster in the news with collapsed buildings &other structure all over the buildings &other structure all over the place, one may think that earthquake place, one may think that earthquake resistant design (EQRD) of structure is resistant design (EQRD) of structure are still in dark age. Thus, we desperately still in dark age. Thus, we desperately need advanced earthquake resistant need advanced earthquake resistant design to make structure less vulnerable design to make structure less vulnerable to earthquake even for large earthquake.to earthquake even for large earthquake.

Seismology is the branch of Geophysics concerned with the study and analysis of Earthquakes and the science of energy propagation through the Earth's crust. Engineering Seismology is concerned with the solution of engineering problems connected with the Earthquakes. Seismology is extremely important because: Study of earthquakes gives us important clues about the earth's interior Understanding earthquakes allows us to minimize the damage and loss of life.

What is an earthquake? :-

An earthquake is the vibration of Earth produced by the rapid release of accumulated energy in elastically strained rocks Energy released radiates in all directions Energy released radiates in all directions from its source, the from its source, the focus energy propagates in the form of seismic energy propagates in the form of seismic waves sensitive instruments around the world Sensitive instruments around the world record the event record the event.

What causes an earthquake?

What causes an earthquake? Movement of Tectonic Plates Earth is divided into sections called Tectonic plates that float on the fluid-like interior of the Earth. Earthquakes are usually caused by sudden movement of earth plates Rupture of rocks along a fault Faults are localized areas of weakness in the surface of the Earth, sometimes the plate boundary itself

How Earthquake Causes Damage.

The severe shaking produced by seismic the severe shaking produced by seismic waves can damage or destroy building &waves can damage or destroy building & bridges, topple utility poles & fracture gas bridges, topple utility poles & fracture gas and water mains. And water mains.

S wave can put stress on building to tear's wave can put stress on building to tear them apart. Also trigger landslide or them apart. Also trigger landslide or avalanches.

Construction Methods:-

Base-isolation are designed in buildings. It is a building designed to reduce amount It is a building designed to reduce amount of energy that reaches the building during of energy that reaches the building during earthquake. Flexible joints and automatic shut off 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, landslide potential. Extensive geologic 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. Buildings need to be designed and constructed as pert be designed and constructed. the building by laws to withstand ground shaking. Architectural and engineering inputs need to be put together to improve building design and construction together to improve building design and construction practices. The soil type needs to be analysed before practices.

Conclusion:-

In the coming years the work in the field In the coming years the work in the field of EQRD is very important to have safe of EQRD is very important to have safe structures which can take the effect of structures which can take the effect of earthquake with less damage to the society.

14.1.2 Seismic Retrofitting of Buildings

Abstract :-

Earthquake around the world is one of the reasons responsible for the destruction to life and property in large numbers. In order to mitigate such hazards, it is important to incorporate norms that will enhance the seismic performance of the structures. Earthquake loads are required to be carefully modelled so as to assess the real behaviour of structure with a clear understanding that damage is expected but it should be regulated. Seismic Retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes.

In this project our aim is to analyse an existing building using STAAD Pro v8i, with and without the provision of seismic retrofitting. The structure is analysed in STAAD Pro v8i and the bending moment was chosen as the criteria for selecting the weak member. RC jacketing was selected as the retrofitting technique employed to the weak member and later the member in the structure was compared with the bending moment value before and after providing retrofitting. It was determined that RC jacketing strengthened the structure, which was vulnerable to seismic activity.

❖ **Objectives** :-

- To study the seismic response of a building.
- To introduce Retrofitting techniques to an existing building.
- To analyses the effectiveness of RC jacketing as a retrofitting technique.
- To analyses the building after introducing Retrofitting.
- To compare the response of the building to seismic activity with and without Retrofitting.

❖ **Scope**:-

- To ensure the safety and security of a building, employees, structure functionality, machinery and inventory.
- Essential to reduce hazard and losses from structural elements.
- Predominantly concerned with structural improvement to reduce seismic hazard.
- Important buildings must be strengthened whose services are assumed to be essential just after an earthquake like hospitals.

❖ **Conclusion:-**

- The study was to investigate the seismic response of an existing building. It showed that the building was vulnerable to seismic activity and after that RC jacketing was provided.
- Retrofitting techniques were evaluated from different journals. RC jacketing was chosen as the most appropriate technique to be employed in this project. According to IS 15988:2013 'Seismic Evaluation and Strengthening of existing RC Buildings' RC jacketing was designed.
- In Columns bending moment causes the section to have decreased axial load capacity. Always if the moment on the section increases, the axial load capacity decrease hence the amount of reinforcement should increase.
- seismic retrofitting provides existing structures with more resistance to seismic activity due to earthquakes.

- Advance Practices in Construction field in Modern Material, Techniques and Equipment's
-
- The building construction activity, especially the residential and commercial complex is highly labor intensive with very little mechanization. Approximately 35% of the total construction cost is spent on labor.
- The laborer's have their limitations and may fail to meet the time limits. The quality of workmanship, too, differs from person to person. Hence, quality standards cannot be maintained. Wastage of material is considerably high as it is handled and utilized manually.
- The objective of the construction organizations should be 'speed and economy'. This cannot be achieved with labor oriented advanced construction techniques.

- Only studying and adopting modern industrial techniques and equipment is the solution. By this, one can save material, reduce labor expenses, and increase the speed of work, leading to the economy in construction.
- Though the scope of the subject is vast, in this chapter we shall discuss only the advanced techniques to be used in advanced construction techniques activities.

EQUIPMENT USED FOR SMALL AND MEDIUM CONSTRUCTION WORK

- Chain and pulley block.
- Grouting pumps.
- Sprayers for painting work.
- Tile cutters.
- Portable hand drilling machines.
- Horizontal trolleys, wheelbarrows.
- Pumps.
- Vibrators for compaction of concrete, surface vibrators.
- Auto ramming concrete block machine.
- Sand washing machine.
- Vertical lifts, hoists, winches.
- M.S. tubular scaffolding, and formwork.
- Concrete mixers.
- Cranes.
- Earth excavators.
- Earthmovers.

OTHER BUILDING CONSTRUCTION TECHNIQUES

1. LIGHTWEIGHT BLOCKS & CONCRETE

The density of normal concrete varies from 2200 to 2600 kg/m3 while that of lightweight concrete varies from 300 to 1850 kg/m³.

Advantage

- Reduction of dead load.
- Increases the progress of work.
- Lowers the handling cost.
- This leads to a lighter structural design.
- Advantageous for structures resting on weak soils.

2. PRECAST COMPONENTS

They are factory-made components of the building which are joined to form the structure.

Advantages

- Controlled quality of the final product.
- Better curing and higher strength due to mechanization.
- Saves space for raw material stackings.
- Reduces the requirement of skilled labour.
- Increase in construction speed due to symmetrical and simple joining methods.
- Saves, total project time.
- Dependability of the activities can be nullified & most of the activities can be taken up simultaneously.

Engineering Aspects Of Soil mechanics - Environmental Impact Assessment

Soil mechanics is a scientific field of the civil engineering discipline that studies the mechanical behaviour of soil. Soil mechanics is critical in civil engineering as it describes the principles that govern the way civil infrastructure projects such as buildings, bridges, tanks, embankments, dams, and tunnels, are supported by the soil.

Soil mechanics differs from classical fluid mechanics or solid mechanics as the soil is (a) a heterogeneous mixture of solid particles (gravel, rock, sand, silt, and clay), liquid, and gas (three-phase system), and (b) is a particulate material. Understanding and predicting soil's behavior is complex as it is stress-dependent and nonlinear.

Soils as they are found in different regions can be classified into two broad categories:

(1)Residual soils
(2) Transported soils

Residual Soils :-

Residual soils are found at the same location where they have been formed. Generally, the depth of residual soils varies from 5 to 20 m.

Chemical weathering rate is greater in warm, humid regions than in cold, dry regions causing a faster breakdown of rocks. Accumulation of residual soils takes place as the rate of rock decomposition exceeds the rate of erosion or transportation of the weathered material. In humid regions, the presence of surface vegetation reduces the possibility of soil transportation.

As leaching action due to percolating surface water decreases with depth, there is a corresponding decrease in the degree of chemical weathering from the ground surface downwards. This results in a gradual reduction of residual soil formation with depth, until unaltered rock is found.

Residual soils comprise of a wide range of particle sizes, shapes and composition.

Transported Soils :-

Weathered rock materials can be moved from their original site to new locations by one or more of the transportation agencies to form transported soils. Transported soils are classified based on the mode of transportation and the final deposition environment.

- Soils that are carried and deposited by rivers are called alluvial deposits.
- Soils that are deposited by flowing water or surface runoff while entering a lake are called lacustrine deposits. Atlernate layers are formed in different seasons depending on flow rate.
- If the deposits are made by rivers in sea water, they are called marine deposits. Marine deposits contain both particulate material brought from the shore as well as organic remnants of marine life forms.
- Melting of a glacier causes the deposition of all the materials scoured by it leading to formation of glacial deposits.
- Soil particles carried by wind and subsequently deposited are known as aeolian deposits.

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

Geotechnical projects are often undertaken with constrained budgets so not only is the environmental impact high but the added value low compared with, for example, a worker in a service industry. However, service industries cannot exist without the work of the geotechnical engineer and analysis of the whole supply chain is key. Those higher up the chain 'buy in' their environmental impact from those lower down the chain. To reduce the overall environmental impact, the higher members of the chain must be persuaded to spend some of the added value that they create to reduce the impact generated by those lower down the chain.

