DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII

AN APPROACH TOWARDS RURBANISATION

VADHAVA Village

SURAT District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
DESAI PRATHAM B.	CIVIL ENGINEERING	160490106023
NANDHA KRUPA R.	CIVIL ENGINEERING	170490106072
CHAUDHARI ANKITBHAI	ELECTRICAL ENGINEERING	180493109003

S.N.P.I.T. & R.C
UMRAKH

(CIVIL) ASST. PROF. SANDIP MISTRY

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NODAL OFFICERS

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 VADHAVA
DISTRICT SUARAT

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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CHAUDHARI ANKITBHAI	**ELECTRICAL ENGINEERING**	**180493109003**

Date of Report Submission:	
Principal Name and Signature:	**Prof.(Dr.) PIYUSH JAIN**
VY-Nodal Officer Name and Signature:	**ASSIST. PROF. MR. SANDIP MISTRY, ASSIST. PROF. MR.ASHISH A. PATEL**
Internal(Evaluator) Guide Name and Signature:	**ASSIST. PROF. MR. SANDIP MISTRY, ASSIST. PROF. MR.ASHISH A. PATEL**
College Name:	**S.N.P.I.T.& R.C.,UMRAKH**
College Stamp:	

ABSTRACT

Let the villages of the future live in our imagination, so that we might one day come to live in them!

-Mahatma Gandhi

Vishwakarma yojana is one of the initiatives towards rurbanisation by government of Gujarat, which was allotted as a real-time situation type project provides to GTU. The students meet at with all citizen of a village, survey the existing facilities. The student use their engineering skills to prepare detailed project report for the infrastructure as a part of their final year project rurbanisation is to bring peace of mind to the villagers by providing them the basic amenities required and still keeping the village soul intact. With the help of this yojana we can bring awareness about the thing which is not available at rural areas. Now a day people are moving from rural to urban area due to lack of basic amenities. So this help to provide better solution for the available problems in rural area like drinking water, drainage facilities, road network.

Our assigned village is Vadhava village. Vadhava village is located at 17 km from Surat and 35 km from Bardoli. Bardoli is nearest town of Vadhava village. The local language is Gujarat. The KHARI river pass near the between the Vadhava and kanbha village. Total population of the village is 7535 as per census 2011. Main occupation of the Vadhava village is farming. 80% people of Vadhava village depend on farming while 10% people are doing dairy and milk production and remaining 10% people are in labor work. Literacy rate of Vadhava is 85%. The village has primary school and milk production business. Village has poor drainage system. Village has gram panchayat building and bus stand. The village elevated reservoir and sump for water storage. There is 24*7 electricity supply for residential use and 8 hour for agricultural use. There are no management for collect and damping of garbage.

There are many facilities which are lack in Vadhava village like health centers, proper road, disposal of drainage water, solid waste management plant, and recreational centers. There are no facilities for the public toilet.

By studying the current stuts and techno-economic survey of Vadhava village in Surat district of Gujarat state in terms of basic services, public facilities, other infrastructural facilities for the need of the people and to prepare a report on the predictable socio-economic growth of area with the discussion of TDO, DDO, and sarpanch will helpful in providing better facilities and services in village

Scope for Improvement The primary area to improve should be providing employment in rural areas and improving the productivity of the agricultural sector. The dwindling literacy rates in rural India, especially for females, are a major matter of concern. There is a need for land and technical reforms

Key words: - Primary Health center, Community Hall, Post office, Biogas plant, Developed village, Rurbanisation.

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, Honorable Vice Chancellor, Gujarat Technological University-Ahmedabad,** for his encouragement and giving us the wonderful project.

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ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
PURA	Provision of Urban Amenities in Rural
PHC	Public health center
TDO	Taluka Developer Officer
DDO	District Developer Officer
NGO	Non-government Organization
PPP	Public Privet Partnership
DRDA	District Rural Development Agency

MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NRUM	National Rurban Mission
RCC	Reinforced Cement Concrete
G.L	Ground Level
P.L	Plinth Level
CM	Cement Mortar
PHC	Primary health centre
ATM	Automated teler machine
AGRSARI	Academy of grass road studies and Research of india
CCTV	Closed circuit television
TRC	Tax residency certificate
PUC	Pollution under control
RO	Reverse osmosis
LED	Light emiting diode
WBM	Water bound macadam
RCC	Reinforced cement concrete
IIT	Indian institute of technology
SWOT	Strength, weakness, opportunities, threats
NSSO	National sample survey organisation
SC	Scheduled caste
ST	Scheduled tribe
UDPFI	Urban development plans, formations And implementations

CHAPTER 1

IDEAL VILLAGE VISIT FROM YOUR DISTRICT OF GUJARAT STATE

Introduction:

An ideal Indian village will be so constructed as to lend itself to perfect sanitation. It will have cottages with sufficient light and ventilation built of a material obtainable within a radius of five miles of it. The cottages will have courtyards enabling householders to plant vegetables for domestic use and to house their cattle. The village lanes and streets will be free of all avoidable dust. It will have wells according to its needs and accessible to all. It will have houses of worship for all, also a common meeting place, a village common for grazing its cattle, a co-operative dairy, primary and secondary schools in which industrial education will be the central fact, and it will have Panchayats for settling disputes. It will produce its own grains, vegetables and fruit, and its own Khadi. This is roughly my idea of a model village. In the present circumstances its cottages will remain what they are with slight improvements. Given a good zamindar, where there is one, or co-operation among the people, almost the whole of the programmer other than model cottages can be worked out at expenditure within means of the villagers including the zamindar or zamindars, without Government assistance. With that assistance there is no limit to the possibility of village reconstruction. But my task just now is to discover what the villagers can do to help themselves if they have mutual co-operation and contribute voluntary labour for the common good. I am convinced that they can, under intelligent guidance, double the village income as distinguished from individual income. There are in our villages' inexhaustible resources not for commercial purposes in every case but certainly for local purposes in almost every case. The greatest tragedy is the hopeless unwillingness of the villagers to better their lot.

The very first problem the village worker will solve is its sanitation. It is the most neglected of all the problems that baffle workers and that undermine physical well-being and breed disease. If the worker became a voluntary Bhangi, he would begin by collecting night-soil and turning it into manure and sweeping village streets. He will tell people how and where they should perform daily functions and speak to them on the value of sanitation and the great injury caused by its neglect. The worker will continue to do the work whether the villagers listen to him or no. Harijan, 9-1-1937

1.1 Background:

Study area location:

Locality Name: Ninat
Taluka Name: Bardoli
District: Surat
State: Gujarat
Language: Gujarati and Hindi, English
Pin. Code: 394350

1.2 Concept: Ideal village, Normal Village:

That village may be regarded as reformed, where everybody wears khadi, which produces all the khadi it needs, in which every inhabitant spends some of his time in one or more processes

relating to cotton, which uses only oil produced in indigenous oil-presses, which consumes only jaggery manufactured in the village itself or in its neighborhood and only hand-milled flour and hand-pounded rice; the village, in other words, where the largest possible number of village industries are flourishing, in which nobody is illiterate, where the roads are clean, there is a fixed place for evacuation, the wells are clean, there is harmony among the different communities, and untouchability is completely absent, in which everybody gets cow's milk, ghee etc., in moderate quantities, in which nobody is without work, and which is free from quarrels and thefts, and in which the people abide by the sevak's advice in all matters. This is possible in the existing conditions. I cannot of course say about the time required.

1.2.1 Objectives of smart village:

A 'Smart Village/Ward' encompasses sustainable and inclusive development of all sections of its Community, so. The 100 per cent achievement of the following basic amenities, they enjoy a high standard of living.

1. Homes for all – with access to toilet, safe-drinking water, and regular power
2. Skills and Village Enterprise development with bank and market linkages gave more flexible access to youth.
3. Has functional solid/liquid waste management system.
4. End all preventable maternal deaths and infant deaths.
5. Zero school drop outs of boys and girls.
6. Functional toilet, potable water, electricity available in Anganwadi Centres, schools.
7. Malnutrition free (children below 9 years of age).
8. No girl-child marriages (girls below 18 years of age).
9. Every village household has a functional bank account/PM Jan Dhan Bank Account.
10. Every GP/Ward has green trees plantations all over its geographic boundaries.
11. Every GP/Ward has functional water conservation and harvesting structures.
12. Every GP/Ward has functional Information Centre, Computer Lab, and Mee-Seva Centre.

1.2.2 EXAMPLE /LIVE CASE STUDY OF IDEAL VILLAGE OF INDIA / GUJARAT:

Table 1.Ninat village detail

Gram panchayat	Ninat
District	Surat
State	Gujarat
Pin code	394350
Population	840(census 2011)
Household	250
Nearest town	Bardoli

MAP OF VILLAGE:

Fig.1 (map of Ninat village)

1.2.3 The idea of model/smart village:

Smart Village refers to a concept developed in rural area that provides solutions to problems occurred and improves the quality of life. The main problems faced by rural areas are cover poverty, low level of education, and limited access to technology. Smart village concept emerged due to some different characteristics between rural and urban areas. Banyuwangi Regency is one of regions that created smart concept starting from rural area, called smart kampung. So far, smart kampung only focused on public services, which included only a small part of smart city concept. Hence, this research was intended to propose the model of smart village examined through initial interview in village sample of Banyuwangi, literature reviews related to smart city, smart village, and smart rural. Then, the results were confirmed and adjusted to support local regulations. This research created a smart village model that was capable to be a guide for each village to develop towards better future. The proposed smart village model was categorized into 6 dimensions including

(1) Governance,

(2) Technology

(3) Resources

(4) Village Service

(5) Living

(6) Tourism.

This research is expected to be applied to villages in other Regencies by adjusting the characteristics of each region

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

Power inverter:

power inverter, or inverter, is a power electronic device or circuitry that changes direct current (DC) to alternating current (AC). The resulting AC frequency obtained depends on the particular device employed. Inverters do the opposite of “converters” which were originally large electromechanical devices converting AC to DC.

The input voltage, output voltage and frequency, and overall power handling depend on the design of the specific device or circuitry. The inverter does not produce any power; the power is provided by the DC source.

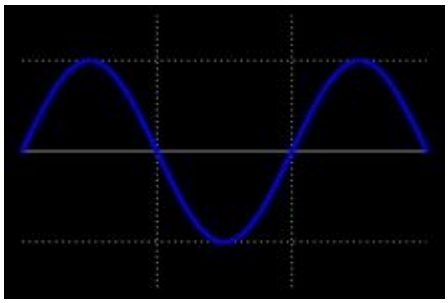
A power inverter can be entirely electronic or may be a combination of mechanical effects (such as a rotary apparatus) and electronic circuitry. Static inverters do not use moving parts in the conversion process.
Power inverters are primarily used in electrical power applications where high currents and voltages are present; circuits that perform the same function for electronic signals, which usually have very low currents and voltages, are called oscillators. Circuits that perform the opposite function, converting AC to DC, are called rectifiers.

Input voltage:
12 V DC, for smaller consumer and commercial inverters that typically run from a rechargeable 12 V lead acid battery or automotive electrical outlet. 24, 36 and 48 V DC, which are common standards for home energy systems. 200 to 400 V DC, when power is from photovoltaic solar panels. 300 to 450 V DC, when power is from electric vehicle battery packs in vehicle-to-grid systems. Hundreds of thousands of volts, where the inverter is part of a high-voltage direct current power transmission system.

Output waveform:
An inverter may produce a square wave, modified sine wave, pulsed sine wave, pulse width modulated wave (PWM) or sine wave depending on circuit design. Common types of inverters produce square waves or quasi-square waves. One measure of the purity of a sine wave is the total harmonic distortion (THD). A 50% duty pulse square wave is equivalent to a sine wave with 48% THD. Technical standards for commercial power distribution grids require less than 3% THD in the wave shape at the customer's point of connection. IEEE Standard 519 recommends less than 5% THD for systems connecting to a power grid.

There are two basic designs for producing household plug-in voltage from a lower-voltage DC source, the first of which uses a switching boost converter to produce a higher-voltage DC and then converts to AC. The second method converts DC to AC at battery level and uses a line-frequency transformer to create the output voltage.

Square wave:



A power inverter device which produces a multiple step sinusoidal AC waveform is referred to as a sine wave inverter. To more clearly distinguish the inverters with outputs of much less distortion than the modified sine wave (three step) inverter designs, the manufacturers often use the phrase pure sine wave inverter. Almost all consumer grade inverters that are sold as a "pure sine wave inverter" do not produce a smooth sine wave output at all, just a less choppy output than the square wave (two step) and modified sine wave (three step) inverters. However, this is not critical for most electronics as they deal with the output quite well.

Where power inverter devices substitute for standard line power, a sine wave output is desirable because many electrical products are engineered to work best with a sine wave AC power source.

The standard electric utility provides a sine wave, typically with minor imperfections but sometimes with significant distortion.

Sine wave inverters with more than three steps in the wave output are more complex and have significantly higher cost than a modified sine wave, with only three steps, or square wave (one step) types of the same power handling. Switch-mode power supply (SMPS) devices, such as personal computers or DVD players, function on modified sine wave power. AC motors directly operated on non-sinusoidal power may produce extra heat, may have different speed-torque characteristics, or may produce more audible noise than when running on sinusoidal power.

1.3 Detail study of Ideal village / Smart Village with photograph:

According to Census 2011 information the location code of Ninat village is 510668. Ninat village is located in Surat district in Gujarat, India. It is located 22km away from Bardoli, which is sub-district of Ninat village. The geographical area of village is 2015.48 hectares. Ninat has a total population of 5100 peoples. There are about 1199 houses in Ninat village. Modasa is nearest town to Ninat which is approximately 27km away.

Physical &demographical growth:

GENERAL INFORMATION OF NINAT Table 2	
Total population	1781
No. of Male voters	924
No. of Female voters	857

Economic profile: table:3	
Farming	51%
Animal Husbandary	63%
Framing work	18%

Occupation details:

1. Agriculture
2. Animal Husbandry
3. Agriculture worker

Gram panchayat of Rayam village

Gram panchayat of Rayam village and temple

Ro Plant

School of Ninat Village

Key element of ideal village (Ninat):

The Ninat village key element is the well drainage systems, Good quality R.C.C roads, Easy Water distributions system, Well maintan Street light, Sanitation facilities.

1.4 SWOT analysis of ideal village/ Smart Village:

Table 4 SWOT analysis

Strength	Weaknesses	Opportunities	Threats
Proper drainage facilities	Banking facility	Improving in waste management	Lack of awareness of villagers about cleaning
Transpo rtation facilities	Community hall	Woman empowerment	Lack of awareness of villagers about education
Sanitation facilities	No facilities for higher secondary Education	Educational awareness	Lack of funds and knowledge in agricultural field

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

For future prospect, the village Ninat can use more advanced technologies for agricultural prospect and for other requirements also. To require the panchayat building

1.6 Benefits of the visits of Ideal village / Smart Village:

We visited Ninat village, Surat, by the visit of the village Ninat, we got an idea about an ideal village. We had seen much kind of new technologies which can be used in village that are being used in the urban area. By this visit of this village, it has improved our communication skills and we knew how to interact with the different peoples. To improvement allocated village. To understand allocated village condition

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

Advances in off-grid systems :

We have recently seen the emergence of off-grid electricity systems that do not require the same supporting networks as traditional forms of centralised power generation. These technological innovations are as much based on information systems as they are directly about energy technology. While traditional electricity grids can gradually pay off (amortise) the high costs of generation, transmission and distribution equipment across many customers and many decades, a new business model is needed to rapidly bring energy services to the rural and urban poor. Mini-grids and products for individual user end-use, such as solar home systems (pay-as-you-go), have benefited from dramatic price reductions and advances in the performance of solid state electronics, cellular communications technologies and electronic banking, and from the dramatic decrease in solar energy costs. This mix of technological and market innovation has contributed to a vibrant new energy services sector that in many nations has outpaced traditional grid expansion.

The comparison between the traditional utility model of central-station energy systems and this new wave of distributed energy providers is instructive. Traditional dynamo generators and arc lighting perform best at large scale, and they became the mainstay of large-scale electric utilities. But the classic utility model of a one-way flow of energy from power plant to consumer is now rapidly changing. The combination of low-cost solar, micro-hydro and other generation technologies coupled with the electronics needed to manage small-scale power and to communicate with control devices and remote billing systems has changed village energy. High-performance, low-cost photovoltaic generation, paired with advanced batteries and controllers, provides scalable systems across much larger power ranges than central generation, from megawatts down to fractions of a watt.

The rapid and continuing improvements in end-use efficiency for solid-state lighting, direct-current televisions, refrigeration, fans, and information and communication technology (ICT) have resulted in a super-efficiency trend. This progress has enabled decentralised power and appliance systems to compete with conventional equipment for basic household needs. These

rapid technological advances in supporting clean energy both on and off the grid are furthermore predicted to continue, a process that has been particularly important at the individual device and household (solar home system) level, and for the emerging world of village mini-grids .

Diverse technology options expand village energy services:

With these technological cornerstones, aid organisations, governments, academia and the private sector are developing and supporting a wide range of approaches to serve the needs of the poor, including pico-lighting devices – often very small 1–2 watt solar panels charging lithium-ion batteries which in turn power low-cost/high-efficiency light-emitting diode (LED) lamps, solar home systems and community-scale micro- and mini-grids. Decentralised systems are clearly not complete substitutes for a reliable grid connection, but they represent an important level of access until a reliable grid is available and feasible, and a platform from which to develop more distributed energy services. By overcoming access barriers, often through market-based structures, these systems provide entirely new ways of bringing energy services to poor and formerly un-connected people.

Meeting people's basic lighting and communication needs is an important first step on the modern electricity service ladder4. Eliminating kerosene lighting from a household improves health and safety while providing significantly higher quality and quantities of light. Fuel-based lighting is a US$ 20 billion industry in Africa alone, and tremendous opportunities exist both to reduce energy costs for the poor and to improve the quality of service. Charging a rural or village cell phone can cost US$ 5–10 per kilowatt hour at a pay-for-service charging station, but less than US$ 0.5 via an off-grid product or on a mini-grid.

This investment frees income and also tends to lead to higher rates of use for mobile phones and other small devices. Overall, the first few watts of power mediated through efficient end uses lead to benefits in household health and education as well as a reduction in poverty. Beyond basic needs, there can be a wide range of important and highly valued services from decentralised power – such as television, refrigeration, fans, heating, ventilation and air-conditioning, or motor-driven applications – depending on the power level and its quality along with demand-side efficiency.
Experience with off-grid under-served people confirms the exceptional value derived from the first increment of energy service – equivalent to 0.2–1 watt hour per day for mobile phone charging or the first 100 lumen-hours of light. Given the cost and service level that fuel-based lighting and fee-based mobile phone charging provide as a baseline, simply shifting this expenditure to a range of modern energy technology solutions could provide a much better service, or significant cost savings over the lifetime of a lighting product – typically three to five years.

CHAPTER 2

LITERATURE REVIEW – (CIVIL & ELECTRICAL CONCEPT)

2.1 Introduction: Urban & Rural village concept

Urban

The urban village is an area occupied by the urban community that lives and resides in the urban environment as a group or in certain group which was formed or naturally due to urbanization.

The world's urban population as of 2014 is 3.9 billion out of 7.4 billion people living on the planet.

According to census of India 2011 the definition of urban area is:

- A place having minimum population of 5000.
- Population density of 400 persons per sq. kilometer or higher.
- 75% plus of the male working population involved in non -agricultural employment activity.

Rural

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

- An area with a population density of up to 400 per square kilometer,
- Villages with clear surveyed boundaries but no municipal board,
- A minimum of 75% of male working population involved in agriculture and allied activities

2.2 Importance of the rural development

Rural development has traditionally centered on the exploitation of land-intensive natural resources such as agriculture and forestry. However, changes in global production networks and increased urbanization have changed the character of rural areas. Increasingly tourism, niche manufacturers, and recreation have replaced resource extraction and agriculture as dominant economic drivers.

Moreover, public investment declined since 1991 coupled with a lack of adequate infrastructure, credit, transport, employment, etc. Henceforth the agricultural output has grown at only 3.2% during 2007-2011. All these factors have been denting the process of development. Therefore there is a need to focus on rural development and not just urban development.

2.3 Ancient village / different definitions of rural areas village

A rural area is a land outside the densely populated urban areas in a city or town. They have low population density, large open areas, lower standard of facilities etc. The primary industry in such area is agriculture.

United states census(2000 census)defines rural areas 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.

2.4 SCENARIO: RURAL/URBAN VILLAGE OF INDIA POPULATION GROWTH

Rural/urban India & Gujarat as per census 2011 Agenda of census of India is to release of provisional population totals-Rural urban distribution. Population of Rural and Urban area (in core).

TABLE 5: POPULATION OF RURAL AND URBAN AREA (AS PER CENSUS 2001 AND 2011)

	2001	**2011**	**DIFFERENCE**
INDIA	102.9	121.0	81.1
RURAL	74.3	83.3	9.0
URBAN	28.6	37.7	9.1

2.5 SCENARIO: RURAL/URBAN VILLAGE OF GUJARAT AS PER CENSUSN 2011

For the first in since independence, the absolute increase in population is more in urban areas that in rural areas. Rural-Urban Distribution: 68.84% and 31.16 Level of urbanization increased from 27.81% in 2001 census to 31.16% in 2011.

TABLE 6: LITERACY RATES IN RURAL AND URBAN AREA (AS PER CENSUS 2001 AND 2011)

	2001	**2011**	**DIFFERENCE**
INDIA	64.8	74.0	+9.2
RURAL	58.7	68.9	+10.2
URBAN	9.9	85.0	+5.1

2.6 RURAL DEVELOPMENT ISSUES – CONCRENS – MEASURES:

1. People related
2. Agricultural related problems
3. Infrastructure related problems
4. Leadership related problems
5. Administrative problem

1. People related

- Traditional way of thinking
- Poor understanding

- Low level of education to understand development efforts and new technology
- Deprived psychology and scientific orientation
- Lack of confidence
- Poor level of education

2. Agricultural related problems

- Lack of expected awareness, knowledge, skill, and attitude
- Unavailability of inputs
- Poor marketing facility
- Insufficient extension staff and services
- Multidimensional tasks to extension personnel
- Small size of landholding

3. Infrastructure related problems

- Poor infrastructure facilities like: -
- Water
- Electricity
- Educational institutions
- Communication
- Health
- Employment
- Storage facility etc.

4. Leadership related problems

- Leadership among the hands of in active and incompetent people
- Self-interest of leaders

5. Administrative problem

- Political interference
- Lack of motivation and interest
- Unwillingness work in village
- Improper utilization of budget

2.7 VARIOUS INFRASTRUCTURE GUIDELINES WITH THE NORMS FOR VILLAGES FOR THE PROVISIONS OF DIFFERENT INFRASTRUCTURE FACILITIES:

Innovative efforts to ensure wide coverage & equitable distribution. Physical Infrastructure: - Water Supply: Size of town Aspect Small Medium Large and Metro Domestic

Absolute	Min.
Desirable	70lpcd
	100lpcd
	70-100lpcd
	135-150lpcd

	135lpcd
	135-150pcd Non-Domestic

Electricity:

- Power supply consumption works out to be about 2 KW per household at the city level including domestic, commercial, industrial and other requirements.
- 1 electric substation of 11 KV for a population of 15,000 is recommended for towns/ cities.
- Solar power System Shall be emphasized in residential as well as Institutional Areas.

Other Facilities:

- Janani Suraksha Yojana
- Kishori Shakti Yojana
- Balika Samriddhi Yojana
- Mid-day Meal Programme
- Intergrated Child Development Scheme (ICDS)
- Mahila Mandal Protsahan Yojana (MMPY)
- Sanitation Programme (SP)
- Indria Awas Yojana.

2.8 ANCIENT/EXISTING ELECTRICAL CONCEPT STUDY AS A LITRETURE REVIEW FOR VILLAGE DEVELOPMENT:

What is a Lightning Arrester/Surge Arrester?

Surge arresters are devices that help prevent damage to apparatus due to high voltages. The arrester provides a low-impedance path to ground for the current from a lightning strike or transient voltage and then restores to a normal operating conditions. A surge arrester may be compared to a relief valve on a boiler or hot water heater. It will release high pressure until a normal operating condition is reached. When the pressure is returned to normal, the safety valve is ready for the next operation. When a high voltage (greater than the normal line voltage) exists on the line, the arrester immediately furnishes a path to ground and thus limits and drains off the excess voltage. The arrester must provide this relief and then prevent any further flow of current to ground. The arrester has two functions, it must provide a point in the circuit at which an over-voltage pulse can pass to ground and second, to prevent any follow-up current from flowing to ground.

Various types of surge voltages can occur in Electrical and electronic systems. They differ mainly with respect to their duration and amplitude. Depending on the cause, a surge voltage can last a few hundred microseconds, hours or even days. The amplitude can range from a few millivolts to some ten thousand volts. Lightning strikes are a special cause of surge voltages. Direct and indirect strikes can result not only in high surge voltage amplitudes, but
also particularly high and sometimes long current flows, which then have very serious effects

Types of Lightning Arrester:

1. Rod gap arrester
2. Sphere gap arrester

3. Horn gap arrester
4. Multi gap arrester
5. Electrolyte type arrester
6. Metal-oxide lightning arrester

Maintenance of Lightning Arrester:
Cleaning the outside of the arrester housing.

The line should be de-energized before handling the arrester. The earth connection should be checked periodically. To record the readings of the surge counter. The line lead is securely fastened to the line conductor and arrester. The ground lead is securely fastened to the arrester terminal and ground.

New Developments in Lightning Arrester Testing Field

New developments, presently achieved for distribution range, foresee the replacement of the conventional porcelain housing with a polymeric one, allowing to improve the mechanical characteristics and the failure mode behaviour. Furthermore special applications for surge arresters, such as protection of gas insulated substations and prevention of lightning faults in transmissions lines, are now taken into consideration by several utilities. The evolution of surge arrester construction technologies and application requires a continuous revision of relevant standards and testing techniques. CESI has been actively involved in testing surge arresters since the 1960s, through the development and setting up of testing facilities and the participation to the major technical and standardization bodies. The paper analyses the most important aspects relevant to surge arrester testing, based on the most recent experience developed in CESI. Particular attention is focused on the short circuit test techniques to address the failure mode and on the ageing test procedures to investigate the long term performance of surge arresters.

What is Done During Lightning Arrester Testing?

Protective measures against lightning strike events are stipulated in lightning protection standard IEC 62305. Other standards in the series are IEC 61643-11, BS6651, IEC 61643-21 and IEC 61643-31. Over twelve years, the protection system will test under all seasonal conditions – these can significantly affect performance due to changes in resistance and other characteristics. Following tests can be conducted:

1. Resistance testing
2. Continuity testing
3. Ground or soil resistivity testing
4. Visual inspection

2.9 Other Project / Schemes of Gujarat / India Government:

- **Gujarat Free Ration Scheme 2021 | Anna Brahma Yojana under PMGKAY to Tackle Coronavirus (COVID-19) Pandemic**

Gujarat government has started Free Ration Scheme namely Anna Brahma Yojana to tackle Coronavirus (COVID 19) pandemic outbreak. In this scheme, the state govt. will provide food items like wheat, rice, pulses, sugar absolutely free of cost. This scheme will ensure that no poor people in the state remain hungry. Around 60 lakh APL ration

- **RTE Gujarat Admission 2021 Online Application Form / School List / Documents / Admit Card at rte.orpgujarat.com**

RTE Gujarat Admission Apply Online | Gujarat RTE Admission Online Application Form | Gujarat RTE Admissions Start Date | RTE Gujarat School List | RTE Gujarat Rules | Gujarat RTE Online Registration Form Gujarat government invites online applications for RTE Gujarat Admission through the official portal at rte.orpgujarat.com. All the selected students will get 25%.

- **Gujarat PNG / LPG Sahay Yojana 2021 – Subsidized Piped Natural Gas to BPL Families**

Gujarat govt. has launched PNG / LPG Sahay Yojana to provide subsidized piped natural gas to bpl families. Under this scheme, the state govt. is going to provide a one time subsidy of Rs. 1,600 for each connection / bpl household. In addition to this, govt. will also provide a loan amount of Rs. 1725.

- **Gujarat Card NRG Online Application Form 2021 for Non Residential Guajarati's (NRGs) / NRIs**

Online Gujarat Card Application Form : Non Residential Gujarati (NRG) Foundation issues a unique and distinctive Gujarat Card (Identity Card) to connect every NRG with their motherland. All the Gujarati people residing away either in India or abroad can avail special value privileges through this Gujarat ID Card. All NRGs or NRIs can take exceptional.

- **Gujarat Zero Interest Loan Scheme 2021 for Farmers – Loans upto Rs. 3 Lakh @ 0% Interest Rate**

Gujarat government is inviting online application forms for CNG Sahbhagi Yojana at www.cngsahbhaagi.com. Now all the people who want to setup new CNG Pump Stations in Gujarat can apply online for CNG Sahayog Scheme. CM Vijay Rupani cabinet has decided to open another 300 CNG stations in the next 2 years. Interested people can make.

- **Gujarat Shravan Tirthdarshan Yojana Application Forms 2021 & Details**

Gujarat Shravan Tirth Darshan Yojana online registration / application form at yatradham.gujarat.gov.in. Shravan Tirthdarshan Yojana is a new scheme launched by the state government of Gujarat under which the government would provide subsidy on tirth yatra expenses for senior citizens. Under the Shravan Tirth Darshan Yojana, the state government would pay 50% of the cost.

CHAPTER 3

SMART CITIES/ VILLAGE CONCEPT AS PER YOUR IDEA AND ITS VISIT

3.1 Introduction: Concepts, Definitions and Practices

Concept

Concept Smart Village and its Importance

- The idea of smart village in the present-day context seems more reasonable as there is a limit of growth of cities which is leading to creation of urban jungles, where the population ratio per km of land is way above the desired norms.
- To take baby steps initially would lead to a campaign at National level once the fruits of this effort start bearing fruits, which surely would be visible for all to see sooner than expected.
- Just like smart cities, a smart village should be interactive and multi-functional; there should be active participation of people in various activities.
- A smart village is one which will automatically link local production with local procurement and local distribution. A smart village will also have power, knowledge, healthcare, technology, entrepreneurship and internet connectivity.
- A smart village will not only bring Internet connection to the rural lands, but will also provide support to sustainable agricultural practices.
- A network of small scale industries linked to agriculture, and a strong network of rail and road corridors with civic amenities such as education and health for all, including farmers, will transform the face of real India.
- The National Sample Survey 61st Round results show that among persons of age 15–29 years, only about 2% are reported to have received formal vocational training and another 8% reported to have received non-formal vocational training indicating that very few young people actually enter the world of work with any kind of formal vocational training.
- This proportion of trained youth is one of the lowest in the world. The corresponding figures for industrialized countries are much higher, varying between 60% and 96% of the youth in the age group of 20–24 years.

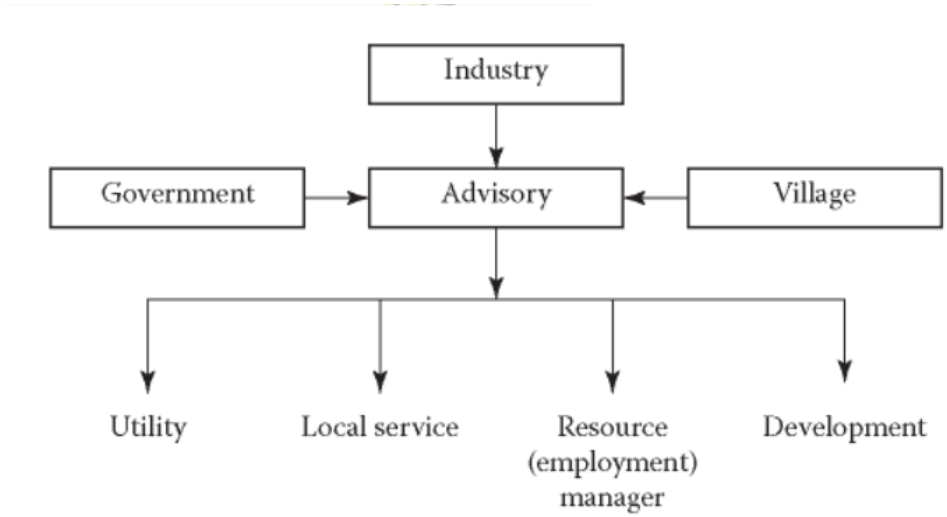
Definition

Smart village means all the necessaries facilities is developed in the village and no need to moves in city for any kind of requirement.

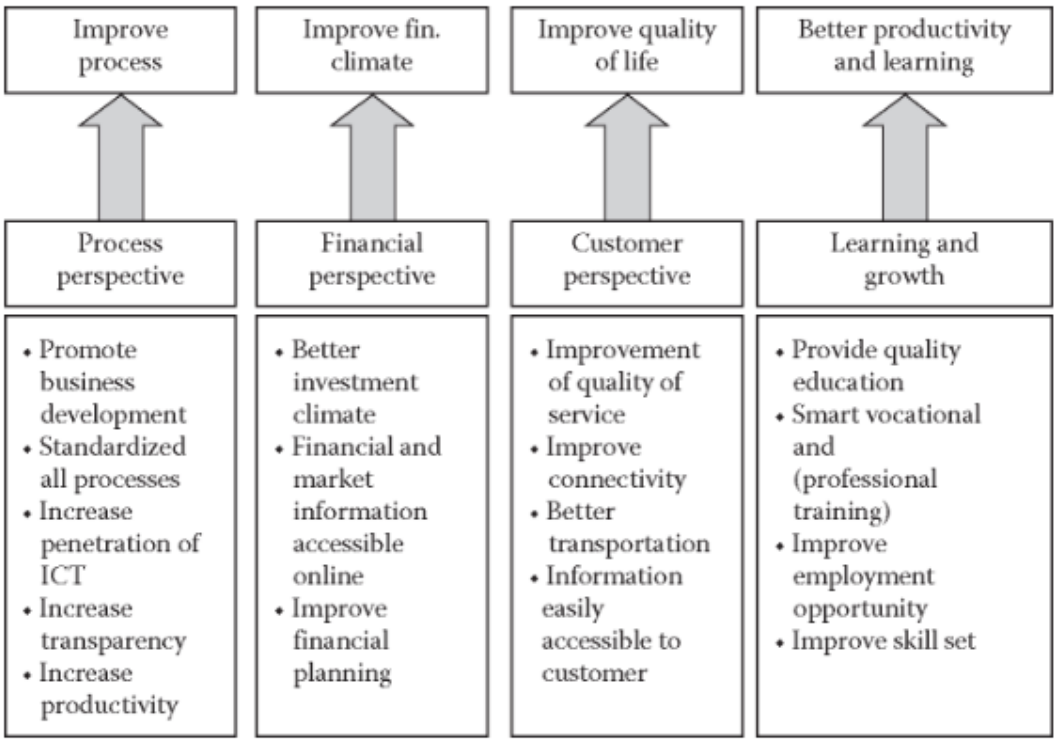
3.2Vision-Goals, Standards and Performance Measurement Indicators:

Now that the services in smart villages are developed, they need to be assessed by measuring their performance. This includes measurement of individual services and the performance of the village as a whole. There must be standard parameters for success in reference to timeliness

response and remedy of complaints, satisfaction to users, accessibility, and so on, and the performances on different parameters are compared with those.



Governance hierarchical model of a smart village.



Performance measurement scorecard.

Smart villages are needed for the welfare of rural people. Technologies are available to make a village smart but due to lack of appropriate strategies, lack of proper, integrated, implementable planning, lack of congenial monitoring, and above all lack of significant execution of activities, there has been failure. However, a framework comprising various factors, such as technological

factors, social factors, legal and governance factors, and their measurements could be used for designing and developing smart villages in India. An ecosystem should be developed for these smart villages, focusing attention on its location as well as the investment opportunity. Here it is also suggested that in order to develop smart villages, the public-private partnership (PPP) model could be of great help. It would be compulsory for the companies taking part in the PPP model to develop these smart villages. It is expected that these concepts and recommendations can be applied in developing smart towns and semi-urban areas to develop smaller towns near the big cities of India. However, it should be kept in mind that the mere development of these smart villages may not suffice the purpose of betterment of living standards, but attention is to be focused holistically on the sustainability of these smart villages.

3.3 Technological Options:

Towns and villages are no strangers to the digital revolution that is taking place in the world, or at least they should not be because their survival depends on it. Innovative solutions, from Big Data to the Internet of Things (IoT), have reached rural areas to help develop and improve their social, economic and environmental conditions

- Smart energy
- Smart mobility
- Smart infrastructure
- Smart public services
- Smart care

3.4 Road Map and Safe Guards:

- The term ‘procedural safeguards’ refers to the protections afforded to a defendant in the course of criminal proceedings.
- The European Commission Green Paper and Proposal for a Council Framework Decision on procedural safeguards adopted the phrase to refer to this aspect of criminal procedure in the area of police and judicial co-operation in criminal matters, for which legislative activity is enacted pursuant to the Third Pillar of EU Treaty Law.
- The 5 key protections identified in the Proposal were the right to legal representation and legal aid, the right to interpretation and translation, notification of rights, assistance for vulnerable defendants, and consular assistance.

3.5 Issues & Challenges:

Budget Constraints

There is a huge issue of budget constraints, which essentially has limited innovative thinking and created obstacles for many other initiatives. The budget constraints have created many hindrances for a lot of smart initiatives that if properly nurtured could be more cost- effective and efficient (UK Government Press, 2013).

Smart Technology

It is considered that smart technology for these smart villages is still in the precommercial or in some cases the conceptual stage. And since the technology is in the pre-mature or conceptual stage, it generates uncertainties regarding return on investment as far as financial parameters are concerned. This also results in apprehension of a long payback period, and investors are unwilling to invest, which contributes to financial uncertainties for smart technology initiatives.

Lack of Knowledge

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

Issues such as data privacy and security and political interferences also do not help to overcome the issue.