Sustainability is not an abstract principle but a concept informed by human values which will vary locally, nationally and internationally. A common position on sustainability therefore may not be desirable if indeed it were possible. However, this does not mean that sustainability can be assessed by any procedure developed at the whim of the assessor. Consideration of the standards for Life Cycle Assessment show that if transparency is to be achieved and the results used by the wider community, rigorous procedures must be developed.

14.1.3 Water Supply-Sewerage system-Waste Water- Sustainable development techniques

Water is the most precious element / commodity available on the earth which is the main life support system of the environment. The water sources are identified and then they are used for various purposes and at various locations. Thus, water supply and distribution facilities are critical infrastructure for the environment.

These facilities include wells or water supply intake structures, transmission mains, distribution mains and individual service lines. Regarding water supply source, water determination may not only bring forth technical issues, but political issues may arise as well. Ownership of water sources can be controversial, whether the source is ground water or surface water.

The use of water except for drinking purpose generates the wastewater which when discharged for the domestic use generates sewage. The sewage collection is carried out through sewer collection system. The sewage cannot be directly let loose in to the environment as there are all possibilities of polluting the surface water or the ground water. Even for irrigation also, the sewage requires treatment. The sewer collection and conveyance needs the treatment before its disposal. The treated sewage can be reused for cooling purpose, irrigation purpose or even for recycling in to the toilets and other applications depending on the specific use excluding drinking and bathing. The sewerage is the sewage collection network starting from individual discharge points to centrally collection point, conveyance mains, treatment systems and safe disposal in to the environment.

Many factors must be considered during planning, design and construction of these systems. For new areas, the population density, the available water supply source and its quantity and the topography is taken in to account. In developed areas where there is existing underground utilities including existing water and sewer, telephone, gas, electric, and cable, it is especially important to consider the impact of new water and sewer mains on these systems. Relocating existing utilities is very expensive, so care must be taken to avoid conflicts as much as possible. Excellent communication and coordination with owners of these utilities and governing agencies during planning, design and construction stage is crucial to the success of this infrastructure project.

In all instances, cost effectiveness is equally as important as technical excellence. Projects must be financially feasible before they can be constructed.

1. Feasibility Studies and Master Planning
2. Preliminary and final design plans and Specifications
3. Project Management
4. Construction Administration and Inspection.

14.1.4 Engineering Aspects of Soil mechanics - Environmental Impact Assessment:-

Environmental Impact Assessment The program serves a diverse student population, a majority of who elect to specialize in structural engineering. For example, in Fall of 2004 and Fall of 2005, 52% of the undergraduate students taking the environmental course specialized in structural engineering, and 30% specialized in transportation engineering. Only 18% of the undergraduate students actually specialized in environmental engineering.

Since a majority of the students taking the course did not specialize in environmental engineering, the required environmental engineering course was considered to be irrelevant by many of the students. In response to these factors, a required course called Environmental Impact Assessment (EIA) has been introduced into the curriculum, just before the required Environmental Engineering (EnvE) course.

The EIA course introduces environmental concepts as a means to perform environmental assessment, a practice employed by engineers of all specializations to develop more sustainable engineering designs. As such, the EIA course focuses on the environmental media of greatest relevance to EIA, namely air, water, soil, and sound; the physical and chemical descriptions of these media; and the transport and transformation of pollutants in and across these media.

Environmental engineering practices to reduce these pollutant concentrations at the source or in the environment are only introduced, and only to make students aware of conventional means to mitigate environmental impact. Conventional methods of drinking water, waste water, and air pollution treatment are now the focus of attention in the revised EnvE course.

The primary goals of the EIA course are to engage all CE students regardless of their specialization, and create an interdisciplinary forum to discuss and evaluate some of the social, economic, and environmental issues associated with CE projects.

The secondary goals of the course are to prepare students for two higher level required courses, and promote the utility and importance of environmental engineering and thus recruit more students into the field of study.

14.1.5 Water Supply-Sewerage System-Waste Water-Sustainable development techniques

The most basic concepts in planning and design of water supply systems are already well shaped and currently widely used. The unique system provides the drinking quality water;

regardless that many users of high quantity water would tolerate water of lesser quality. Sometimes users of large quantities of non-drinking water quality may construct a separate system, as an economical solution.

Regardless of the availability of advanced technology research and development in many areas promise the planning and design of better water supply systems in the future. Sewerage is the infrastructure that conveys sewerage, surface runoff using Sewer. It encompasses components such as receiving drains, manholes, pumping stations, stored overflows and screening chambers of the combined sewer or sanitary sewer.

Type of Sewerage system

- Combined system
- Separate system
- Partiality separate system

Wastewater is any water that has been contaminated by human use. Wastewater is "used water from any combination of domestic, industrial, commercial or agricultural activities, surface runoff or storm water, and any sewer inflow or sewer infiltration".

Therefore, wastewater is a byproduct of domestic, industrial, commercial or agricultural activities. The characteristics of wastewater vary depending on the source. Types of wastewater include: domestic wastewater from households, municipal wastewater from communities (also called sewage) and industrial wastewater. Wastewater can contain physical, chemical and biological pollutants. Sustainable development can be defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. “Sustainable development also focuses on finding better ways of doing things without affecting the quality of our life.

Type of Sustainable development

- Human sustainability.
- Human sustainability aims to maintain and improve the human capital in society.
- Social sustainability.
- Economic sustainability
- Environmental sustainability.

14.2 Electrical Engineering

14.2.1 Design of Power Electronics Converter

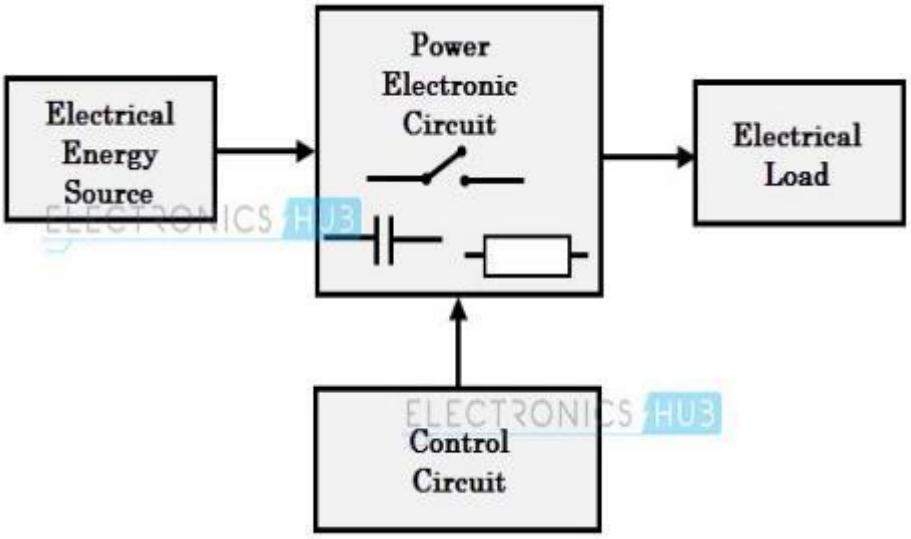
A Power electronic converter uses **power electronic** components such as SCRs, TRIACs, IGBTs, etc. to control and **convert** the **electric power**. The main aim of the **converter** is to produce conditioning **power** with respect to a certain application
The **design of power electronics converter** circuits requires **design** the **power** and control circuits. The voltage and current harmonics that are generated by the **power converters** can be reduced or minimized with a proper choice of the control strategy.
- Diode rectifier
- AC to DC Converter (Controlled Rectifier)
- DC to DC Converter (DC Chopper)
- AC to AC Converter (AC voltage regulator)
- DC to AC Converter (Inverter)
- Static switch

Diode Rectifiers. A diode rectifier circuit converts AC voltage into a fixed DC voltage. The input voltage to rectifier could be either single phase or three phase.
AC to DC Converters. An AC to DC converter circuit can convert AC voltage into a DC voltage. The DC output voltage can be controlled by varying the firing angle of the thyristors. The AC input voltage could be a single phase or three phase.
AC to AC Converters. This converters can convert from a fixed ac input voltage into variable AC output voltage. The output voltage is controlled by varying firing angle of TRIAC. These type converters are known as AC voltage regulator.
DC to DC Converters. These converters can converter a fixed DC input voltage into variable DC voltage or vice versa. The DC output voltage is controlled by varying of duty cycle.
Static Switch. Because the power devices can be operated as static switches or contactors, the supply to these switches could be either AC or DC and the switches are called as AC static switches or DC static switches.
Power electronic technology deals with processing and controlling the flow of electrical energy in order to supply voltages and currents in a form that optimally suited for end user's requirements.
A power electronic converter uses power electronic components such as SCRs, TRIACs, IGBTs, etc. to control and convert the electric power. The main aim of the converter is to produce conditioning power with respect to a certain application.

The block diagram of a power electronic converter is shown in figure above. It consist of an electrical energy source, power electronic circuit, a control circuit and an electric load. This converter changes one form of electrical energy to other form of electrical energy.

is built with a complex low power electronic circuit that consists of either analog or digital circuit assembly.