3.6 Smart infrastructure- Intelligent Traffic Management:

Smart cities need an Intelligent Transportation System (ITS) which can meet their transportation requirements. Transportation in a smart city should be hassle-free, environment-friendly, and of connected and shared vehicles for better public transportation services. An ITS is supposed to offer these through better traffic control, energy and fleet management. The best fit for this is the Electric Vehicle which also resolves the energy issues of the future. EVs equipped with intelligence i.e., Autonomous Electric Vehicles (AEVs) adds the connected and shared layer required by a smart city. These are capable of communicating the relevant transportation information with other relevant receivers and the communication is referred to Vehicle-to-anything (V2X) communication. This work proposes an ITS whose framework depends on the communication between these EVs and utilizes the applications of an IoT network. MQTT protocol is considered for IoT data exchange within the IoT cloud. Information about the availability of public AEVs is shared with the passengers through a mobile application. Rigorous algorithms are developed to maintain the frequency and availability of public AEVs using data analysis of real-time demands of AEVs in a particular area. Moreover, these AEVs can also be utilized for the energy management of smart cities by connecting them with smart grids and sharing the energy as required. An Illustrative study is made to optimize and regulate the traffic and public transportation for the route between Masjid-e-Nabvi and Masjid-e-Quba of Madina city in Saudi Arabia which faces huge traffic during Hajj. The route discusses retrofitting for introducing smart transformations of existing

structures like street lights, road dividers, and commercial building. Greenfield developments for innovation planning and implementation of establishments like smart grid, Level-2, and Level-3 charging stations. Centralized control is installed to monitor and regulate this ITS through robust big data analytics and cloud technology.

3.7 Smart infrastructure- Intelligent Traffic Management:

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. A significant portion of that data can be sensitive information, whether that be intellectual property, financial data, personal information, or other types of data for which unauthorized access or exposure could have negative consequences. Organizations transmit sensitive data across networks and to other devices in the course of doing businesses, and cyber security describe the discipline dedicated to protecting that information and the systems used to process or store it. As the **volume and sophistication of cyber attacks grow**, companies and organizations, especially those that are tasked with safeguarding information relating to national security, health, or financial records, need to take steps to protect their sensitive business and personnel information. As early as March 2013, the nation's top intelligence officials cautioned that cyber-attacks and digital spying are the top threat to national security, eclipsing even terrorism.

As several critical services become interconnected, the need for cyber security surges to protect data exchanges, privacy as well as the health and safety of citizens. However, there is currently no harmonized guideline or standard to model these data exchanges. This leads IPT operators, municipalities, policy makers as well as manufacturers, solution providers and vendors to adopt specific solutions with low scalability and disparate requirements.

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling:

The several strategies for the development of smart cities which can be elaborated in the terms of Retrofitting, Redevelopment, Greenfield Development. These three are the advanced techniques to be implemented for the fulfillment of projects under smart cities initiatives taken all over the world.

The purpose of the Smart Cities Projects is to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology, especially technology that leads to Smart outcomes.

Area- based development will transform existing areas (retrofit and redevelop), including slums, into better planned ones, thereby improving liveability of the whole City.

New areas (Greenfield) will be developed around cities in order to accommodate the expanding population in urban areas.

Application of Smart Solutions will enable cities to use technology, information and data to improve infrastructure and services.

Comprehensive development in this way will improve quality of life, create employment and enhance incomes for all, especially the poor and the disadvantaged, leading to inclusive Cities.

With the help of green retrofitting of a building both owner and tenants can attain the benefits which are either tangible or intangible benefits.

It will result in reduction in consumption of energy, utilities and water.

Maintenance, new technologies and occupancy changes also need to be continually dealt with.

Upgrading existing buildings not only helps to preserve the character of a place; it is an optimal solution for owners, tenants, the community and the environment.

3.9 Strategic options for fast development:

Choosing the right strategic options for your charity or non-profit organization, following your analysis.

A vital step in strategy development is about taking all of the ideas emerging from the analysis, weighing them up, and making some decisions about your course of action to achieve the vision and mission.

Whilst there are some tools to help, some of this activity is about using your experience, taking a 'punt', having the strength of mind to go for it. Safely!

The strategic plan

Your non-profit organisation's strategic plan shows you know the direction in which you are heading and how to get there.

SWOT analysis

A really useful tool to help collect together all of your thinking from your external analysis of opportunities and threats and your internal analysis of strengths and weaknesses.

Swotting a PEST

Using a combination of these two useful strategy tools to develop some strategic options.

Decision-making matrix

Sometimes deciding between strategic options is really tough. This matrix can help you weigh up different strategic options to make an informed, objective decision.

Cost benefit analysis

Considering both elements is an important part of decision making.

Mission/money matrix

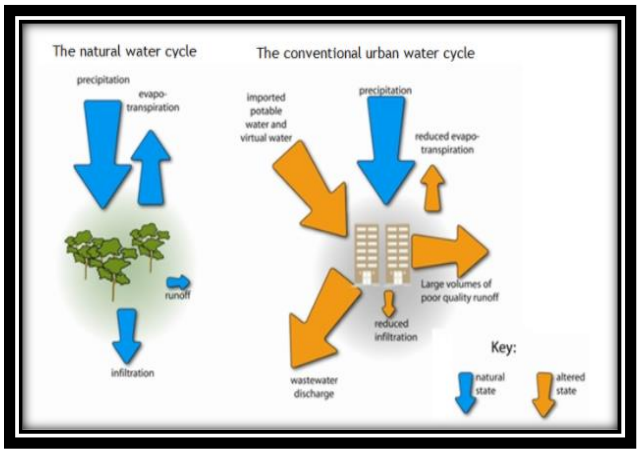
This is a useful management tool for helping an organisation decide on priorities, whether to bid for a contract, or take on a piece of work.

3.10 India's urban water and sanitation challenges and role of indigenous technologies:

Conventional urban water supply and sanitation management is generally characterized by an unsustainable use of water and nutrients. This represents important environmental, economic and social challenges, which are intensified by the process of urbanization.

- **Major differences between the natural water cycle and the conventional urban water cycle. Source: HEALTHY WATERWAYS (2011)**
- **Disruption of the natural water cycle:**

The conventional urban water cycle is characterised by a linear infrastructure that transportsclean water into and wastewater out of urban neighbourhoods. Due to a high percentage of sealed soil and thus impervious surfaces, evapotranspiration and groundwater recharge are reduced and low quality surface runoff is increased – utilities are often left to deal with extremely large volumes of water, especially during wet weather (CORCORAN et al. 2010). Climate change will further intensify these challenges in many regions as it will lead to more erratic patterns of droughts and storms.



- **Pollution of water sources:**

Urban settlements are the main source of point source pollution (UNESCO et al. 2004). It is estimated that more than 90% of sewage in the developing world is discharged directly into rivers, lakes, and coastal waters without treatment of any kind (LUETHI et al. 2009). In low- and middle-income countries, leaking on-site sanitation facilities together with the absence of sewerage pipes that dispose the wastewater, result in large volumes of local wastewater soaking into the soil, and eventually seeping into aquifers and polluting groundwater (GROENWALL et al. 2010).

- **Depletion of groundwater sources:**

In urban settings, the use of shallow groundwater sources is an especially common feature of many low-income communities in low- and middle-income countries. More than half of the world's megacities depend on groundwater (see also sources of groundwater).

- **Broken nutrient cycles and impoverished soils:**

The "end-of-pipe" paradigm discourages recovery and reuse so that nutrients are lost to water bodies. This waste of valuable resources can lead to eutrophication and cause algal blooms and a depletion of oxygen in receiving water bodies (HOWE et al. 2011, see also sanitation systems). In Africa, 85% of arable land is losing an average of 30kg of nutrients per hectare per year (LUETHI et al. 2009).

- **Waste of resources:**

Water treated to potable water is used for non-potable purposes such as toilet flushing, garden use and industry. When water is heavily invalid link or charged based on a fixed rate, users have little financial incentive to use it sparingly (HOWE et al. 2011).

- **High water demand:**

The concentration of a great quantity of population and activities on a small area involve the need of a great amount of good quality water (CHOCAT 2002). Urban areas usually have a higher per capita consumption of water compared to rural areas. Water demand is additionally increased as urban population grows and per capita water consumption in many cities is on the rise (see also water use).

- **Cost-intensive infrastructure for water supply and wastewater collection**:

The increase of urban population asks for a continuous expansion of water networks and wastewater networks (see also wastewater collection and treatment). Centralised networks are very cost-intensive in terms of construction, operation and maintenance. If the networks are not sufficiently maintained, leakages lead to a loss of valuable resources, unreliable or irregular water supply and low revenue collection for the utilities (see also leakage control). Many large cities suffer from chronic water shortages due to over-exploitation of raw water resources, and to losses of water, which sometimes reach up to 60% of the volume of water supplied (UNESCO et al. 2004).

3.11 Initiatives in village development by local self-government:

Local Self Government is a concept that refers to governance by local people of their area.

Now, considering the number of villages in India that lack total connection from the urban parts and often get neglected by the government, it is essential to have a concept of local self-government to ensure that even rural areas are duly represented.

Local self-government is panchayats in rural and municipalities in urban areas. Both got its constitutional recognition after 73rd and 74th Amendments in the Indian constitution respectively.

After recommendations of several committees authoritative status was given to these institutions in India but it can be seen that still, the working of such institutions in our country is not up to the mark.

Major reasons for the same are Poor infrastructure, inadequate funds, bureaucratic influence excessively, and despite the appointment of subordinate bodies for accountability political dominance still plays a very important role in the functioning of this institution.

3.12Smart initiatives by Surat Municipal Corporation: For Example, GIFT:

Water Supply - Initiatives Taken

- Water Supply Grid System - for uninterrupted water supply
- Quality Assurance
- Private Sector Participation
- ISO-9001-2008 Certification for Water Supply
- Alternate Source of Raw Water
- NRW Cell & Water Audit

Water Supply Grid System - for uninterrupted water supply

- Initially, entire water supply for Surat city was dependant on one water works only. Therefore, shutdown/ closure of the plant caused regular interruption in the entire water supply system.
- Today, there are four water works and ten water distribution stations interconnected in a grid in such a way that;
- Failure of any water works does not cause any disruption on the entire water supply system
- All the water distribution stations can be fed from any of the alternative water works.
- Dual power supply has been provided at all water works to ensure minimum disruption to water supply.

Quality Assurance

- Conventional Coagulant Alum is replaced with PAC (Poly Aluminium Chloride) in water treatment process. PAC is advanced coagulant, which helps removal of algal content, minimizes water losses during water treatment process and improves water quality.

- Online Water Quality Monitoring System :- Water Supply System of Surat City is 100% based on surface water of river Tapti. In order to meet and ensure the treated water quality in accordance to the drinking water standard IS 10500:1991 edition 2.2, online water quality monitoring system is deployed for round the clock monitoring of essential water quality parameters like pH, Turbidity, Free Residual Chlorine, Total Dissolved Solids (TDS), Dissolved Oxygen. This system has got inbuilt capability to store database for monitored parameters. This helps better water treatment process control and ensures water quality.
- Consumer Water Quality Monitoring:- This system is established to follow the protocol of collection of water samples from various consumers as per CPHEEO and WHO guidelines. More than 180 samples are collected from the consumer end and taken to the dedicated analytical laboratory. As per guidelines all samples are analyzed to ensure its fitness. Moreover, Free Residual Chlorine (FRC) is also being analyzed at consumer end during supply hours to ensure minimum FRC of 0.2 ppm.
- As a part of Water Quality Monitoring System, consumer water samples are collected and analyzed in dedicated laboratory. Details of zone wise status of unfit samples along with its location are published on SMC's website on monthly basis.
- Deweeder Machine:- Deweeder Machine is deployed in River Tapti for the removal of floating, submerged and rooted vegetation from reservoir. This machine is imported from Netherlands and having capital cost of Rs.2.20 Crore. Machine is in operation since May 2007 and since then about 23,000 MT of vegetation is removed.

Private Sector Participation

With a view to control O & M expenditure and introduce operational efficiencies, Surat Municipal Corporation has given annual contracts to private agencies for:

- Operation & Maintenance of Water Treatment Plants.
- Operation & Maintenance of Water Distribution Stations.
- Valve operation in the different parts of the city.
- Collection of water samples during the water supply period.
- Housekeeping of Water Works & Water Distribution Stations.

Outsourcing by comprehensive management contract for O&M of New North area (Amroli, Kosad, Chhaprabhatha, Mota Varachha, Utran & Variav) water supply system on 24x7 water supply basis (implemented under JnNURM) covering scope of work from raw water up to consumer point including giving new water connection with water meter, reading & billing etc.

ISO-9001-2008 Certification for Water Supply

- QMS consists of treatment water quality control, engineering & maintenance, administration, house-keeping & maintaining all records at all water works and defines clear-cut distribution & allocation of duties & responsibilities among the staff.
- Each aspect of QMS is being maintained to meet its individual objective which in turn is directed to achieve the common goal of the department to provide safe, sufficient & regular potable water supply of the given standards to citizens of Surat consistently.
- This ISO certificate has been awarded by Orion registrar Inc., USA and its' validity is up to March 9, 2013

Alternate Source of Raw Water

- Since centuries, city is substantially dependent on surface water of river Tapi for daily water supply.
- In the absence of any alternative source of water, city water supply may get hampered due to any unforeseen situation (like drought in consecutive years) in future.
- To create an alternate source of water, three options are being actively considered:

Laying 58 Km. long pipeline from Kakrapar to Surat

- Constructing 2 new French wells
- Construction of Balloon Barrage

Leakage Mapping


Orion Registrar, Inc., USA
Certificate of Registration

This is to certify the Quality Management System of:

Surat Municipal Corporation
Head Water Works (HWW), Surat Municipal Corporation,
Opp. CNG Gas Station, Surat - Kamrej Road, Beside Maharana Pratap Garden
Surat- 395 006, Gujarat, India

Has been assessed by Orion Registrar and found to be in compliance with the following Quality Standard:

ISO 9001:2008

The Quality Management System is applicable to:

Conversion of Tapti River Water into Drinking Water and Supply up to Gate of Water Works
This Scopes Applicability is Pertinent to all Sites

The Registration period is from March 10, 2010 to March 9, 2013
This registration is subject to the company maintaining its system to the required standard, and applicable conditions, which will be monitored by Orion.
Client ID 6818-60060 Certificate ID 70060142-1
EAC Code 34
For Additional Sites See Appendix Page

ANAB ACCREDITED
IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

Mr. Paul M. Burck, President
03/11/2010
Date

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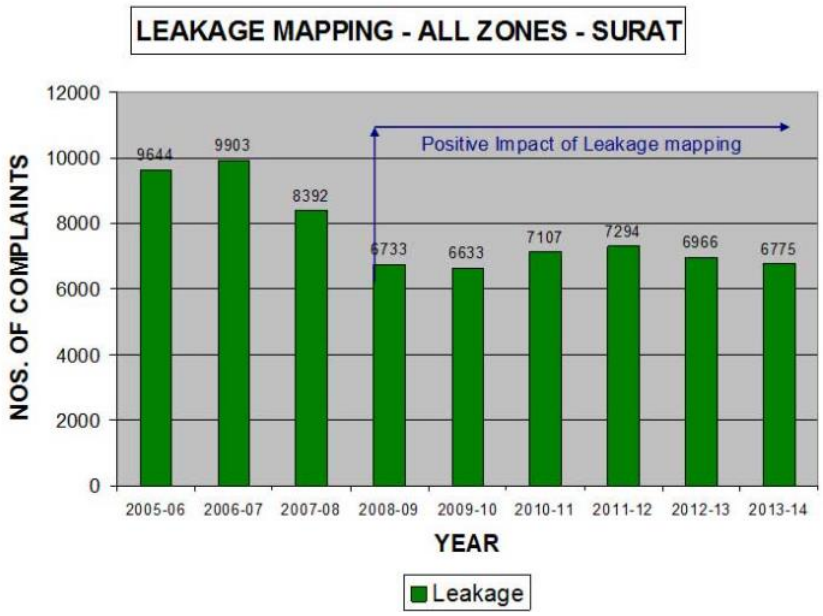
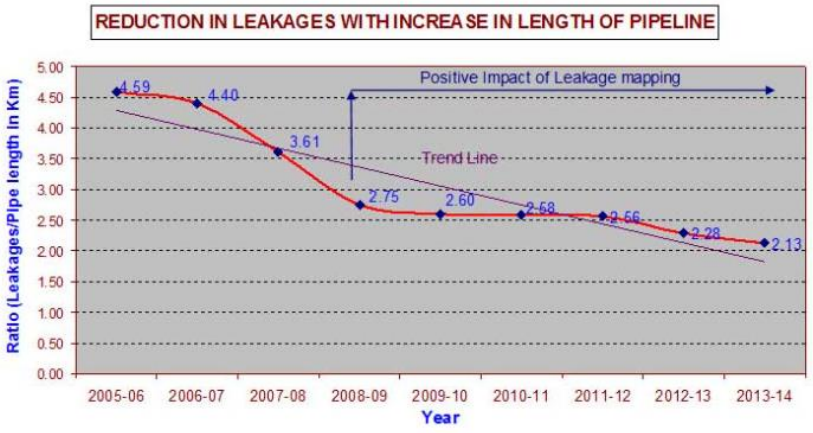
- As a part of constant endeavor to achieve the targeted benchmark of 15% losses, Non-Revenue Water (NRW) cell of Surat Municipal Corporation has been set up and has started functioning recently.
- Leakage Mapping has been an important activity of recently formed NRW cell, this initiative was actually started in year 2007.
- It has been observed that, after the Leakage Mapping initiative, the number of leakages in the central zone has reduced gradually. The same is evident for other zones as well. Thus, leakage mapping resulted in saving of precious potable water and also reduction in the probability of occurring water borne diseases. Positive impact of reduced number of leakages has been depicted well in the chart below:



- Water audit ("a thorough accounting of all water into and out of a utility as well as an in-depth record and field examination of the distribution system that carries the water, with the intent to determine the operational efficiency of the system and identify sources of water loss and revenue loss") will help to keep track of water that is being lost and thus to know the extent of NRW.
- It has been observed that, after the Leakage Mapping initiative, the number of leakages in water supply pipelines reduced gradually in last 7 years. In the recent years, length of water supply present. Hence ratio of numbers of leakages per km length of pipeline is very important, which is shown graphically in the chart below:pipeline network has also increased considerably from 2100 Km in year 2005-06 to about 2950 Km at



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

Country concept:

Smart Village in India gets its foundation from Mahatma Gandhi's vision of Adarsh Gram (model village) and Gram Swaraj (Village self-rule/independence). Gandhi in two texts, Hind Swaraj and Gram (Village) Swaraj, promotes the concept of integrated rural development to impact majority of the population, as the primary initiative after India Independence in 1947.

The Eco Needs Foundation has initiated the concept of "Smart Village". Under this project the Foundation is adopting villages and putting efforts for sustainable development by providing basic amenities like sanitation, safe drinking water, internal road, tree plantation, water conservation.

The Foundation is also working for inculcating moral values in the society and for improving the standard of living of the villagers. In the concept of "Smart Village" the development of the village shall be based on the five paths Retrofitting, Redevelopment, Green fields, e-Pan, Livelihood.

3.14 How to implement other countries smart village's projects in Indian village context:

Human society is developing with rapid momentum and achieved various successes for making its livelihood better. The civilization is witness for various changes related to it's the development through different catalysts like industrial development, green revaluation, science and technology, etc. The present era is augmented on Information and Communication Technology.
This technology has proved its potential in various sectors of development in urban and rural landscapes. Urban areas are seems to more inclined to accept and adopt Information and Communication Technology due to advantages of literacy and better infrastructure as compared to rural areas. Due to such suitable situations of urban landscapes good amount of success of this technology is visible in the form of smart cities and better livelihood of residing human beings. But the problems, consequences and opportunities in urban areas are different for effective utilization of Information and Communication Technology for sustainable development of rural masses. The present research article discusses about rural development in developing world for the up-liftment of livelihood of the rural masses and to take a 'look ahead' at scientific developments and technologies that might be influential over the next 10 -20 years.

3.15 Electrical concept (Design Ideal and Prototype model):

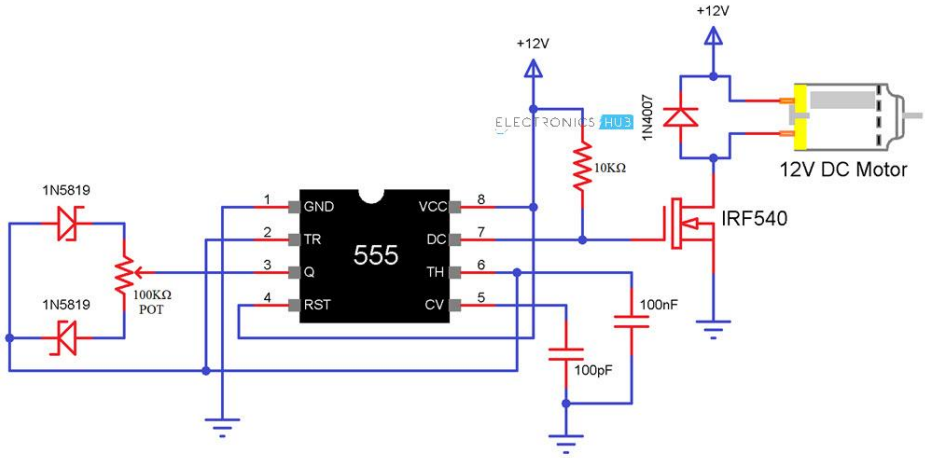
How Speed Control of DC Motor is implemented?

There are multiple ways to adjust the speed of a DC Motor manually. The simplest way to achieve this is with the help of a variable resistor i.e. we can adjust the speed of a DC Motor by using a variable resistance in series with the motor.

But this method is usually not prepared for two reasons. The first reason is energy wastage i.e. the resistor dissipates the excess energy as heat. The second reason is if we want to use any devices like microcontrollers or any other digital equipment for automating our DC Motor speed control, then this method cannot be used.

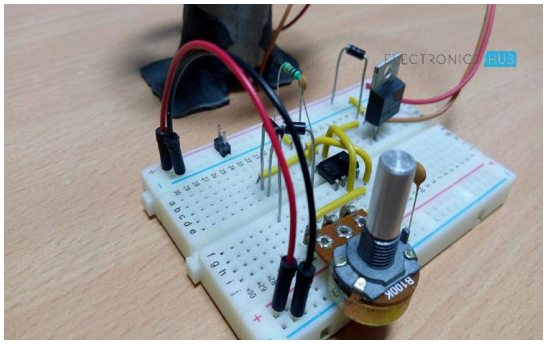
A more efficient way to proceed is by using Pulse Width Modulation technique to Control the speed of our DC motor.

Circuit Diagram of PWM Based DC Motor Speed Control:



Components Required:

555 Timer IC	10KΩ Resistor
12V DC Motor	100KΩ Potentiometer
1N5819 x 2	IRF540 MOSFET
1N4007	Mini Breadboard
100pF	12V Power Supply
100nF	Connecting Wires



Circuit Design:
I am not going to explain the Pin Diagram of 555 IC and willassume that you are already familiar with that. Continuing to design of the circuit, Pin 1 of 555 is connected to GND. Pins 8 and 4 are connected to +12V Supply.

Pins 6 and 2 are short and a 100nF Capacitor is connected between Pin 2 and GND. The wiper pin of the POT is connected to Pin 3 of 555. Two Schottky diodes (1N5819) are connected to the other two pins of the POT as shown in the circuit diagram.

The common point of the diodes is connected to Pin 2. Pin 7 is pulled high with the help of a 10KΩ Resistor. The Gate terminal of the MOSFET is connected to Pin 7 of 555. The motor is connected between +12V Supply and Drain of MOSFET while the Source of MOSFET is connected to GND.

A PN Junction Diode is connected across the Motor terminals to prevent the back emf.

CHAPTER 4

About Vadhava village

4.1 Introduction

4.1.1 Introduction about VADHAVA village:

GTU allocated one village to us of Gujarat for surveying which is the Vadhava in Surat district. This is our study area to find problem related to structure and general amenities. Vadhava village is located at 49 km from Surat and 13 km from Bardoli. Surat is nearest town of Vadhava village. The local language is Guajarati. The VADHAVA THI river pass near the between the Vadhava and Utara village. Total population of the village is 1211 as per census 2011. Main occupation of the Vadhava village is farming. 80% people of Vadhava village depend on farming while 10% people are doing dairy and milk production and remaining 10% people are in labor work. Literacy rate of Vadhava is 85%.

The village has primary school and public garden. Village has not drainage system. Village has gram panchayat building and bus stand. The village elevated reservoir and sump for water storage. There is 24*7 electricity supply for residential use and 8 hour for agricultural use. There are no management for collect and damping of garbage.

4.1.2 Justification/ need of the study:

To development of village compare to the city area in the basic facility to needed for people and their amenities and to study whole village. For development the basic needed and their requirement. It should development road, drainage, school, hospital, etc.

• To reduce migration from rural to urban areas.

• To provide basic and sustainable facilities to rural area to reduce the pressure on urban areas.

• Giving urban touch to the rural soul.

• To uplift the living standard of rural people by providing facilities and better Infrastructure.

•For making the village source of income for other nearby villages.

4.1.3 Study Area (Broadly define):

GTU allocated one village to us of Gujarat for surveying which is the Vadhava near surat district. This is our study area to find problem related to structure and general amenities. town of Vadhava village. Vadhava village is located at 49 km from Surat and 35 km from bardoli. Surat is nearest town of Vadhava village.

4.1.4 Objective of the study:

1. To analyze the existing conditions

2. To find out the problems of Vadhava village.

3. To analyses existing social and physical amenities, public buildings as well as infrastructure.

4. To collect socio-economic data through techno-economic survey.

5. To propose the comprehensive planning suited for ideal village.

6. To provide all the facilities the villagers

Creation of Infrastructure:

To provide connectivity, civic and social infrastructure with provision of alternative Economy generation is the key pillars that the concept.

Basic Physical Infrastructure:

To provide Water Supply, Transport, Sewerage and Solid Waste Management should be the priority on it. To provide internal roads within village.

Efficient Transportation systems to improve connectivity between urban and rural areas, Public transportation facilities that need to be developed like bus stops, transport depot etc.

Basic Social Infrastructure:

To provide Health and Education facilities should be provided and ensure proper delivery of facilities to village houses.

Promote development of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure.

To reduce migration from rural to urban areas due to lack of basic services.

4.1.5 Scope of study:

Sustainability:

- Clean drinking water
- Sanitation
- Primary& secondary education
- Drainage
- Electricity
- Solid waste management
- Utilizing renewable source
- Housing& livelihood
- Better health
- Environmental sustainability

Technology:

- Irrigation facilities
- Delivery of government services
- Telecommunication & internet facilities
- Modern equipment for farming
- ATM Machines
- Biometrics for better targeting of services such as PDS, insurance, pension
- Delivery of government service
- Smart education by projector and wifi

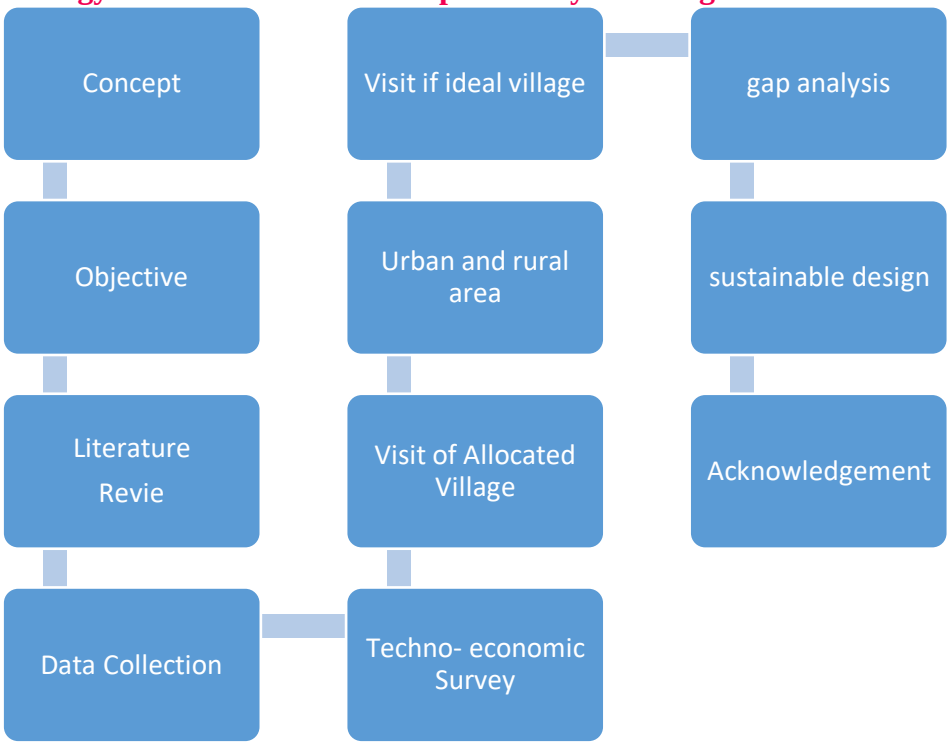
Connectivity:

- Physical connectivity to towns and other places through roads
- Easy and cheap means of transportation
- Digital connectivity
- Financial connectivity

Community Involvement:

- Village development
- Stable Panchayati raj
- Influencing personal and community behavior
- Monitoring the utilization of government funds to increase accountability

4.1.6 Methodology Frame Work for development of your village:



4.1.7 Available Methodology for development of related to Civil/Electrical:

- Reinforced cement concrete road
- Transportation system
- Primary school with electricity
- Overhead water tank: circular
- River
- Anganwadi with electricity

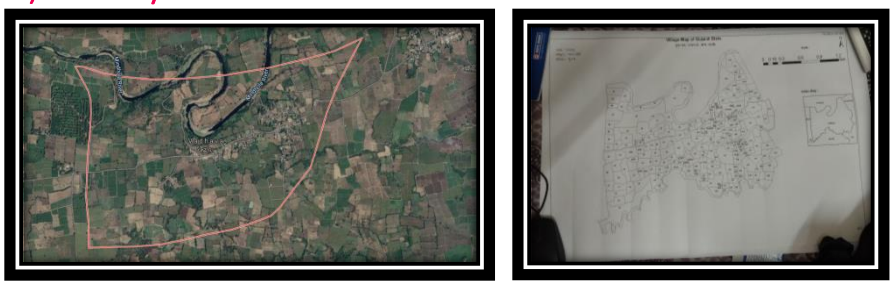
4.2 Study Area Profile:

4.2.1 Study area location:

Gt allocated one village to us of Gujarat for surveying which is the Vadhava near Surat district. This is our study area to find problem related to structure and general amenities. town ofVadhava village. Vadhava village is located at 17 km from Surat and 35 km from bardoli. Surat is nearest town of Vadhava village.

Table .6. Vadhava	
Village Name	Vadhava
Taluka	Bardoli
District	Surat
State	Gujarat
Language	Gujarati
Time Zone	IST(UTC+5:30)

4.2.2 Base Location map, Land Map, Gram Tal Map (Map with all existing facilities) & Study area land use detail:

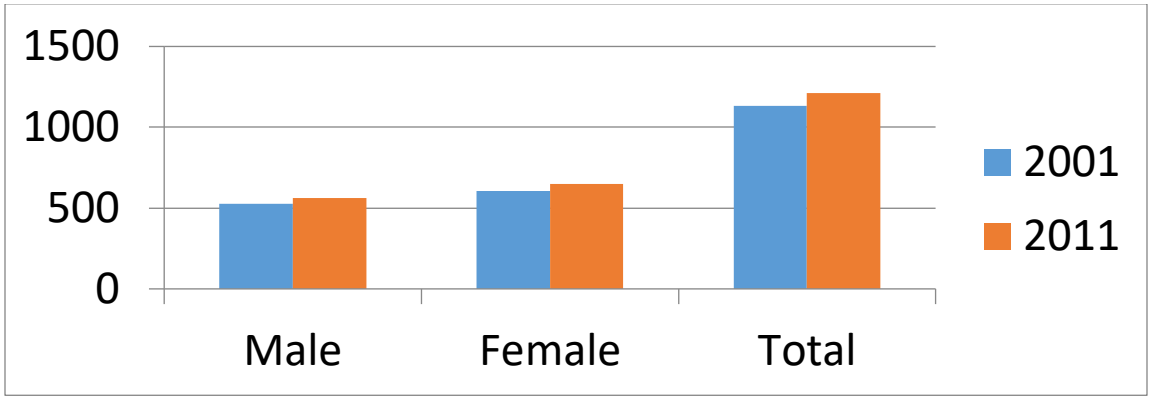


Land map of vadhava village

4.2.3 Physical demographical growth:

Physical Growth

- Primary school (Nos. 1)
- Anganwadi (Nos. 2)
- Bus stop
- Water tanks



Demographic growth of Vadhava

Brief history:

Vadhava village is situated in Surat district. People of this village are living in very peaceful manner. This village having very proud history. Agriculture is the main profession of this village.

Still the village is waiting for industrial development, education, drinking water and roads are the main concerns of this village. Young generation is attracted towards mobile, laptop and computer technology these days. Medical and health services must be improved. There are not sufficient toilet is available.

4.2.4 Economic profile / Banks

About the economic profile of this village, many citizens work interest is farming and labour work. Dairy and milk production also the prime source of income.

The village doesn't have any better facilities regarding infrastructure but has good electrification System which distributed 24*7 hours for domestic use and 8 hours for agricultural use. Village does not have any drainage system.

4.2.5 Actual problem faced by villagers and smart solution:

In the Vadhava village, RCC road is in a poor condition and it is very difficult to drive on this road in rainy season. So it is necessary to redevelopment of RCC road.

In the Vadhava village, there is no drainage facility available so they face problem in rainy season. In the Vadhava village, there are no facilities to disposal of drainage water. Drainage water is disposed in VEDAVATHI river near the village. So it should be necessary to provide connection of drainage in the main line of drainage system.

There no facilities for collecting and damping of wastage coming from resident. It's only solution that provide dustbin at some interval and collect timely.

4.2.6 Social scenario:

The major population is get income through the farming and there are no other job opportunities.

The major crops produced in the village are sugar cane, rise and lady finger.

It was found that all the people of this village are not very much connected with today's technology environment rather than their main major working area .The education is limited to Primary school.

4.2.7 To know the reason of migration/trends of migration/Problem and potential of migration:

People are migrating from rural to urban area to get employment, better education, better health care and other recreation facilities. Now the young generation does not want to live in village and they need more facilities that they cannot get from village

4.2.8 Study area land use details:

Agricultural land use: - 70%

Residential land use: - 20%

Future development: - 8%

Infrastructure: - 2%

4.3General (methods for data collection)

Data collection related to village is the most important first step for development of any village. Without data we cannot identify what is the future requirement for development of village. The following data was collected by various means like: Office record of concerned office department like- R&B Department, Talati office etc. Interaction with Sarpanch, Deputy sarpanch, villagers etc. Visit to different parts of village

4.3.1Method for Collection:

Household for population

A household, as defined in the survey refers to a person or group of people usually living and eating together and jointly running the household's economy (de jure population). ... Women 15-49 years of age, who are the main TDHS respondents, constitute about one-half of the de facto household population: 51 percent

Occupational survey

The Occupational Requirements Survey (ORS) is a product of the Bureau of Labor Statistics (BLS). The ORS provides job-related information regarding physical demands; environmental conditions; education, training, and experience; as well as cognitive and mental requirements for jobs in the U.S. economy.

Transportation survey

Transportation surveys are carried out for the identification of the current transportation system of particular area or region including the points of future development, needs and priorities. Surveys are much essential for recording the facts and finding out the ground realities of remote regions.

Educational survey

An education survey allows you to gather feedback and opinions from both the learner and educator, and then use these findings drive continual improvement across any number of educational areas

Techno-economic survey

Techno-economic assessment or Techno-economic analysis (abbreviated TEA) is a methodology framework to analyze the technical and economic performance of a process, product, or service. TEA normally combines process modeling, engineering design, and economic evaluation.

4.3.2 Primary survey data

The Primary survey was conducted to identify the various general problems of the villagers by interacting with them and enquiring about the problems faced by them in daily life. They were asked to suggest the possible and desirable solutions for these problems as well as other infrastructural facilities they would like to have in their village.

Following questions were asked to the different age group and status of village people:

• Do you have enough water supplies?

• Which type of irrigation facility you are using? Is it enough?

• Are you comfortable with your Road network facility?

• What are your Sources of economy?

•Which type of medical facility is available?

• What is your primary need?

• Which type of facility you want first?

• Where you dispose your waste?

• Are comfortable with available medical facility?

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

As per the sarpanch and our survey there are average 7 x 15 m2 household in village.

4.3.4 No of human being in one house:

As per the sarpanch and our survey there are average 4 persons per household in village.

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

The construction of the houses was made of stone, cement, sand, bricks and concrete. In this village kachha houses are more than the pucca houses.

4.3.6 Geographical Detail

Major economic option of the village is farming so there are no more locally material available like standard bricks, aggregates, concrete and reinforcements. So, this material is brought from nearest city for construction of the houses. In the village 10 to 12 % people doing labor work for money. They either work in the village or go to the nearest city for some labor work

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

Table .8

About 99.5% of population in the Vadhava village is ST and 0.5% of people are another cast.

Particular	total	Male	Female
Population	1211	563	648
Child (0-6)	130	57	73
Literacy	770	384	386

4.3.8 Occupational Detail - Occupation wise Details / Majority business:

In this village 80 to 85 % people connected with agriculture activities its the villages main source of income. But village has the milk production business so that's an income of source too there are approx. 5 to 10 % people are connected with milk production and other are doing labor work for money. About 80% of populations in Vadhava village connect with the agricultural activity and some are connected with the labor work.

4.3.9 Agricultural Details / Organic Farming / Fishery:

Main source of income in this village is farming. Farmers use drip irrigation system to do farming. The main agriculture product is groundnut, cotton, wheat. 258.16-hectare area covered in the agriculture activity out of 368.81hectare.

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses:

Groundnut, cotton, wheat and milk are the main manufacturing product of this village.

4.3.11 Tourism development available in the village for attracting the tourist

No tourism in this village

4.4 Infrastructure Details (With Exiting Village Photograph)

4.4.1 Drinking water:

For drinking Purpose ground water tank, tube well and tap water available. Some people also use hand pump for water purpose. There is over headed water tank is available in village for drinking purpose.

4.4.2Drainage facility:

No drainage system available.

4.4.3Transportation &network:

Main road of village is in good condition and all main roads are of black topped. The width of main road is 3m. Road maintenance is required in some areas of village. The internal street roads are also 90% of R.C.C. But buses are easily not available at the entrance of village.

Other transport facilities like Auto, chhakda and private vehicles are also available. There is no railway station near the Vadhava village.

4.4.4 Housing condition:

In the Vadhava village, the condition of house is good.

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

No social infrastructure facilities, community hall and library. There is an aganwadi and a school.

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

In Vadhava public building like gram panchyat, school is good in condition. But anganwadi, post office condition is not well so maintenance is required.

4.4.7 Technology Mobile/ WIFI / Internet Usage Details:

In the Vadhava village, there are only 20% people are using smart mobile and internet.

4.4.8 Sports Activity as Gram Panchayat

There is no Any Sport Activity as Gram Panchayat.

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

There is no availability of any socio-cultural facility like public library, public garden, and cinema hall etc. inside the village so Socio-cultural Facility is required. There is a one playground. Village pond is not available.

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

There are three bank available in Vadhava. One public food distribution shop available in the village. Primary school and secondary school, three water tanks for drinking purpose are available in village.

•Village needs sewage treatment plant

•Needs public library

•Needs community hall

4.4.11 Agricultural development:

Farmers do not use modern equipments for agriculture activities. Fertilizer is easily available by sahakarimandali in village for a crop. For agricultural use electricity is available for only 8 hours per day. Main road of village are in good condition and all main roads are of black topped. The width of main road is 3m. Road maintenance is required in some areas of village. The internal street roads are also 90% of R.C.C. But buses are easily not available at the entrance of village.

Other transport facilities like Auto, chhakda and private vehicles are also available. There is no railway station near the Vadhava village.

4.5 Electrical Concept

4.5.1 Renewable energy source planning particularly for villages

Small Wind Electric Systems:
If you have enough wind resource in your area and the situation is right, small wind electric systems are one of the most cost-effective home-based renewable energy systems – with zero emissions and pollution.

Small wind electric systems can:

1. Lower your electricity bills by 50%–90%
2. Help you avoid the high costs of having utility power lines extended to a remote location

3. Help uninterruptible power supplies ride through extended utility outages.
4. Small wind electric systems can also be used for a variety of other applications, including water pumping on farms and ranches.

How a Small Wind Electric System Works:

Wind is created by the unequal heating of the Earth's surface by the sun. Wind turbines convert the kinetic energy in wind into clean electricity. When the wind spins the wind turbine's blades, a rotor captures the kinetic energy of the wind and converts it into rotary motion to drive the generator. Most turbines have automatic overspeed-governing systems to keep the rotor from spinning out of control in very high winds. Our wind power animation has more information about how wind systems work and the benefits they provide.

A small wind system can be connected to the electric grid through your power provider or it can stand alone (off-grid). This makes small wind electric systems a good choice for rural areas that are not already connected to the electric grid.

Small Wind Electric System Components:

A wind electric system is made up of a wind turbine mounted on a tower to provide better access to stronger winds. In addition to the turbine and tower, small wind electric systems also require balance-of-system components.

Turbines
Most small wind turbines manufactured today are horizontal-axis, upwind machines that have two or three blades. These blades are usually made of a composite material, such as fiberglass.

The turbine's frame is the structure onto which the rotor, generator, and tail are attached. The amount of energy a turbine will produce is determined primarily by the diameter of its rotor. The diameter of the rotor defines its "swept area," or the quantity of wind intercepted by the turbine. The tail keeps the turbine facing into the wind.

Towers
Because wind speeds increase with height, a small wind turbine is mounted on a tower. In general, the higher the tower, the more power the wind system can produce.

Relatively small investments in increased tower height can yield very high rates of return in power production. For instance, to raise a 10-kilowatt generator from a 60-foot tower height to a 100-foot tower involves a 10% increase in overall system cost, but it can produce 25% more power.

Most turbine manufacturers provide wind energy system packages that include towers. There are two basic types of towers: self-supporting (free-standing) and guyed. There are also tilt-down versions of guyed towers. Most home wind power systems use a guyed tower, which are the least expensive and are easier to install than self-supporting towers. However, because the guy radius

must be one-half to three-quarters of the tower height, guyed towers require enough space to accommodate them.

While tilt-down towers are more expensive, they offer the consumer an easy way to perform maintenance on smaller light-weight turbines, usually 10 kilowatt or less. Tilt-down towers can also be lowered to the ground during hazardous weather such as hurricanes. Aluminum towers are prone to cracking and should be avoided.

Balance of System Components:
The balance-of-system parts you'll need for a small wind electric system – those in addition to the wind turbine and the tower – will depend on your application. For example, the parts required for a water pumping system will be much different from what you need for a residential application.

The balance-of-system parts required will also depend on whether your system is grid-connected, stand-alone, or hybrid.

Most manufacturers can provide you with a system package that includes all the parts you need for your particular application. For a residential grid-connected application, the balance-of-system parts may include the following:

1. A controller
2. Storage batteries
3. An inverter (power conditioning unit)
4. Wiring
5. Electrical disconnect switch
6. Grounding system
7. Foundation for the tower.

4.5.2 Irrigation Facilities

What is Irrigation?

Irrigation is the process of applying water to the crops artificially to fulfil their water requirements. Nutrients may also be provided to the crops through irrigation. The various sources of water for irrigation are wells, ponds, lakes, canals, tube-wells and even dams. Irrigation offers moisture required for growth and development, germination and other related functions.

The frequency, rate, amount and time of irrigation are different for different crops and also vary according to the types of soil and seasons. For example, summer crops require a higher amount of water as compared to winter crops.

Let us have a look at different types of irrigation and the methods used for irrigation.
Types of Irrigation:

There are different types of irrigation practised for improving crop yield. These types of irrigation systems are practised based on the different types of soils, climates, crops and resources. The main types of irrigation followed by farmers include:

Surface Irrigation:
In this system, no irrigation pump is involved. Here, water is distributed across the land by gravity.

Localized Irrigation:
In this system, water is applied to each plant through a network of pipes under low pressure.

Sprinkler Irrigation:
Water is distributed from a central location by overhead high-pressure sprinklers or from sprinklers from the moving platform.

Drip Irrigation:
In this type, drops of water are delivered near the roots of the plants. This type of irrigation is rarely used as it requires more maintenance.

Centre Pivot Irrigation:
In this, the water is distributed by a sprinkler system moving in a circular pattern.

Sub Irrigation:
Water is distributed through a system of pumping stations gates, ditches and canals by raising the water table.

Manual Irrigation:
This a labour intensive and time-consuming system of irrigation. Here, the water is distributed through watering cans by manual labour.

Methods of Irrigation:
Irrigation can be carried out by two different methods:

1. Traditional Method
2. :Modern Methods

Traditional Methods of Irrigation:
In this method, irrigation is done manually. Here, a farmer pulls out water from wells or canals by himself or using cattle and carries to farming fields. This method can vary in different regions.

The main advantage of this method is that it is cheap. But its efficiency is poor because of the uneven distribution of water. Also, the chances of water loss are very high.

Some examples of the traditional system are pulley system, lever system, chain pump. Among these, the pump system is the most common and used widely.

Modern Methods of Irrigation:

The modern method compensates the disadvantages of traditional methods and thus helps in the proper way of water usage.
The modern method involves two systems:

1.Sprinkler system
2.Drip system

Sprinkler System:

A sprinkler system, as its name suggests, sprinkles water over the crop and helps in an even distribution of water. This method is much advisable in areas facing water scarcity.
Here a pump is connected to pipes which generate pressure and water is sprinkled through nozzles of pipes.

Drip System:

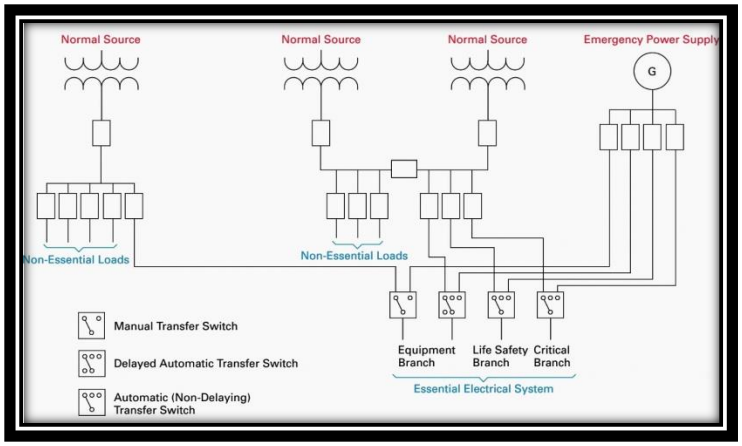
In the drip system, water supply is done drop by drop exactly at roots using a hose or pipe. This method can also be used in regions where water availability is less.

4.5.3 Electricity Facilities with Area

Type 1 Essential Electrical Systems (EES):
Type 1 essential electrical systems (EES) have the most stringent requirements for providing continuity of electrical service and will, therefore, be the focus of this section.
Type 1 EES requirements meet or exceed the requirements for Type 2 facilities.

Sources of electrical power:
Type 1 systems are required to have a minimum of two independent sources of electrical power – a normal source that generally supplies the entire facility and one or more alternate sources that supply power when the normal source is interrupted.

The alternate source(s) must be an on-site generator driven by a prime mover unless a generator(s) exists as the normal power source. In the case where a generator(s) is used as the normal source, it is permissible for the alternate source to be a utility feed.
Alternate source generators must be classified as Type 10, Class X, Level 1 gensets per NFPA 110 that are capable of providing power to the load in a maximum of 10 seconds.
It is permissible to feed multiple branches or systems of the EES from a single automatic transfer switch provided that the maximum demand on the EES does not exceed 150 kVA.
This configuration is typically seen in smaller healthcare facilities that must meet Type 1 EES requirements



Essential Electrical System Branches
The Type 1 EES consists of three separate branches capable of supplying power considered essential for life safety and effective facility operation during an interruption of the normal power source.

They are the life safety branch, critical branch and equipment branch.
Life Safety Branch:
Life Safety Branch supplies power for lighting, receptacles and equipment to perform the following functions:

1. Illumination of means of egress.
2. Exit signs and exit direction signs.
3. Alarms and alerting systems.
4. Emergency communications systems.
5. Task illumination, battery chargers for battery powered lighting, and select receptacles at the generator.
6. Elevator lighting control, communication and signal systems.
7. Automatic doors used for egress.

These are the only functions permitted to be on the life safety branch. Life safety branch equipment and wiring must be entirely independent of all other loads and branches of service. This includes separation of raceways, boxes or cabinets.
Power must be supplied to the life safety branch from a non-delayed automatic transfer switch..

4.6 Existing Institution like - Village Administration – Detail Profile

4.6.1 Bachat Mandali:

No There is no Bachat Mandali.

4.6.2 Dudh Mandali: no

There is no Dudh Mandali.

4.6.3 Mahila forum:

noThere is no Mahila forum.

4.6.4 Plantation for the Air Pollution:

There is no Plantation for the Air Pollution yet.

4.6.5 Rain Water Harvesting - Waste Water Recycling:

There is no Rain Water Harvesting - Waste Water Recycling

4.6.6 Agricultural Development:

There is no Agricultural Development

4.6.7 Any Other:

There is a small shop for skill development.

CHAPTER 5

TECHNICAL OPTIONS WITH CASE STUDIES OF THE EXISTING VILLAGE

5.1 Concept (Civil)

5.1.1 Advance construction techniques / Practices and Quantity Surveying:

India has witnessed rapid urban transformation in the recent decades and the ongoing smart cities initiative by the central government has added new thrust to this change. In the ideal sense, smart cities will enhance the quality of living for citizens by using cutting-edge information and communication technologies to manage civic assets and resources efficiently.

The application of technology is expected to transform civic administration and governance and provisioning of utilities including electricity, water and sanitation, along with ensuring efficient management of traffic and transport systems. A strong civic infrastructure lies at the core of most of these services and this includes residential and commercial buildings.

Smart buildings and structures therefore become a vital ingredient of smart cities. Further, ecological sustainability is a key requirement of modern smart cities. India's construction industry, given the role it will play in building smart cities, must evolve and start embracing advanced construction technologies. Below are three important technologies for constructing smart and sustainable buildings:

Prefabricated Structures

Precast or prefabricated construction is a modern technique where major elements of a building or a structure, including floors, walls and roofs, are manufactured in a factory and then simply 'assembled' on site. Nearly all metro projects, including Delhi Metro and Bangalore Metro, have used Precast or Prefabricated structures, and as a consequence their actual construction has never lagged behind deadlines. Use of precast construction has reportedly helped in saving almost 60% of time in completion of projects (as compared to the conventional construction methods) and has also brought down costs by 10-15%.

This technique has today emerged as a preferred and promising alternative to the conventional concrete-based construction practices for speed, accuracy and higher quality. Prefabricated structures are more durable as they are manufactured under controlled conditions and under strict guidelines. Since the modules are factory-built, there are no problems faced when it comes to quality control, placement problems or untimely deliveries.

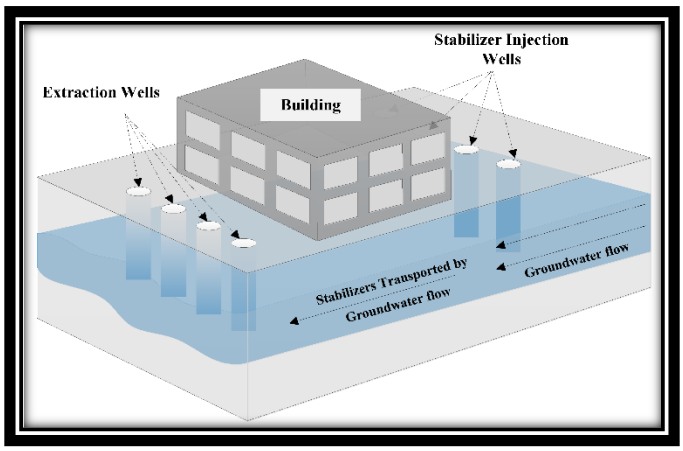
Needless to say, prefabricated buildings are likely to play a key role in keeping the smart cities project on track, both in terms of cost and time.

Constructible BIM

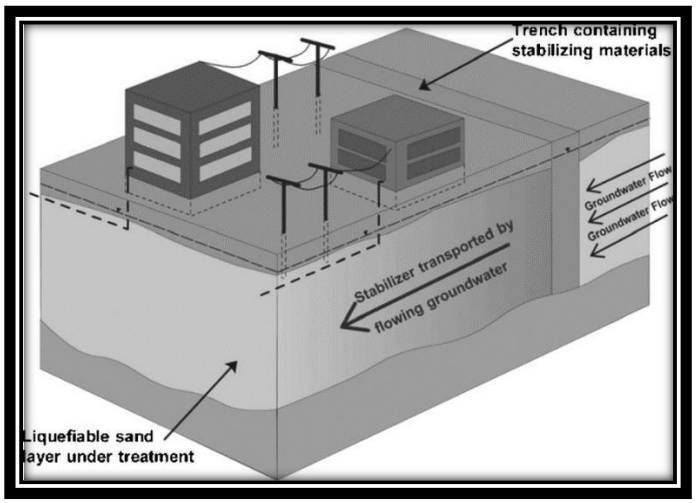
Construction is a complex process. To convert an architect's plan into a built structure requires great precision, which can be achieved by using BIM or Building Information Modeling. BIM enables the creation and management of accurate, detailed, highly constructible 3D structural models which help in visualization of a project from its conception till the end. Detailed BIM models can test the constructability of a building in advance to make sure that errors, rework, wastage is minimized and the project is predictably profitable.

India generates a huge construction waste annually. This also amounts to huge losses for the contractors, which makes the cost of construction higher. By using BIM, it is possible to estimate the exact amount of material required and thus wastage can be reduced to negligible amounts. Adopting constructible BIM to build new structures for the smart cities will thus save both time and money.

5.1.2 Soil Liquefaction:



In the booming field of nanotechnology, colloidal silica (CS) has been introduced for ground improvement and liquefaction mitigation. It possesses a great ability to restrain pore pressure generation during seismic events by using an innovative stabilization technique, with the advantages of being a cost-effective, low disturbance, and environmentally friendly method. This paper firstly introduces molecular structures and some physical properties of CS, which are of great importance in the practical application of CS. Then, evidence that can justify the feasibility of CS transport in loose sand layers is demonstrated, summarizing the crucial factors that determine the rate of CS delivery. Thereafter, four chemical and physical methods that can examine the grouting quality are summed and appraised. Silica content and chloride ion concentration are two effective indicators recommended in this paper to judge CS converge. Finally, the evidence from the elemental tests, model tests, and field tests is reviewed in order to demonstrate CS's ability to inhibit pore water pressure and lower liquefaction risk. Based on the conclusions drawn in previous literature, this paper refines the concept of CS concentration and curing time being the two dominant factors that determine the strengthening effect. The objective of this work is to review CS treatment methodologies and emphasize the critical factors that influence both CS delivery and the ground improving effect. Besides, it also aims to provide references for optimizing the approaches of CS transport and promoting its responsible use in mitigating liquefaction.



To increase liquefaction resistance and limit the potential deformations of ground soil, one of the most popular soil improvement techniques is densification. Dynamic compaction, vibro-compaction, and explosive compaction have been extensively adopted to densify soil to mitigate liquefaction risk. Pioneering works, conducted by Dappolonia et al. (1954), Menard and Broise (1975), Mayne et al. (1984), and Welsh (1986), have facilitated the development and implementation of these densification techniques. However, these reinforcement measures can only be adopted in undeveloped sites, given the fact that the buildings and structures are sensitive to vibration and dynamic compaction. At constrained and developed sites, underpinning and grouting seems to be the most feasible technique. With underpinning, foundation is extended in depth or breadth so that it can either rest on a more supportive soil stratum or distribute its load across a broader area. The stress states of the existing structural elements are significantly improved in order to mitigate liquefaction. Nevertheless, this method targets specific structures rather than the entire ground. In the case of grouting, permeation grout can be classified into two categories, namely, cement suspension and chemically based solutions. Both grouting materials are of high viscosity, so that they are often adopted to form grout columns rather than a uniform distribution across the entire ground beneath the structure. In addition, most typical chemical solutions, such as acrylate and epoxy, are toxic and likely to create pollution to the local underground water. Especially in the case of cement, where the mean particle size of Portland cement ranges from 10–30 μm, allowing it to permeate through voids with a size greater than 0.2–0.3 mm. As a consequence, only on the condition that the soil stratum is mainly composed of medium to coarse sand can Portland cement be adopted as a grouting material. This is even the case with ultra-fine cement, where the mean grain size decreases to 3–5 μm, which has been proposed to be used in pressure grouting in recent years. Even this cement is only appropriate for use in fine to medium sand. However, liquefaction is more likely to occur when the stratum is mainly composed of silty sand or fine sand, so there are some limitations when using these traditional materials to mitigate liquefaction risk.

With the development of nanotechnology, nanomaterials have been proposed by many researchers to be introduced into ground treatment to improve mechanical properties and mitigate liquefaction risk. The concepts and inspirations of nanotechnology originate from a famous talk hold by Richard Feynman entitled “There’s Plenty of Room at the Bottom” at Caltech, in Pasadena, California, in December of 1959. Since then, a new field, exploring and manipulating nanoscale microscopic particle has begun to develop at a breathtaking pace. At present, the economic benefit created by nanomaterials and relevant products annually increases by 20%. Meanwhile, the cost of nano production decreases significantly with the promoting effect of booming market development. Under these circumstances, nanomaterials, such as carbon nanotubes, nano alumina, colloidal silica, nano bentonite, laponite, and so on, have an

expansive application space in civil engineering, especially as kinds of additives to improve the properties of cement, concrete and soils.

Among these advanced nanomaterials, the cheapest and most widely used one in soil treatment is colloidal silica (CS). CS is a kind of powerful material that can be used for passive site stabilization, which is a relatively new technique that has been proposed by Gallagher (2002) as a nondisruptive treatment to mitigate liquefaction risk. The passive site stabilization technique involves three critical procedures, namely, the injection of grouting materials at the upgradient edge of the site, the delivery of the stabilizing materials to the targeted location, and gelation into a rigid gel. The most critical point in passive site stabilization is the smooth delivery of the grouting materials, with the condition of low-gradient terrain. Here, it is required that the given material in use has a low initial viscosity and excellent permeability characteristics, which it needs to sustain for sufficient time such that the modifier could be transported to the desired location. Since CS has an extremely low initial viscosity of around 2 cP (where, as a comparison, pure water has an initial viscosity of 1 cP), after mixing with a salt solution, it can easily flow through the voids of liquefiable soil and permeate across the soil stratum, along with the underground water flow induced by the extraction wells. Once CS reaches the target location, extraction is eliminated, waiting for the CS grouting gel to change into a firm solid. CS has been investigated by many scholars as a kind of grouting material for soil improvement and liquefaction mitigation. The mechanical behavior of the soil stabilized with CS has been evaluated in conventional geotechnical tests, bench-scale model tests and field tests. It has been proven that CS can decrease the axial strain and restrain pore pressure development in the soil subjected to cyclic loading. Therefore, it is potential material to be adopted in ground treatment, especially for strata mainly composed of liquefiable soils.

5.1.3 Sustainable Sanitation:

Poor sanitation and open defecation are huge problems. We know that. And yet, when we discuss them, we so often assume these issues are limited to isolated, rural communities. But the truth is, we are witnessing a global crisis in urban sanitation. And its scale is truly daunting.

Right now, there are nearly one billion people living in urban slums around the world. Many of these people have extremely

poor access to water, sanitation and hygiene. As well as depriving them of a basic standard of living and dignity, poor sanitation contributes to all kinds of problems, including endemic diseases, poor school attendance, low productivity and limits on economic growth.

If existing predictions are accurate, it's only going to get worse. At current rates, it's forecast that 70% of the global population will live in cities by 2050. But despite this, there is plenty to be hopeful about. In fact, the solution to this global crisis may well have been under our noses the whole time.

This January, the Pune Smart Sanitation City Project will launch in India. Pune is home to more than 6 million people. And in a bid to overcome a growing sanitation crisis, the city is to become a test bed for the world's most innovative and imaginative sanitation solutions.

Numerous pilots will be running in tandem as part of a collaboration between the Toilet Board Coalition, Pune Municipal Corporation and private sector partners like Unilever. One pilot includes innovation in waste management systems to tackle the city-wide challenges around untreated sewage (which currently stands at 65%). Another will incorporate smart technologies in the toilets and sanitation system to improve preventative public health information, and potentially provide early warnings for outbreaks of disease.

Crucially, a third pilot will increase the number of public toilet blocks in the form of 'Connected Hygiene Centre's'. Designed to be self-funding, these provide free toilet facilities while, at the same time, turning the surrounding areas into pay-per-use wi-fi hotspots. This offers affordable internet access to some of the poorest residents of the city.

These initiatives are just a selection of the pilots being set up in Pune and elsewhere throughout the 18-month project. The Toilet Board Coalition and its partners will be tracking various metrics – financial, social, economic and health – with the aim of developing scalable, self-sufficient business models that could revolutionize tomorrow's cities.

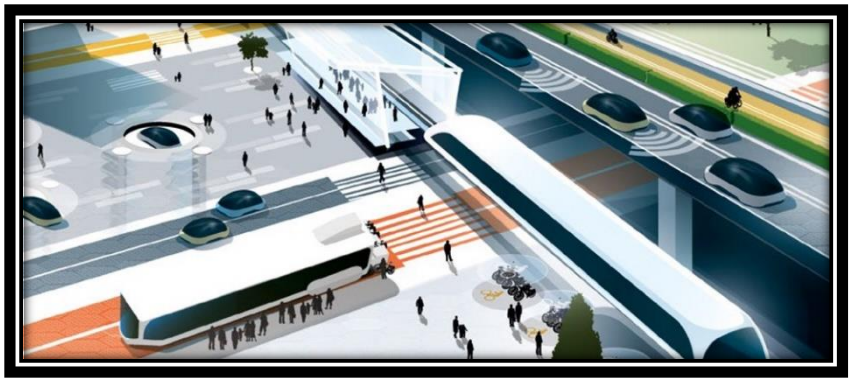
Development experts have learned the hard way that the sanitation crisis is as big as it is complex. These leading-edge experiments – although very promising – can only supplement more traditional but proven interventions, designed with a 'people first' mindset. Smart cities with smart sanitation economies don't just have the power to help solve the crisis; they have the potential to drive a whole new economic model. One that thrives on agile start-ups, governments and larger businesses working in collaboration.

5.1.4 Transport Infrastructure / system:

At present, the smart city is the object of an important and growing body of scientific literature. One result of that broad movement embracing that specific issue is the existence of numerous debates, different definitions of what a smart city is and its implications are.

The concept of the smart city rests upon different pillars, and smart transport and transport infrastructure is one of them. Smart transport and smart transport infrastructure contribute to the building and designing of a smart city by making

it more valuable (with a fluid and non-congested traffic), livable (less noisy, free of accidents), more connected (internet networked) and interconnected (stations becomes kinds of cities inside city). A smart city will change the governance of a city as it influences the cooperation among stakeholders acting in the transport field.



Smart city, smart transport and smart transport infrastructure appear to be a promising evolution but some scholars alert with some critics, concerning potential reinforcing inequalities and segregation effects. The smart city, smart transport and smart transport infrastructure have to be fully understood as a political project, implying many issues such as ideologies, urban planning, governance, coordination among actors, etc.

The spread of the electric bikes (e-bikes) use can promote a smart velomobiles, by making possible a "sustainable, active, and networked mode" of transport, which also could be part of connected vehicles. Arsenio, Dias, Lopes and Perreira examine the potential and barriers to the use of e-bikes by students. Through a questionnaire and a stated-choice experiment with students issued from two secondary schools in Águeda, the authors are able to provide crucial information concerning the barriers to a spread of such innovation, but also the attributes, which are valuable for the potential users. Topography and available cycling lane and infrastructure are the main barriers for using a bicycle to go to school. Those constraints emphasize the involved mixed dimensions of cities (physical and virtual infrastructure ones) and the necessity to be able to couple them. Harrison and Donnelly showed already the city can be conceived as an information one with different layers (social systems, services, resources, infrastructure and natural environment). Arsenio and her coauthors explain that a connected bike could also be an opportunity for pupils for using alternative mode of transportation to the motorized one, but it implies some issues related to the cost and the information service provided have to be solved first.

Smart city and smart transport imply also an ability to produce up-dated and valuable information. Harrison and Donnelly explain that a smart city, here a smart transport system, provide a new way for observing in details the behaviors and the choices of individuals. Smart cities and smart transport infrastructure become complex systems, which have to be though as such. Ebendt and Tcheumadjeu's contribution shows the importance of knowledge and the necessity of having an appropriate decision support tool for that purpose. Their paper tries to answer such a stake by proposing an approach through a dynamic location referencing.

Smart city and smart transport infrastructure highlight many new issues and challenges for society at large. First, smart city and smart transport infrastructure require a well-designed governance system and appropriate organizations and institutions, which the ultimate goal is to serve the population (citizen driven project). A well-aligned system of cooperation among stakeholders appears as a crucial issue for having an efficient and effective smart transport system. Second, there are issues related to justice and equity. The spread of new internet connected things, the systematic collection of individual data and the new uses of big data raised potential dangers for privacy and individual liberties. Smart transport has not to become a big brother system, with systematic supervision of individuals and individual choices. The development of high technology systems also should be inclusive and not exclude less technologically oriented population groups benefiting from the advantages and progress. Third, the building of a smart city with smart transport requires a lot of money and resources. That evolution could imply the involvement of private sector at a larger scale raising the remaining room for public intervention. That could mean also a redefinition of public-private association for building, managing, operating and owning crucial (transport) infrastructure. Smart city, smart transport and smart transport infrastructure participate to a change of the face of the city. Here there are a large avenue and some perspectives for new research for having a city and transport more efficient, more livable and more inclusive.

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. The modern concept of vertical farming was proposed in 1999 by Dickson Despommier, professor of Public and Environmental Health at Columbia University. Despommier and his students came up with a design of a skyscraper farm that could feed 50,000 people. Although the design has not yet been built, it successfully popularized the idea of vertical farming. Current applications of vertical farming's coupled with other state-of-the-art technologies, such as specialized LED lights, have resulted in over 10 times the crop yield than would receive through traditional farming methods.

The main advantage of utilizing vertical farming technologies is the increased crop yield that comes with a smaller unit area of land requirement. The increased ability to cultivate a larger variety of crops at once because crops do not share the same plots of land while growing is another sought-after advantage. Additionally, crops are resistant to weather disruptions because of their placement indoors, meaning less crops lost to extreme or unexpected weather occurrences. Because of its limited land usage, vertical farming is less disruptive to the native plants and animals, leading to further conservation of the local flora and fauna.

Vertical farming technologies face economic challenges with large start-up costs ompared to traditional farms. In Victoria, Australia, a “hypothetical 10 level vertical farm” would cost over 850 times more per cubic meter of arable land than a traditional farm in rural Victoria. Vertical farms also face large energy demands due to the use of supplementary light like LEDs. Moreover, if non-renewable energy is used to meet these energy demands, vertical farms could produce more pollution than traditional farms or green greenhouse.

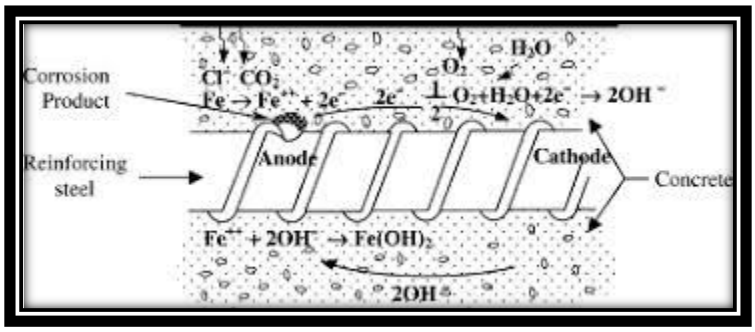
5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure:

In the era of the smart cities no infrastructure activity is possible without reinforced concrete structures and these structures face Corrosion of reinforcement. Every year there is a loss of billions required for repair and maintenance necessary for maintaining the performance of the infrastructure. Corrosion of the RCC rebar is responsible for the reduction of load carrying capacity of the structure. So, detection of the corrosion is very important for further loss of any type.

Methods/Analysis: For the corrosion detection in RCC structure it is very important to know about philosophy of the corrosion occurrence. In the current work various corrosion detection techniques were discussed including surface potential technique, radiography, vibrating wire and electrical strain gauges, Hough transform optical fiber sensors and embedded corrosion Instrument. All these methods are studied on the basis of the progressive detection criteria and the merits and the demerits of each method. Findings: On the basis of the review areas required improvement in environment corrosion interaction philosophy, simulation of acceleration rate of corrosion of steel, studies related to the transport of chlorides and carbonation process, corrosion cracking behavior.

Modern construction has been inconceivable without the reinforced cement concrete. Reinforced concrete has been found as an economical and robust material in civil engineering structures. However, influence of the external condition of environment such as acid rain, chloride ingress2, loading fatigue, and carbonization have coinciding damaging effects on concrete. As a result,

concrete get deteriorated and steel gets corroded. Corrosion is defined as the undesirable deterioration of a metal or an alloy caused by its interaction with the environment that adversely affects the properties of the metal/alloy, which should otherwise be preserved. Due to presence of alkaline environment which is provided by concrete and passivity of bars reinforcements were always believed to be "non-corrodible" but with the passage of time, chlorides ingress into concrete and reinforcement cover decreases and reinforcement steel becomes prone to corrosion damage. Corrosion is an unavoidable process it cannot be stopped; it can only be slowed down or prevented. Presently, corrosion of steel has become a serious problem worldwide, especially for structures exposed to weather. To avoid the loss of serviceability life of structure and structural collapse repairing or replacement is required, which is leading to very high repair cost, sometime even above the initial construction cost. Concrete provides a very diverse environment for the reinforcements inside. Corrosion of steel in concrete when compared with corrosion in natural environment would involve more complicated process than in sea or air. Many issues related to corrosion of steel in concrete are still unsolved; scientists and engineers need to do a lot of research to solve the problems related to corrosion. Reinforced concrete structures are very huge, so same steel bar can be subjected to different kind of corrosion at different ends. Corrosion of steel is closely related to concrete and environmental factors. Change in any one factor would affect each other and would certainly change the whole equation, thus changing the corrosion behavior of steel. For example, any change in temperature would increase concentration of chloride ions and moisture content inside concrete depends not only on moisture



available in air but also depends on temperature cycle during day and night. Thus, we can see effect of environmental factors on corrosion of steel is very complicated. Thus, it is needed to carefully study all the factors affecting corrosion and also the interaction among these factors needs to be investigated. Lack of appropriate techniques to study and monitor the corrosion process have made this research area more difficult.

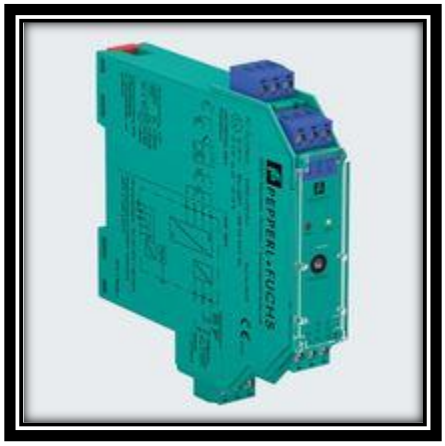
5.1.7 Sewage treatment plant:

Wastewater treatment plants collect and clean sewage and industrial wastewater. In mixing systems, rainwater is added to the wastewater from retention basins and is brought into the plant via pipelines. Wastewater is commonly pumped to a higher level in order for it to pass through the next section of the pipeline. Any flammable materials that are introduced into or penetrate the pipeline, plus any chemical reactions in the wastewater, can create a potentially explosive atmosphere in the pump stations. For this reason, the stations are subject to explosion protection directives.

In the inlet area of the treatment plant, three essential functions take place: The raw wastewater must be transported to pump stations without disruption. This means that the rotational speed of the delivery pumps must be constantly monitored so that the system can switch to a reserve pump in the event of a failure. At the same time, the flow rate and level of the wastewater are measured to prevent subsequent stages of the plant from being overloaded. The conveyor

systems switch on and off as required, ensuring optimal energy use. This means that any potential disruptions—such as a burst pipe—are detected at an early stage. The water quality is also monitored to protect the environmental conditions for the bio-organisms in the subsequent biological stage of the treatment plant. Alongside temperature and salt content, the pH value is a key parameter, as it may indicate alkaline condition or excessive acidity. This means that appropriate measures can be taken to protect the biological stage of the treatment plant.

The isolated barriers of the K-System are interface modules for safely transferring and converting the signals sent from hazardous areas to the control room. The rotational speed of the delivery pumps is monitored by reading out discrete sensor signals using a frequency converter. Flow can be measured using magnetic flow transmitters while the water level is measured by ultrasonic sensors. Transmitter power supplies are used to power the components and facilitate communication between them. Alongside other devices, pH sensors in the inlet determine the pH value of the wastewater while conductivity sensors measure the salt content. Both of these solutions protect the biological stage of the plant. This data is transferred via transmitter power supplies with adjustable limit values.



The K-System portfolio offers interface modules for all signals and applications, ranging from simple isolators to highly functional modules. The Power Rail provides the devices with supply voltage and offers the option for a collective error message. The Power Rail, which consists of a DIN rail with an insert, reduces wiring costs by making it easy to plug in the modules. The K-System has numerous global approvals, including up to SIL 3 for all signal types.

The water inlet of a wastewater treatment plant is defined as a hazardous area and extends to all collection and transport routes up to the point where wastewater enters the plant. Process control encompasses the control of water transport systems, quantity regulation, and water quality monitoring. Frequency converters monitor the rotational speed of wastewater pumps. Transmitter power supplies transfer the signals concerning water level, flow measurement, pH value, and conductivity measurement.

5.1.8 Technical Case "Study on PRIOR ENVIRONMENT CLEARANCE"

Executive Summary

The applicant Mrs. Keshmira Anupkumar Vyas extracts the sand (minor mineral) from river bed of Tapi at Kala Vyara, Tal: Vyara, Dist: Tapi. The unit is applying to regularize the existing Sand mining activity. The mining area of the unit is 01-37-00 ha that is less than 5 ha. Therefore, project falls under category B (B2) of schedule 1(a), as per the EIA Notification, September 2006. Therefore, it requires prior Environment Clearance

Co-ordinates of the corners of lease area (Latitude and Longitude)

There is no forest, wild life sanctuary, eco sensitive area present within 10 km area from the project site.
Unit does not require electricity during the mining activity.

In sand mining activity, water required for domestic, dust suppression & tree plantation only. The requirement is met by surface water & bore well water (nearby village).

No hazardous waste is generated during mining activity. Municipal Solid Waste generation within the lease area is of minor quantity. One dustbin has been provided at the identified place to store all domestic waste & disposed to nearby Gram Panchayat site

	Latitude	**Longitude**
a	21°16'34.05" N	73°23'56.87" E
b	21°16'34.53" N	73°24'06.91" E
c	21°16'31.94" N	73°23'07.59" E
d	21°16'30.73" N	73°23'57.24" E

Introduction

The unit is engaged in extraction of mineral from river bad of Tapi at Kala Vyara, Vyara, Dist: Surat.

This project should be considered under Category "B" of EIA Notification dated 14.09.06. The applicant has applied for lease approval to the District Collector of minor minerals (Sand).