The power electronic circuit consists of both power part and control part. Power part transfers the energy from source to load and it consists of power electronic switches (SCR or TRIAC), transformers, electric choke, capacitors, fuses and sometimes resistors



Power electronic converters perform various basic power conversion functions. This converter is a single power conversion stage that can perform any of the functions in AC and DC power conversion systems. Depending on the type of function performed, power electronic converters are categorized into following types.

- **AC to DC** = Rectifier: It converts AC to unipolar (DC) current
- **DC to AC** = Inverter: It converts DC to AC of desired frequency and voltage
- **DC to DC** = Chopper: It converts constant to variable DC or variable DC to constant DC

AC to AC = Cycloconverter, Matrix converter: It converts AC of desired frequency and/or desired voltage magnitude from a line AC supply

14.2.2 Electronic Soft Starter for 1/3 Phase Induction Motor for Agriculture

Introduction

The ac motor starters are increasingly becoming popular due to its controlled soft-starting capability. The ac motor starter provides limited starting current and hence conventional electromagnetic line starters and reducedvoltage starters are replaced with ac motor starters. Thyristor-based soft starters have many desirable properties and provide a viable solution to starting problems in three phase induction motors. These power semiconductor based starters are cheap, simple, and reliable and occupies less volume. The power density of these soft starters is also very high. A three phase induction motor produces electromagnetic torque on its shaft but initial switching instants of all three phases to the supply produces pulsations on the electromechanical torque when it is controlled by a direct- online starter. These severe pulsations in electromagnetic torque might cause shocks to the shaft and hence to the driven equipment. These pulsations might damage mechanical system components, such as shafts, couplings and gears etc. The electromagnetic torque pulsations also causes long term effects on various mechanical system components if the strength of materials is exceeded which might lead to fatigue also.

An Induction motor can self-start owing to the interaction between the rotating magnetic field flux and the rotor winding flux, causing a high rotor current as torque is increased. As a result, the stator draws high current and by the time the motor reaches to full speed, a large amount of current (greater than the rated current) is drawn and this can cause heating up of the motor, eventually damaging it. To prevent this, motor starters are needed.
Motor starting can be in 3 ways

- Applying full load voltage at intervals of time: Direct On Line Starting
- Applying reduced voltage gradually: Star Delta Starter and Soft starter
- Applying part winding starting: Autotransformer starter

Working Example of Electronic Soft Start System for 3 phase induction motor
The system consists of the following components.

- Two back to back SCRs for each phase, i.e. 6 SCRs in total.
- Control Logic circuitry in the form of two comparators- LM324 and LM339 to produce the level and the ramp voltage and an opt isolator to control the application of gate voltage to each SCR in each phase.

A power supply circuitry to provide the required dc supply voltage.

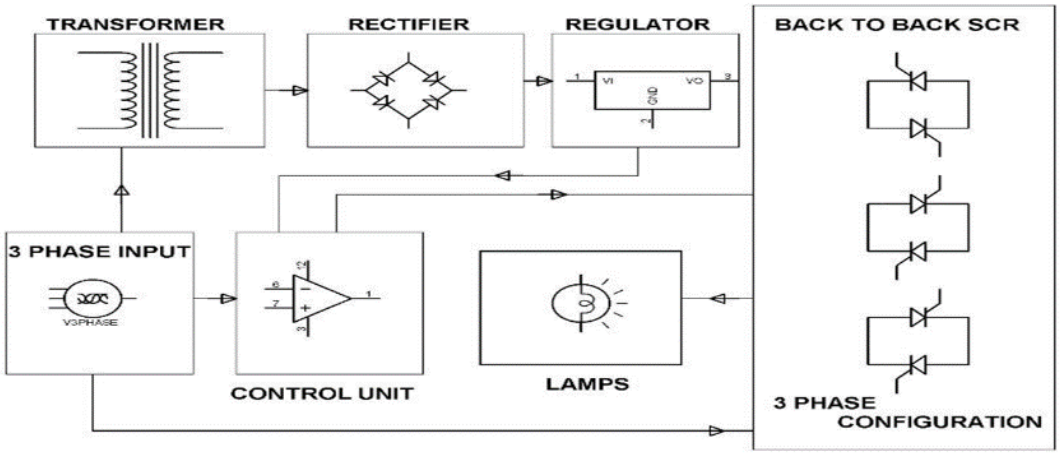


Fig 69. Block Diagram showing Electronic Soft Start System for 3 phase Induction Motor

The level voltage is generated using the comparator LM324 whose inverting terminal is fed using a fixed voltage source and the noninverting terminal is fed through a capacitor connected to the collector of an NPN transistor. The charging and discharging of the capacitor cause the output of the comparator to change accordingly and the voltage level to change from high to low. This output level voltage is applied to the noninverting terminal of another comparator LM339 whose inverting terminal is fed using a ramp voltage. This ramp voltage is produced using another comparator LM339 which compares the pulsating DC voltage applied at its inverting terminal to the pure DC voltage at its noninverting terminal and generates a zero voltage reference signal which is converted to a ramp signal by the charging and discharging of an electrolyte capacitor.

CIRCUIT DIAGRAM :-

The circuit diagram of soft-starting of three phase IM is shown in Fig.1. The circuit diagram comprises of voltage regulator, zero crossing detector, bridge rectifier, 4N25 opt-Isolator,

At mega 328P microcontroller and TRIAC circuit. TRIAC circuit performs the role of soft starter in each phase of three phase induction motor. TRIAC circuit basically consists of two antiparallel SCRs connected back to back. This soft starter is used to give soft starring to Induction motor. A 12 V DC regulated supply is obtained with the help of step-down transformer and bridge circuit. The step down transformer converts 230V to 12V ac supply and then it is fed to bridge circuit. The bridge circuit in turn converts ac supply to dc supply.

ADVANTAGES AND DISADVANTAGES OF SOFT STARTERS

The soft starters used in three phase induction motor eliminates high inrush current and high mechanical torque on startup. It reduces cable and switch-gear rating in power supply network. It prevents any dip in line voltage. The soft starter has desirable features of soft, step-less acceleration & deceleration. It also avoids current and torque peaks and provides less electrical stress on the power supply network and mechanical stress on entire drive. It reduces stress on couplings and other transmission devices such as gear boxes, shafts, belts etc. The soft starters also suffers from certain drawbacks like harmonics, problems of speed regulation, dependency of acceleration and deceleration time on load etc. It produces harmonics less than inverter. The operating speed of an electric motor is fixed throughout the operation. The speed regulation of an electric motor is not possible when soft-starters are employed in three phase induction motor.

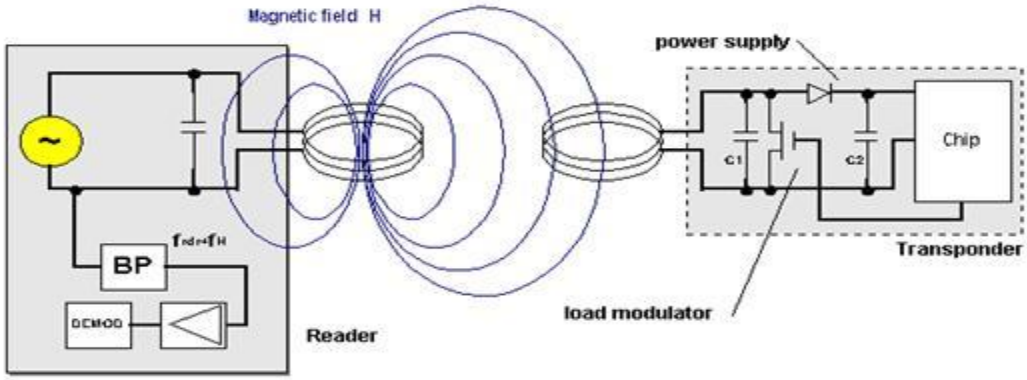
14.2.3 Advanced Wireless Power Transfer System

Wireless Power Transmission Through Solar Power System & Working

Traditional wired power transmission systems usually require lying of transmission wires between the distributed units and the consumer units. This produces a lot of constraints as the cost of the system- the cost of the cables, the losses incurred in the transmission as well as in distribution. Just imagine, only the resistance of the transmission line results in loss of about 20-30% of the generated energy.

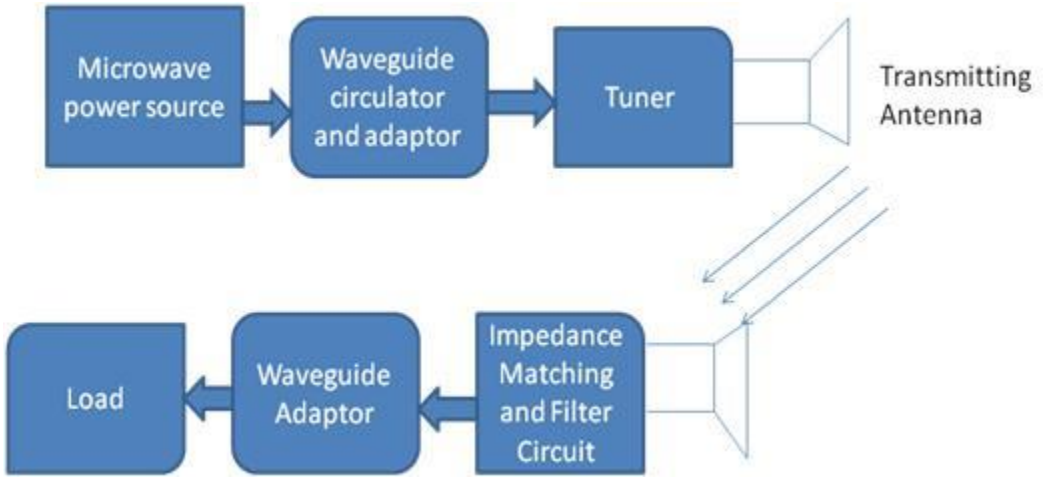
If you talk about the DC power transmission system, even that is not feasible as it requires a connector between the DC power supply and the device.