The guidelines of Ministry of Environment and Forests & Geological Survey of India will be followed, the most important is as under:-

- Dry pit mining will be followed which means mining at all times will be above flowing river bed water level with no mining when water is above bed level.
- Sand/ Gravel will be collected in slices of ½ m thickness up to a depth of 2 m or River bed water level whichever is less than prescribed 3 m depth, maximum depth as per model guidelines of Geological Survey of India and Ministry of Environment & Forest.
- Stream will not be diverted to form inactive channel.
- Mining at the concave side of the river channel will be avoided to prevent bank erosion.
- Mining will be restricted minimum 3 m away (inward) from river bank to minimize effect of river bank erosion and to avoid consequent channel migration.
- Area of mining lease will be demarcated prior to mining for sustainable development and Pucca Pillars will be erected on ground.
- No mining operations shall be carried out in proximity of any bridge and/ or embankment

Project Proponent:

The unit is a proprietorship firm & owned by "Mrs. Keshmira Anupkumar Vyas" Government has granted the permission (Sand lease) for the period of 3 years to extract the Sand (Minor mineral) in area of 01-37-00 ha from the riverbed of Tapi (right now, lease is under process of renewal to the District Collector).

Nature of the project

The unit is a small scale unit, falls under the category of mining of minerals.

Need for the Project

Unit is one of the suppliers of sand. The mining and associated activities bring about infrastructural development, i.e., roads are constructed, schools and hospitals are established, and communication facilities are developed, etc., which tend to improve the quality of life of the complexes.

Employment Generation (Direct & Indirect) Due To the Project

Approximately 15 people get direct & indirect employment due to the project activity. The mining and associated activities offer opportunities of employment to the eligible people from the ethnic population.

Project Description

Details of the Project

Sr. No.	Particulars	Details
1.	A. Village	Kala Vyar
	B. Tehsil	Vyara
	C. District	Tapi
	D. State	Gujarat
2.	Elevation range (meter)	47.87 mSL to 50.30 mSL
3.	Total Lease Area (in hectares)	Sand lease Area: 01-37-00 ha (In front of Gamtal) on river bed of Tapi at Kala Vyar, Tal: Vyar, Dist: Tapi.
4.	Nearest National Highway	NH-8 at 47.50 Km in W Direction
5.	Nearest Railway Station	Vyara Railway Station is located 17.59 Km in SW
6.	Nearest Town	Kala Vyara: 0.97 Km in SSW Vyara: 18.29 Km in SSW Tapi: 21.42 Km in E Vyara Police station:18.10 Km in SW Vyara Taluka Panchayat:18.15 Km in SW
7.	Nearest Airport	Surat-Airport is located 70.42 Km in WSW direction
8.	Ecological Sensitive	Vansda National Park: 65.91 Km in SSE

	Areas Reserve/Protected Forest	Dandi Eco Sensitive Zone: 83.39 Km in WNW Purna wild life sanctuary: 50.43 Km in SE Shoolpaneshwar wild life sanctuary: 67.53 Km in NE
9.	Interstate Boundary of Gujarat	Maharashtra State Boundaries: **77.90** Km in ESE
10.	Water Requirement	**Source:** Nearby Village bore well, **Qty**.: 15 m^3/d,
11.	Manpower Requirement	10-15 Persons

About Kala Vyara:

Kala Vyara is a Village in Vyara Taluka in Surat District of Gujarat State, India. It is located 67 KM towards East from District head quarters Surat 19 KM from 270 KM from State capital Gandhinagar.

Type of Project

Sand Mining (Semi Mechanized By scraping/dredging the mineral)

Location

The site is located at about 21°16'32.99" N latitude and 73°23'58.54" E longitude

Details of Alternate Sites

Unit has been doing mining activity (extraction of sand) for last few years. Moreover, no additional mining area is proposed. Therefore, no alternate site is considered for this existing project.

Size / Magnitude of Operation

Production Capacity (Mining Area/Mining Rate)

Extraction of the Sand @ 20,000 MT/Yr (Approx.) from an area of 01-37-00 ha (In front of Gamtal) from river bed of Tapi at Kala Vyara, Vyara, Tapi.

Mining Details

Sr. No.	Details	Explanation
1.	Lease area	01-37-00 ha
2.	Rate of Production	20,000 Mt/Yr
3.	Method of mining	Semi Mechanized (By scraping/dredging the mineral)

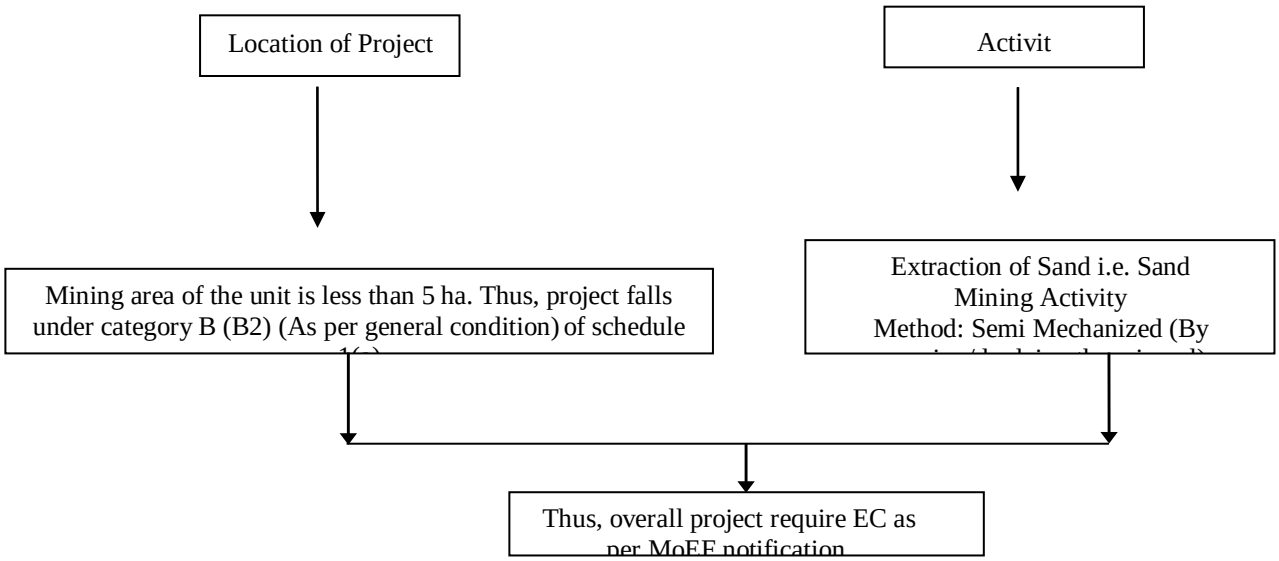
4.	Validity of Lease Period	Lease No.1: (01-37-00) (In front of Gamtal) on river bed of Tapi at Kala Vyara, Tal:Vyara, Dist: Surat Lease Issue : 27/06/2006 Lease Period: Three Years from the issue date Lease Renewal (applied for): 29/11/2011
5.	Extent of mechanization	Suction Dredger (Extractor), Truck and Tractors Trolley
6.	Ultimate Working depth	4.7 m to 5 m
7.	Water level of river bed	2.7 m to 3 m

Method of Mining

Mining of the minerals is done by scraping/dredging the mineral from active channel or Floodplain or terrace.

Mining of the minerals is done by scraping/dragging the mineral in ½ meter strip. Then the mining is restricted up to 2 m depth only.

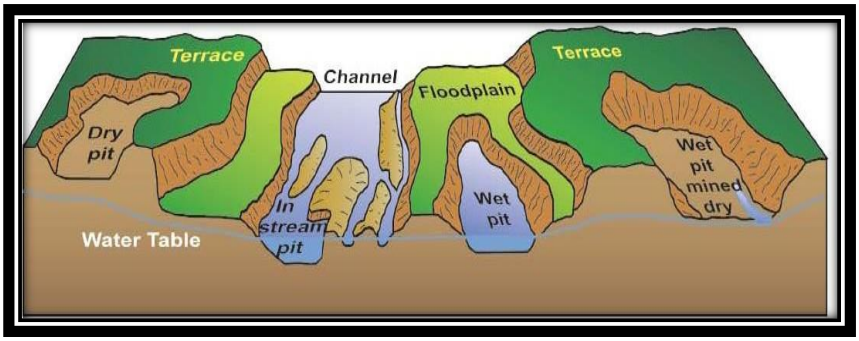
SCHEMATIC REPRESENTATIONS OF PROJECT



The unit is applying to regularize the existing Sand mining activity. There is no additional mining area is proposed. Estimated cost towards environmental protection measures for the project is as under;

Details	Description	Approximate Recurring Cost Per Annum (Rs. in Lacs)	Approximate Capital Cost (Rs. in Lacs)

Green Belt Development	Tree Plantation along the road side	0.33	0.5
Environmental Monitoring and Management	Periodic monitoring of environmental quality and management shall be carried out by external agency	0.3	--
CSR Activity	CSR activity is proposed for various local development activities like conducting medical checkups for the local people, road development, improvisation or development of school and hospital facilities, development of temples, providing scholarships for the backward and girl students, etc.	0.3	--
TOTAL	**-**	**0.93**	**0.5**

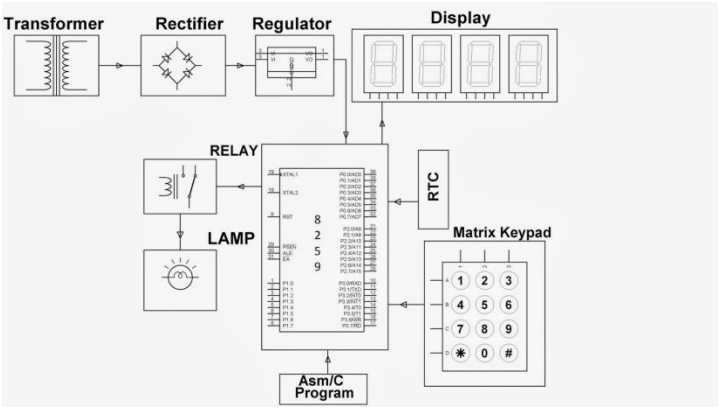


Method of Mining

5.2 Concept (Electrical):

5.2.1 Programmable 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.

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
- Manpower dependency is less.

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,aCrystal 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 ie,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 ie 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 ie 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

5.2.2 Railway Security System using IoT:

Railway has been playing a important role of public Transportation from 19'th century, in this a steam locomotive Began to be run. From that moment, the railway was Regarded as a core method to transport population moving Along the determinant paths within and between Metropolitan cities. The basic technology of the railway has Been so far progressed and enables a high-speed railway System which satisfies the public demand on traveling a long Distance. The railway possesses the inherent characteristics Of huge capacity and energy efficiency, and those merits Motivate the governments of many countries to encourage And support the railway for public interest. The governments take into account the railway vital once they establish Transport policies. One of the important problem for railway Operators is maintenance of their railway systems. As the Railway system content of various entities including train Vehicles, tracks, facilities (i.e. tunnels and bridges), Catenaries and electrical devices in trackside. It is necessary For the railway operators to guarantee that every entity of The railway system operates in good condition. Any Operational damage supposed to be strictly prevented, Because an unexpected fault may threat the security of Passengers. Due to this fact, the government forces theRailway operators to totally engage themselves in conducting The maintenance.Securing safety of passengers is a very important Task to train operating company. To date, many different Approaches have appeared. In this work, two approaches are Introduced. First approach is based on integrated use of Multiple sensors. These sensors provide location Information with much more increased precision. These Approaches can be used with other methods to provide Elevated level of safety to passengers.

Recent trend of railway train development can be Characterized in several aspects: high speed, infotainment,Intelligence in driving, and so on. In specific, trend of high Speed in driving is prominent and competition for high Speed amongst several techno-savvy countries is becoming Severe. To achieve high speed, engines or motors are Distributed over multiple vehicles of train to provide Increased motive power, while a single engine or motor has Been mostly used for conventional trains. Increased speed And more complicated power train system naturally incur Much higher chance of massive accidents. From this angle, Importance of proactive safety control before accident takes Place cannot be over-emphasized. To implement proactive Safety management needs situation-aware integration and Transmission of safety info obtained from IoT sensors. Types Of essential IoT sensors depend upon situational conditions.

Thus, integration and transmission of safety info ought to be Performed with IoT sensors providing the security info Correct for long-faced state of affairs. This work is to devise a Methodology how to operate IoT sensor network enabling proactive safety control for railway vehicles.

5.2.3 Management through Energy Harvesting Concept:

Energy harvesting (also known as power harvesting or energy scavenging or ambient power) is the process by which energy is derived from external sources (e.g., solar power, thermal energy, wind energy, salinity gradients, and kinetic energy, also known as ambient energy), captured, and stored for small, wireless autonomous devices, like those used in wearable electronics and wireless sensor networks.
Energy harvesters provide a very small amount of power for low-energy electronics. While the input fuel to some large-scale generation costs resources (oil, coal, etc.), the energy source for energy harvesters is present as ambient background. For example, temperature gradients exist from the operation of a combustion engine and in urban areas, there is a large amount of electromagnetic energy in the environment because of radio and television broadcasting.

One of the earliest applications of ambient power collected from ambient electromagnetic radiation (EMR) is the crystal radio.

The principles of energy harvesting from ambient EMR can be demonstrated with basic components.

Operation:

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

Accumulating energy:

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

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

Storage of power:

In general, energy can be stored in a capacitor, super capacitor, or battery. Capacitors are used when the application needs to provide huge energy spikes. Batteries leak less energy and are therefore used when the device needs to provide a steady flow of energy. These aspects of the battery depend on the type that is used. A common type of battery that is used for this purpose is

the lead acid or lithium ion battery although older types such as nickel metal hydride are still widely used today. Compared to batteries, super capacitors have virtually unlimited charge-discharge cycles and can therefore operate forever enabling a maintenance-free operation in IoT and wireless sensor devices.

Use of the power:

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

RF Energy Harvesting:

Radio Frequency (RF) energy harvesting has experienced a rapid development in recent years due to the increasing number of RF transmitter sources producing an abundant ambient microwave energy waste. Furthermore, the development of wireless power transmission (WPT) technologies has triggered impetus for RF energy harvesting. Hence, RF energy scavenging is a promising solution as it has the potential to provide a sustainable energy source to meet upcoming demands. Efficient ambient RF energy scavenging is a very challenging issue, as it deals with the low RF power levels available in the environment. The scavengeable power levels are generally unknown and can vary unpredictably; therefore sparking research interest to develop highly sensitive RF energy scavengers to capture ambient RF signals over a range of low input power levels.

Ambient-radiation sources:

A possible source of energy comes from ubiquitous radio transmitters. Historically, either a large collection area or close proximity to the radiating wireless energy source is needed to get useful power levels from this source. The nantenna is one proposed development which would overcome this limitation by making use of the abundant natural radiation (such as solar radiation).

One idea is to deliberately broadcast RF energy to power and collect information from remote devices:This is now commonplace in passive radio-frequency identification (RFID) systems, but the Safety and US Federal Communications Commission (and equivalent bodies worldwide) limit the maximum power that can be transmitted this way to civilian use. This method has been used to power individual nodes in a wireless sensor network.

5.2.4 Moisture Monitoring System

Soil moisture sensors aid good irrigation management. Good irrigation management gives better crops, uses fewer inputs, and increases profitability. Soil moisture sensors help irrigators to understand what is happening in the root zone of a crop.
This page is a guide to selecting an appropriate soil moisture sensor for your farm.

Scheduling irrigation:

To be used effectively, soil moisture sensors must be:

1. Used in an irrigation shift that delivers water evenly.

2. Installed correctly and placed in an area which is representative of the crop being grown.
3. Used in combination with other irrigation management information (soil moisture sensors only measure a tiny area of an irrigation shift):

- Evaporation-based scheduling.
- Soil moisture monitoring.
- Grower observation.

Sensor types:

There are basically two groups of sensors:
1.Water potential sensors, such as tensiometers and granular matrix sensors
2.Soil moisture sensors that give a percentage or relative content of soil moisture.

Water potential sensors:

These sensors measure how hard it is to remove water from the soil, providing the best indication of available water for plants. Soil type and water content influence the suction pressure required to remove water from the soil, but a monitored sensor, which is recorded and graphed, will show the sharp fall that indicates water has become hard for a plant to access.

Tensiometer sensors:

Tensiometers are the most responsive water potential sensor, and they require the most care and maintenance. There are two types of tensiometer tip: one is used in sands, and the other in clays and loams. Use the appropriate tip to see quick reactions to changes in water status.
Tensiometer work by measuring suction pressure at the tensiometer's porous tip. Water is drawn out of or into the tip, depending on water availability. This creates a suction pressure representing the suction force required for a plant to obtain water from the soil. Measurements can be done by manually reading a vacuum gauge, or automatically, using a logging pressure transducer.

To maintain tensiometer, check for bubbles and refill the fluid used to create the vacuum within the tensiometer.

Granular matrix sensors:

Granular matrix sensors pass a current across a porous media – usually gypsum – with the electrical resistance changing proportionally to the amount of water drawn in and out of the media. They are generally a low cost, low maintenance sensor. Once installed they often last many years without intervention.

The reactivity of granular matrix sensors to changes in water status is the biggest limitation to their use. Accuracy is somewhat poor and can vary greatly – between 10% and 25% of the actual measurement.

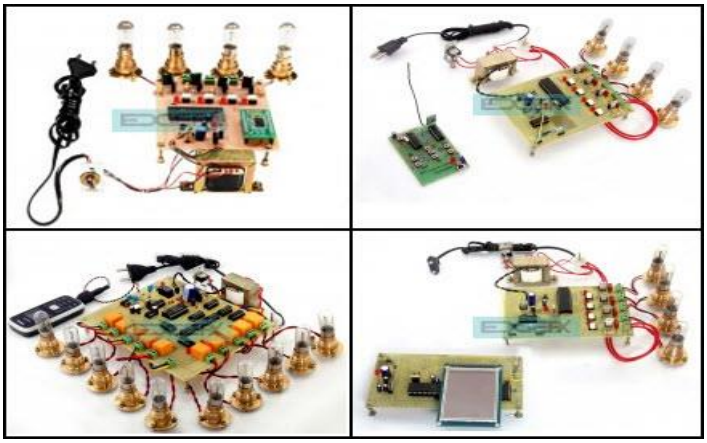
Most granular matrix sensors have low accuracy at low tension (0–10 kilopascals). This is an issue if the soil type being measured has limited plant available water and the crop is water sensitive, such as vegetables grown on the coarse WA sands and heavier clays.

Depending on the porous material and the construction of the sensor, the water seems to move in and out of these sensors slower than with tensiometers. There tends to be a lag in the sensor wetting and drying in response to the soil. The lag tends to be greater as the soil dries, as opposed to rewetting, and therefore may lead to an underestimation of plant stress on the drying cycle.

5.2.5 Home Automation using IoT / Any other methodology:

The process of controlling or operating various equipment, machinery, industrial processes, and other applications using various control systems and also with less or no human intervention is termed as automation. There are various types of automation based on the application they can be categorized as home automation, industrial automation, autonomous automation, building automation, etc., In this article, let us discuss about wireless home automation using IOT (Internet of Things).

Wireless Home Automation using IOT (Internet of Things)
There are various techniques to control home appliances such as IOT based home automation over the cloud, home automation under WiFi through android apps from any smartphone, Arduino based home automation, home automation by android application based remote control, home automation using digital control, RF based home automation system and touch screen based home automation.

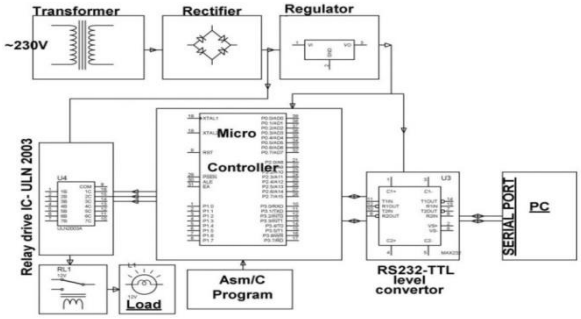


Wireless home automation using IOT is an innovative application of internet of things developed to control home appliances remotely over the cloud. The home automation system project can be developed by following simple steps shown below.

Required Components & Materials:
The essential components and materials for home automation using IOT project can be listed as a Wi-Fi module, Opto-coupler, TRIAC, resistors, capacitors, diode, regulator, loads (home appliances). There are various eCommerce websites that are providing facility to purchase all the required components online such as a project kit consisting of individual components essential to design a particular project.

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 the proposed system like speed, cost, and distance.



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

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

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

Compilers are programs used to convert a High Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors.

i.e the programs written in one of the HLL like ‘C’ will compile the code to run on the system for a particular processor like x86 (underlying microprocessor in the computer).

For example compilers for Dos platform is different from the Compilers for Unix platform So if one wants to define a compiler then compiler is a program that translates source code into object code.

Equipment	Price(Rs.)
Micro-controller	500
Level shifter IC	20
Transformer	400
Rectifier	1200
Relay drive	500
Regulator	15
TTL Level convertor	120
Total	2755

5.2.7 Electrical Parameters Measurements

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.

The following table gives a list of some of the standard electrical units of measure used in electrical formulas and component values.

Electrical Parameter	Measuring Unit	Symbol	Description
Voltage	Volt	V or E	Unit of Electrical Potential V= I x R
Current	Ampere	I or i	Unit of Electrical Current I = V / R
Resistance	Ohm	R or Q	Unit of DC Resistance R = V / I
Conductance	Siemen	G	Reciprocal of Resistance G = 1 /R
Capacitance	Farad	C	Unit of Capacitance C =Q /V

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

• dB – The Decibel, The decibel is a one tenth unit of the Bel (symbol B) and is used to represent gain either in voltage, current or power. It is a logarithmic unit expressed in dB and is commonly used to represent the ratio of input to output in amplifier, audio circuits or loudspeaker systems.
For example, the dB ratio of an input voltage (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.

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

CHAPTER: 6

SWACHH BHARAT ABHIYAN (CLEAN INDIA)

6.1 Swatchhta needed in allocated village -Existing Situation with photograph

Swachh Bharat Abhiyan

Swachh Bharat Mission is a mass movement for cleanliness launched on 2nd October 2014 by the Prime Minister of India. The Swachhta Abhiyan has turned into a National Movement with citizens now becoming active participants in cleanliness activities across the nation. The dream of a, Clean India "once seen by Mahatma Gandhi is being realized with millions of people across the country joining the cleanliness initiatives of the government departments, NGOs and local community centers to make India clean as a part of this Jan Andolan".

Swachh Bharat Abhiyan App

When a person with this Clean India App, sees any intolerable waste/ garbage dump:

- He/ she will open this App and take picture of the waste/ garbage dump
- This picture will get uploaded on the Swachh Bharat National Server (Clean India National Server) along with its geo-location, time and date of upload
- National Server will process the image and grade this waste/ garbage dump as Red, Yellow or Green. Red for Urgent Action, Yellow for taking Notice and Green to indicate Clean.
- National Server hence places a "Tag" of respective color on the Google Map (or on ISRO's BHUWAN) at that geo-location.
- Now consider that many persons have uploaded such information, all such Geo-Tags will be seen to anyone on Google Map (or on ISRO's BHUWAN).

Geo-spatial Technology for Swachh Bharat Abhiyan

A novel initiative to contribute in the Swachh Bharat Abhiyaan using the Geo-spatial Technology (GST) was taken up jointly by the central Government institutions in Dehradun. This initiative was supported by Nagar Nigam, Dehradun (local authorities). Indian Institute of Remote Sensing (IIRS), a Unit of ISRO, coordinated this programme in collaboration with the following institutions

- Anthropological Survey of India
- Archaeological Survey of India
- Botanical Survey of India
- Indian Institute of Petroleum
- Defence Electronics Application Laboratory (DEAL), DRDO

6.2 Guidelines - Implementation in allocated village with Photograph:

- Elimination of open defecation
- Eradication of Manual Scavenging
- Modern and Scientific Municipal Solid Waste Management

- To effect behavioral change regarding healthy sanitation practices
- Generate awareness about sanitation and its linkage with public health Capacity Augmentation for ULBs to create an enabling environment for private sector participation in Capex (capital expenditure) and Opex (operation and maintenance) Mission Strategy The estimated cost of implementation of SBM (Urban) based on unit and per capita costs for its various components is Rs. 62,009 Crore.

The balance funds are proposed to be generated through various other sources of fund which are, but not limited to:

- Private Sector Participation
- Additional Resources from State Government/ ULB
- User Charges
- Innovative revenue streams
- Market Borrowing
- Beneficiary Share
- Corporate Social Responsibility
- Land Leveraging
- Swachh Bharat Kosh
- External Assistance

Mission Components:

Household toilets, including conversion of insanitary latrines into pour-flush latrines

- Community toilets,
- Solid waste management
- Capacity building and Administrative & Office Expenses (A&OE)
- Public toilets and urinals
- IEC & Public Awareness

6.3 Activities Done by Students for allocated village with Photograph:

- While traveling doesn't throw any wrapper, paper or any dry waste on road. Keep it in your bag or pocket (as it is a dry waste you can keep them in your bag/pocket).
- Keep paper bags with yourself to store wet waste and throw them in dustbin only.
- Spitting on roads (as it can be the reason of viral disease).
- Avoid chewing Pan-Masala, Gutka and Tobacco.
- Avoid use of plastic bag.
- Follow government's rules and regulations.
- If someone is breaking the rule then make them aware of it.
- Stop your friends if they are making such mistakes.
- Spread awareness to keep our village clean.

Education start-ups can also partner with other schools for spreading awareness among the adults in rural areas. If the elderly populace of villages does not comprehend the value of education, they won't allow their children to study.

CHAPTER: 7

VILLAGE CINDITION DUE TO COVID-19:

India has overtaken Brazil and become the second-worst affected country in the world by the coronavirus pandemic, with more than 4 million cases. COVID-19 had mostly remained in India's cities, but the disease is now spreading to rural India – an area with over 850 million people and far worse healthcare.

The reason for this shift appears to be migrant workers who have been returning to their villages since lockdown was eased at the end of June. The medical response to stop the spread and treat those infected has been inadequate, according to media reports.

With one trained doctor for every 1,497 people, against the World Health Organization recommended one per 1,000, and public health expenditure for 2018 at just 1.3% of GDP, India faces an uphill struggle in dealing with the pandemic. While two-thirds of India's population lives in rural areas, there are almost four times as many health workers per person in cities.

Most rural communities rely on untrained health workers. Over two-thirds of these rural health providers have no formal medical training, but remain the only option of medical support for most of the rural population.

7.1 TAKEN STEPS IN ALLOCATED VILLAGE RELATED EXISTING SITUATION:

COVID stigma:

This situation is worsened by the stigma and misinformation that surrounds COVID-19 in India . Fear of the virus has led to widespread mistrust of trained healthcare professionals. Indian doctors have reported being evicted from rented accommodation and others have been violently targeted in some slum communities. The misconception is that health professionals are sources of infection and that they will force people to be removed from their families into quarantine centers. These centers are viewed with suspicion and fear.

The stigmatization of those infected or suspected to have COVID-19 is likely to result in unreported cases. And, indeed, some reports suggest that this is taking place. This means the situation can only get worse for COVID-19 victims and is undermining efforts to mitigate the pandemic.

In the long term, it threatens India's recovery and progress, with the potential for many people to become debilitated with illness and economic hardship. In rural India, basic preventative measures of washing hands pose challenges because of the lack of access to clean running water.

Trust in and cooperation with the state, health professionals, or law enforcement agencies is key in the context of a pandemic. This is evidenced in countries such as Germany, South Korea and Taiwan, where trust is high, as well as the Indian

state of Kerala and India's biggest slum Dharavi in Mumbai, where citizens have cooperated and followed the guidelines. In each of these examples, the spread of the virus has been halted and controlled by a rigorous approach of test, track and trace.
In a parliamentary democracy, the bedrock of this approach is the willingness of the people to cooperate, accept responsibility and have confidence in the system. These three pillars, in turn, are anchored in the trust citizens have in the government machinery delivering public services. India's pandemic response has made it clear how feeble such trust really is.

Trust in a pandemic:

The situation in India has highlighted the weaknesses of public healthcare provision. India requires more resources to expand the pool of trained doctors accessible to its majority rural population and improve the trust people have in them.
Perhaps making careful use of informal health practitioners could be one way to do this. While the treatment they provide is often unsafe, most are usually trusted. My research into a women's self-help network, conducted over eight years between 2009-17 in rural Bihar, India, suggests that many rural people have unreserved trust in their local village informal health practitioner. This is also echoed in other states of India.

7.2 ACTIVITIES DONE BY STUDENTS FOR ALLOCATED VILLAGE:

Proactive measures are needed on the part of the government and civil society to safeguard rural populations from the economic fallout of this pandemic.
These could include:

1. Continuing the supply chain of midday meals and Anganwadi meals, and delivering them to the families' doorsteps (like Kerala has done), so that children and pregnant mothers get at least one meal a day.
2. Supplying free ration to rural households through the public distribution system.
3. Supporting rural households with 30-50 days' worth of labor wages, from the MGNREGA budget.
4. Leveraging the SHG network and ASHA workers to disseminate IEC material.
5. Extending Village Organizations (VOs) to provide soft loans to households that lose wage days and/or incur COVID-19-related health expenses—State Rural Livelihood Missions may consider extending the use of the Vulnerability Reduction Fund (VRF) to the VOs for this purpose.
6. Rescheduling bank loan repayment cycles for SHGs and individual agricultural debtors.

7.3 ANY OTHER STEPS TAKEN BY STUGENTS / VILLAGERS:

The current crisis is one which we are not fully equipped for, nor know enough about. Preparing and empowering the rural population would go a long way in this fight.
We provide awareness, safety measures and precautions regarding COVID-19.

CHAPTER: 8

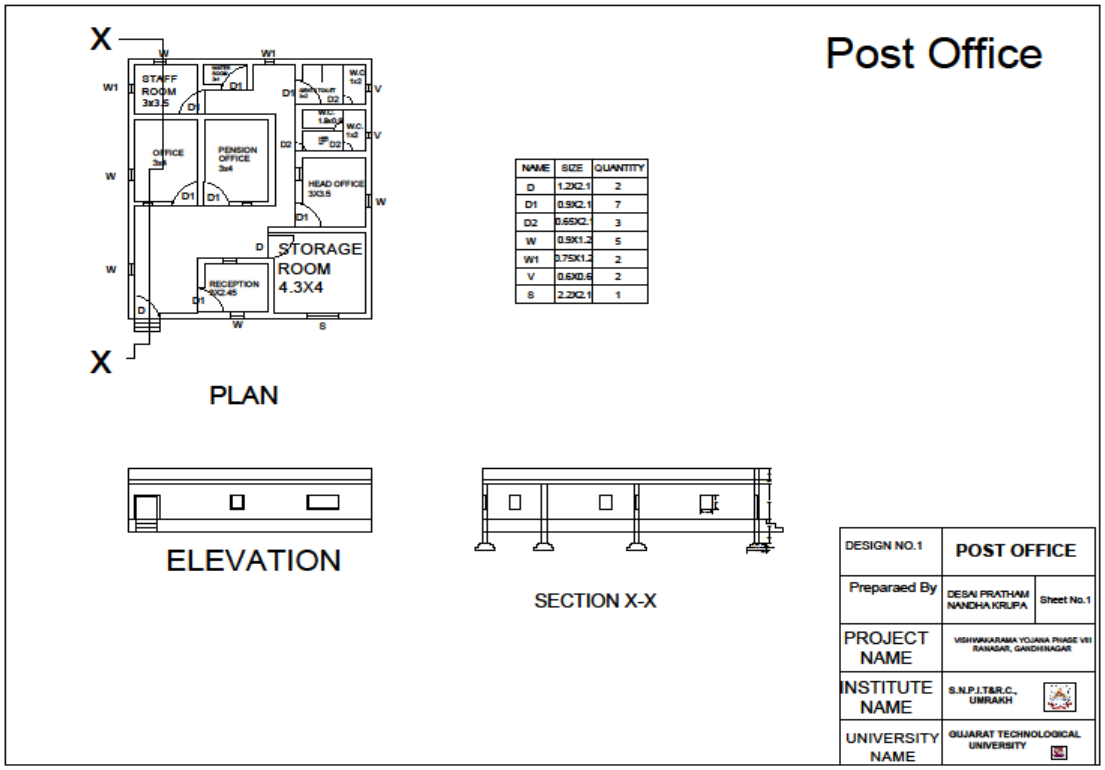
SUSTAINABLE DESIGN PLANNING PROPOSAL

8.1 Design Proposals

8.1.1 Social-Cultural Design (Post office):

In our village VADHAVA, The Post office is available but condition of the Post office is not good and size (area) of Post office is very small. For problem in post services are not solved by village Post office . So villagers are go outside of village for any problems of post services and huge size post like any electronic item etc. Also taken by other Post office which is outside of the village. So we are design Post office for solve the problem of villagers.

In design of post office large size waiting room and sitting room provided. Receptionist office is also provided for any queries, problem and information about post services. Two main offices are also provided in design for any kind of work of post services and solutions of post problems. For any problem by officer and problem not solved so for complaints of officers one head office is provided. Gent's and ladies toilet are also provided. For drinking is purpose small kitchen (water) is provided. One staff room is also provided. For huge size of Post services large size storage room is provided. The Post office is made by low cost.



Measurement Sheet of post office						
SR. NO	DESCRIPTION	NO`	L	B	H	QUANTITY
	Total Centre line=(11.2×4)+(12.7×3)+23+4.6+3.3+2.75+7.1+8.4=111.35 No. Of T-junction=26					
1.	Excavation for foundation up to 1.5 depth					
	Length=total center line-(number of tea junction×width÷2)					
	=111.35-(26×0.9÷2) =99.65	1	99.65	0.9	0.9	80.72m3
	For steps:-					
	L=1.2+0.15=1.5m	1	1.5	0.6	0.15	0.135m3
					Total:-	80.86m3
2.	Providing and laying PCC(1:4:8) for foundation	1	99.65	0.9	0.3	26.91m^3
	Steps	1	1.5	0.9	0.15	0.236m3
					Total:-	27.15m^3
3.	First class brick masonry C:M(1:6) for foundation					
	Step:-1(60cm)					
	L=103.55m	1	103.55	0.6	0.3	18.64m^3
	Step:-2(50cm)					
	L=104.85m	1	104.85	0.5	0.3	15.73m^3
					Total:-	34.37m^3
4.	Back filling in foundation					
	=80.72-34.37=46.35m^3				Total:-	46.35m^3
5.	First class brick masonary G.L to P.L					
	L=106.15m	1	106.35	0.4	0.575	24.42m^3
	Step1.	1	1.2	0.3	0.15	0.054
	Step2.	1	1.2	0.3	0.30	0.108
	Step3.	1	1.2	0.3	0.45	0.162
					Total:-	24.74m^3
6.	DPC(2.5cmthick)	1	106.15	0.4		42.46m^2
	Deduction:-					
	S	1	2.2	0.4		0.88
	D	2	1.2	0.4		0.96

	D1	6	0.9	0.4		2.16
	D2	3	0.75	0.4		0.9
					Total:-	4.9
					Net total:-	37.56m^2
7.	First class brick masonary for superstructure					
	L=107.45m	1	107.45	0.3	3	96.71m^3
	Deduction					
	(1)Lintel	1	107.45	0.3	0.15	4.84
	(2)Door					
	(a)D	2	1.2	0.3	2.1	1.512
	(b)D1	6	0.9	0.3	2.1	3.402
	(c)D2	3	0.75	0.3	2.1	1.42
	(3)Shutter	1	2.2	0.3	2.1	1.386
	(4)window					
	(a)W	5	0.9	0.3	1.2	1.62
	(b)W1	6	0.75	0.3	1.2	1.62
	(5)ventilation	2	0.6	0.3	0.6	0.216
					Net total:-	80.69m^3
8.	Half brick partition wall in C:M (1:6)					
	PLW	2	2		3	12
	PSW	1	1.9		3	5.7
	Deduction:-					
	D3	3	0.65		2.1	4.1
					Net total:-	13.6m^3
9.	Providing and laying RCC(1:2:4) for slab, lintel, chhajja					
	(1)Lintel L=107.45m	1	107.45	0.3	0.15	4.84
	(2)Chhajja					
	(a)W	5	0.9	0.45	0.1	0.2
	(b)W1	6	0.75	0.45	0.1	0.2
	(c)D	1	1.2	0.45	0.1	0.054
	(3)RCC slab	1	13	11.5	0.1	14.95
					Total:-	20.24m^3

10.	Providing mild steel reinforcement for RCC work including binding and bending and placing in position					
	Quantity=1% of volume of concrete					
	=20.24×78.54=1589.65kg					
	Say=1590kg				Total:-	1590kg
11.	12 cm thick plaster					
	(A)Internal plaster					
	(1)ceiling					
	(A) waiting room.					
	(I)	1	5.3	3		1.59
	(ii)	1	3.3	2.55		8.42
	(b)Receptionist	1	3	2.45		7.35
	(c)storage room	1	4.3	4		17.2
	(d)head office	1	3	3.5		10.5
	(e)Toilet	2	2	3		12
	(f)Drinking water	1	2	1		2
	(g)staffroom	1	2.5	3		7.5
	(h)office	2	3	4		24
	(I)passage					
	(I)	1	1	1.3		1.3
	(ii)	1	1	4.6		4.6
	(iii)	1	2	2.5		5
	(iv)	1	1.2	2.3		2.76
	(2)Wall					
	(a)Waiting room					
	(I)	1	5.3		3	15.9
	(ii)	1	6.6		3	19.8
	(iii)	1	2.75		3	8.25
	(iv)	1	3.3		3	9.9
	(v)	1	3		3	9
	(vi)	1	1.25		3	3.75
	(b)Receptionist					
	(i)	2	3		3	18
	(ii)	2	2.45		3	14.7
	(c)Storage room					
	(i)	2	4.3		3	25.8
	(ii)	2	4		3	24
	(d)head office					
	(i)	2	3		3	18
	(ii)	2	3.5		3	2.1
	(e)Toilet					
	(i) Gents:-1.	2	1.9		3	11.4

	2.	4	2		3	24
	3.	2	1		3	6
	(ii) Ladies:-1.	2	1		3	6
	2.	2	2		3	12
	3.	4	1.9		3	22.8
	4.	2	0.9		3	5.4
	5.	2	1		3	6
	(g)drinking water					
	(i)	2	2		3	12
	(ii)	2	1		3	6
	(h)staffroom					
	(i)	2	3		3	18
	(ii)	2	2.5		3	15
	(I)office					
	(i)	4	3		3	36
	(ii)	4	4		3	48
	(j)passage					
	(i)	1	1.3		3	3.9
	(ii)	1	8.1		3	24.3
	(iii)	1	4.6		3	13.8
	(iv)	1	2		3	6
	(v)	1	2.5		3	7.5
	(vi)	1	3.3		3	9.9
					Total:-	396.6m^2
	(B)External wall up to parapet top					
	Lw	2	13		4.6	119.6
	Sw	2	11.5		4.6	105.8
	(1)Parapet top					
	Lw	2	13	0.2		5.2
	Sw	2	11.1	0.2		4.44
	(2)Parapet inside					
	Lw	2	12.6		0.9	22.68
	Sw	2	11.1		0.9	19.98
	(3)Chhajja					
	W	10	0.9	0.45		4.05
	W1	12	0.75	0.45		4.05
	D	2	1.2	0.45		1.08
	(4)Chhajja(front)					
	W	5	0.9		0.1	0.45
	W1	6	0.75		0.1	0.45
	D	1	1.2		0.1	0.12
	(5)Chhajja(side)					
	W	10		0.45	0.1	0.45
	W1	12		0.45	0.1	0.54

	D	2		0.45	0.1	0.09
					Total:-	288.98m^2
	Deduction:-					
	(a)Door					
	D	2	1.2		2.1	5.04
	D1	6	0.9		2.1	11.34
	D2	3	0.75		2.1	4.725
	D3	3	0.65		2.1	4.095
	(b)Window					
	W	5	0.9		1.2	5.4
	W1	6	0.75		1.2	5.4
					Total:-	36
					Net total:-	649.58m^2
12.	5cmthickmosictilesflooring					
	(1)waiting room					
	(i)	1	5.3	3		15.9
	(ii)	1	3.3	2.55		8.42
	(2)Receptionist	1	3	2.45		7.35
	(3)Head office	1	3	3.5		10.5
	(4)storage room	1	4.3	4		17.2
	(5)Toilet passage	2	1	1.9		3.8
	(6)drinking water	1	2	1		2
	(7)staffroom	1	3	2.5		7.5
	(8)office	2	3	4		24
	(9)passage					
	(i)	1	1	1.3		1.3
	(ii)	1	1	4.6		4.6
	(iii)	1	2	2.5		5
	(iv)	1	1.2	2.3		2.76
					Total:-	110.33m^2
13.	10cmBBLC(1:2:4)					
	(1)waiting room					
	(i)	1	5.2	2.9	0.1	1.51
	(ii)	1	3.2	2.45	0.1	0.784
	(2)Receptionist	1	2.9	2.35	0.1	0.68
	(3)Head office	1	2.9	3.4	0.1	0.99
	(4)storage room	1	4.2	3.9	0.1	1.64
	(5)toilet	2	2.9	1.9	0.1	1.102
	(6)drinking water	1	1.9	0.9	0.1	0.171
	(7)staffroom	1	2.9	2.4	0.1	0.70
	(8)office	2	2.9	3.9	0.1	2.26
	(9)passage					
	(i)	1	0.9	1.2	0.1	0.11

	(ii)	1	0.9	4.5	0.1	0.41
	(iii)	1	1.9	2.4	0.1	0.46
	(iv)	1	1.1	2.2	0.1	0.24
					Total:-	11.57m^3
14.	Sand filling/murum					
	(1)waiting room					
	(i)	1	5.2	2.9	0.45	6.79
	(ii)	1	3.2	2.45	0.45	3.53
	(2)Receptionist	1	2.9	2.35	0.45	3.07
	(3)head office	1	2.9	3.4	0.45	4.44
	(4)storage room	1	4.2	3.9	0.45	7.4
	(5)toilet	2	2.9	1.9	0.45	4.96
	(6)drinking water	1	1.9	0.9	0.45	0.77
	(7)staffroom	1	2.9	2.4	0.45	3.132
	(8)office	2	2.9	3.9	0.45	10.18
	(9)passage					
	(i)	1	0.9	1.2	0.45	0.49
	(ii)	1	0.9	4.5	0.45	1.82
	(iii)	1	1.9	2.4	0.45	2.05
	(iv)	1	1.1	2.2	0.45	1.09
					Total:-	49.72m^3
15.	Providing and laying white glazed tiles WC					
	(1)W.C.-1					
	(i)	2	2	1		4
	(ii)wall(a)	4	1		2.1	8.4
	(b)	4	2		2.1	16.8
	(2)W.C-2					
	(i)	1	1.9	0.9		1.71
	(ii)wall(a)	2	1.9		2.1	7.98
	(b)	2	0.9		2.1	3.78
	Deduction:-					
	D3	3	0.65		2.1	4.1
					Net total:-	38.57m^2
16.	Providing and laying skirting of mosaic tiles					
	(1)waiting room					
	(i)	1	5.3			5.3
	(ii)	1	6.6			6.6
	(iii)	1	3			3
	(iv)	1	2.75			2.75
	(v)	1	3.6			3.6
	(vi)	1	2.55			2.55
	(2)Receptionist					

	(i)	2	3			6
	(ii)	2	2.45			4.9
	(3)storage room					
	(i)	2	4.3			8.6
	(ii)	2	4			8
	(4)head office					
	(i)	2	3			6
	(ii)	2	3.5			7
	(5)toilet passage					
	(i)	4	1.9			7.6
	(ii)	4	1			4
	(6)drinking water					
	(i)	2	2			4
	(ii)	2	1			2
	(7)staffroom					
	(i)	2	3			6
	(ii)	2	2.5			5
	(8)office					
	(i)	2	3			6
	(ii)	2	4			8
	(9)passage					
	(i)	1	1.3			1.3
	(ii)	1	4.6			4.6
	(iii)	1	8.1			8.1
	(iv)	1	2			2
	(v)	1	2.5			2.5
	(vi)	1	3.3			3.3
					Total:-	128.7m
	Deduction:-					
	D	2	1.2			2.4
	D1	6	0.9			5.4
	D2	3	0.75			2.25
	D3	3	0.65			1.95
					Net total:-	116.7m

ABSTRACTSHEET					
Sr. no	description	Quantity	Rate	Per	Amount (Rs)
1	Excavationforfoundationupto 1.5mdepth In ordinary soil	80.86	85	M^3	6873.1
2	Providing and lying PCC for	27.15	1500	M^3	40725

	foundation				
3	1st class brick masonry CM(1:6) for				
	Foundation	34.37	1600	M^3	54992
4	Back filling in foundation	46.35	50	M^3	2317.5
5	1st classbrickmasonryfromG.L toP.L	24.744	1600	M^3	39590.4
6	Providing and lying DPC	37.56	150	M^2	5634
7	1st classbrickmasonryCM(1:6) for				
	Superstructure	80.69	1500	M^3	121035
8	Half brick partition wall CM(1:3)	13.6	1500	M^2	20400
9	Providing and lying RCC(1:2:4)	20.24	2500	M^3	30360
10	Providing mild steel reinforcement for				
	RCC work	1590	35	KG	55650
11	12mmthickcementplaster	649.58	150	M^2	97437
12	5cmthickmosaictilesfloor	110.33	200	M^2	22066
13	10cmthickBBLC(1:2:4)	11.57	1000	M^3	11570
14	Sand filling/murrum filling	49.72	50	M^3	2486
15	Providing and lying white glazed tiles				
	W.C	38.57	200	M^2	7714
16.	Providing and laying skirting of mosaic tiles	116.7	250	M	29175
				Total=	548025
				3%contingency	16440.75
				2% work charge establishment:-	10960.5
				Total =	575426.2
				10%contractor profit :-	57542.625
				GRAND TOTAL=	632968.875

8.1.2 Physical Design (LOW COST TOILET):

Gramalaya has been implementing for more than two and half decades various toilet technology depending on the terrain with the support of Water Aid and Water.org for the last 20 years. There are several designs and technologies available for installing a household type sanitary latrine. Therefore, it is important to give several technological options or informed choices to the user to

choose and own and maintain a sanitary latrine without much external support but several inter-related factors play important role in installing a sanitary latrine to a rural household.

This includes:

Affordability

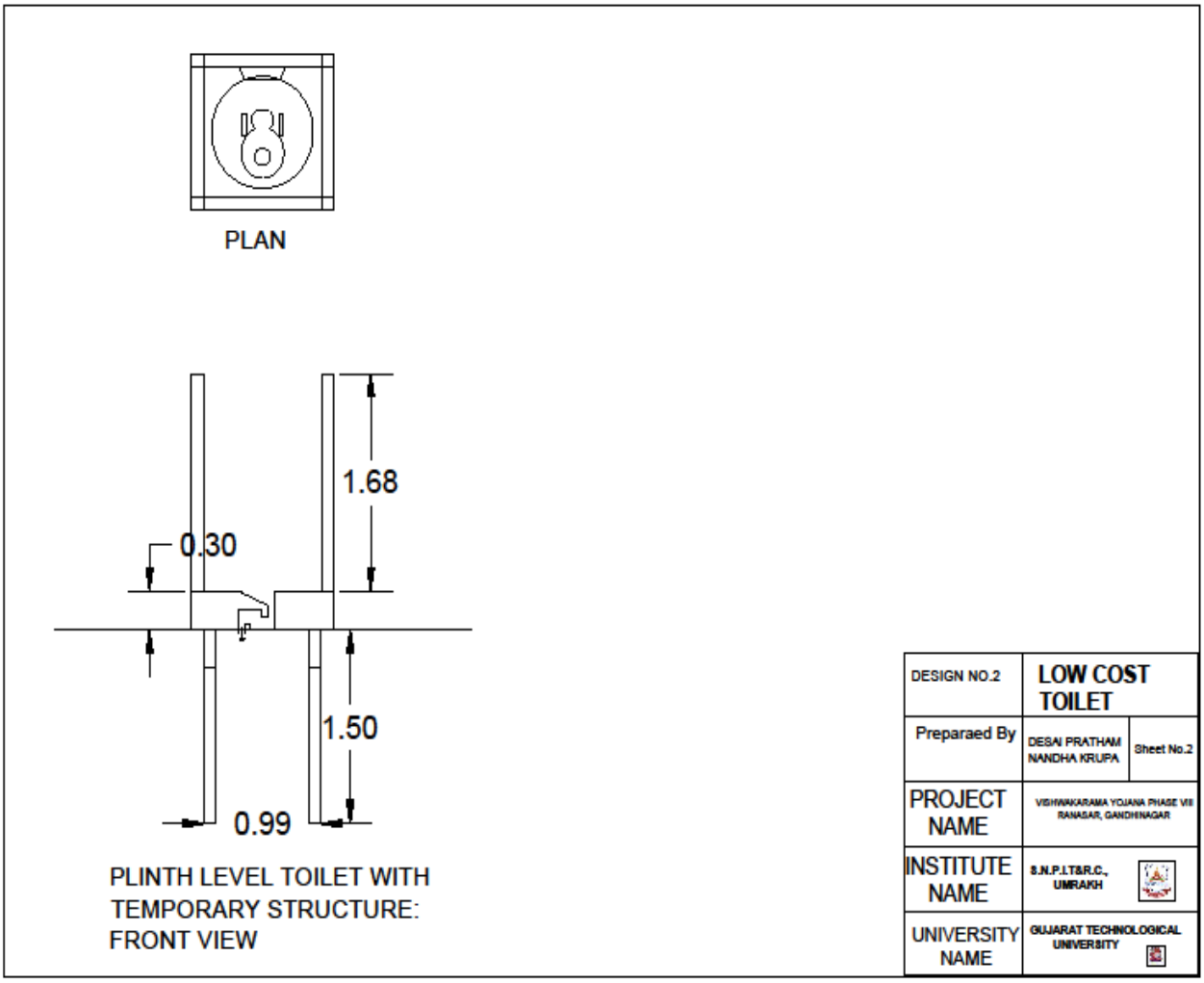
Space in the home

Geographical conditions - soil/water table etc.

Cultural habits • Availability of water/scarcity of water

Availability of skilled or semi-skilled manpower

- Plinth level toilet with temporary superstructure:



Salient features:

1. Appropriate where space is limited

2. Easier to empty when pit fills

3. Low cost

4. Superstructure made from locally available materials such as banana leaves, bamboo sticks and gunny bags

5. It is appropriate for festival places and during emergencies

6. It is constructed in one day

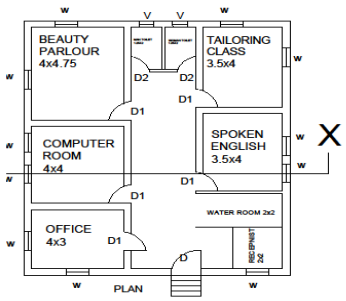
7. The plinth level basement may be circle or square shape

Cost Estimate:

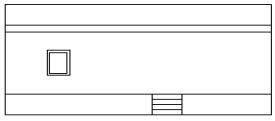
Details	Number of units	Units cost (in RS.)	Total Amount (In Rs.)
Toilet pan with p-trap (ceramic rural pan with deep slope)	1	250	250
Jaggery and jute bag for connecting the p-trap and pan			75
Squatting slab	1	300	300
Cement	½ bag	140	140
Masonry charges	1 mason	350	350
Sand	3 bond	100	100
Soling slope for pit lining	½ unit		300
Total		1515	

8.1.3 Social Design (SKILL DEVELOPMENT CENTER DESIGN):-

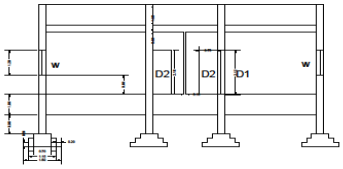
SKILL DEVELOPMENT CENTER DESIGN



NAME	SIZE	QUANTITY
D	1.2X2.1	1
D1	0.9X2.1	5
D2	0.75X2.1	2
W	0.9X1.2	11
V	0.6X0.6	2



ELEVATION



SECTION X-X

DESIGN NO.3	SKILL DEVELOPMENT CENTER
Preparaed By	DESAI PRATHAM NANDHA KRUPA / Sheet No.3
PROJECT NAME	VISHWAKARAMA YOJANA PHASE VIII RANASAR, GANDHINAGAR
INSTITUTE NAME	S.N.P.I.T&R.C., UMRAKH
UNIVERSITY NAME	GUJARAT TECHNOLOGICAL UNIVERSITY

Measurement Sheet of skill development center						
Sr. No	DESCRIPTION	NO.	L	B	H	QUANTY
	Total Centre line=4x10.4+4x11.9= 89.2m No. Of T-junction=16					
1.	Excavation for foundation up to 1.5 depth					
	Length=total centerline-(numberofteajunction×width÷2)					
	=89.2-(16×0.9÷2)=82	1	82	0.9	0.9	66.42m3
	For steps:-					
	L=1.2+0.15=1.5m	1	1.5	0.6	0.15	0.135m3
					Total:-	66.55m3
2.	Providing and laying PCC(1:4:8) for foundation	1	82	0.9	0.3	22.14m^3
	Steps	1	1.5	0.9	0.15	0.236m3

					Total:-	22.376m^3
3.	First class brick masonry C:M(1:6) for foundation					
	Step:-1(60cm)					
	L=84.4m	1	84.4	0.6	0.3	15.192m^3
	Step:-2(50cm)					
	L=85.2m	1	85.2	0.5	0.3	12.78m^3
					Total:-	27.97m^3
4.	Back filling in foundation					
	=66.42-27.97=38.45m^3				Total:-	38.45m^3
5.	First class brick masonary G.L to P.L					
	L=86m	1	86	0.4	0.575	19.78m^3
	Step1.	1	1.2	0.3	0.15	0.054
	Step2.	1	1.2	0.3	0.30	0.108
	Step3.	1	1.2	0.3	0.45	0.162
					Total:-	20.104m^3
6.	DPC(2.5cmthick)	1	86	0.4		34.4m^2
	Deduction:-					
	D	1	1.2	0.4		0.48
	D1	5	0.9	0.4		1.8
					Total:-	2.28m2
					Net total: -	32.12m^2
7.	First class brick masonary for superstructure					
	L=86.8m	1	86.8	0.3	3	78.12m^3
	Deduction					
	(1)Lintel	1	86.8	0.3	0.15	3.906
	(2)Door					
	(a)D	1	1.2	0.3	2.1	0.756
	(b)D1	5	0.9	0.3	2.1	2.835
	(a)W	8	0.9	0.3	1.2	2.592
	(5)ventilation	1	0.6	0.3	0.6	0.108
					Net total:-	67.923m^3
8.	Half brick partition wall in C:M (1:6)					
	PLW	1	1		3	3
	PSW	1	2		3	6
	For toilet					
	Lw	1	2		3	6
	Sw	1	2		3	6
	Deduction:-					
	O	1	0.5		2.1	1.05

	D3	1	0.75		2.1	1.575
					Net total:-	18.375m^3
9.	Providing and laying RCC(1:2:4) for slab, lintel, Chhajja					
	(1)Lintel L=86.8m	1	86.8	0.3	0.15	3.906
	(2)Chhajja					
	(a)W	8	1.2	0.6	0.1	0.576
	(3)RCC slab	1	12.2	10.7	0.1	13.054
					Total:-	17.608m^3
10.	Providing mild steel reinforcement in RCC work					
	Quantity=1%ofvolumeofconcrete					
	=17.608×78.54=1382kg					
					Total:	1382kg
11.	12cmthickplaster					
	(A)Internal plaster					
	(1)ceiling					
	Beutiparlar class	1	4	4		16
	Computer class	1	4	4		16
	Tailoring class	1	3.5	4		14
	Spoken English class	1	3.5	4		14
	Passage	1	2	8.3		16.6
	Open space	1	3.5	3		10.5
	Office	1	4	3		12
	Reception and water room	1	2	3		6
	Wall					
	Beutiparlar class	4	4		3	48
	Computer class	4	4		3	48
	Tailoring class	2	3.5		3	21
		2	4		3	24
	Spoken English class	2	3.5		3	21
		2	4		3	24
	Passage	1	1.5		3	4.5
		1	11.6		3	34.8
		1	8.6		3	25.8
		1	3.5		3	25.8
	Office	2	4		3	24
		2	3		3	12
	Reception and water room	2	2		3	12
					Total	429.5m2
11	External plaster up to parapet					

	Lw	2	12.2	0.2		4.88
	Sw	2	10.3	0.2		4.12
	Parapet inside					
	Lw	2	11.8		0.9	21.24
	Sw	2	10.3		0.9	18.54
	Chajja (window)					
	Face	8	1.2		0.1	0.96
	Side	2x8	0.6		0.1	0.96
	Top	8	0.6		0.1	5.76
	Bottom	8	0.6		0.1	5.76
					Total	272.9m2
	Deduction					
	D	1	1.2		2.1	2.52
	D1	5	0.9		2.1	9.45
	D2	1	0.75		2.1	1.575
	W	8	0.9		1.2	8.64
	V	1	0.6		0.6	0.36
	O	1	0.5		2.1	1.05
					Total	23.595m2
					Net total	678.805m2
12.	5cmthickmosictilesflooring					
	Beutiparlar class	1	4	4		16
	Computer class	1	4	4		16
	Tailoring class	1	3.5	4		14
	Spoken English class	1	3.5	4		14
	Passage	1	2	6.6		13.2
	Open space	1	3.5	3		10.5
	Office	1	4	3		12
	Reception and water room	1	2	2		4
					Total	99.7m2
13.	10cmBBLC(1:2:4)					
	Beutiparlar class	1	3.9	3.9	0.1	1.521
	Computer class	1	3.9	3.9	0.1	1.521
	Tailoring class	1	3.4	3.9	0.1	1.326
	Spoken English class	1	3.4	3.9	0.1	1.326
	Passage	1	1.9	8.5	0.1	1.615
	Open space	1	3.4	2.9	0.1	0.986
	Office	1	3.9	2.9	0.1	1.131
	Reception and water room	1	1.9	2.9	0.1	0.551
					Total	9.977m3
14.	Sand filling/murum					
	Beutiparlar class	1	3.9	3.9	0.45	6.84

	Computer class	1	3.9	3.9	0.45	6.84
	Tailoring class	1	3.4	3.9	0.45	5.967
	Spoken English class	1	3.4	3.9	0.45	5.967
	Passage	1	1.9	8.5	0.45	7.267
	Open space	1	3.4	2.9	0.45	5.08
	Office	1	3.9	2.9	0.45	2.47
	Reception and water room	1	1.9	2.9	0.45	4.437
					Total	44.868m3
15.	Providing and laying skirting of mosaic tiles					
	Beutiparlar class	4	4			16
	Computer class	4	4			16
	Tailoring class	2	3.5			7
		2	4			8
	Spoken English class	2	3.5			7
		2	4			8
	Passage	2	11.2			22.4
	Office	2	4			8
		2	3			6
	Reception and water room	4	2			8
	Deduction					
	D	1	1.2			1.2
	D1	5	0.9			4.5
	D2	1	0.75			0.75
	O	1	0.5			0.5
					Total	99.45m

ABSTRACT SHEET					
Sr. No	Description	Quantity	Rate	Per	Amount (Rs)
1	Excavationforfoundationupto1.5mdepth inordinarysoil	66.55	85	M^3	5656.75
2	Providing and lying PCC for foundation	22.376	1500	M^3	33564
3	1st class brick masonry CM(1:6) for				
	Foundation	27.97	1600	M^3	44752
4	Back filling in foundation	38.45	50	M^3	1922.5
5	1st classbrickmasonryfromG.LtoP.L	20.104	1600	M^3	32166.4
6	Providing and lying DPC	32.12	150	M^2	4818
7	1st classbrickmasonryCM(1:6)for				

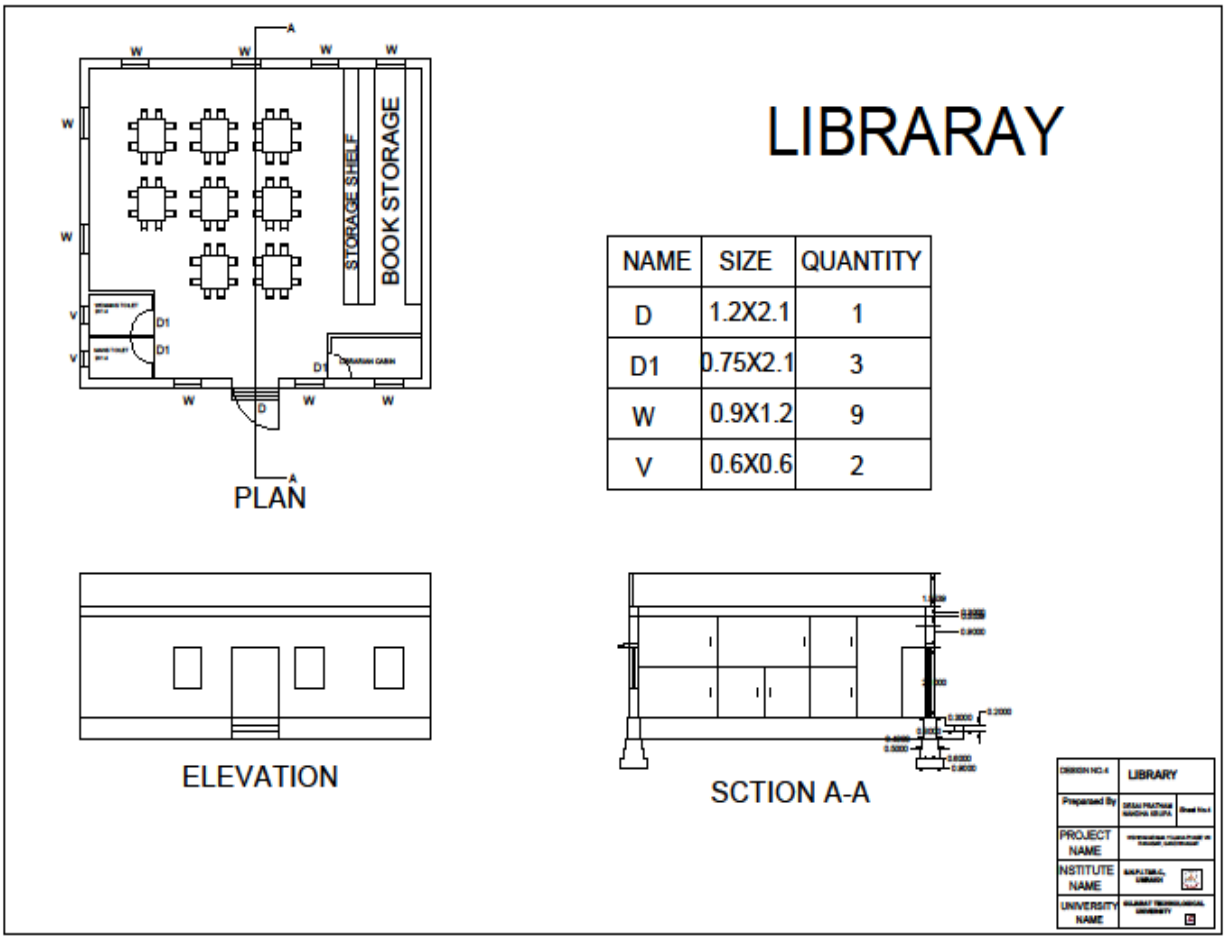
	Superstructure	67.923	1500	M^3	101884.5
8	Half brick partition wall CM(1:3)	3.675	1500	M^2	5512.5
9	Providing and lying RCC(1:2:4)	17.608	2500	M^3	44020
10	Providing mild steel reinforcement for				
	RCC work	1382	35	KG	48370
11	12mmthickcementplaster	678.80	150	M^2	101820
12	5cmthickmosaictilesfloor	99.7	200	M^2	19940
13	10cmthickBBLC(1:2:4)	9.977	1000	M^3	9977
14	Sand filling/murrumfilling	44.868	50	M^3	2243.4
15.	Providing and laying skirting of mosaic tiles	99.45	250	M	24862.5
			Total=		472530.25
			3% contingency		14175.90
			2% work charge establishment:		9450.6
			Total =		483398.75
			10%contractor profit :-		48339.875
			GRAND TOTAL=		531738.638

8.1.4Social-cultural Design (DESIGN OF LIBRARY):

Population	Seat/1000 population
Up to 10,000	5
10,000 to 25,000	4.5

For 15,000 population,

No of seat per 1000 population = (5+4.5)/2 = 4.75 Total no of seat required = 4.75x15 = 72



NAME	SIZE	QUANTITY
D	1.2X2.1	1
D1	0.75X2.1	3
W	0.9X1.2	9
V	0.6X0.6	2

Measurement Sheet of LIBRARY						
SR. NO	DESCRIPTION	NO.	L	B	H	QUANTITY
	Total Centre line=2x10.92+3x9.48= 50.28m No. Of T-junction=2					
1.	Excavation for foundation up to 1.5 depth					
	Length=total centerline-(numberofteajunction×width÷2)					
	=50.28-(2×0.9÷2)=49.38	1	49.2	0.9	0.9	39.92m3

			8			
	For steps:-					
	L=1.2+0.15=1.5m	1	1.5	0.6	0.15	0.135m3
					Total :	40.055m3
2.	Providing and laying PCC(1:4:8) for foundation	1	49.28	0.9	0.3	13.30m^3
	Steps	1	1.5	0.9	0.15	0.236m3
					Total :-	13.5m^3
3.	First class brick masonry C:M(1:6) for foundation					
	Step:-1(60cm)					
	L=49.68m	1	49.68	0.6	0.3	8.94m^3
	Step:-2(50cm)					
	L=49.78m	1	49.78	0.5	0.3	7.46m^3
					Total :-	16.40m^3
4.	Back filling in foundation					
	=39.92-8.94=30.98m^3				Total :-	30.98m^3
5.	First class brick masonary G.L to P.L					
	L=49.88m	1	49.88	0.4	0.575	11.47m^3
	Step1.	1	1.2	0.3	0.15	0.054
	Step2.	1	1.2	0.3	0.30	0.108
	Step3.	1	1.2	0.3	0.45	0.162
					Total :-	11.79m^3
6.	DPC(2.5cmthick)	1	49.88	0.4		19.95m^2
	Deduction:-					
	D	1	1.2	0.4		0.48
					Net total:-	19.47m^2
7.	First class brick masonary for superstructure					
	L=49.98m	1	49.9	0.3	3	44.98m^3

			8			
	Deduction					
	(1)Lintel	1	49.98	0.3	0.15	2.25
	(2)Door					
	(a)D	1	1.2	0.3	2.1	0.756
	(a)W	9	0.9	0.3	1.2	2.92
8	Brickwork for parapet, 0.2m					
	LW = 11.22	2	11.22	0.2	0.9	4.04
	SW_1= 9.38	2	9.38	0.2	0.9	3.37
					Net total: -	74.672m^3
9.	Providing and laying RCC(1:2:4) for slab, lintel, chhajja					
	(1)Lintel L=49.98m	1	49.98	0.3	0.15	2.25
	(2)Chhajja					
	(a)W	9	1.2	0.45	0.1	0.486
	(3)RCC slab	1	11.22	9.78	0.1	10.97
					Total :-	13.76m^3
10.	Providing mild steel reinforcement in RCC work					
	Quantity=1%ofvolumeofconcrete					
	=13.76×78.54=1080.79kg					
					Total :-	1080.79kg
11.	12cmthickplaster					
	(A)Internal plaster					
	(1)ceiling	1	10.62	9.18		97.49
	Wall					
	LW=10.62m	2	10.62		3	63.72
	SW_1= 9.18m	2	9.18		3	55.08
	SW_2= 7m	2	7		3	42
					Total	258.29m^2

11	External plaster up to parapet					
	Lw	2	11.22		4.6	103.23
	Sw	2	9.78		4.6	89.98
	Parapet inside					
	Lw	2	10.82		0.9	19.44
	Sw	2	9.38		0.9	16.88
	Chajja (window)					
	Face	9	1.2		0.1	1.08
	Side	2x9	0.45		0.1	0.81
	Top	9	0.45		0.1	0.405
	Bottom	9	0.45		0.1	0.405
					Total	232.23m2
	Deduction					
	D	1	1.2		2.1	2.52
	W	9	0.9		1.2	9.72
					Total	12.24m2
					Net total	478.28m2
12.	5cmthickmosictilesflooring					
	LW= 10.62					
	SW=9.18	1	10.62	9.18		97.49
	Deduction	1	7	0.3		2.1
					Net Total	95.39m2
13.	10cmBBLC(1:2:4)					
	LW= 10.61					
	SW=9.17	1	10.61	9.17	0.1	9.72
	Deduction	1	7	0.3	0.1	0.21
					Total	9.51m3
14.	Sand filling/murum					
		1	10.61	9.17	0.45	43.78
	Deduction	1	7	0	0.45	0.945

				. 3		
					Total	42.83m3
15.	Providing and laying skirting of mosaic Tiles	2	10.6 2			21.24
		2	9.18			18.36
		2x1	7			14
	Deduction	1	1.2			1.2
					Total	52.4m

ABSTRACT SHEET					
SR. NO	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT(RS)
1.	Excavation for foundation up to 1.5 m depth	40.05 m^3	100	m^3	4005
2.	Providing and laying PCC (1:4:8) for foundation	13.5 m^3	1500	m^3	20250
3.	First class brick masonry CM (1:6) for foundation	16.40 m^3	1600	m^3	26240
4.	Back filling in foundation	30.98 m^3	70	m^3	2168.6
5.	First class brick masonry GL to PL	11.79m^3	1600	m^3	18864
6.	DPC (2.5 cm thick)	19.47 m^2	200	m^2	3894
7.	First class brick masonry for super structure	74.67 m^3	1500	m^3	112005
8	Providing and laying RCC (1:2:4)	13.76m^3	2500	m^3	34400
9	Providing mild steel reinforcement for RCC work including binding and bending and placing in position	1080.79 kg	45	Kg	48635.55
10.	12 mm thick plaster	478.28 m^2	150	m^2	71742
11.	5 cm thick mosaic tiles flooring	95.39 m^2	200	m^2	19078
12.	10 cm BBLC (1:2:4)	9.51 m^3	1000	m^3	9510
13.	Sand filling / murrum	42.83m^3	60	m^3	2569.8
14.	Providing and laying skirting of mosaic tiles	52.4m	250	M	13100

		TOTAL :-	386461.95
		3 % CONTIGENCY :-	11593.85
		2 % WORKCHARGE ESTABLISHMENT :-	7729.23
		TOTAL :-	405785.03
		10 % CONTRACTOR PROFIT :-	40578.5
		GRAND TOTAL :-	446363

8.1.5 Physical Design (Bio-rock waste water treatment plan for school):-

BIOROCK offers a complete range of compact and non-electric residential waste water treatment plants, denominated into 6, 8, 10, 15 & 30 person systems. If installed in parallel the treatment units can also cater for 60, 90, 120 people and so on. BIOROCK power-free Waste Water Treatment Plants offers an ideal solution for residential, domestic wastewater treatment.BIOROCK provides a revolutionary, efficient and reliable compact wastewater treatment solution. Very compact, our systems are free from any blower or air diffusors. They don't need any electricity for the treatment process, leading to minimal maintenance and repair costs, the lowest operational costs and the longest dislodge intervals. These unique advantages lead to significant costs savings for the user compared to conventional wastewater treatment plants, as the reliability of the system is maximized with no possible breakdowns thus no need for expensive spare parts.

The costs-saving Wastewater Treatment Solution

Not all Wastewater Treatment Plants are created equal. The on-going operational cost is one of the most important considerations when buying a Wastewater Treatment Plant. Electric On-Site Treatment Plants require expensive operational costs into the future. By combining competitive acquisition costs with the most cost effective annual energy use, BIOROCK is an investment in your future.

Revolutionary Technology

The BIOROCK units are packaged wastewater treatment plants, providing a consistent high quality effluent that meets the highest standards. The biological purification technique requires no electricity or moving parts. As a result of this; maintenance and operational costs are particularly low, and reliability maximized. The units are assembled in durable HDPE tanks with lightweight, low profile, access covers. The plants are supplied as a complete package for simple installation. The BIOROCK units utilizes a unique fixed bio-film technology with specific functions to achieve an odor free effluent, suitable for irrigation or re-use in the grey water system. Due to the high quality of the treated effluent produced, should it be desired, it can be discharged into sensitive water courses.

BIOROCK Multirock

ECOROCK-5000 Treatment Units installed in parallel up to 300 PE

MULTIROCK: ECOROCK-5000 Treatment Units installed in parallelIf the BIOROCK-5000 units are installed parallel they can cater for 60, 90, 120, 180, people (P.E.) and so on.The BIOROCK-5000 units can be installed in parallel after the primary tank. Following the Primary tank is a "Flow Control Chamber" (FCC) and a Splitter-Box System (SB). The FCC acts as a 'header tank' to provide a surge of flow through the SB and guarantees equal flow to each of the BIOROCK units. Multiple SB's are used when it is required to split the flow in the case where more than 3 Units are installed in parallel.

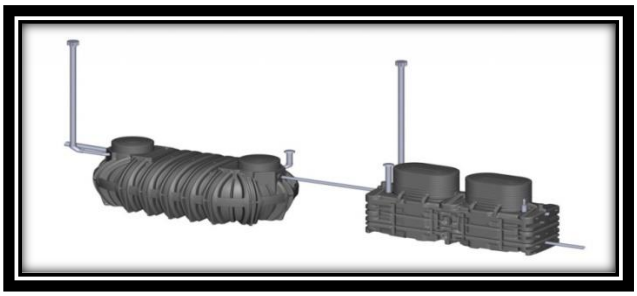
BIOROCK, THE ORIGINAL

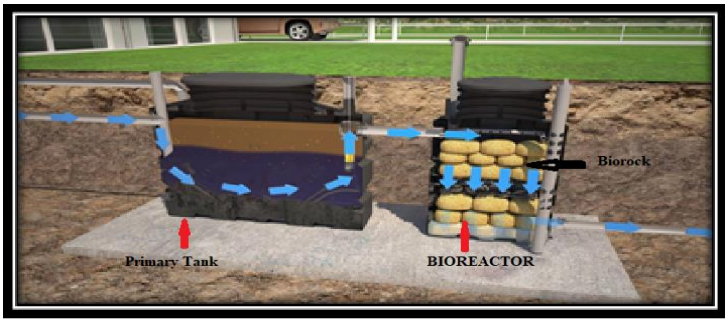
- The only manufacturer giving a 15 years warranty on the complete system.
- No electricity bills
- 1 to 3 year primary tank emptying interval
- No spare parts needed for the BIOROCK sewage treatment plant as no moving parts
- The best effluent quality - Twice as clean as the UK standard
- Almost zero Carbon Footprint - 3 times lower than a septic tank/reedbed
- EN 12566-3 2005 Certified as mandatory in the UK
- No other UK sewage treatment plant can compete
- Free training available on the installation
- Can convert a traditional septic tank or cesspit into a first class wastewater treatment plant
- Designed and manufactured for UK site condition, with reinforcements in the inside. (High ground water conditions)
- Ultra strong tanks
- Annual service only

Calculation:-

As Student use water in the school is= 70lpcd.
Avg. demand of school=90*70=6300 lit/day
Max. daily demand = 1.5 * Avg. demand of village
= 1.5*6300
= 9450 lit/day
Waste water generation = 80% * 9450
= 7560 lit/day
= $8.75*10^5$ m^3/s

Automatic Dairy and Leather Industry Biorock - Non Electrical Sewage Treatment Plant, Rs 250000 /set





Process:-

Step 1: Primary Tank

The Primary Tank clarifies the raw sewage by dividing fats, oils, greases and organic solids. The sewage then passes through an effluent filter, before discharging into the BIOROCK reactor.