Imagine a system completely devoid of wires, where you can get AC power to your homes without any wires. Where you can recharge your mobile without having to physically plug into the socket. Where the battery of the pacemaker (placed inside a human heart) can be recharged without having to replace the battery.



Microwave Power Transmission:

This idea was developed by William C Brown. The whole idea involves converting the AC power to RF power and transmitting it through space and again reconverting it to AC power at the receiver. In this system, power is generated using microwave power sources like klystron, and this generated power is given to the transmitting antenna via the waveguide (which protects the microwave power from reflected power) and the tuner (which matches the impedance of the microwave source with that of the antenna). The receiving section consists of the receiving antenna which receives the microwave power and the Impedance matching and filter circuit which matches the output impedance of the signal with that of the rectifying unit. This receiving antenna along with the rectifying unit is known as the Rectenna. The antenna used can be a dipole or a Yagi-Uda Antenna. The receiver unit also consists of the rectifier section consisting of Schottky diodes which is used to convert the microwave signal to DC signal. This transmission system uses frequencies in the range of 2GHz to 6GHz.



Wireless Transfer of Solar power:

One of the most advanced wireless power transfer systems is based on transferring solar power using a microwave or LASER beam. The satellite is stationed in the geostationary orbit and consists of photovoltaic cells that convert sunlight into an electric current which is used to power a Microwave generator and accordingly generate microwave power. This Microwave power is transmitted using RF communication and received at the based station using a Rectenna, which is a combination of an antenna and a rectifier and is converted back to electricity or required AC or DC power. The satellite can transmit up to 10MW of RF power.

14.2.4 Industrial Temperature Controller

As the name implies, a **temperature controller** is an instrument used to control temperatures, mainly without extensive operator involvement. A controller in a temperature control system will accept a temperature sensor such as a thermocouple or RTD as input and compare the actual temperature to the desired control temperature, or setpoint. It will then provide an output to a control element.

A good example would be an application where the controller takes an input from a temperature sensor and has an output that is connected to a control element such as a heater or fan. The controller is usually just one part of a temperature control system, and the whole system should be analyzed and considered in selecting the proper controller.

What Are the Different Types of Process or Temperature Controllers, and How Do They Work?

There are three basic types of process controllers: on-off, proportional and PID. Depending upon the system to be controlled, the operator will be able to use one type or another to control the process.

On/Off temperature Controller:-

An on-off temperature controller is the simplest form of control device. The output from the device is either on or off, with no middle state. An on-off controller will switch the output only when the temperature crosses the setpoint. For heating control, the output is on when the temperature is below the setpoint, and off above setpoint.

Proportional Control :

Proportional controls are designed to eliminate the cycling associated with on-off control. A proportional controller decreases the average power supplied to the heater as the temperature approaches setpoint.

This has the effect of slowing down the heater so that it will not overshoot the setpoint, but will approach the setpoint and maintain a stable temperature. This proportioning action can be accomplished by turning the output on and off for short time intervals. This "time proportioning" varies the ratio of "on" time to "off" time to control the temperature. The proportioning action occurs within a "proportional band" around the setpoint temperature.

PID Control

The third controller type provides proportional with integral and derivative control, or PID. This controller combines proportional control with two additional adjustments, which helps the unit automatically compensate for changes in the system.

On-Off Controllers

On-Off process controllers are the simplest type of controllers featuring on-off control action designed to provide the functionality of general purpose PID controllers but at a price suited to On/Off applications.

Autotune PID Controllers
PID controllers provide very tight control but the PID algorithm requires tuning. Autotune controllers provide that function.

Multiloop Controllers
Each control loop normally consists of one input and at least one output. OMEGA offers numerous multiloop controllers which can handle more than a single control loop. OMEGA's CS8DPT can handle up to 6 control loops.

Safety Limit Controllers :-
A safety limit controller is an off-off controller with a latching output. When the output changes state it requires a manual reset to change it back. Safety limit controllers are typically used as redundant controllers, to shut down a process when undesirable limits are reached.

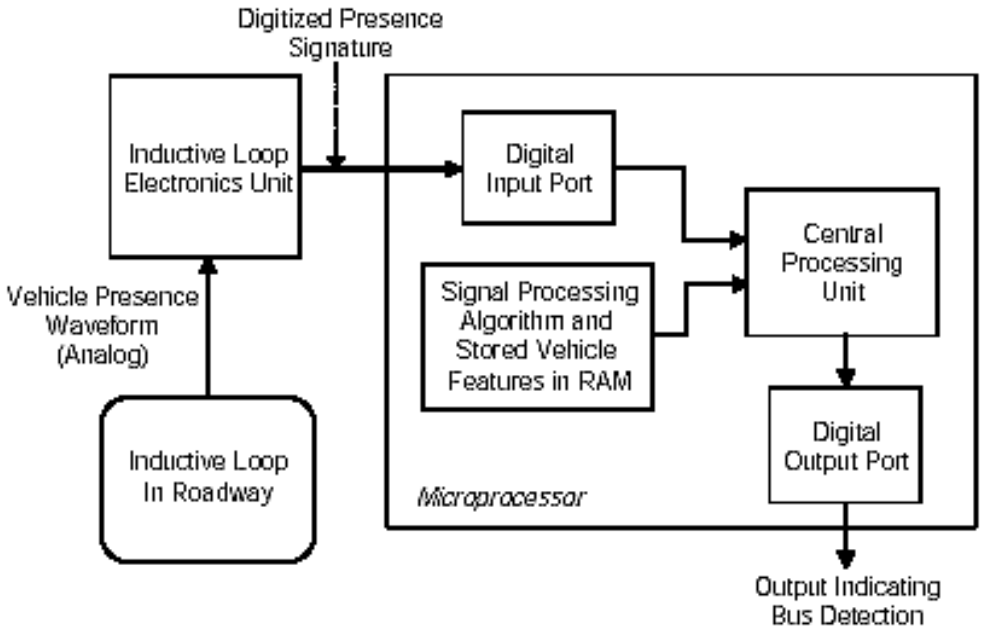
Temperature Switches :-
An adjustable temperature switch is suited for applications which require an economical solution to temperature control. Temperature switches are typically less complicated and easier to setup than more sophisticated electronic controls.

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

An Intelligent Traffic Management Framework has been proposed in this section as depicted in The planned framework deals with traffic control system STMS as the core module and it has the sub-modules such as video control system, Traffic Control System,, Supervisory computer control system and peripheral devices. The Traffic Control System manages and controls the heavy traffic during pre-defined rush period on the road. It uses the video monitoring system to identify excess traffic through video camera and when the amount of vehicles in particular path increases a pre-calculated threshold value, it informs the traffic control incharge of STMS with an alarm indicating “traffic limit reached” and prevents any further vehicle to enter in that path.

The Block diagram of the proposed system Fig.1 shows the basic block diagram of the proposed system with all the functional components and controlling system. So the next vehicles would be diverted towards another selected path, hence controlling the traffic. This traffic control system incorporates efficient transmission and uninterrupted communication by sending and receiving correct signal in proper time events.

The smart peripheral devices handle the correct configuration of input sensors and output actuators to capture and detect the events and send the response and required information to control points. Similarly deployment of CCTV Camera at noticeable traffic points which covers maximum range of scenario is also important activity of this module



The designed procedure used for preventing traffic congestion is as follows. Step 1- Total number of vehicle information transiting, crossing and waiting for a specific traffic at a particular time range is sent by the traffic signal sensor device to the central server. Step 2- The above real time data from sensors serves as input to the data analytic engine and used by the mobile agent at the STMS supervisory computer control system which is connected to the GIS mapping of the roads. Step 3 – When the congestion level crosses a particular threshold value, the data analytic engine sends a broadcast message to all the agent computers through mobile agent service situated at traffic controllers to divert the next two and four wheeler passengers to an alternate route.

Design of Smart Vehicles

This section provides an average assessment of basic pre requisites before implementing the proposed model in a metropolitan city. Generally, the fundamental requirement for the proposed traffic control framework includes one urban traffic control center, centralization of around 200 intersection points in the city, approximately 4,700 vehicle loop detectors, 60 video detection cameras, fifty signalization devices for blind persons , replacement of approx. 1,400 signal points, Continuous service maintenance applications

Chapter : 15

Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society. (For Allocated village development, villagers happiness, comfortable and for enhancement of the village) (With the Smart village development Concept As Per Your Idea And Village Visit, modern technology with innovation). with doing small changes, Period, Amount Expenditure and Benefit – a) Immediately b) Within 1 year c) Long term (3-5 years) along with cost estimation. b) If possible, List the sources of the funding available with the Village gram panchayat

The all design is implantation newly in the village so no any change in existing design. All the new design implementation period with cost and estimation are as given bellow table.