Step 2: BIOREACTOR

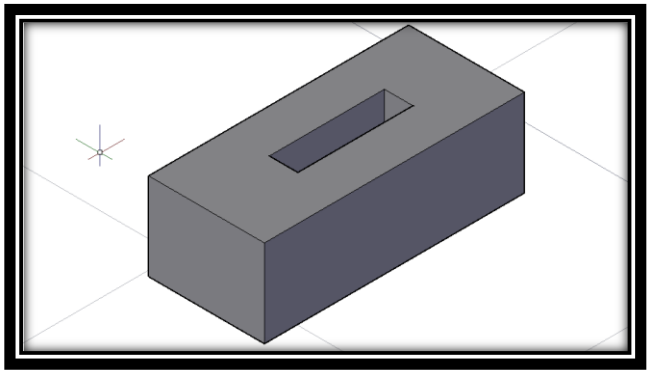
The Bioreactor purifies further the pretreated wastewater with a biological process. To naturally treat the wastewater, our systems use our unique BIOROCK Media, an exclusive and very efficient carrier material for bacteria.

Step 3: Discharge

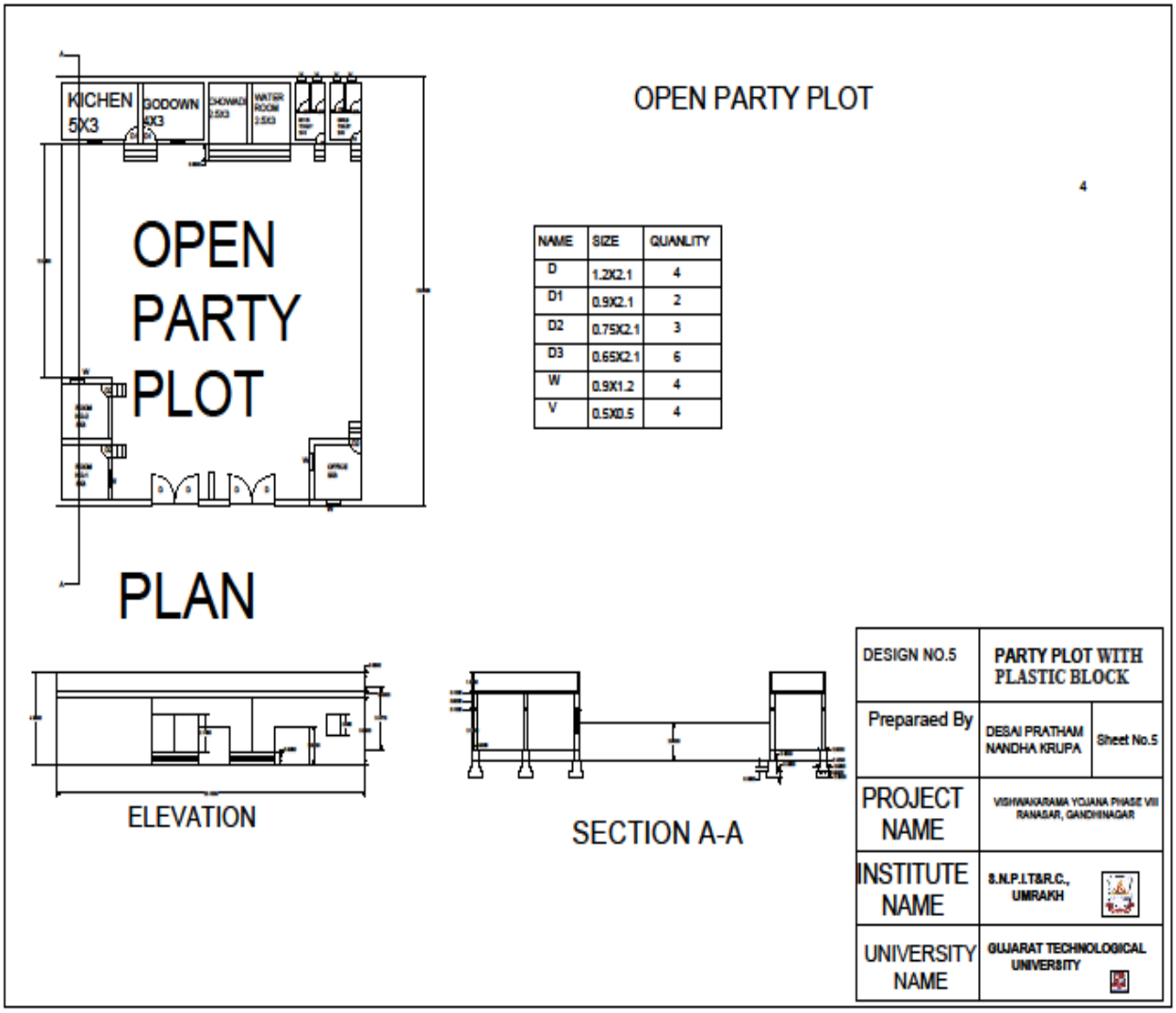
Depending on the ground type, effluent will be discharged by gravity, or by a pump.

8.1.6 Social cultural Design (OPEN PARTY PLOT WITH USE OF PLASTIC BLOCK)

USE THE PLASTIC BLOCK IN THE WALL



3D Modal of plastic brick



NAME	SIZE	QUANLITY
D	1.2X2.1	4
D1	0.9X2.1	2
D2	0.75X2.1	3
D3	0.65X2.1	6
W	0.9X1.2	4
V	0.5X0.5	4

DESIGN NO.5	PARTY PLOT WITH PLASTIC BLOCK	
Preparaed By	DESAI PRATHAM NANDHA KRUPA	Sheet No.5
PROJECT NAME	VISHWAKARAMA YOJANA PHASE VIII RANASAR, GANDHINAGAR	
INSTITUTE NAME	S.N.P.I.T&R.C., UMRAKH	
UNIVERSITY NAME	GUJARAT TECHNOLOGICAL UNIVERSITY	

Measurement Sheet of open party plot						
SR. NO	DESCRIPTION	NO.	L	B	H	QUANTIY
	Total Centre line= 22.7x2+19.8x3+3.3x4+6 .6+3.3x5=141.1m No. Of T-junction= 9					
1.	Excavation for foundation up to 1.5 depth					
	Length =141.1-(9×0.9÷2)= 137.45	1	137.45	0.9	0.9	111.33m3
	For steps:-					
	At door D_2					
	L= 0.9+0.15+0.15=1.2M	3	1.2	0.6	0.15	0.324
	At door D_1, L= 1.5M	2	1.5	0.6	0.15	0.27
	At chowkadi , water room					
	L= 6+0.3+2x0.15=6.6m	1	6.6	0.6	0.15	0.594
	At toilet, L= 0.75+2x0.15= 1.05m	2	1.05	0.6	0.15	0.189
					Total	112.70m3
2.	Providing and laying PCC(1:4:8) for foundation	1	137.45	0.9	0.3	37.11m^3
	Steps :					
	D_2	3	1.2	0.9	0.15	0.486
	D_1	2	1.5	0.9	0.15	0.405
	At chowakadi,water room	1	6.6	0.9	0.15	0.891
	D_3	2	1.05	0.9	0.15	0.283
					Total	39.17m3
3.	First class brick masonry C:M(1:6) for foundation					
	Step:-1(60cm) L=138.4m	1	138.4	0.6	0.3	24.91m^3
	Step:-2(50cm)					
	L=138.85m	1	138.85	0.5	0.3	20.82m^3
					Total :-	45.73m^3
4.	Back filling in foundation					
	=111.33-39.17=72.16m^3				Total :	72.16m^3
5.	First class brick masonary G.L to P.L					
	L= 139.3m	1	139.3	0.4	0.575	32.0.4m^3
	At D1					
	Step1.	2	0.9	0.3	0.15	0.081
	Step2.	2	0.9	0.3	0.30	0.162
	Step3.	2	0.9	0.3	0.45	0.243

	At D2					
	Step 1	3	1.2	0.3	0.15	0.162
	Step 2	3	1.2	0.3	0.30	0.324
	Step 3	3	1.2	0.3	0.45	0.486
	At chowkadi ,water room					
	Step 1	1	6.3	0.3	0.15	0.283
	Step 2	1	6.3	0.3	0.30	0.567
	Step 3	1	6.3	0.3	0.45	0.850
	At toilet,					
	Step 1	2	0.75	0.3	0.15	0.0675
	Step 2	2	0.75	0.3	0.30	0.135
	Step 3	2	0.75	0.3	0.45	0.202
					Total	$35.26m^3$
6.	DPC(2.5cmthick)	1	139.3	0.4		$55.72m^2$
	Deduction:-					
	D1	2	1.2	0.4		0.96
	D2	3	0.9	0.4		1.08
	D3	2	0.75	0.4		0.6
	D	2	1.5	0.4		1.2
					Net total	$51.88m^2$
7.	First class brick masonary for superstructure					
	LW = 20.10m	2	20.10	0.3	3	36.18
	SW = 3m	7	3	0.3	3	18.9
	For room 1,2					
	LW = 3m	3	3	0.3	3	8.1
	SW = 6.9m	2	6.9	0.3	3	12.42
	For office,					
	LW =3m	2	3	0.3	3	5.4
	SW = 3.6m	2	3.6	0.3	3	6.48
	For boundary,					
	SW1= 15.80m	1	15.80	0.3	2	9.48
	SW2 = 12.5m	1	12.50	0.3	2	7.5
	LW = 9.9m	1	9.9	0.3	2	5.94
	Deduction					
	At chowkadi, water room					
	L = 3.3	1	3.3	0.3	3	2.97
	D	2	1.5	0.3	2	1.8
	D1	2	1.2	0.3	2.1	1.512
	D2	3	0.9	0.3	2.1	1.70
	D3	2	0.75	0.3	2.1	0.94
	W	5	0.9	0.3	1.2	1.62
	V	12	0.4	0.3	0.4	0.576
					Total	11.11
					Net	99.28

					total	
8.	Half brick partition wall in C:M (1:6)					
	LW =0.9m	5	0.9		3	13.5
	SW= 1.1m	3	1.1		3	9.9
	Deduction					
	D4	5	0.65		2.1	6.825
					Net total	16.575m^2
	LW1 =20.10m	1	20.10	0.2	0.5	2.01
	LW2 = 13.8m	1	13.8	0.2	0.5	1.38
	SW = 3m	2	3	0.2	0.5	0.6
	For room 1,2					
	LW = 3m	2	3	0.2	0.5	0.6
	SW = 6.9m	2	6.9	0.2	0.5	1.38
					Total	5.97m^3
9.	Providing RCC slab, lintel, chhajja					
	Lintel					
	LW= 20.10	2	20.10	0.3	0.15	1.809
	SW = 3	7	3	0.3	0.15	0.945
	For room 1,2					
	LW = 3m	3	3	0.3	0.15	0.405
	SW = 6.9m	2	6.9	0.3	0.15	0.621
	For office, LW =3m	2	3	0.3	0.15	0.27
	SW = 3.6m	2	3.6	0.3	0.15	0.324
	Chhajja					
	W	5	1.1	0.45	0.1	0.247
	RCC slab					
	For last portion	1	20.10	3	0.1	6.03
	For room 1,2	1	6.9	3	0.1	2.07
	For office	1	3.6	3.6	0.1	1.296
					Total	14m^3
10.	Providing mild steel reinforcement in RCC work					
	Quantity=1%ofvolumeofconcrete					
	=14×78.54=1099.56kg					
					Total :-	1099.56kg
11.	12cmthickplaster					
	(A)Internal plaster					
	(1)ceiling					
	Kitchen	1	5	3		15
	Godown	1	4	3		12
	Toilet M	1	2	3		6

	Toilet F	1	2	3		6
	Room 1,2 and office	3	3	3		27
	Wall					
	Kitchen	2	5		3	30
		2	3		3	18
	Godown	2	4		3	24
		2	3		3	18
	Toilet M	4	2		3	24
		4	2		3	24
	Room 1,2 and office	6	3		3	54
		6	3		3	18
					Total	276m^2
11	External plaster up to parapet					
	LW =20.10m	1	20.10		4.35	87.43
	SW = 15.1m	1	15.1		4.35	65.68
	Room 1,2 LW = 6.9m	2	6.9		4.35	60.03
	SW = 3m	2	3		4.35	26.1
	Office LW = 3.6m	2	3.6		4.35	31.32
	SW =3.3m	2	3.3		4.35	28.71
	Boundary wall					
	SW1= 12.5m	2	12.5		2	50
	SW2=15.8m	2	15.8		2	63.2
	LW=12.9m	2	12.9		2	51.6
	Chhajja Face	5	1.2		0.1	0.6
	Side	10	0.45		0.1	0.45
	Top	5	0.45		0.1	0.225
	Bottom	5	0.45		0.1	0.225
					Total	465.0.7m^2
	Deduction D	2	1.5		2.1	6.3
	D1	2	1.2		2.1	5.04
	D2	3	0.9		2.1	5.67
	D3	2	0.75		2.1	3.15
	W	5	0.9		1.2	5.4
	V	12	0.4		0.4	1.92
					Total	27.48m2
					Net total	712.59$m,^2$
12.	5cmthickmosictilesflooring					
	Kitchen	1	5	3		15
	Godown	1	4	3		12
	Toilet	2	3	3		18
	Room 1,2 and office	3	3	3		27
	Chowkadi,water room	2	2.5	3		15
					Total	87m2
13.	10cmBBLC(1:2:4)					

	Kitchen	1	4.9	2.9	0.1	1.421
	Godown	1	3.9	2.9	0.1	1.131
	Toilet	2	1.9	2.9	0.1	1.102
	Room 1,2 and office	2	2.9	2.9	0.1	1.682
	Chowkadi,water room	2	2.4	2.9	0.1	1.392
					Total	6.73m^3
14.	Sand filling/murum					
	Kitchen	1	4.9	2.9	0.45	6.39
	Godown	1	3.9	2.9	0.45	5.08
	Toilet	2	1.9	2.9	0.45	4.959
	Room 1,2 and office	2	2.9	2.9	0.45	7.57
	Chowkadi,water room	2	2.4	2.9	0.45	6.26
					Total	30.25m^3

ABSTRACT SHEET					
SR. NO	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT (RS)
1.	Excavation for foundation up to 1.5 m depth	112.70 m^3	100	m^3	11270
2.	Providing and laying PCC (1:4:8) for foundation	39.17 m^3	1500	m^3	58755
3.	First class brick masonry CM (1:6) for foundation	45.73 m^3	800	m^3	36584
4.	Back filling in foundation	72.16 m^3	70	m^3	50512
5.	First class brick masonry GL to PL	35.26m^3	800	m^3	28208
6.	DPC (2.5 cm thick)	51.88 m^2	200	m^2	10376
7.	First class brick masonry for super structure	105.25 m^3	700	m^3	73675
8	Half brick wall	16.575m^3	700	M^2	11602.5
9.	Providing and laying RCC (1:2:4)	14m^3	2500	m^3	35000
10.	Providing mild steel reinforcement for RCC work including binding and bending and placing in position	1099.56 kg	45	Kg	49480.2
11.	12 mm thick plaster	712.59 m^2	150	m^2	106888.5
12.	5 cm thick mosaic tiles flooring	87 m^2	200	m^2	17400
13.	10 cm BBLC (1:2:4)	6.73 m^3	1000	m^3	6730
14.	Sand filling / murrum	30.25m^3	60	m^3	1815
		TOTAL :-			498296.2
		3 % CONTIGENCY :-			14948.88

		2 % WORKCHARGE ESTABLISHMENT :-	9965.92
		TOTAL :-	523211
		10 % CONTRACTOR PROFIT :-	52321.1
		GRAND TOTAL :-	575532.1

8.1.7 AUTO STREET LIGHT WITH DETECTING VEHICLE MOVEMENT

INTRODUCTION:

This paper shows the design to detect the vehicle movement on roadways to switch ON just a block of road lights in front of it, and to turn OFF the trailing lights to save energy. During night each one of the lights on the expressway stay ON for vehicles, yet loss of power is experienced when there is no vehicle movement. This proposed framework satisfactorily works for energy saving. This is accomplished by detecting a vehicle moving towards the street and turns ON a block of street lamps in front of the vehicle. As the vehicle moves forward by, the trailing lamps turn OFF on its own. By doing this, a considerable amount of power is saved. So each of the road lights stay in OFF condition when there are no vehicles on the street. There is another method of operation where instead of turning off the lights totally, they stay ON ten percent of the extreme intensity of the light. As the vehicle approaches, the block of road lamps change to hundred percent intensity and as the vehicle moves forward by, the trailing lights return to ten percent power once more. HID lamps are utilized for metropolitan road lights.

The intensity is not governable by any voltage diminishment technique since HID depends on the principle of gas release. White LED based lights are soon supplanting the high intensity discharge lights in road light. Intensity is likewise conceivable by PWM created by the microcontroller. The photodiode and IR LEDs delivers logic signal to microcontroller to turn ON or OFF depending upon the operation. Consequently, this progressively changing from ON/OFF sides in saving a great deal of power. This venture utilizes an 8051-arrangement microcontroller. Proposed venture the unsuccessful road light and afterward delivery a short message service to the control division by means of GSM modem for suitable action.

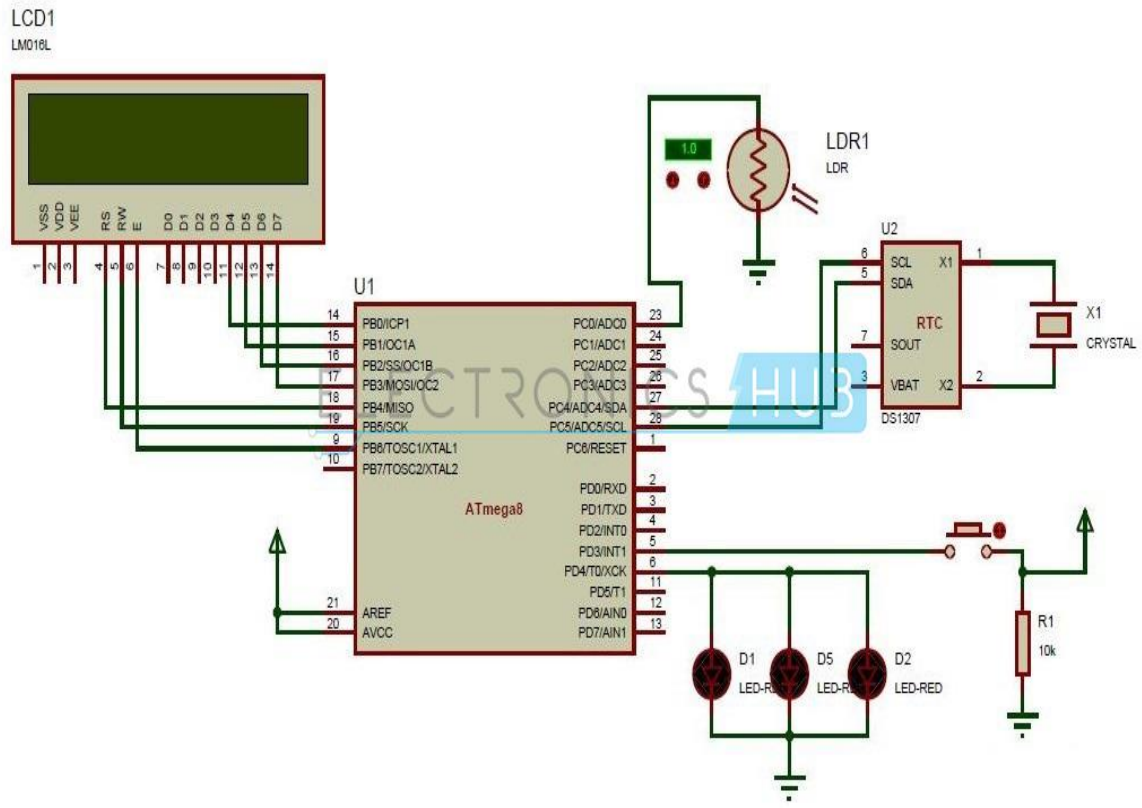
OBJECTIVES OF THE STUDY:

- Generally, street lights are switched on for whole night and during the day, they are switched off. But during the night time, street lights are not necessary if there is no traffic. Saving of this energy is very important factor these days as energy resources are getting reduced day by day.
- Alternatives for natural resources are very less and our next generations may face lot of problems because of lack of these natural resources. We have already seen the circuit diagram and working of Auto Intensity Control of Street Lights circuit in the earlier post. This article describes about the circuit that switches the street lights on detecting vehicle movement and remains off after fixed time.

STREET LIGHT THAT GLOW ON DETECTING VEHICLE MOVEMENT (USING AVR MICROCONTROLLER) PRINCIPLE BEHIND THIS CIRCUIT:

- The proposed system consists of Atmega8 microcontroller, LDR, PIR sensor and RTC. This system controls the street lights using light dependent resistor and PIR sensor.
- Street lights are switched on depending on the intensity of the Sun light on LDR. If the intensity of Sunlight on light dependent resistor is low, its resistance value is high. This value increases and becomes high when it is completely in dark. This resistance value decides when the street lights are required to switch ON.
- As the resistance value is maximum in the midnights, real time clock comes into the play. The controller checks peak time during which there is no traffic and switch OFF the lights. When there is any vehicle on the road, it is detected by the PIR sensor.
- Whenever PIR sensor is detected it just indicates the microcontroller to switch on the street lights. Then lights are switched on for 2 to 3 minutes and switched off automatically.
- Another way to this approach is, one can maintain minimum intensity without completely switching off the lights by using PWM and switch them on to maximum intensity whenever it detects the vehicle. But in this article the circuit is designed in such a way that lights are completely switched OFF and will be switched ON only when there is any vehicle.

CIRCUIT DIAGRAM:



CIRCUIT COMPONENT:

- ATmega8 microcontroller LCD

- DS1307 IC
- PIR sensor
- LDR
- LED array

CIRCUIT DESIGN:

- The proposed circuit consists of ATmega8 microcontroller, PIR sensor, light dependent resistor and real time clock, Liquid Crystal Display.
- Passive Infrared sensor, also called as PIR sensor is connected to the PD0 pin of the microcontroller. PIR sensor senses the motion of the objects.
- The PIR sensor internally will have an IR detector. Every object in the world radiates some IR rays. These are invisible to the human eye but electronic components can detect them. Different objects will emit IR rays of different wavelength. These rays were detected by the PIR sensor. PIR is initially high and is set to low automatically after sometime. Whenever it detects the motion of any object, it becomes low.
- LDR is connected to the ADC pin – ADC0 of the microcontroller as LDR will produce analog value which is converted to digital by the ADC.
- Light dependent resistors will have low resistance in light and high resistance in dark. The resistance of Light dependent resistor in dark is in range of ohms and in dark its resistance is in the range of mega ohms. When the light falls on LDR it resistance is reduced to a great extent.
- Real time clock IC used is DS1307, which is I2C compatible. Real time clock has 8 pins.1 and 2 pins are connected to the crystal oscillator.3rd pin is connected to a battery.6th pin of RTC is connected to PC5 pin of microcontroller.5th pin is connected to PC4 pin of microcontroller.
- I2C is inter integrated circuit. This is two wire interface protocol in which only two signals were used to transmit the data between two devices.
- LCD is used for displaying time. LCD interfacing in 4bit mode is shown in the circuit diagram. Time from RTC is read and displayed on the LCD.

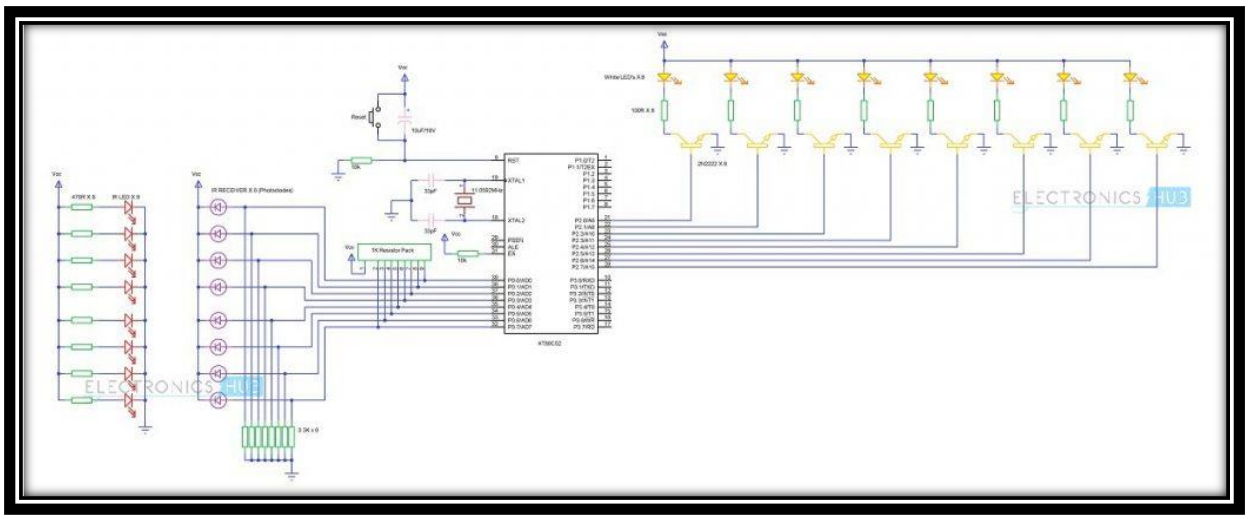
HOW TO OPERATE THIS CIRCUIT?

- Initially power the circuit.
- LCD displays the time read from RTC.
- Place the LDR in darkness. Now street light is switched ON.
- Now micro controller continuously checks the time. Street Light is switched on for fixed timings written in the code
- After this time, they are switched of automatically.
- Place your hand in front of PIR sensor, this switches the street lights again, indicating that on the detection of any object street light is ON.
- After 2-3 seconds delay, lights are again switched of automatically.

STREET LIGHT THAT GLOWS ON DETECTING VEHICLE MOVEMENT USING 8051 AND IR SENSOR

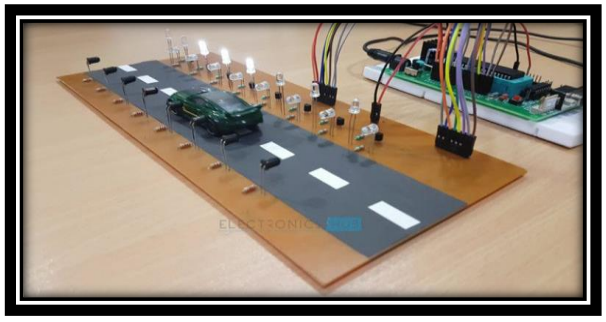
The above circuit shows the street light that glows on detecting vehicle movement using avr. Here is the circuit that uses 8051 and IR sensors.

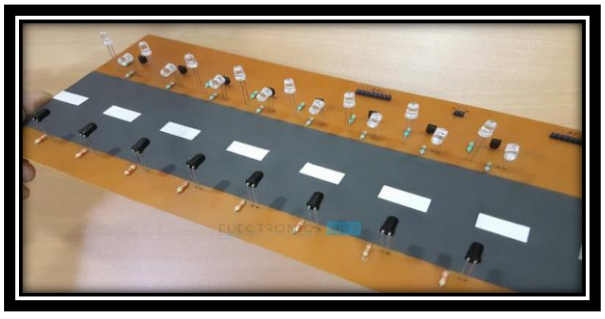
CIRCUIT DIAGRAM:



PRINCIPLE OF OPERATION:

- The principle behind the working of the project lies in the functioning of IR Sensor. We are going to use a Transmissive type IR Sensor in this project.
- In Transmissive IR Sensor, the IR transmitter and receiver are placed facing each other so that IR receiver always detects IR Rays emitted by the IR Transmitter.
- If there is an obstacle between the IR Transmitter and Receiver, the IR Rays are blocked by the obstacle and the IR Receiver stops detecting the IR Rays.
- This can be configured to turn ON or OFF the LEDs (or street lights) with the help of microcontroller.

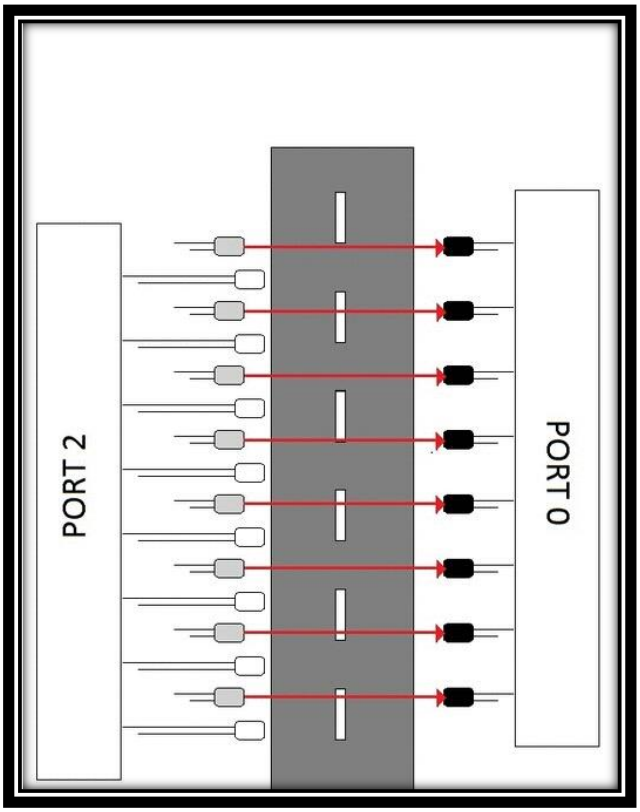




CIRCUIT DESIGN:

- The main components of the project are AT89C52 Microcontroller, IR Sensor (IR Transmitter and IR Receiver) and LEDs.
- The basic connections required for 8051 Microcontroller involve crystal, reset and External

Access.



- In order to use the on-chip oscillator, the 8051 microcontroller requires an external clock. This is provided by a crystal oscillator. An 11.0592MHz quartz crystal is connected to XTAL1 and XTAL2 pins with two 22pF ceramic capacitors connected to it.
- The reset circuit of the microcontroller consists of a 10K resistor, 10uF capacitor and a push button. All the connections of the reset circuit are shown in the circuit diagram.
- External access Pin is used to access external memory when it is connected to ground. Anyway, we are not going to use any external memory here. So, connect this pin to Vcc via a 10K resistor.
- The next hard ware we are going to connect is the IR Receiver. We are going to connect the 8 IR receivers to port 0 pins of the microcontroller. In order to use the PORT0 as I/O port, we need to connect external pullup resistors to the port 0 pins.
- After that, connect the output of the IR receiver i.e. anode terminal of the photo diode to port 0 pins. Cathode terminals of the photo diodes are connected to supply. Also, a 3.3k Resistor is connected between the anode terminal and ground.
- The next part of the circuit is IR transmitter. IR transmitter is not a part of the microcontroller connections as the only job of the IR transmitter is to continuously emit infrared rays.
- Hence, connect the 8 IR transmitters with corresponding 8 current limiting resistors of 470 ohms with a power supply.
- Finally, we need to connect the LEDs. We need to connect the LED's with the help of transistors to the PORT2 of the microcontroller. The base of the 8 2N2222 transistors is connected to the PORT 2 of the microcontroller while the emitters of the transistors are connected to ground.
- An LED along with a series current limiting resistor of 100 ohms is connected to the each of the collector terminal of the transistor.

WORKING:

The aim of this project is to design a street light control system using 8051 microcontroller, which automatically turns on or off the street lights by detecting the movement of vehicles. The working of the project is explained here.

Below GIF demonstrates the working of the project.

- The IR transmitter is placed directly in line of sight with IR receiver, so that the IR receiver continuously receives infrared rays. Once the IR receiver receives infrared rays, the

microcontroller will detect Logic 1. If the infrared rays are blocked by some means, the microcontroller will detect logic 0.

- So, the program for the microcontroller must be written in such a way that it will turn ON the LEDs, which means here the street lamp, when it detects Logic 0 and it will turn OFF the LEDs, when it detects Logic 1.
- Consider the two IR sensors i.e. IR Transmitter and IR Receiver are placed on the either side of the road. As per the circuit diagram, the IR receivers are connected to the PORT0 and the LEDs are connected to the PORT2 of the microcontroller.
- At the beginning, when there is no obstacle, the IR receiver continuously detects IR light transmitted by the IR Transmitter. When a car or any other vehicle blocks any of the IR sensor, the microcontroller will turn ON the immediate three LEDs.
- If the car blocks the first IR sensor, the first three LEDs are turned ON by the microcontroller. As the car moves forward and blocks the second IR sensor, the corresponding next three LEDs will be turned ON and the first LED of the previous set is turned OFF. The process continues this way for all the IR Sensors and LEDs.

ADVANTAGES:

- If the lighting system implements all LED lights, the cost of the maintenance can be reduced as the life span and durability of LEDs is higher than Neon based lights which are normally used as street lights.

- As the lights are automatically turned ON or OFF, huge amount of energy can be saved.

PROJECT ESTIMATION AND COSTING:

Microcontroller Section:

Sr. No.	Components	Quantity	Price(Rs.)
1	AT89C52 Microcontroller	1	60
2	AT89C52 Programmer Board	1	60
3	11.0592 MHz Quartz Crystal	1	10
4	22pF Ceramic Capacitor	1	10
5	10K Resistor	2	5*2=10
6	10uF Electrolytic Capacitor	1	10
7	Push Button	1	10
		Total	170

IR Transmitter and Receiver Section

Sr. No.	Components	Quantity	Price(Rs.)
1	IR LED (IR Transmitters)	8	8*5=40
2	470R Resistor	8	8*8=64
3	Photo Diode (IR Receivers)	8	8*30=240
4	3.3K Resistor	8	8*3=24
5	1K Resistor	8	8*3=24
		Total	392

Load Section

Sr. No.	Components	Quantity	Price(Rs.)
1	2N2222 NPN Transistors	8	8*10=80
2	100R Resistor	8	8*2=16
3	White LEDs	8	8*2=16
		Total	112
		Grand Total	674

CONCLUSION:

This proposed system provides a solution for energy saving. This is achieved by sensing an approaching vehicle and switches ON a block of street lights ahead of the vehicle. As the vehicle passes by the behind lights switch OFF automatically. So when there are no vehicles on the highway, then all the lights remain OFF.

8.1.8PREPAID ENERGY METER:

INTRODUCTION:

- The present traditional billing system has many problems like problem of payment collection, energy thefts etc. due to which the traditional billing system is slow, costly and unreliable. Resent billing system has chances of error and it is also time or labour consuming. A paper suggests a design of digital energy meter for improved metering and billing system. Poly phase prepaid energy metering system has also been proposed and developed based on local prepayment and card reader. Another paper suggests prepaid energy mater using a microcontroller from microchip technology Inc PIC family, used due to low cost of microcontrollers. So it is essential to develop a billing system which solves the problem of billing manually and also reduces the manpower.
- In this paper we proposed and designed prepaid energy meter using two microcontrollers AT89S52 and AT24C02 from ATMEL family. The reason for using these microcontrollers is its high performance, power efficiency or design flexibility etc. In this paper, a recharge card is used which is available in various ranges (i.e., Rs. 50, Rs. 100, Rs. 20 etc.) and the energy meter to which the no. of recharge units has to be loaded. Suppose a consumer buys a recharge card for Rs. 50 he/she can insert this amount through the keypad so that the prepaid energy meter will be activated. According to the power consumption the amount will be reduced.
- An LDR circuit is used to count the amount of energy consumed and an LCD is used to display the meter readings. When the recharge card amount is nil the relay will automatically shut down the whole system. In this project we also have provision to give an alarm sound using buzzer to the consumer before the whole amount is depleted.
- Prepaid energy meter is technique which is cost efficient and can reduce problems associated with billing and also reduces deployment of manpower for taking meter readings.

OBJECTIVES OF THE STUDY:

- The conventional method of electricity billing involves a person from the distribution unit reading the number of units pf electricity consumed in energy meter, conveying this information to the distribution unit and then preparing the bill according to the units consumed for fixed amount of time. This can prove quite tedious as it involves various tasks like reading, then preparing the bill. Still, accuracy cannot be guaranteed as there can be errors in human reading. Even though digital meters are replacing conventional electromechanical meters and provide many accurate readings, still the problem of deliberately making a false reading can exist. Despite this, the task of billing for every consumer is a time-consuming job for the distribution grid. Also the consumer can deliberately consume more amount of power than required and still refrain from paying the bill and nothing can be done to severe the electric power supply.
- To eliminate all these problems, the most convenient method is making the whole system prepaid similar to a mobile phone recharge or a DTH recharge.

Why Prepayment – From supplier point of view?