Sr. No.	Design Name	Period	Amount Expenditure (RS.)	Benefit
8.4	Sustainable Design- Composed pit	9 months	60,000/-	produce homemade fertilizers for our garden.
8.5	Physical-Public garden	8 months	2,27,000/-	Heath and scope for sports
8.6	Social-Solid waste management	7 months	78,000/-	For clean village
8.7	Socio-Cultural design- Chabutro	1 year	12,500/-	Improve beauty of village
8.1.5	Smart Village Design- Shopping mall	1.2 years	8,35,000/-	Become a smart village
8.1.6	Heritage village Design- community hall	8.5 months	9,15,000/-	For village income
13.5				
13.6				
13.7				
13.8	Smart Village Design-	1 year	2,50,000/-	Become a smart village

Fig 70. Design implementation

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 Village.
- For now we can't even think about the provision of latest technology in village until basic need fulfil.
- Villagers are also not aware or habitat for use of latest technology.

- Involvement of Gram panchayat or Sarpanch is prime requirement for village development.

So before all this thing we should take an action to such village sarpanch or panchayat member who are illiterate and not working toward villagers oriented.

Category – I (Immediately)
1. Solid waste management
2. Bus stand

B) Within 1 year:-

- From actual visit we saw that there is no any major scheme is implemented in village.
- Some Internal street road and Close Drainage work are completed in new village but in old village these all basic requirement are lack.
- Some of our proposed design like Internal road design by paver block can implement within one year.

Category – II (Within 1 year)
1. Solar Street light
2. Renewable solar design for existing school
3. Design of CCTV system

C) Long term (3-5 years):-

- Form our proposed design long term development include those infrastructure which provide after few years.
- These facilities required more amount to implement.
- We proposed construction of, Post Office, Public Garden, etc. Currently they less requirement than above design, but after few year they need to construct it.
- Bio-Gas Plant should provide after completion of all basic facilities.

Category – III (Long term 3 to 5 year)
1. Biogas plant
3. Garden
5. Design of submersible pump operating system using solar power and grid
6. Public health centre

Chapter : 16

Survey By Interviewing With Talati And/Or Sarpanch

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Survey with Interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

CHAPTER- 16

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?	Yes	Farming and Shop
2	What are the chances of employment in village?	Yes	-
3	What are the special technical facilities in village?	Yes	farming business
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?	No	-
7	Are women having opportunity to work and income?	Yes	Anganvadi
8	Child girl education is appreciated in village?	Yes	Primary School
9	Facility of vaccination to child is available in village?	Yes	
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	-
11	Women help line number information is provided to village people?	Yes	-
12	Is water scarcity in village? How many days per year?		-
13	Is village under any debt?	No	-
14	Is any serious issue due to debt from bank or any person happened in village?	No	-
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	No	-
16	Is any death of patient occurred due to unavailability of medical facility in village?	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.	Yes	Some Physically challenged.
18	Is village improvement is observed in comparative scenario from past to present?	No	-
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	No	-
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	having exceed weeding in Villages womens

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

Fig 71. Survey By Interviewing With Talati And/Or Sarpanch

Chapter : 17

Irrigation / Agriculture Activites And Agro Industry, Altenate Technics And Solution

Irrigation:

a system of supplying (land) with water by means of artificial canals, ditches, etc, esp. to promote the growth of food crops. a sophisticated irrigation system. 2. a system used to clean the stool out of the colon.

Types of irrigation system:-

- Surface irrigation. Running or impounding water over the surface and allowing it to saturate the soil to some depth.
- Sprinkle irrigation. Spraying water into the air and allowing it to fall on to plants and soil as simulated rainfall.
- Drip irrigation.
- Subsurface eluders.
- Sub irrigation.

Irrigation activates :

Irrigation helps to grow agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of less than average rainfall. Irrigation also has other uses in crop production, including frost protection, suppressing weed growth in grain fields and preventing soil consolidation

problem in irrigation activates :

Two of the most common problems with farm irrigation systems have to do with irrigation scheduling. Likewise, starting an irrigation cycle too late or not running the system for a long enough period of time is considered under watering and can cause reduced yields and poor crop quality which can affect price

Solution :

Water run-off and pooling. You can also adjust the valves and nozzles to deliver water at slower rates to allow adequate time for the water to soak into the soil. In some instances, a drip irrigation system may be the best solution

Agro Industry :

An agro-industry is an enterprise that processes bio-mass, i.e. agricultural raw materials, which include ground and tree crops as well as livestock and fisheries, to create edible or usable forms, improve storage and shelf life, create easily transportable forms, enhance nutritive value, and extract chemicals.

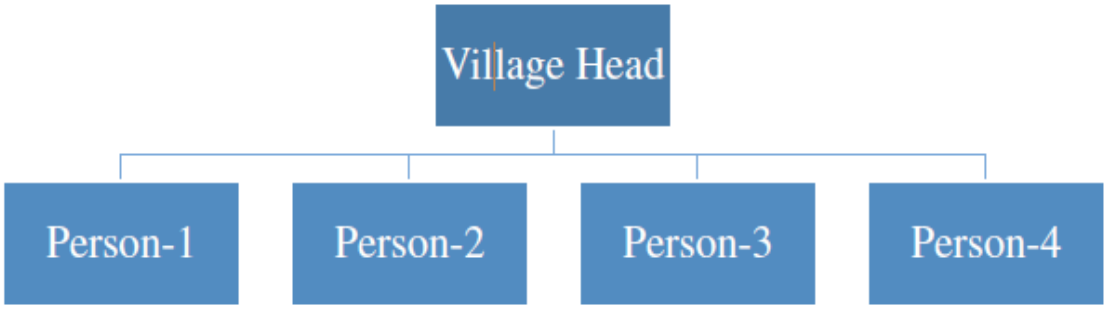
Type of agro farming :

- Alternative farming techniques
- Bio dynamic farming
- Eco farming
- HOMA
- LEISA
- Natural farming
- Organic farming
- Permaculture
- Polyculture
- Sustainability Urban and Peri-Urban farming
- Integrated farming systems
- No tillage farming

Chapter : 18

Social Activities – Any Activates Planned By Students e.g Teaching Learning activities, awareness camp, business idea for SELF HELP GROUP OR ANY OTHER

village head: function of village head is taken out work form below person.



village head: function of village head is taken out work form below person.
Person 1: he is working on cleaning of village.
Person 2: he is working on Education system.
Person 3: he is working with village fund to develop the village
Person 4: he is working on health of village people.

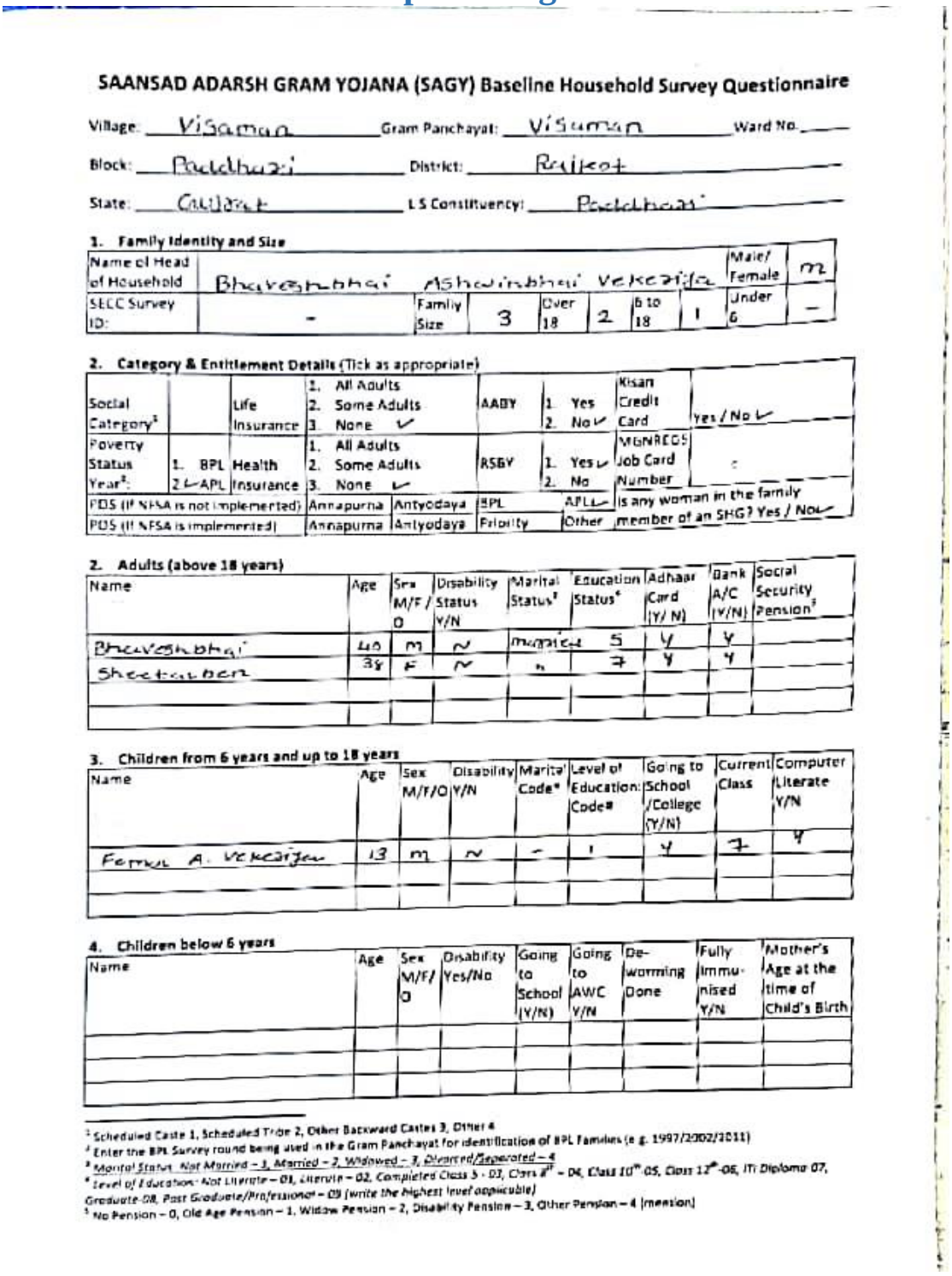
- Digital India
- Beti bachao beti padhavo
- Entrepreneurship
- One day Health Awareness / Education Camp
- Women Empowerment and her Rights

Benefits of this social activity

- Reducing air and water pollution
- Reducing energy costs and use associated with heating and cooling
- Reducing the urban heat island
- Protecting roadways and reducing the amount of asphalt sealers required
- Reducing noise pollution
- Providing valuable carbon storage and sequestration
- Increasing food security of urban areas

Chapter : 19

19. VISAMNAN VILLAGE SAGY Questionnaire Survey form with the Sarpanch Signature



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Visaman Gram Panchayat: Visaman Ward No.: —

Block: Paddhari District: Rajkot

State: Gujarat LS Constituency: Paddhari

1. Family Identity and Size

Name of Head of Household	Bhaveshbhai Ashwinbhai Vekariya						Male/ Female	M
SECC Survey ID:	-	Family Size	3	Over 18	2	6 to 18	1	Under 6	-

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]		Life Insurance	1. All Adults 2. Some Adults 3. None ✓	AABY	1. Yes 2. No ✓	Kisan Credit Card	Yes / No ✓
Poverty Status Year[2]:	1. BPL 2 ✓ APL	Health Insurance	1. All Adults 2. Some Adults 3. None ✓	RSBY	1. Yes ✓ 2. No	MGNREGS Job Card Number	
PDS (If NFSA is not implemented)	Annapurna	Antyodaya	BPL	APL ✓		Is any woman in the family member of an SHG? Yes / No ✓	
PDS (If NFSA is implemented)	Annapurna	Antyodaya	Priority	Other			

2. Adults (above 18 years)

Name	Age	Sex M/F/O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/N)	Bank A/C (Y/N)	Social Security Pension[5]
Bhaveshbhai	40	M	N	married	5	Y	Y	
Sheetalben	38	F	N	"	7	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
Fenil A. Vekariya	13	M	N	-	1	Y	7	Y

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 Immunised Y/N	Mother's Age at the time of Child's Birth

[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	no	no
Children	no	no

9. House & Homestead Data

Own House Yes / No	No. of Rooms: 2
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	0KM
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:
Cooking: LPG/Biogas/Kerosene/Wood/Electricity
Mention if Any Other:
If cooking in Chullah: Normal/ Smokeless

12. Landholding (Acres)

1. Total	–	2. Cultivable Area	–
3. Irrigated Area	–	4. Uncultivable Area	–

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	
Sharecropping /Farming Leased Land	
Animal Husbandry	✓
Pisciculture	
Fishing	
Skilled Wage Worker	
Unskilled Wage Worker	✓
Salaried Employment in Government	
Salaried Employment - Private Sector	
Weaving	
Other Artisan(mention)	
Other Trade & Business (mention)	

14. Migration Status
Does any member of the household migrate for Work: Yes / No. If Yes Entire Year / Seasonal
Does anyone below 18 years migrate for work: Y/N ✓

15. Agriculture Inputs

Do you use Chemical Fertilisers	Yes/No ✓
Do you use Chemical Insecticides	Yes/No ✓
Do you use Chemical Weedicide	Yes/No ✓
Do you have Soil Health Card	Yes/No ✓
Irrigation: None/ Canal/ Tank/ Borewell/Other	
Drip or Sprinkler Irrigation: Drip /Sprinkler / None	

16. Agricultural Produce in a normal year (Top 3)

Name	Unit	Quantity

17. Livestock Numbers

Cows: 1	Bullocks: 0	Calves: 3
Female Buffalo: 0	Male Buffalo: 0	Buffalo Calves: 0
Goats/ Sheep: 0	Poultry/ Ducks: 0	Pigs: 0
Any other: Type		No.
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres):		

18. What games do Children Play

cricket.

19. Do children play musical instrument (mention)

No.

Schedule Filled By: C23/05121)
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: Visaman

b. Block: Padadhari

c. District: Rajkot

d. State: Gujrat

e. Lok Sabha Constituency: Padadhari

f. Number of Wards in the Gram Panchayat: _____

g. Number of Villages in the Gram Panchayat: 1

h. Names of Villages:

visaman village

Demographic Information

Number of Households 426 Total Population 2030 Male 995 Female 1035

SC HHs 17.43.1 ST HHs — 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	N	N
b.	Nearest Primary Health Centre (PHC)	Y	in village
c.	Nearest Community Health Centre (CHC)	N	N
d.	Nearest Post Office	Y	in village
e.	Nearest Bank Branch (Any)	N	"
f.	Nearest Bank with CBS Facility	N	N
g.	Nearest ATM	Y	in village
h.	Nearest Primary School	Y	"
i.	Nearest Middle School	Y	"
j.	Nearest Secondary School	Y	"
k.	Nearest Higher Secondary School / +2 College	Y	13km,
l.	Nearest Graduate College	Y	12.8kmofDis
m	Nearest ITI / Polytechnic Centre	Y	Rajkot 42km
n	Kisan Seva Kendra	N	

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	N	-
p	Nearest Agro Service Centre	N	-
p	MSP based Government Procurement Centre	N	N
q	Milk Cooperative /Collection Centre	Y	in village
r	Veterinary Care Centre	N	N
s	Ayurveda Centre	N	N
t	E – Seva Kendra	N	N
u	Bus Stop	Y	13 km
v	Railway Station	Y	Paddhari 13 km.
w	Library	N	N
x	Common Service Centre	N	V

IV. Sports Facilities in the Gram Panchayat

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

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 1

b. Number of villages without Angan Wadi Centres 0

Names of such villages: _____

c. Schools (Number)

Primary Private: 0 Primary Govt.: 1

Middle Private: 0 Middle Govt.: 0

Secondary Private: 0 Secondary Govt.: _____

Higher Secondary Private: 0 Higher Secondary Govt: 1

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)	-	-	-	-	Goverment -	Yes	-
b.	Kerosene	0	-	-	-	goverme	Yes	-
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 / Not Covered	visamarv	-
b.	Hand Pump Coverage in Villages:	Covered / Not Covered	-	visamarv
c.	Coverage under Covered Drains:	Covered / Not Covered	-	visamarv
d.	Coverage under Open Drains:	Covered / Not Covered	visamarv	-
e.	Villages with Household Electricity Connection (Numbers)	Connected / Not Connected	visamarv(426)	

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	720.60	d.	Pasture / Grazing Land		g.	Check Dam	0
b.	Irrigated Land	720.80	e.	Forests/ Plantations	-	h.	Wells/Bore Wells	1
c.	Un-irrigated Land		f.	Other Common Land	618.00	i	Tanks /Ponds	1

[1] Mention the number of Villages Covered and Not Covered

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)	28
b)	Number of Households receiving pension (old age, widow, disability)	28
c)	Number of eligible Households who are not receiving pension	406
d)	Number of Households eligible for Ration Card	426
e)	Number of eligible HHs having ration cards	0
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	100
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	0
h)	Number of active Job Card holders under MGNREGA	350
i)	Number of Job Card holders who completed 100 days of work during 2013-14	0
j)	Number of shops selling alcohol	0
k)	Number of BPL families	30
l)	Number of landless households	0
m)	Number of IAY beneficiaries	130
n)	Number of FRA[2] beneficiaries	0
o)	Number of Community Sanitary Complexes	0
p)	Number of Households headed by single women	170
q)	Number of Households headed by physically handicapped persons	2
r)	Total number of Persons with Disability in the village	10
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'

Parth Parmar Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	23/05/21 Date of Survey

[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: Visaman

b. Ward Number: _____

c. Gram Panchayat: Visamara

d. Block: Padhari

e. District: Rajkot

f. State: Gujrat

g. Lok Sabha Constituency: Padhari

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

i. Names of Habitations / Hamlets:

Demographic Information

Number of Households 426 Total Population 2030 Male 995 Female 1035

SC HHs 17.491. ST HHs _____ 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	Y	In village
b.	Nearest Middle School	Y	"
c.	Nearest Secondary School	Y	"
d.	Kisan Seva Kendra	N	-N
e.	Milk Cooperative /Collection Centre	N	N
g.	Health Sub Centre	N	N
h.	Bank	Y	-
i.	ATM	Y	-
j.	Bus Stop	N	13km
k.	Railway Station	Y	Padadhari 13km