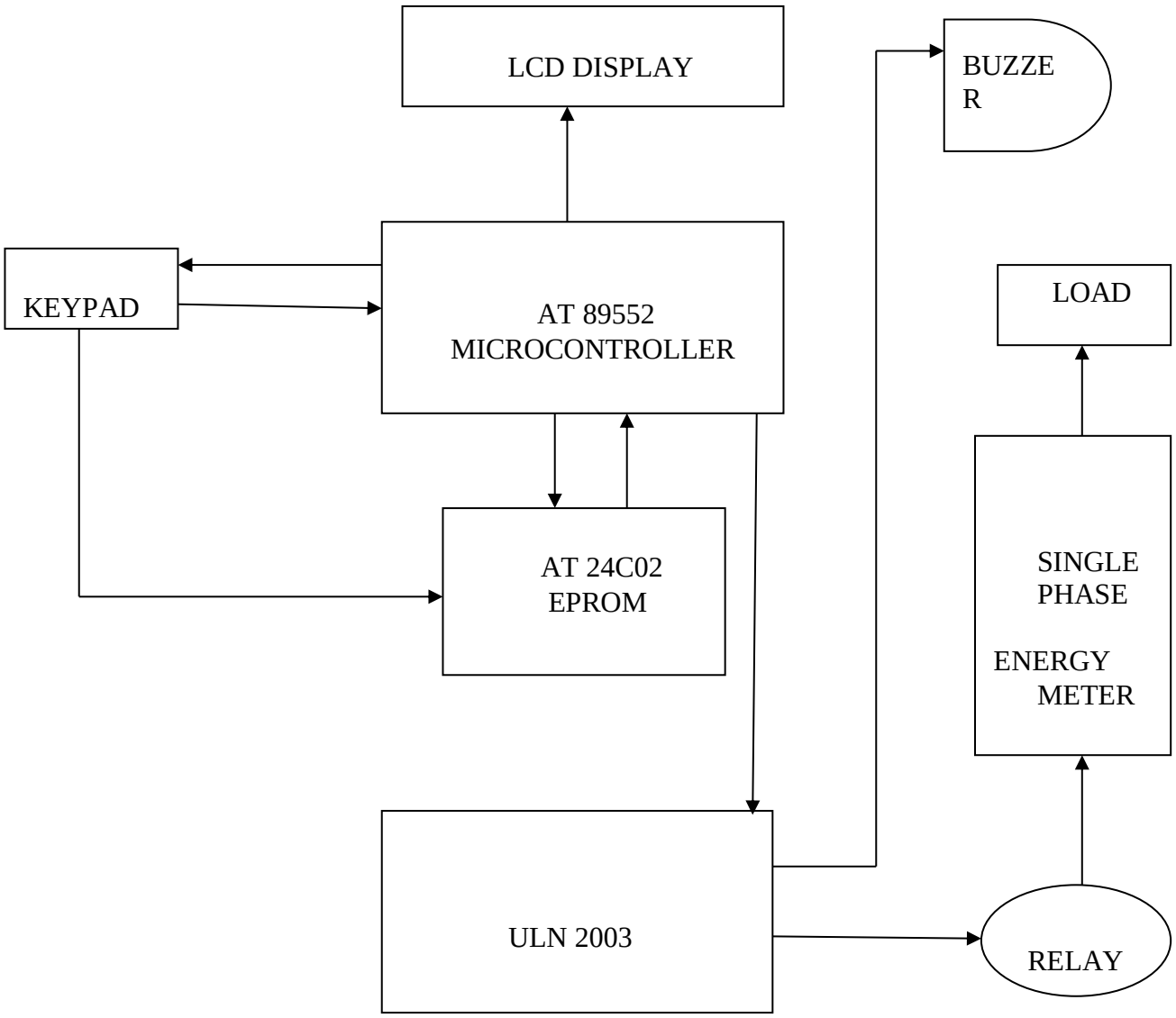
- Pay before use
- Recover money owed (debt)
- No bill production
- No further actions such as disconnections
- Customer responsible for disconnection
- Load and demand side management
- Load based
- Keep customers on supply
- Lower overhead
- No bill distribution
- No need to chase payments
- Social acceptability
- Limit load
- Time based

Why Prepayment – From Customer point of view?

- >80% mobile phones used in India are prepaid
- Pay to suit your income status
- Show true cost of consumption and money left
- Reduce consumption when income is tight– make money last
- No socially unacceptable disconnection
- Flexible payment solution
- Daily, weekly, monthly budgeting
- Reduce waste – conserve energy
- No bills
- No billing errors

BLOCK DIAGRAM OF PREPAID ENERGY METER:

The block diagram of prepaid energy meter is shown in fig. It consist of microcontroller AT89S52, buzzer, keypad, relay, single phase energy meter, IC AT24C02 which is an EEPROM and has volatile memory, IC ULN2003 is a high voltage/ high current Darlington array each contains seven open collector Darlington pairs with common emitters used to drive loads.



CRCUIT DESCRIPTION AND WORKING:

The circuit diagram of prepaid energy meter contains two parts
(a) Energy meter circuit
(b) LDR circuit.

(a)Energy Meter Circuit

The circuit diagram of energy meter circuit is shown in fig. A 230 V A.C – 12 V D.C step down transformer is used as power supply. The rectifier circuit is used to convert A.C into D.C. at the output of rectifier circuit +12V power supply is generated. The IC 7805 is a voltage regulator which is a 3 pin IC and is used to convert +12V into +5V. Now in our project where we need +5V supply we take it from output of IC7805 and where we required +12V supply we take from

the input of IC7805. When the microcontroller AT89S52 which is a 40 pin IC gets signals first of all we insert the recharge number using the keypad. The recharge unit is stored in IC AT24C02 which is an EEPROM and has volatile memory and this recharge unit is display in Liquid Crystal display (LCD) and a message "recharge successful" also displays. The IC ULN2003 is a high voltage/ high current Darlington array containing seven open collector Darlington pairs with common emitters used to drive loads. Since the current produced by the microcontroller is only 10 mA which is very low to drive a relay that is why we are using ULN2003 which converts 10 mA into 80 mA and the relay is switched ON. As the power is consumed the reading in the single phase energy meter (connected across X2-1 and X2-2) is increased and the units in LCD is decreased by Rs.1.When the balance reaches to Rs.10 then the buzzer starts indicating that we should recharge our meter soon. And if balance is nil then the relay is switched off and no electricity flows.

(b)LDR Circuit

LDRs or Light Dependent Resistors are very usefulespecially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 10 MΩ, but when they are illuminated with light resistance drops dramatically. When the light level is low the resistance of the LDR is high. This prevents current from flowing to the 555 timer. Consequently the LED does not light. However, when light shines onto the LDR its resistance falls and current flows into the 555 timer and the LED lights. LDR Circuit is used to count the unit pulses. When the LED blinks for 10 time it counts the energy unit as 1. This will show in LCD of the main circuit and the recharge amount in the LCD is decreased by Rs.1

A.Energy calculation

Energy is the measure of how much work has been required over a known period of time. We are using a light bulb as a load with a 100W rating which consumes 100 watts of active power in order to create light (and heat). First of all a wattmeter is used to measure the power consumed by the load by using the equation. The frequency across 100 W load obtained during an experiment is

F= 0.5 Hz

And P = 100*X/0.5

P = 200*X

Where X is the frequency of pulses that is produced by the energy meter.

1 watt sec = 1 kW sec/1000

1 watt sec = 1 kWh/ (1000*3600)

Therefore Energy = P * Sec/ (1000*3600)

CIRCUIT DIAGRAM:

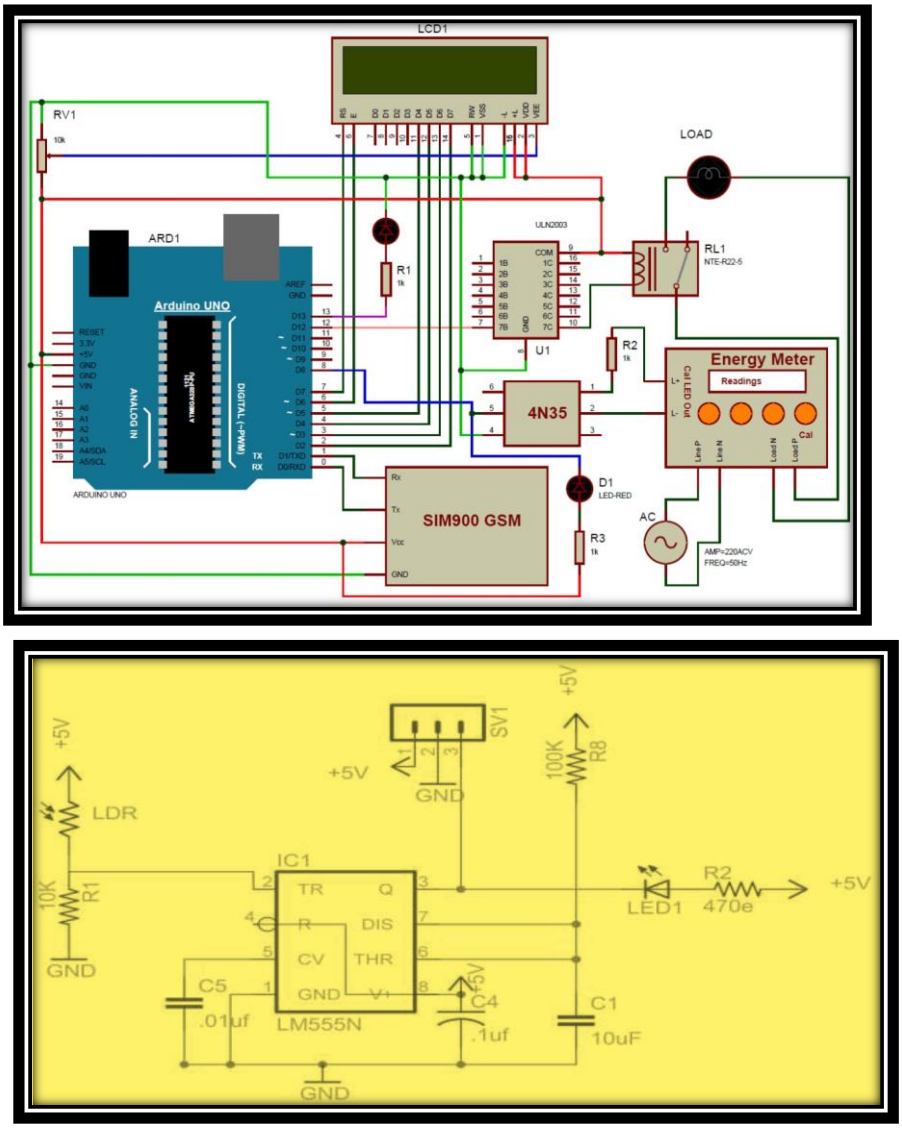


Fig.20 LDR Circuit

Table Test result of prepaid energy meter

Time (sec)	Energy Output from Measurement (kW-sec)
0	0
10	0.27
20	0.55
30	0.83
40	1.11
50	1.38

60	1.66
70	1.94
80	2.22
90	2.50
100	2.77
110	2.04
120	2.32

Software development for prepaid energy meter

The system software is implemented by C language and the developed code is edited, compiled and debugging by Win-AVR software. We can also program the system using MATLAB

ADVANTAGES:

- Recharge and monitor from anywhere.
- Live updates on consumption and improved quality of service.
- Direct web-based access for power monitoring and eliminate the need for manual supervision.
- Keep records of recharge and consumption history for OPEX savings.

ESTIMATION AND COSTING:

Sr. No.	Components	Description	Quantity	Price(Rs.)
1	AT89S52	40 Pin	1	90
2	AT89C2051	20 Pin	1	70
3	AT24C02	8 Pin	2	20*2= 40
4	ULN 2003	16 Pin	1	90
5	MCT2E	6 Pin	1	210
6	Resonator	Ceramic 12 Hz	1	10
7	Relay	12V/30A	1	205
8	LCD	16*2	1	130
9	Buzzer		1	30
10	LED	Green	11	10
		Black		10
11	Resistor	56K	2	10
		10K	2	5
		330 OHM	9	10

		56 OHM	1	5
12	Capacitor	1 MICROFARAD/16V ELECTROLYTIC	1	10
		1 MICROFARAD CERAMIC	1	5
		33pF CERAMIC	4	5
				945

CONCLUSION:

Using this project we can reduce the manual efforts to take the readings from the energy meter which is cost and effective solution.
Reduces man power.
It is user friendly and we can enhance this project, in which an electricity department can send message to the consumer about the billing information.

8.1.9 SOLAR CROP DRYER:

INTRODUCTION:

- Drying of food grains in the fields by exposure to sun has been very common in India since ancient times. The industrialization in the present century created a demand for controlled drying of many agricultural products such as tobacco, wood, peaches, resins, etc., since such products retain the flavour, quality and appearance and thus have better sale prospects. The other advantage is that such products could be dried in peak season and made available for consumption throughout the year.

- Coal, oil or firewood are usually used in such conventional industrial dryers. The present energy crisis compels one to think of use of alternate sources of energy and the population free. Abundant and readily available solar energy seems to be the only answer.

- Solar dryers could be classified as direct or indirect types. The former involves directly exposing the material to the sun. While in the latter, the material is dried by circulating hot air over it without directly exposing the material to the sun. The merits of any solar dryer would depend upon the type and quantity of material to be dried. Sometimes a passive system incorporates a wind-driven fan for the air circulation.

OBJECTIVES OF THE STUDY:

The objective of a solar dryer is to provide ample amount of heat i.e. more than ambient heat under given humidity. It increases the vapour pressure of the moisture confined within the product and decreases the relative humidity of the drying air so that the moisture carrying capacity of the air can be increased

How it works

1. Perforated metal cladding panels are affixed to a roof; in areas where snow accumulation is a problem, the minimum slope should be 45° to allow the snow to slide off. Equator facing slopes are the best, but other orientations are suitable, too. Walls can also work well if the roof is not suitable.
2. To get the most free heat possible from your solar roof panels, as much of the roof should be covered as possible. Maximum efficiency and heat gains can be realized by placing panels over every roof surface – even going around obstacles and openings. If photovoltaics (PV) are being considered, the PV panels simply get placed over the transpired solar collector panels.

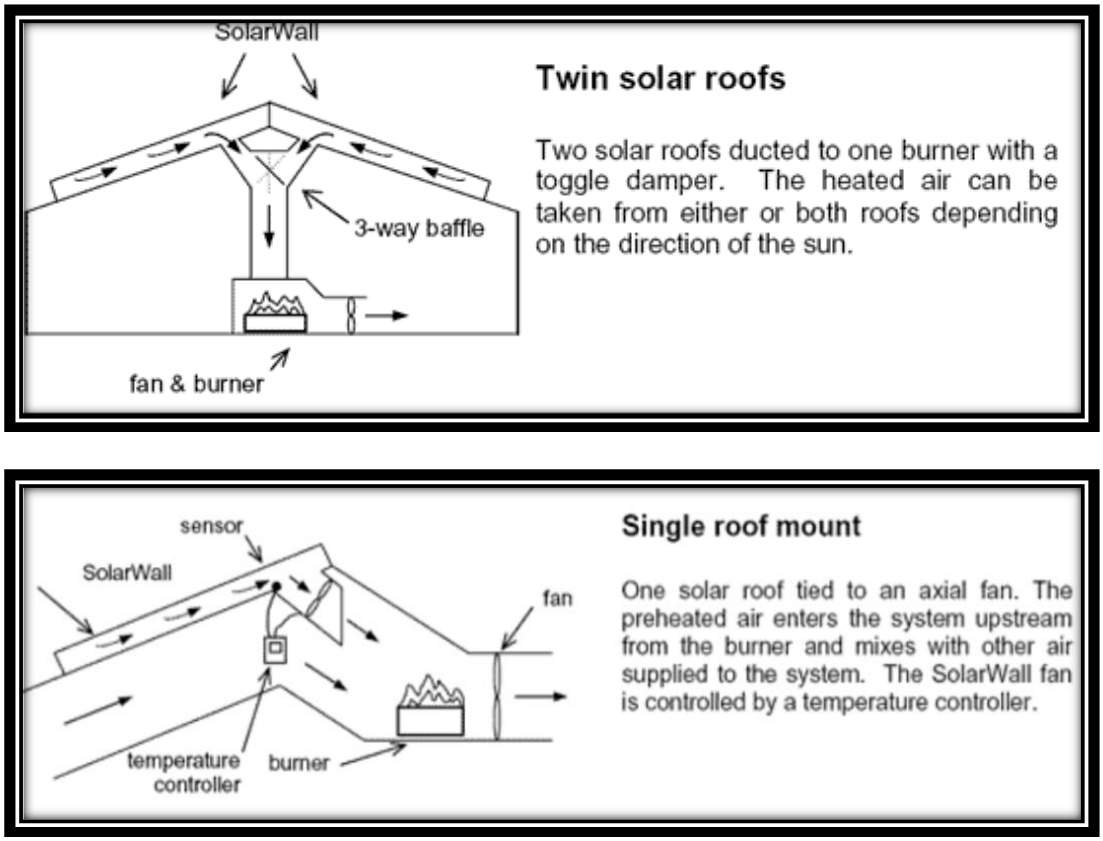
When SolarWall solar heating/solar drying panels are affixed to the roof (or wall), a gap is left between the metal cladding and the roof surface. The metal panels are heated by the sun's rays shining on the dark metal cladding. Thanks to fans which create negative pressure in the roof space/cavity, the heated air passes through the small perforations in the cladding and then travels to the nearest fan or blower intake. The air flows in such as way as to help simplify balancing and ensures that no solar heat is lost. Note: All driers have fans; SolarWall simply ties into that fan, bringing air that has been warmed before it hits the burner.

How big a gap is needed between roof and cladding?

The ambient temperature and material being dried will dictate the heat gain needed from the solar collector panels in any given application. How much the temperature rises in the SolarWall panels depends on the volume of air per square foot (or meter) moving through the panel. Individual needs can be worked out in advance by SolarWall engineers so that the optimal amount of paneling is added, and the right amount of space is left between the roof surface and the cladding. On average, though, the gap is about 8" (20 cm).

Mounting the panels

It is best to mount the SolarWall panels on the roof, either with twin solar roofs or with a single roof mount (depicted in the typical connection details).



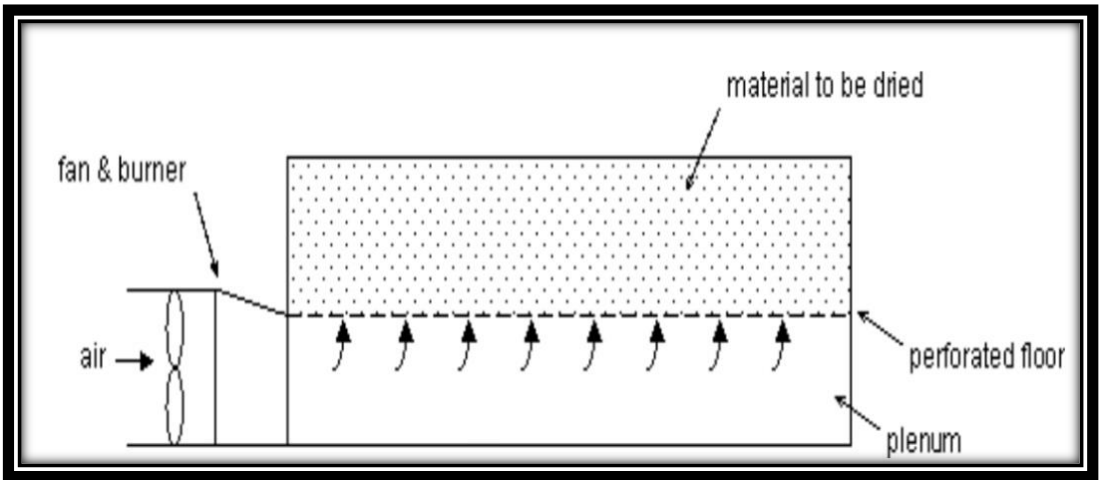
Construction of solar crop dryer

When a commercial dryer or heater is also being used

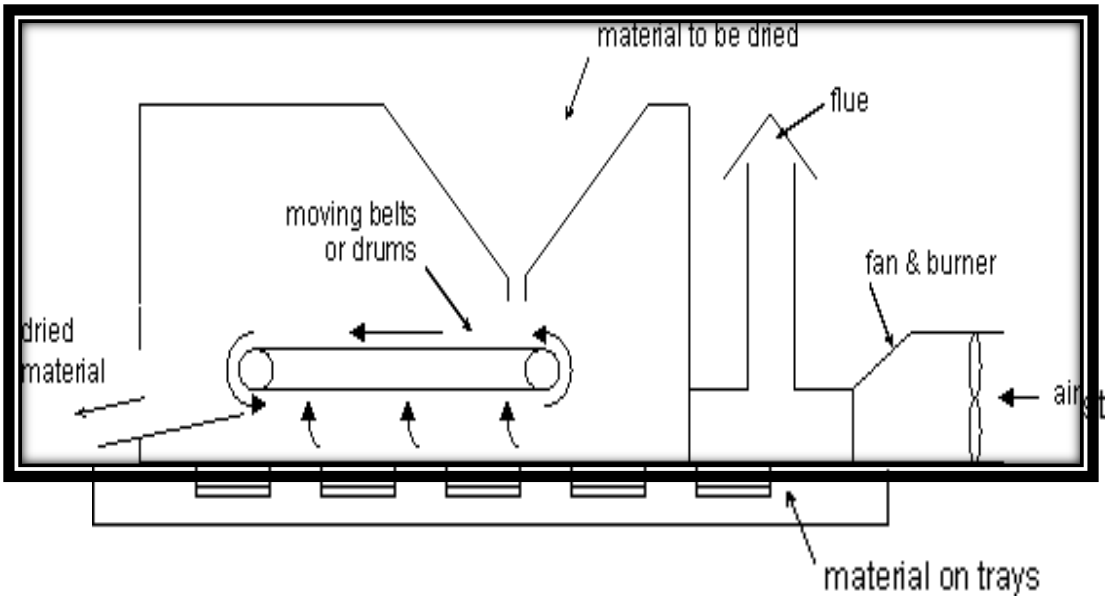
On sunny days, the increase in air temperature ranges from 20ºC to 30ºC (36ºF to 54ºF); in some cases though, even more heat gain may be needed and a dryer is needed with the SolarWall panels acting as pre-heaters. When SolarWall panels are being used in conjunction with a dryer (new or existing), it's essential that there be a means of modulating the flame so that…

- The burner can be turned down (or off) when the panels are producing enough solar heat,
- The burner can be turned up to top up the solar heat when it's cloudy or very cold outside.

The SolarWall system works equally well with trough driers, tunnel driers, belt driers and drum driers.



Tunnel Dryer*:* Is most often used for drying products such as fruit and fish which have a higher initial moisture content.



To recap

Perforated, dark, metal cladding is placed on as much roof surface as possible. Air is warmed by the sun, and is drawn in through the holes. This pre-heated air is drawn into ducting and, if necessary, has its temperature boosted by a supplementary burner, before being used for crop or process drying. Yes, it is as simple as it sounds

:

ADVANTAGES:

(1) A smaller area of land in order to dry similar amounts of crop.
(2) Relatively high quality of dry crop, because insects and rodents are unlikely to infest it during drying,
(3) Shortened drying period.
(4) Protection from sudden rain.
(5) Low capital and running costs.

ESTIMATION AND COSTING:

Specification of dryer	
Total height of the cabinet	0.95m
Front width of cabinet	0.56
Side width of cabinet	0.39m
Length of solar collector	1.6m
Width of solar collector	0.91m
Depth of solar collector	0.19m
Glass thickness	6mm
No. of tray	4
Type of tray	Wire mesh
Area of tray	0.15m^2

COST OF CONSTRUCTION:

Table cost of material			
S. No.	**Material Required**	**Quantity**	**Amount(Rs.)**
1.	Plywood (2438.4mm length ,1219.2mm wide & 18mm thick	1	1500
2.	Float glass (6mm)	4	1250
3.	Aluminum frame(kg)	2.5	1550
4.	Wire mesh(Net in feet)	10	200
5.	Rubber (feet)	10	150
6.	Bracket-*	2	30
7.	PVC pipe(feet & 110mm dia.)	1	50

8.	Elbow (75mm dia.)	2	50
9.	Handle	1	50
10.	Screw	150	100
11.	Adhesive (gm)	500	70
12.	Thermocol	4	200
13.	Black board black paint, Primer , brush	-	425
14.	Solvent (PVC adhesive)	2	70
15.	Glass adhesive (tape)	1	200
16.	Miscellaneous items (hinge, nut, bolt etc.)	-	1605
17.	Labour charge	-	2000
	Total		9500

CONCLUSION:

The dependence of the drying on the characteristics of product remains still as a problem, for comparison of drying efficiencies of various driers. Author presented a comprehensive review of the various design, details of constructional and operational principles of the wide variety of practically realized design of solar energy drying systems.

CHAPTER: 9

FUTURE DEVELOPMENT OF THE VILLAGE

•The study is aimed to know the basic scenario of village through techno economic survey and gap analysis form

•Our master development plan might include provisions of all the facilities suggest by us, then our focus will be on the improvement in the existing amenities.

•Our aim is to work according to the new upcoming town planning scheme in VADHAVA village.

•Based on these plans, our next target will be to provide regular maintenance program, which helps in sustaining the structure for longer duration.

•Also, due to lack in maintenance, villagers avoid consuming it and which make the structures obsolete.

AGRICULTURE STORAGE ROOM:

Storage is an important marketing function, which involves holding and preserving goods from the time they are produced until they are needed for consumption.

- The storage of goods, therefore, from the time of production to the time of consumption, ensures a continuous flow of goods in the market.
- Storage protects the quality of perishable and semi-perishable products from deterioration;
- Some of the goods e.g., woolen garments, have a seasonal demand. To cope with this demand, production on a continuous basis and storage become necessary;
- It helps in the stabilization of prices by adjusting demand and supply;
- Storage is necessary for some period for performance of other marketing functions.
- Storage provides employment and income through price advantages.

CYBER CAFÉ:

Internet cafés offer the use of computers with high bandwidth Internet access on the payment of a fee. Usage is generally charged by the minute or part of hour. An Internet cafe will generally also offer refreshments or other services such as phone repair. Internet cafes are often hosted within a shop or other establishment. They are located worldwide, and many people use them when traveling to access webmail and instant messaging services to keep in touch with family and friends. Apart from travelers, in many developing countries Internet cafés are the primary form of Internet access for citizens as a shared-access model is more affordable than personal ownership of equipment and/or software. Internet cafés are a natural evolution of the traditional café. Cafés started as places for information exchange, and have always been used as places to read the paper, send postcards home, play traditional or electronic games, chat to friends, find out local information. As Internet access is in increasing demand, many pubs, bars and cafés have terminals, so the distinction between the Internet café and normal café is eroded. In some, particularly European countries, the number of pure Internet cafés is decreasing since more and more normal cafés offer the same services.

RO PLANT:

PRIMARY SHOP:

A pharmacy is a shop where therapeutic drugs are sold. Sometimes a pharmacy is also called a drug store. A pharmacy is the place where most pharmacists practice the profession of pharmacy. Pharmacists play a major role in providing healthcare services by means of community pharmacy services in rural areas where physicians are not available or where physician services are too costly for meeting the healthcare necessities.

MILK DAIRY:

People who have a diet rich in milk and milk products can reduce the risk of low bone mass throughout the life cycle. Foods in the milk group provide vital nutrients, including calcium, potassium, vitamin D, and protein.

Build Stronger Bones

- Diets rich in milk and milk products help build and maintain bone mass. This may reduce the risk of the bone-thinning disease osteoporosis.
- Milk products are especially important to bone health during childhood and adolescence, when bone mass is being built.
- Diets that include milk products tend to have a higher overall nutritional quality.
- Calcium-fortified foods and drinks such as soy beverages or orange juice are other sources of calcium but may not provide other necessary nutrients.

BANK:

Banks offer a diverse variety of programs to attract and hold customers. Compare the offerings of different banks and do not be afraid to switch if another bank is better at suiting your needs — but first, make sure that you understand what those needs are. Do you need multiple locations and ATMs? Is online banking important to you? Do you prefer mobile apps? Is a smaller minimum balance required based on your cash flow? Examine your banking needs in detail.

Once you are confident that you know what you are looking for in a bank, you can make an educated comparison and maximize your benefits. Don't forget to consider banks that are completely online with no physical branches. Their lower overhead costs can result in better rates for you.

If you have decided that your current bank is not for you, speak with them and give them a chance to retain your business. You have leverage as a customer; don't be afraid to use it.

CHAPTER: 10

CONCLUSIONS

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

Aim:

Developing village with a rural soul, but with all Smart urban amenities that a city may have‖.

This will help in developing Smart villages in sustainable manner, reduce migration from villages and prevent the cities from the urban pressure. This should lead to some rethinking about the meaning of efficiency beyond the usual conceptions of economic or technical efficiency. Indeed, employment expansion is at least as important as growth in productivity. In a sense, both represent the utilization of labor as a resource. Why, then, does thinking about efficiency focus on one and neglect the other It is important to reflect on this question. The answer, which calls for change in both economics and politics, could make a real differenc

People of village migrate from rural to urban for better education, to get employment, to live standard life. To reduce the migration of people from rural to urban by providing all the general facilities in the villages like primary-secondary education, public health center, skill development center. Infrastructure facilities should be encouraging the people of the rural village to get sufficient livelihood and improve their standard of living.

Success in development of a village only can be achieved, if Sarpanch of that village wants to nourish it. Government of India has provided many schemes/programmer among the nation for the village and the villagers, but Sarpanch works as a bridge between Government and the villagers. All this can be fulfilled, by having little awareness and helpful working group in the village, perfect example is Ankodiya village. Also, it was awarded as cleanest village.

We had a desire for us as well as for the villagers that “united we stand and divided we fall” with this motto we have come so far and hope that we could complete all our wished projects within time. We faced problems but we have gathered our courage, self-motivation and team-motivation to complete the work on time.

That so why we provide the design to develop the village and also easy life gives the villagers:

Post office	Library	Solar Street light designing
Low cost Toilet	Biorock Treatment plan	Solar crop dryer
Skill development center	Party plot with plastic block	Prepaid energy meter

CHAPTER: 11

REFERENCE

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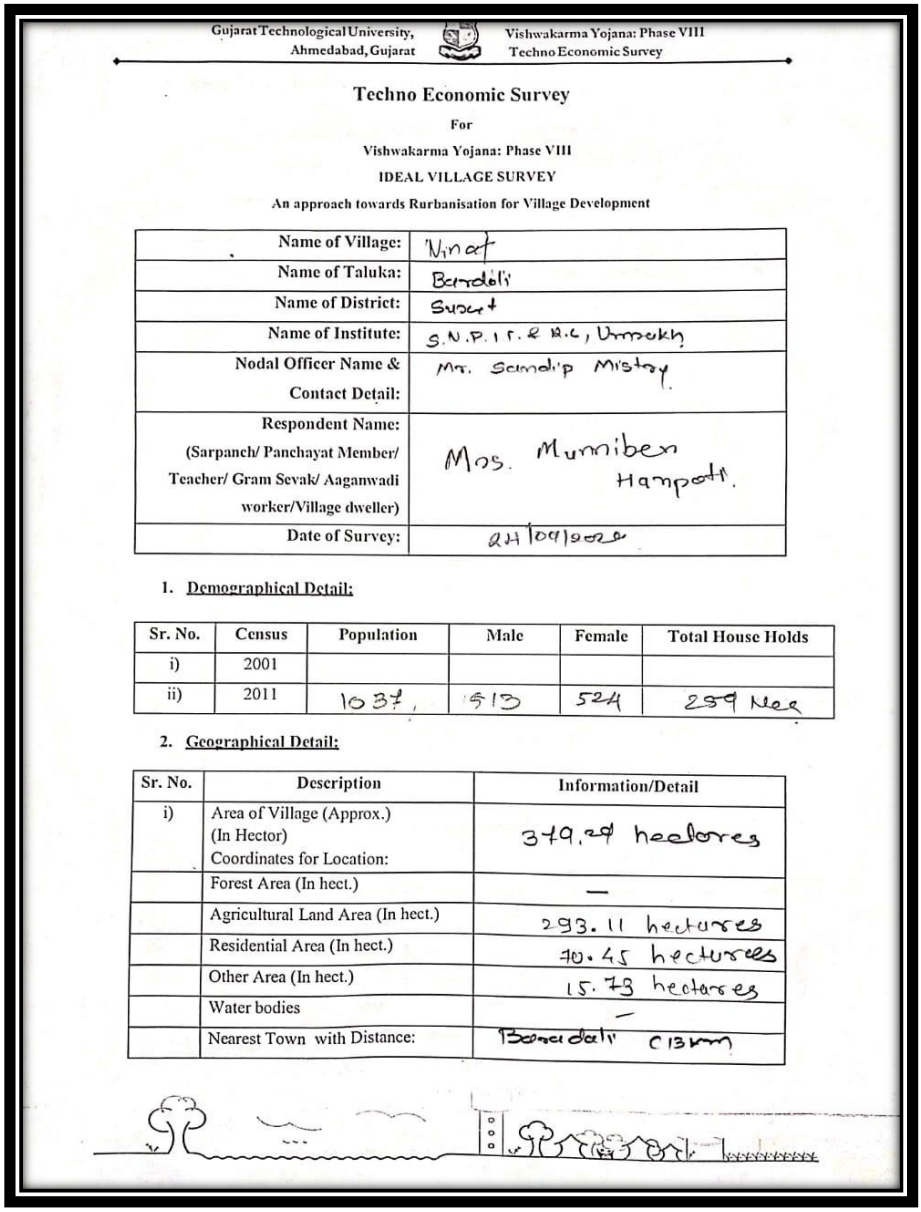
https://en.wikipedia.org/wiki/Pradhan_Mantri_Gram_Sadak_Yojana

CHAPTER 12:

ANNEXURE

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



Gujarat Technological University, Ahmedabad, Gujarat — Vishwakarma Yojana: Phase VIII Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	Vinar
Name of Taluka:	Bardoli
Name of District:	Surat
Name of Institute:	S.N.P.I.T. & R.C, Umrakh
Nodal Officer Name & Contact Detail:	Mr. Sandip Mistry
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Mrs. Mumiben Hampati.
Date of Survey:	24/09/2020

1. Demographical Detail:

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001				
ii)	2011	1037	513	524	259 Nos

2. Geographical Detail:

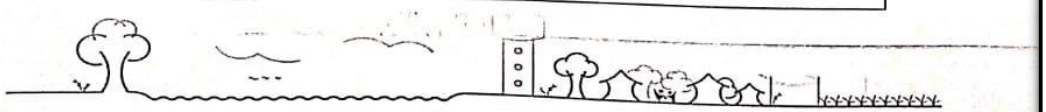
Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	379.29 hectares
	Forest Area (In hect.)	—
	Agricultural Land Area (In hect.)	293.11 hectares
	Residential Area (In hect.)	70.45 hectares
	Other Area (In hect.)	15.73 hectares
	Water bodies	—
	Nearest Town with Distance:	Bardoli 13km

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1.	Agriculture
	2.	Animal husbandary
	3.	Agri work

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	morning evening	✓	✓	
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	Rock & Bar		
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	close			
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	✓	✓		
	If Open than Pucca / Kutchcha	—	—	—	
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	—			
Suggestions if any:					

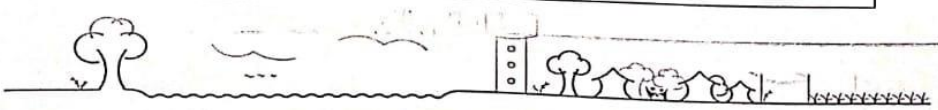


3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1.	Agriculture
	2.	Animal husbandary
	3.	Agri work

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	morning evening	✓ ✓	 ✓ ✓ ✓	
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	Rock & Bar 2 Nos		
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	close			
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	✓	✓		
	If Open than Pucca / Kutchcha	—	—	—	
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	—			
Suggestions if any:					



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E.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road				
	Main road	RCC / WBM			
	Internal streets				
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH:-8 SH:- Mahuva			
Suggestions if any:					

F.	Transport Facility				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	10. Km – Bardoli 20 – Mavesari			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Bardoli/10 Within Village			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Yes			
Suggestions if any:					

G.	Electricity Distribution				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Bardoli DGVC	Gram Jyoti		
	Power supply for Domestic Use	8 hrs			
	Power supply for Agricultural Use				
	Power supply for Commercial Use	None			
	Road/ Street Lights	Yes			

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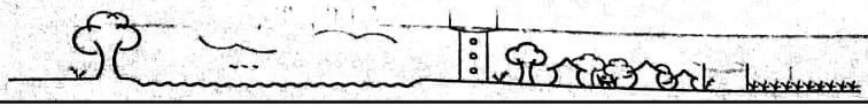
	Electrification in Government Buildings/ Schools/ Hospitals	Yes.			
	Renewable Energy Source Facilities (Y/ N)	yes / high in use			
	LED Facilities	Yes. - LED			
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.				
	Location Condition			✓	
	Community Toilet (With bath/ without bath facilities)			✓	
	Solid & liquid waste Disposal system available			✓	
	Any facility for Waste collection from road			✓	
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	Dore /		✓	
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	100% /	Pucca		

5. Social Infrastructural Facilities:

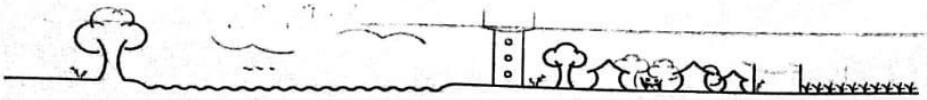
Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

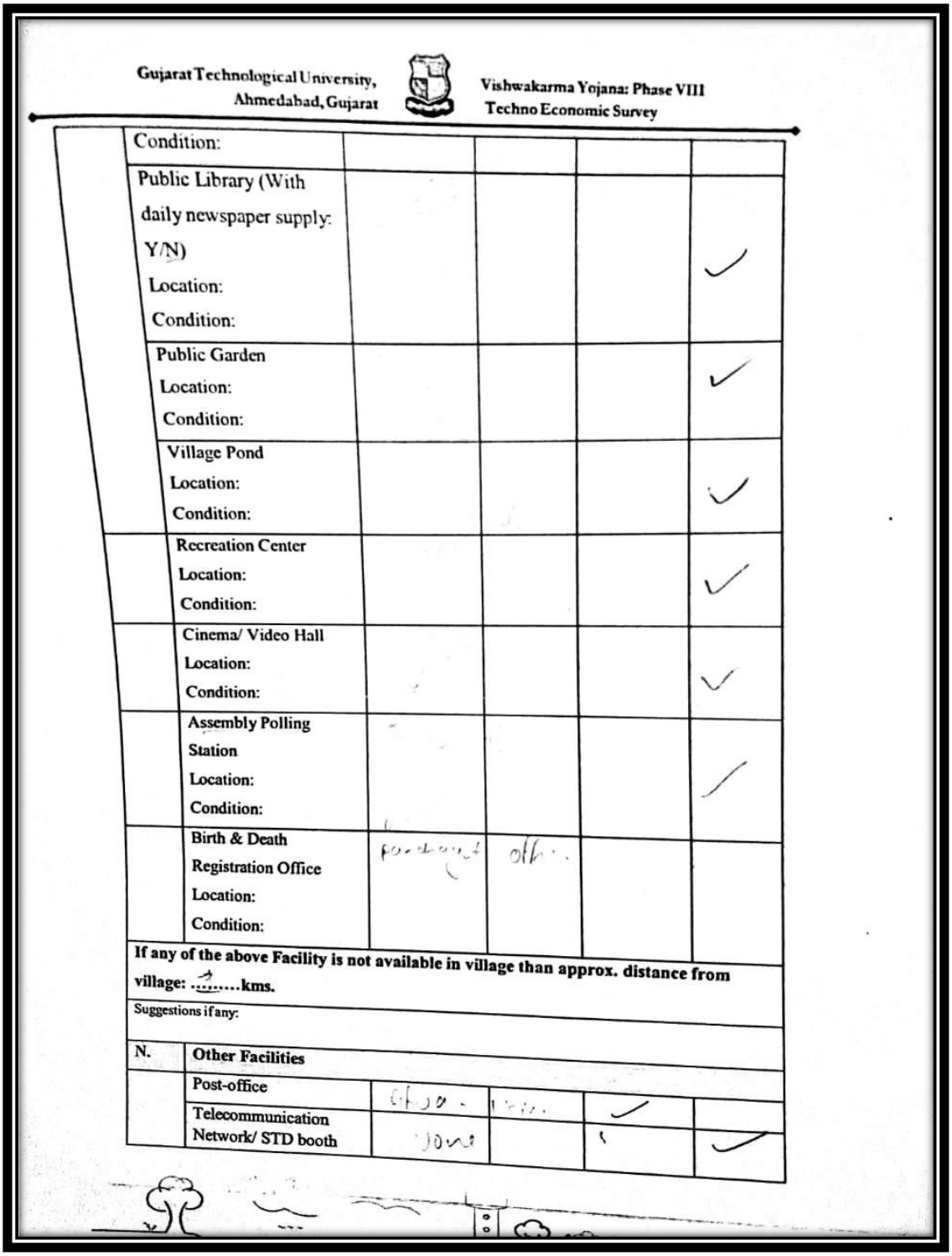


K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	2 Nos		✓ ✓ ✓ ✓ ✓	
	Private Clinic/Private Hospital/ Nursing Home				
	If any of the above Facility is not available in village than approx. distance from village: ..2.5..kms.				
Suggestions if any:					

L.	**Education Facilities:**				
	Aaganwadi/ Play group	10.	✓		
	Primary School	2 Part	✓		
	Secondary school	1	✓		
	Higher sec. School	1	✓		
	ITI college/ vocational Training Center			✓	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities			✓	
	If any of the above Facility is not available in village than approx. distance from village: ..20...kms.				
Suggestions if any:					

M.	**Socio- Culture Facilities**				
	Community Hall (With or without TV) Location:	1 Nos.	✓		





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	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:				✓
	Public Garden Location: Condition:				✓
	Village Pond Location: Condition:				✓
	Recreation Center Location: Condition:				✓
	Cinema/ Video Hall Location: Condition:				✓
	Assembly Polling Station Location: Condition:				✓
	Birth & Death Registration Office Location: Condition:	[illegible]	oth...		