[1] While filling this the surveyor must collect the information from the Ward Member/s and relevant government officials

1

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	N	N
m	Common Service Centre	N	N
n	Veterinary Care Centre	N	N

ii. Road Connectivity

a. Habitations connected by All-weather Roads *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations where not available:_____

iii. Drinking Water Facilities

a.Piped Water Supply Coverage to Habitations: 1-All *(1-All 2-None 3-Some)*

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

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

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

b. Coverage under Open Drains: 1 All *(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: 1-All

b.Coverage under Street Lighting: All*(1-All 2-None 3-Some)*

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

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): _____

b.Mini Stadium : N Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 1

c. Schools (Number)

Primary Private: ____ Primary Govt.: 1

Middle Private:____ Middle Govt.: 1

Secondary Private:____ Secondary Govt.: 1

Higher Secondary Private: - Higher Secondary Govt: -

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	72060	d.	Pasture / Grazing Land		g.	Check Dam	0
b.	Irrigated Land		e.	Forests/ Plnatations		h.	Wells/Bore Wells	1
c.	Un-irrigated Land		f.	Other Common Land	618.00	I	Tanks /Ponds	1

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	370
2	Number of active Job Card holders who have completed 100 days of work	30
3	Number of shops selling alcohol	0
4	Number of BPL families	130
5	Number of landless households	0
6	Number of IAY beneficiaries	0
7	Number of FRA beneficiaries	0
8	Number of common sanitation complexes	0
9	Number of SHGs	0
10	Number of active SHGs	6
11	Existence of SHG Federation in the Village (Yes / No)	N
12	Number of Youth Clubs	0
13	Number of Bharat Nirman Volunteers	0

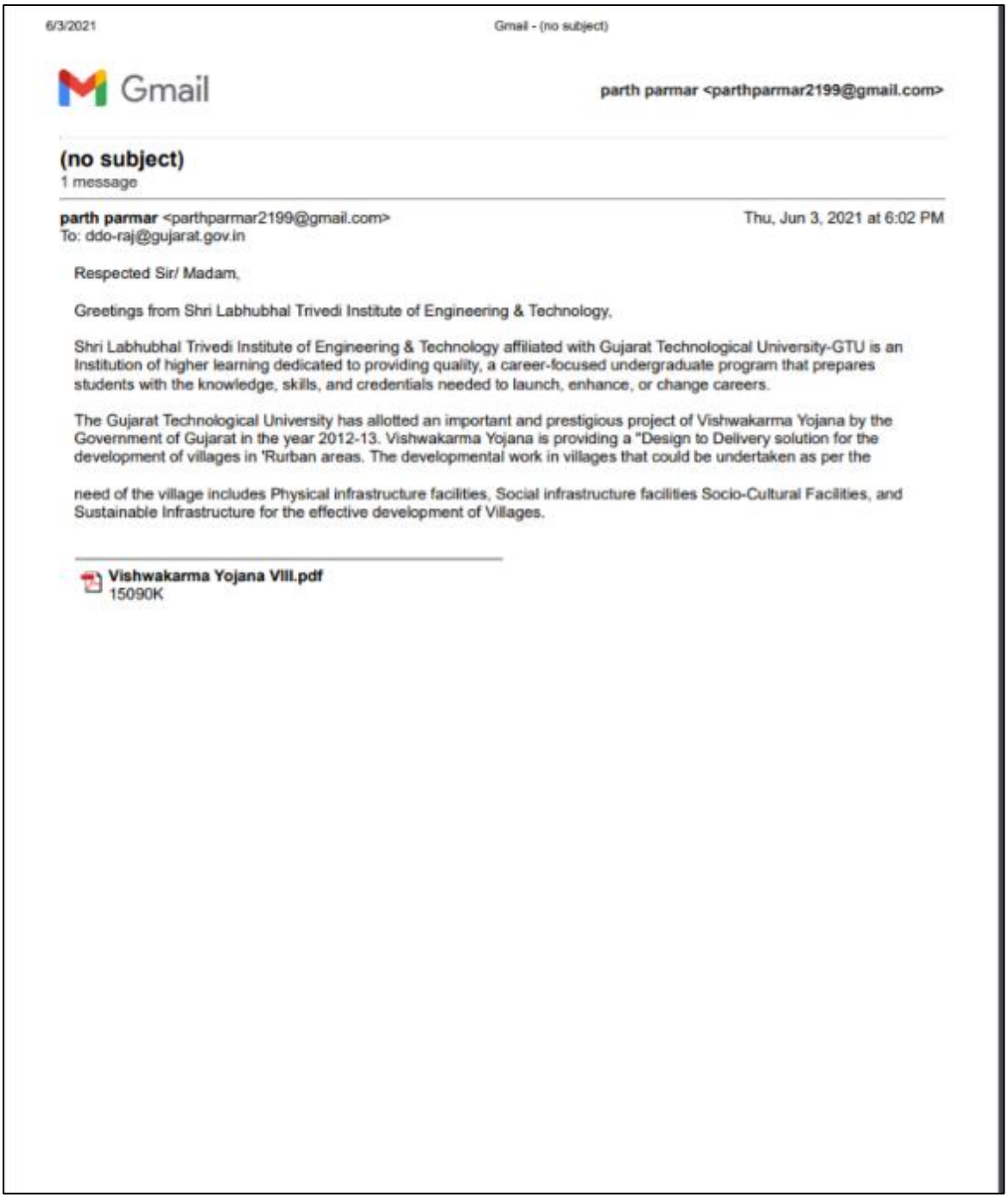
Name and Signature of Surveyor and Respondent'

Parsm Parmar 2	ગ્રામપંચાયત સભ્યશ્રી	ગ્રામપંચાયત સભ્યશ્રી	23/05/21
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

3

Chapter : 20

20.TDO-DDO-Collector email sending Soft copy attachment in the report



6/3/2021 Gmail - (no subject)

Gmail

parth parmar <parthparmar2199@gmail.com>

(no subject)
1 message

parth parmar <parthparmar2199@gmail.com> Thu, Jun 3, 2021 at 6:02 PM
To: ddo-raj@gujarat.gov.in

Respected Sir/ Madam,

Greetings from Shri Labhubhal Trivedi Institute of Engineering & Technology,

Shri Labhubhal Trivedi Institute of Engineering & Technology affiliated with Gujarat Technological University-GTU is an Institution of higher learning dedicated to providing quality, a career-focused undergraduate program that prepares students with the knowledge, skills, and credentials needed to launch, enhance, or change careers.

The Gujarat Technological University has allotted an important and prestigious project of Vishwakarma Yojana by the Government of Gujarat in the year 2012-13. Vishwakarma Yojana is providing a "Design to Delivery solution for the development of villages in 'Rurban areas. The developmental work in villages that could be undertaken as per the

need of the village includes Physical infrastructure facilities, Social infrastructure facilities Socio-Cultural Facilities, and Sustainable Infrastructure for the effective development of Villages.

Vishwakarma Yojana VIII.pdf
15090K

Fig 72. TDO-DDO-Collector email sending Soft copy attachment in the report

Chapter : 21

Comprehensive report for the entire village

Developing a village with a 'rural soul but with all urban amenities is that a city may have Vishwakarma Yojana is one of the initiatives towards GUJARAT TECHNOLOGICAL UNIVERSITY, Vishwakarma Yojana is one of the initiatives towards Urbanization that is village development by the government of Gujarat, which was allotted as a real time situation type project provides to GTU. Vishwakarma Yojana is provides special scheme for development of village by GTU and Government of Gujarat in which students work together and collect data and information regards village development with the help of gram panchayat and stake holders.

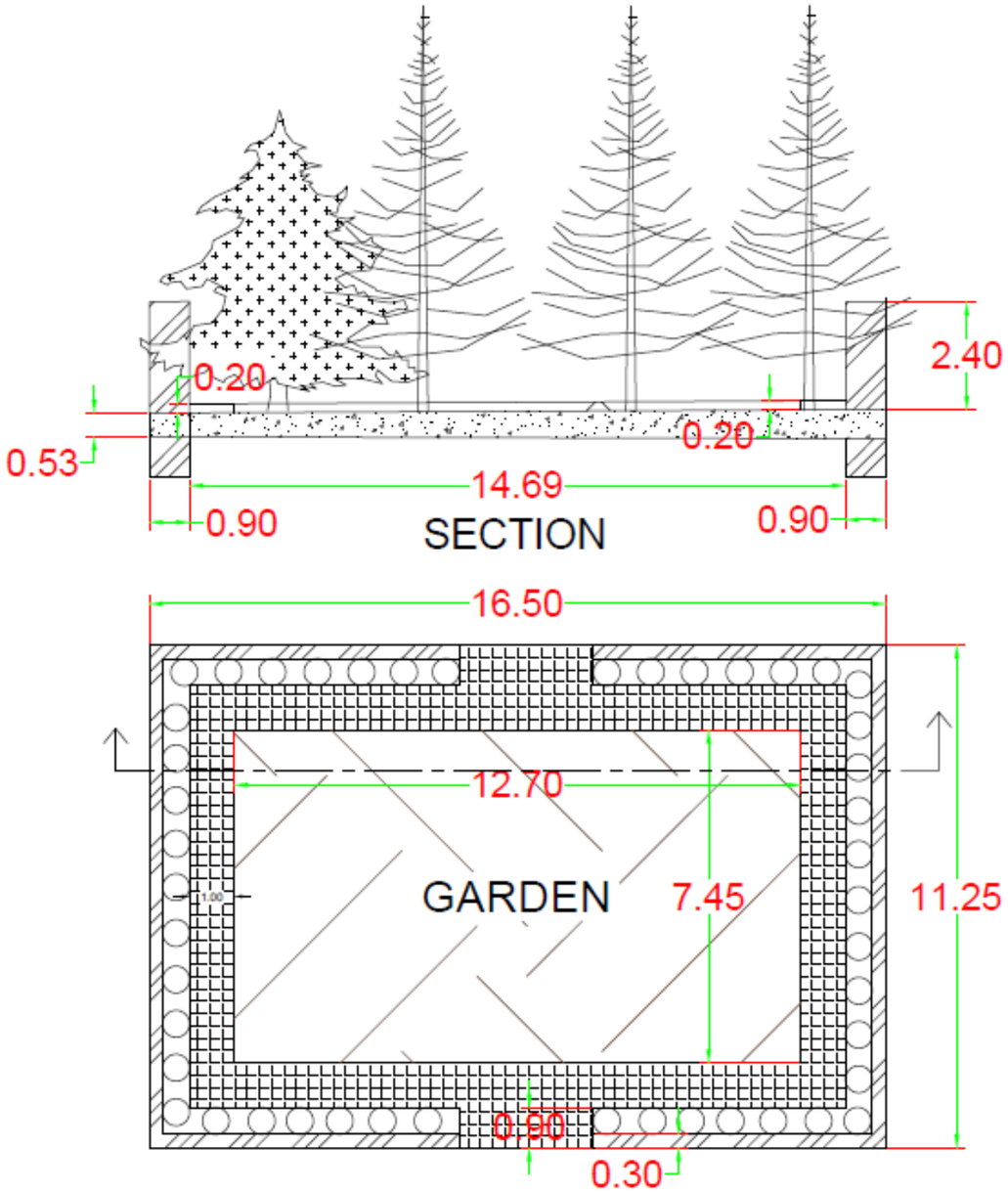
Village have some basic facilities likes drinking water, drainage system, pucca road, and other facilities like primary school, primary health center, community hall, library, public latrine block, are sufficient so that village can develop. So, we will give proposal regarding sustainable energy sources and solution related to infrastructure problems.

Efforts have been made in this project work to identify and plan some of the below facilities for sustainable development of village and to meet need of future population. Vishwakarma Yojana is one of the initiatives towards Rurbanization that is village development by the government of Gujarat, which was allotted as a real time situation type project provides to GTU.

It is one of the strategies 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. In this project the students meet the relevant citizens of village and survey the existing facilities. Then design of the sustainable infrastructure which is to be modified is carried out for the village.

This includes implementation of engineering skills to prepare detailed project reports for village as a part of the final year project work. By this project certain experiences recreates a real work and need of application of an individual technical knowledge on any existing problems. Based on survey we tried to give design of basic facilities to fulfill their needs.

By providing these basic facilities to village for reduce urban city pressure and decrease migration rate, which is ultimate aim of Vishwakarma.



PROPOSED GARDEN LAYOUT PLAN : -

VILLAGE: - VISAMAN
TALUKA: -PADADHARI
DISTRICT:-RAJKOT

VISHVAKARMA YOJNA PHASE - 8

ALL DIMENSION IN METER

AREA OF GARDEN: - 16.50 X 11.25

LEGENDS : -

TREES

FLOWER BED

SWING FOR CHILDREN

VISHVAKARMA YOJNA PHASE - 8

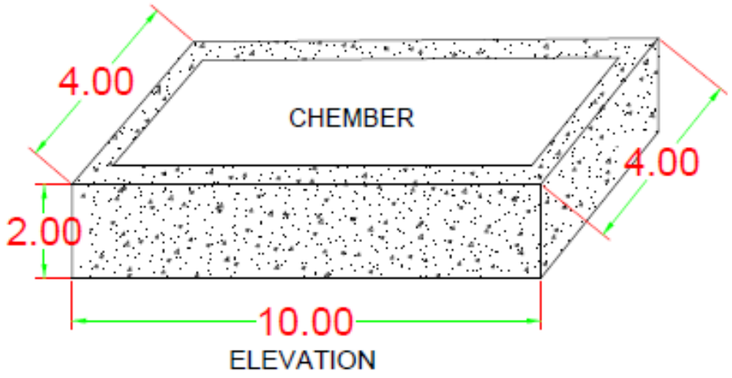
VILLAGE: - VISAMAN
TALUKA: -PADADHARI
DISTRICT:-RAJKOT

TITLE: -
public garden

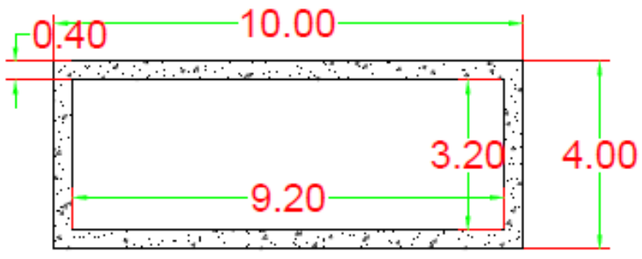
SCALE : - 1:100

DRAWN : -
PARTH PARMAR
RUSHIT PARMAR

DWG NO : - 01



ELEVATION



PLAN

PROPOSED COMPOSITE PIT LAYOUT PLAN : -

VILLAGE: - VISAMAN
TALUKA: -PADADHARI
DISTRICT:-RAJKOT

VISHVAKARMA YOJNA PHASE - 8

ALL DIMENSION IN METER

AREA OF PIT: - 10 X 4

VISHVAKARMA YOJNA PHASE - 8

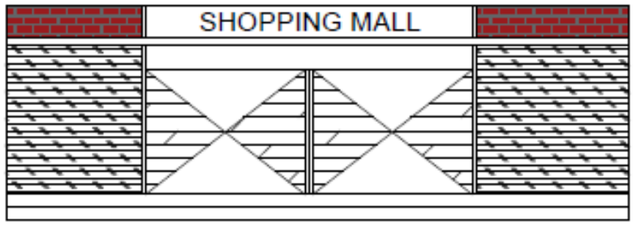
VILLAGE: - VISAMAN
TALUKA: -PADADHARI
DISTRICT:-RAJKOT

TITLE: -
COMPOSITE PIT

SCALE : - 1:100

DRAWN : - PARTH PARMAR
RUSHIT PARMAR

DWG NO : - 02



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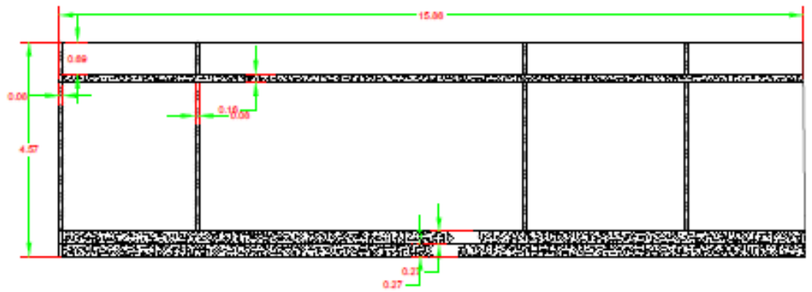

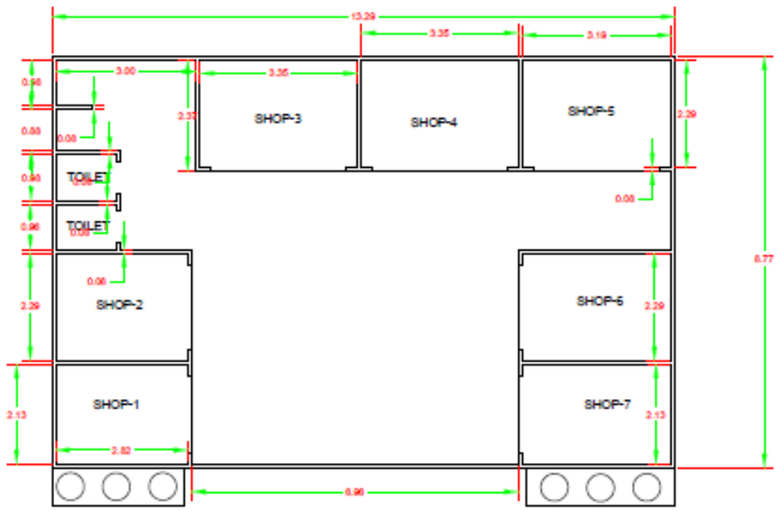

PLAN

SHOPPING MALL

PROPOSED SHOPPING LAYOUT PLAN : -

VILLAGE: - VISAMAN
TALUKA: -PADADHARI
DISTRICT:-RAJKOT

VISHVAKARMA YOJNA PHASE - 8

ALL DIMENSION IN METER

AREA OF SHOPPING : - 11.54 X 7.62

VISHVAKARMA YOJNA PHASE - 8

VILLAGE: - VISAMAN
TALUKA: -PADADHARI
DISTRICT:-RAJKOT

TITLE: -
SHOPPING

SCALE : - 1:100

DRAWN : -
PARTH PARMAR
RUSHIT PARMAR

DWG NO : - 03