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	Oth...	[illegible]	✓	
	Telecommunication Network/ STD booth	Done		✓	✓

	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	Null			
Q.	Any Other				

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	

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Vishwakarma Yojana: Phase VI
Techno Economic Survey

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)	with computer, library, Garden.	
2.	Additional Information/ Requirement		

9. Smart Village Proposal Design

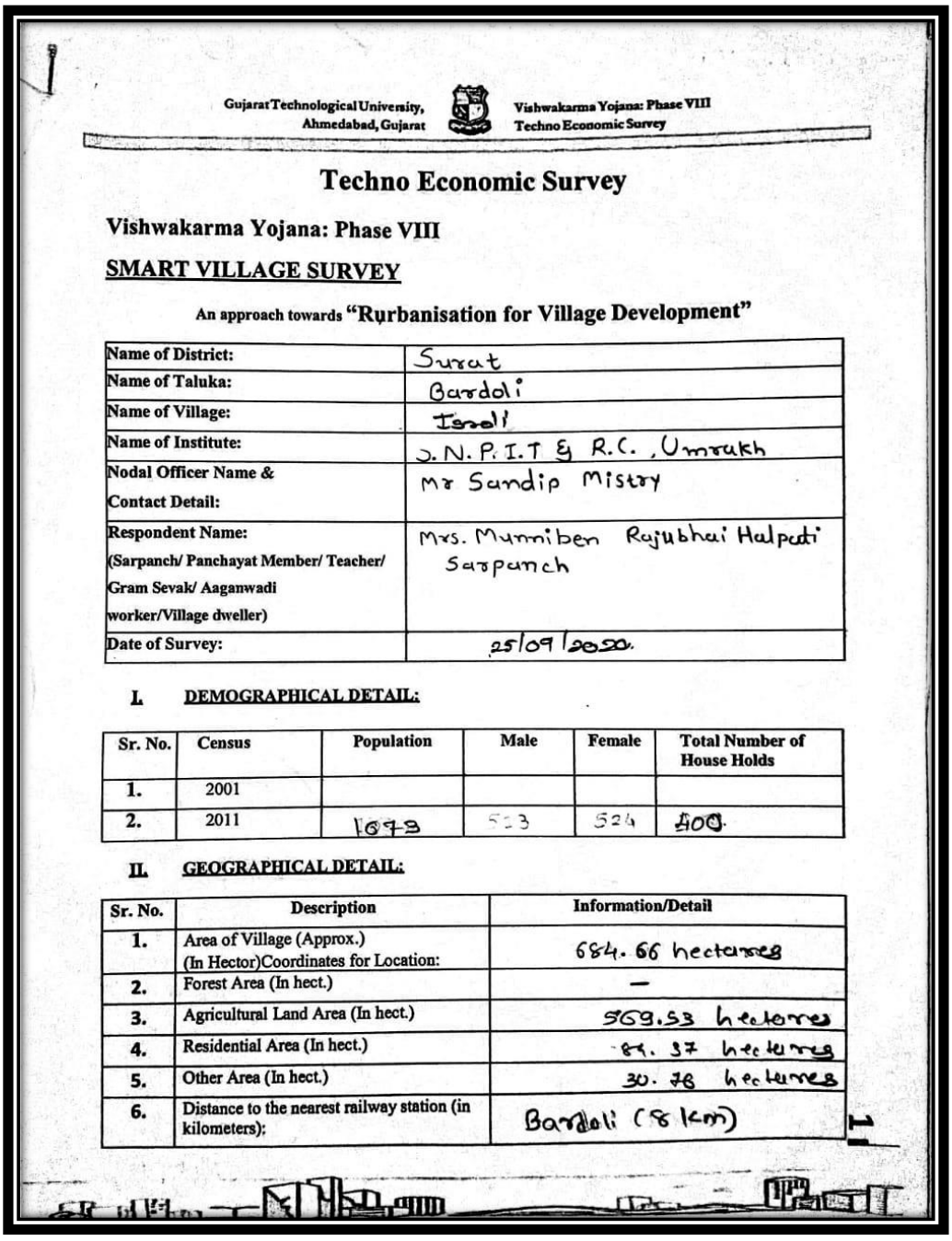
Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

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

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

મુન્નીલેન રાજુભાઈ ઠળપત્ત
સરપંચ,
ગ્રામ પંચાયત-નિણાત
તા. બારડોલી

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



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

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

Name of District:	Surat
Name of Taluka:	Bardoli
Name of Village:	Isroli
Name of Institute:	S.N.P.I.T & R.C., Umrakh
Nodal Officer Name & Contact Detail:	Mr Sandip Mistry
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Mrs. Mumiben Rajubhai Halpati Sarpanch
Date of Survey:	25/09/2020.

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	1079	523	524	400

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	684.66 hectares
2.	Forest Area (In hect.)	—
3.	Agricultural Land Area (In hect.)	569.53 hectares
4.	Residential Area (In hect.)	84.37 hectares
5.	Other Area (In hect.)	30.76 hectares
6.	Distance to the nearest railway station (in kilometers):	Bardoli (8 km)

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

7.	Name of Nearest Town with Distance:	Bardoli (8km)
8.	Distance to the nearest bus station (in kilometers):	Bardoli (8km)
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.	Animal Husbandry
	3.	Agriculture labour

Major crops grown in the village:	1.	Sugarcane
	2.	Rice
	3.	Mango

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER**	3-times	daily		
	Piped Into Dwelling				
	Piped To Yard/Plot				
	Public Tap/Standpipe				
	Tube Well Or Bore Well				
2.	**DUG WELL**	1 Nos			
	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/**	1 Nos	Canal	(not good condition)	
	Irrigation Channel				
	Bottled Water	Yes	1 Nos		
	Hand Pump				
	Other(Specify)Lake/ Pond				

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Suggestions if any:						
B.	**Water Tank Facility**					
	Overhead Tank	Capacity:	20K & 30K	2 Nos.		
	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	Khadkuva		✓		
Suggestions if any:						
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**					
	Village approach road	DBM	✓			
	Main road	DBM	✓			
	Internal streets	DBM	✓			
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH 8	✓			
Suggestions if any:						
E.	**Transport Facility**					
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Bardoli / Pardi	9 km Jyoti	✓		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Bardoli (10 km)		✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)		✓			
Suggestions if any:						
F.	**Electricity Distribution**					
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Govt.	✓			

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	Power supply for Domestic Use	24 hrs.	✓		
	Power supply for Agricultural Use	8 hrs.	✓		
	Power supply for Commercial Use	24 hrs.	✓		
	Road/ Street Lights	✓ electric	✓		
	Electrification in Government ~~Buildings~~/ ~~Schools~~/ Hospitals		✓		
	Renewable Energy Source Facilities (Y/ N)	3 hours	✓		
	LED Facilities			✓	

Suggestions if any:

G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes / 6 Nos.		[3/3]	
	Location Condition	with in range/good.			
	Community Toilet (With bath/ without bath facilities)			✓	
	Solid & liquid waste Disposal system available	Have/good.		✓	
	Any facility for Waste collection from road	collected within village.		✓	

Suggestions if any:

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

Suggestions if any:

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

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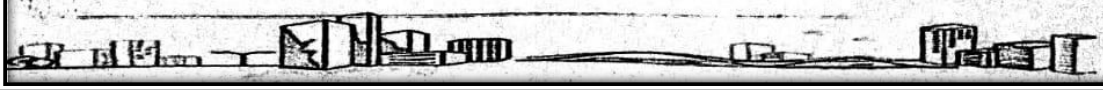

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	1 Nos	✓		
	Sub-Centre			✓	
	PHC	1 Nos	✓		
	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: ..2.5.....kms.				
	Suggestions if any:				
K.	**Education Facilities:**				
	Aaganwadi/ Play group	2/0	✓		
	Primary School	2 (1 govt)	✓		
	Secondary school	1 – Govt	✓	✓	
	Higher sec. School	1	✓	✓	
	ITI college/ vocational Training Center	Ten.		✓	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	Tapore -120 KI		✓	
	If any of the above Facility is not available in village than approx. distance from village: ..20.....kms.				

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Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	2 Nos.		✓	✓
	Public Library (With daily newspaper supply: Y/N)				✓
	Public Garden				✓
	Village Pond				✓
	Recreation Center				✓
	Cinema/ Video Hall				✓
	Assembly Polling Station				✓
	Birth & Death Registration	T.L, Nadg		✓	

If any of the above Facility is not available in village than approx. distance from village: ..10...kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	✓		✓	✓
	Telecommunication Network/ STD booth				✓
	General Market				✓
	Shops (Public Distribution System)			✓	
	Panchayat Building		(Pe).	✓	
	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				✓

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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	combinted with 4 village Cbobala, Sarbhand, bharvasham, Jhakhada, mirad)			
	Other Facility				

Suggestions if any:

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

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Solar Plant	✓		
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.	illage 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	N		✓	
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	with Computer Library Good	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?	3 2	

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

M. S. [illegible]
સરપંચ
ગ્રામ પંચાયત ઈસરોલી
તા. બારડોલી, જિ. સુરત

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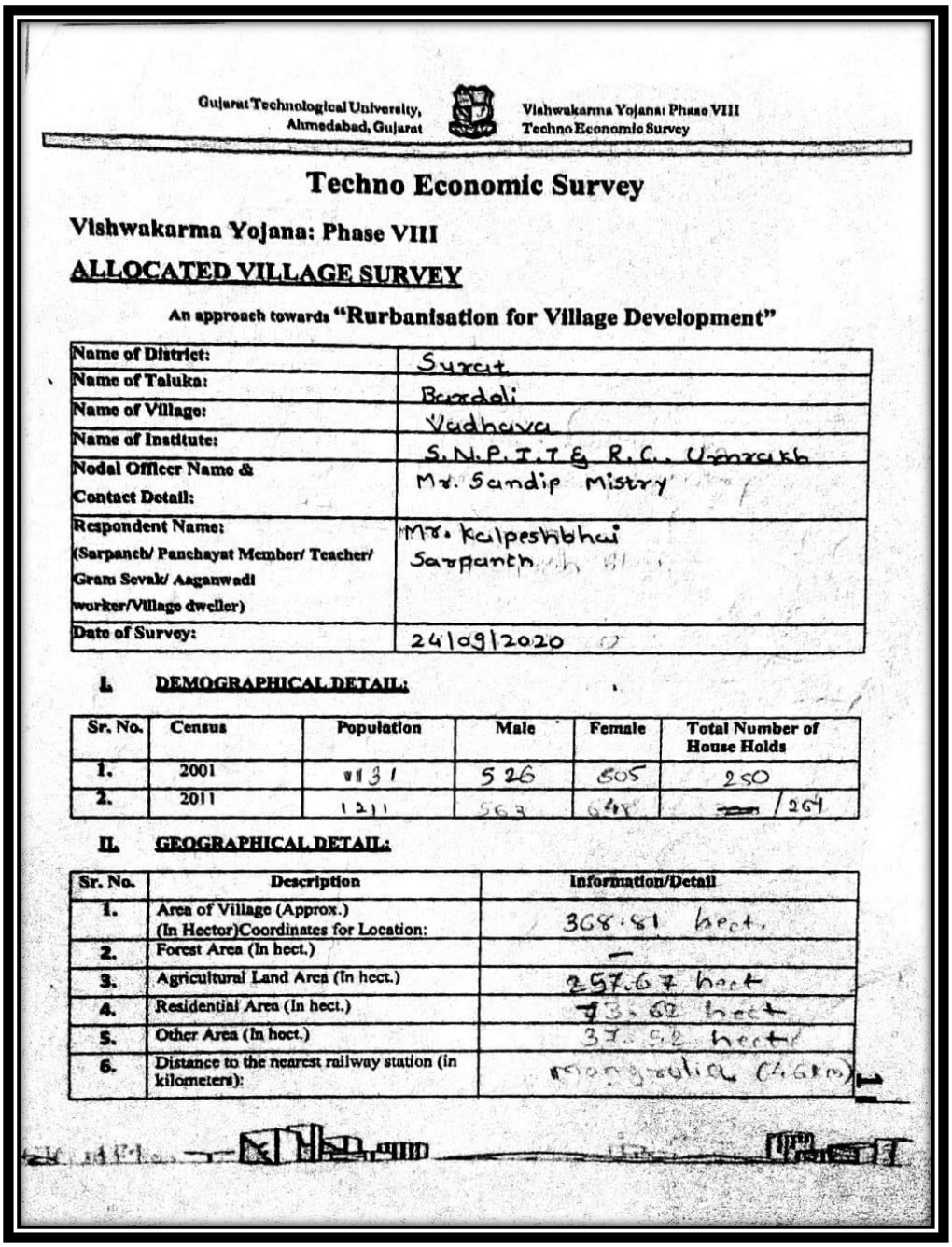
12.3 SURVEY FORM OF ALLOCATED VILLAGE (SCANNED COPY) ATTACHMENT IN THE REPORT FOR PART-1 SURVEY FORM IDEAL VILLAGE (ORIGINAL COPY) ATTACHMENT IN THE REPORT FOR PART II:



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

Name of District:	Surat
Name of Taluka:	Bardoli
Name of Village:	Vadhava
Name of Institute:	S.N.P.I.T & R.C., Umrakh
Nodal Officer Name & Contact Detail:	Mr. Sandip Mistry
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Mr. Kalpeshbhai Sarpanch
Date of Survey:	24/09/2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	1131	526	605	250
2.	2011	1211	563	648	/264

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	368.81 hect.
2.	Forest Area (In hect.)	—
3.	Agricultural Land Area (In hect.)	257.67 hect
4.	Residential Area (In hect.)	73.82 hect
5.	Other Area (In hect.)	37.32 hect
6.	Distance to the nearest railway station (in kilometers):	Kosamba (4.6km)

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7.	Name of Nearest Town with Distance:	Bardoli (8 km)
8.	Distance to the nearest bus station (in kilometers):	Karachakia (3.1 km)
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. Farming 2. Agriculture labour 3. Animal Husbandry
Major crops grown in the village:	1. Sugarcane 2. Rice 3. Lady finger, Vegetables

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	yes	✓	✓	
	Public Tap/Standpipe				
	Tube Well Or Bore Well			✓	
2.	**DUG WELL**				
	Protected Well	not in use	✓		
	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				

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	Other(Specify)Lake/ Pond	Bore	✓		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	2	1000/2000	
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	kharkuva		✓	
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.				
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station—Kms)	Timbarva (5 km)		✓	
	Bus station (Y/N) Condition: (If No than Nearest Bus Station—Kms)	Bardoli (8 km)		✓	
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)			✓	
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Govt		✓	

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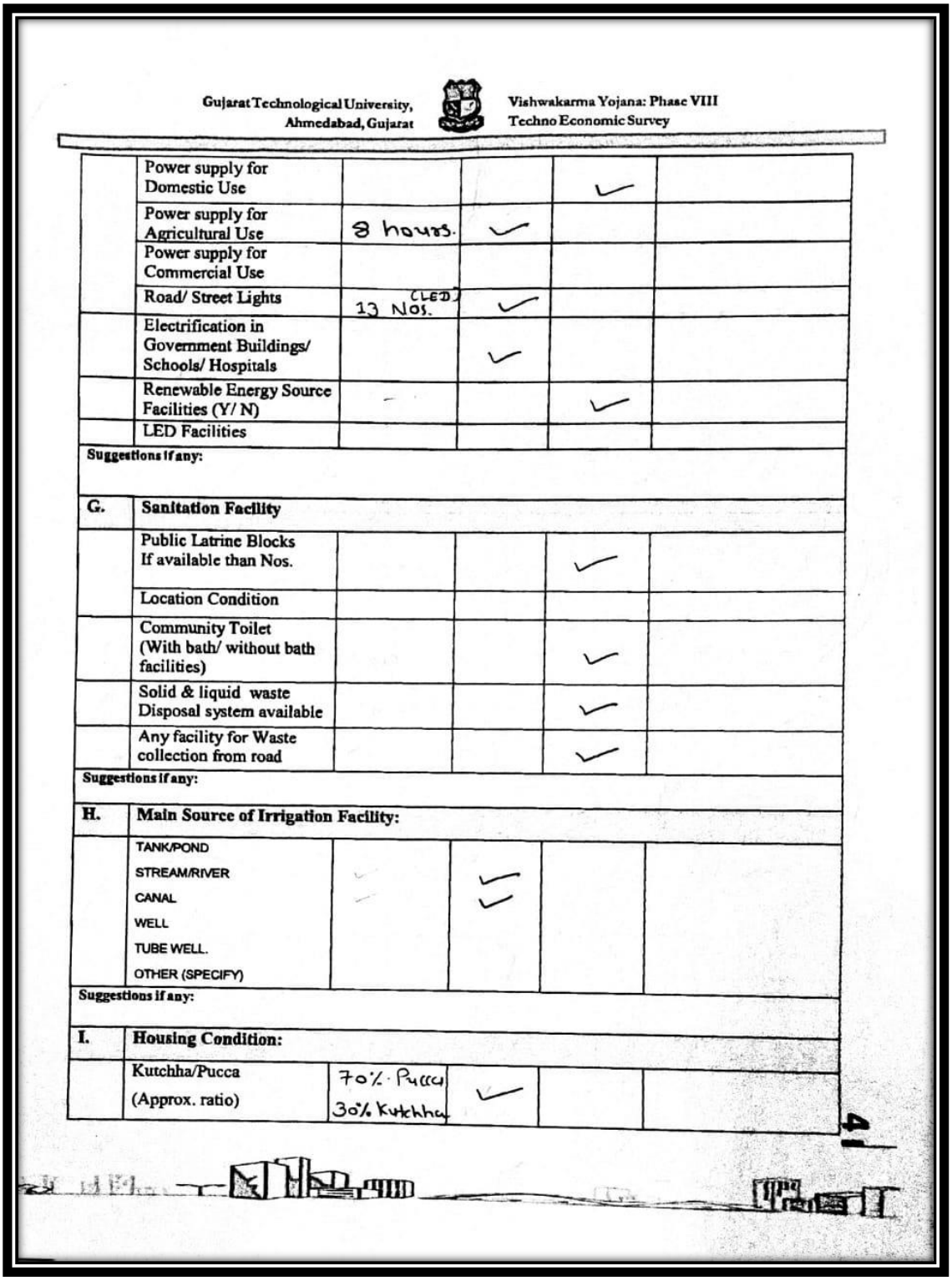

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	Power supply for Domestic Use			✓	
	Power supply for Agricultural Use	8 hours.	✓		
	Power supply for Commercial Use				
	Road/ Street Lights	13 Nos. (LED)	✓		
	Electrification in Government Buildings/ Schools/ Hospitals		✓		
	Renewable Energy Source Facilities (Y/ N)	-		✓	
	LED Facilities				

Suggestions if any:

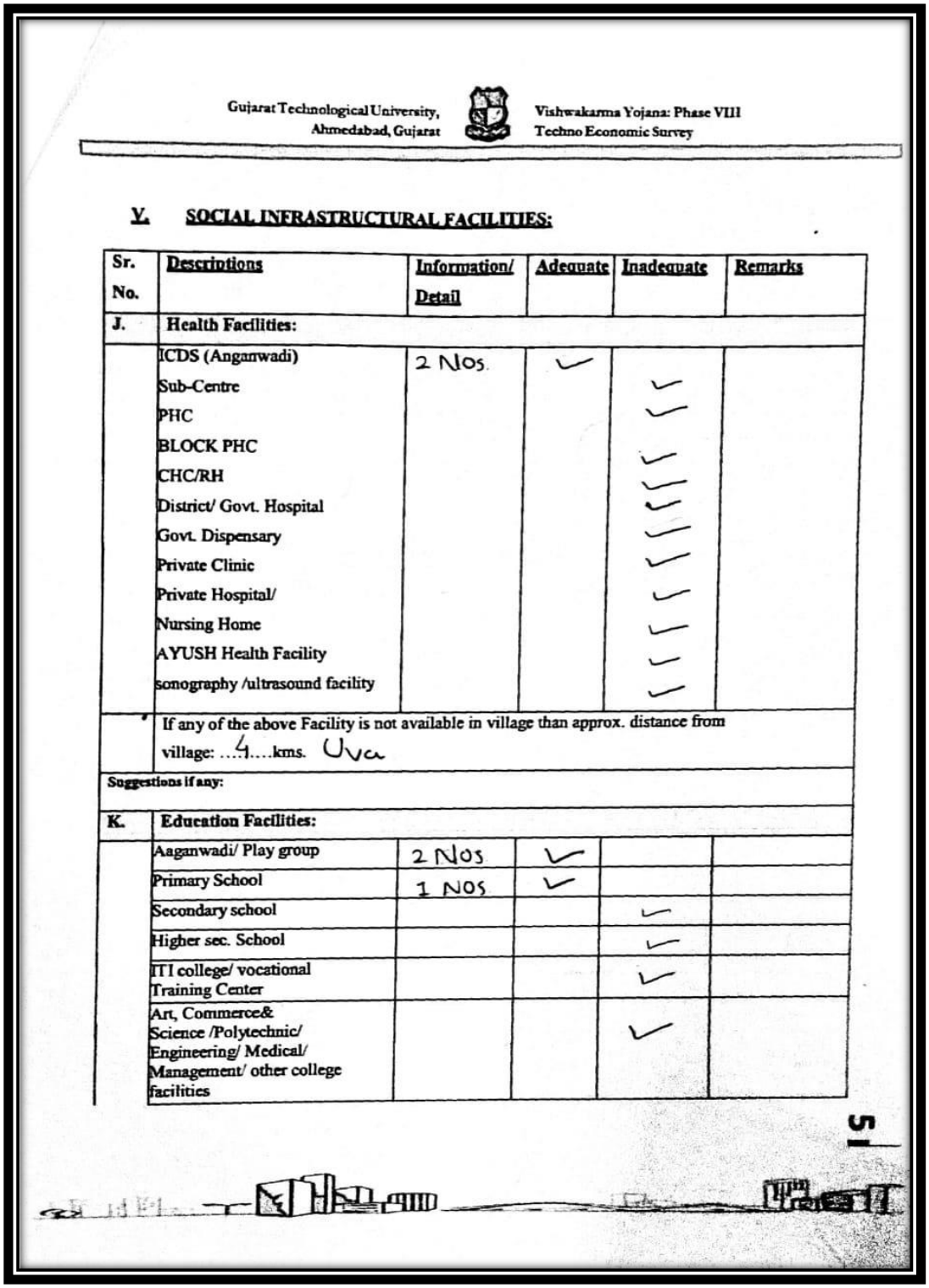
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.			✓	
	Location Condition				
	Community Toilet (With bath/ without bath facilities)			✓	
	Solid & liquid waste Disposal system available			✓	
	Any facility for Waste collection from road			✓	

Suggestions if any:

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

Suggestions if any:

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



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Vishwakarma Yojana: Phase VIII
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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	2 Nos.	✓		
	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: ....4....kms. Uva				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	2 Nos	✓		
	Primary School	1 Nos	✓		
	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: ...4.....kms. ova

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	good. INO.	center	✓	
	Village Pond				✓
	Recreation Center				✓
	Cinema/ Video Hall				✓
	Assembly Polling Station		School	✓	
	Birth & Death Registration Office	bad	Panchayat building	✓	

If any of the above Facility is not available in village than approx. distance from village: ....2...kms. Bardoli

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office				✓
	Telecommunication Network/ STD booth				✓
	General Market				✓
	Shops (Public Distribution System)	(8 Nos) good	within village	✓	
	Panchayat Building	Bad		✓	
	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				✓

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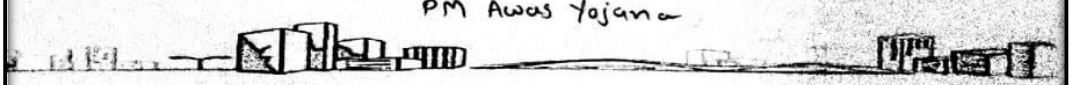
	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Milk dairy		✓	✓ ✓ ✓
	Other Facility				

Suggestions if any:

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



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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	Hard Copy	✓		
2.	Recent Projects going on for Development of Village	Sanitation Programme	✓		
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)	Flood	✓		

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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	Garden, Panchayat Buiding	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?	1 1	

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	Community Hall, PM Awas Yojana, Water for Animal	

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

M.S. પટેલી
વધાવા ગ્રામ પંચાયત
તા. બારડોલી, જિ. સુરત

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12.4 GAP ANALYSIS OF ALLOCATED VILLAGE

Village Facilities	Planning Commission/UDPF I Norms	Village Name:			
		Population:			
		Existing	Required as per Norms	Smart Vilage / Cities / Heritage Future Projection Design	Gap
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	2	NO	2	0
Primary School	Each Per 2500 population	1	NO	1	0
Secondary School	Per 7,500 population	0	NO	0	0
Higher Secondary School	Per 15,000 Population	0	NO	0	0
College	Per 125,000 Population	0	NO	0	0
Tech. Training Institute	Per 100000 Population	0	NO	0	0
Agriculture Research Centre	Per 100000 Population	0	NO	0	0
Skill Development Center	Per 100000 Population	0	NO	0	0
Health Facility					
Govt/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	0	YES	1	1
Primary Health & Child Health Center	Per 20,000 population	0	NO	1	1
Child Welfare and Maternity Home	Per 10,000 population	0	YES	1	1
Multispeciality Hospital	Per 100000 Population	0	NO	0	0
Public Latrines	1 for 50 families (if toilet is not there in home, especially for slum pockets & kutcha house)	0	YES	6	6
Physical Infrastructure Facilities					
Transportation		**Adequate**			
Pucca Village Approach Road	Each village	YES			
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	YES			
Drinking Water (Minimum 70 lpcd)		**Adequate**			
Over Head Tank	1/3 of Total Demand	2	YES	3	1
U/G Sump	2/3 of Total Demand	0	YES	1	1
Drainage Network – Open		**Inadequate**	NO	0	0
Drainage Network – Cover		**Inadequate**	YES	1	1
Waste Management System		**Inadequate**	N0	0	0
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	0	YES	1	1
community hall and Public Library	Per 15000 Population	0	0	1	1
Cremation Ground	Per 20,000 population	0	NO	0	0
Post Office	Per 10,000 population	0	NO	0	0
Gram Panchayat Building	Each individual/group panchayat	1	NO	1	0
APMC	Per 100000 Population	0	NO	0	0
Fire Station	Per 100000 Population	0	NO	0	0
Public Garden	Per village	0	NO	0	0
Police post	Per 40,000Population	0	NO	0	0
Shopping Mall					
Electrical Design					
Electricity Network		**Adequate**	NO	**Adequate**	0
Any Smart Village Facility					
Technology					
		ESR cap	0		
		Sump cap	0		
		Lat	0		

12.5 Summary of All Villages Designs:

Sr. No.	Village name	Branch	Design	
			PART-I	PART-II
1.	Vadhava	Civil Engineering	Post office	Agriculture storage room
			Low cost Toilet	Cyber café
			Skill development center	Funeral home
			Library	Primary shop
			Biorock Treatment plan	Milk Dairy
			Party plot with plastic block	Bank
		Electrical Engineering	Solar street light designing	Auto Irrigation System using Soil Moisture Sensor and PIC
			Solar crop dryer	Fire alarm
			Prepaid energy meter	Earth Fault Detector foe electrical cable
2.	Utara	Civil Engineering	Drainage system	Organic Waste Composting
			Bus stand	Temple
			Party plot	Bank with ATM
			Cemetery	Cheese Factory
			Public Health Centre	Banquet Hall
			Cattle house	Park
		Electrical Engineering	Underground cable	Solar tracker with stepper motor using microcontroller
			CCTV camera	Auto intensity control of street light
			Solar Photovoltaic	Electrical load control by Computer
3.	Nani-Bhatlav	Civil Engineering	Public toilet with plastic block	ATM
			Rain Water Harvesting	Village gate
			Public Health Centre with Plastic block	Chabutaro
			Grocery shop	Panchayat Building
			Garden	Sports club
			Primary school	Krushi sheva Kendra
		Electrical Engineering	Earthing product	Programmable Load Shedding
			Miniature circuit breaker (MCB)	Home Automation
			Time switch specification	PC based electrical load control

12.6 Summary of Good Photographs in Table



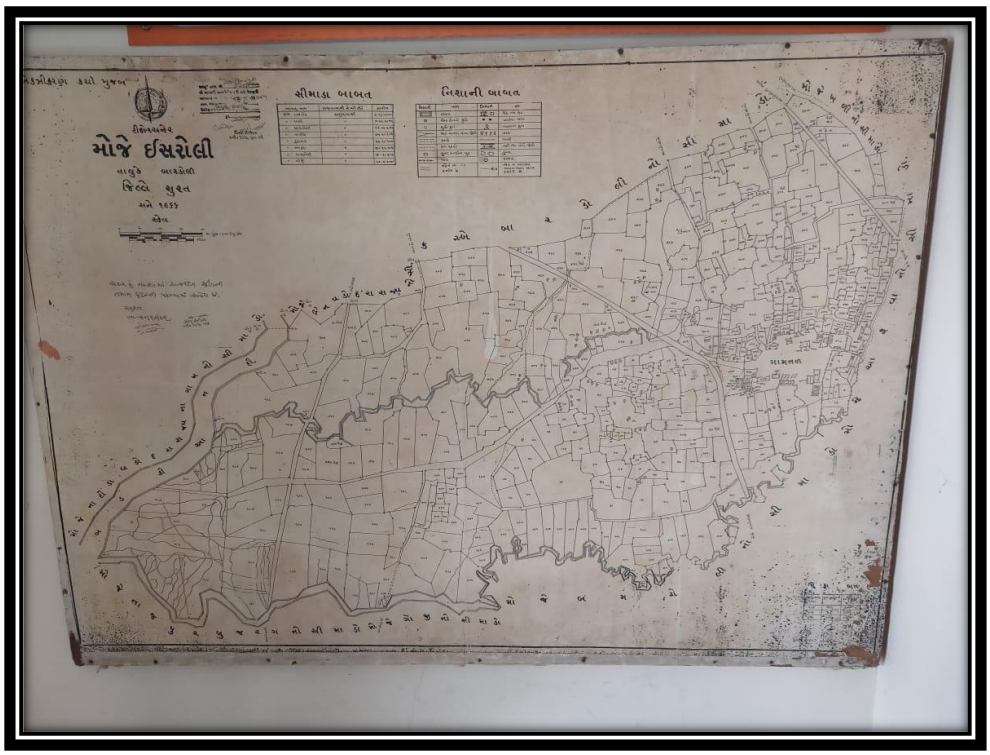











સીમાડા બાબત
નિશાની બાબત
મોજે ઈસરોલી
તાલુકો બારડોલી
જિલ્લો સુરત

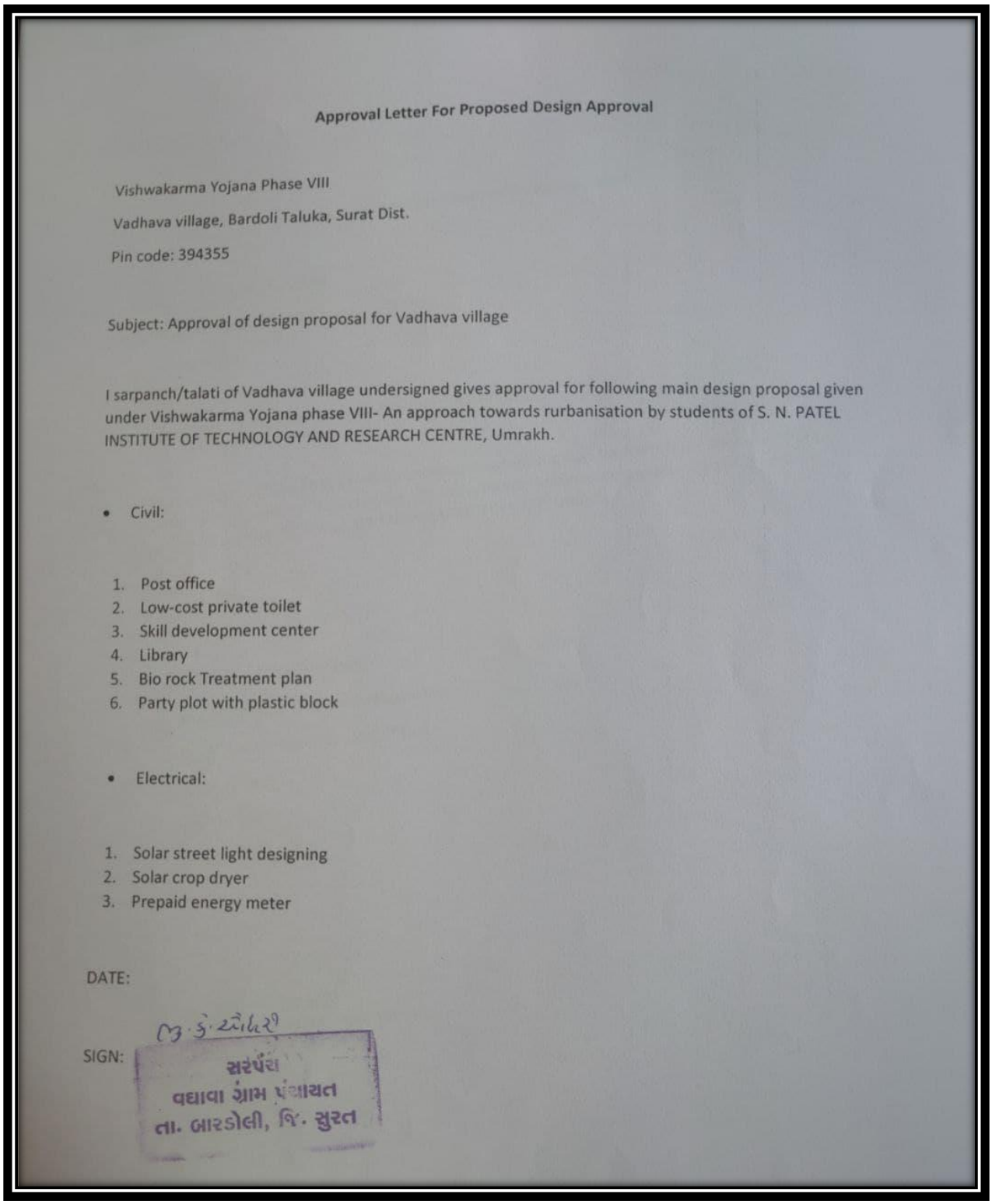
12.7 Village Interaction Report with sarpanch photograph as a report format

Techno economic survey forms give much information about village by interacting with Talati and Sarpanch. But interaction with village dwellers and observation of village condition is required.

We visited allocated village Vadhava and also visited ideal village and Smart village isroli. We met to Sarpanch K.D vaghela and Talati of Vadhava village. They both are very dynamic person and gave us the detailed information and data whenever we required.

We visited all the internal part of the village and interacted with villagers directly and ask them about the present situation of village. We conducted a Techno-economic survey of Vadhava village. After all, we analyzed the gap analysis and provided the necessary facilities to village. We saw that as per UDPFI norms there are some non-adequate facilities.

12.8 Sarpanch Letter giving information about the village development



Approval Letter For Proposed Design Approval

Vishwakarma Yojana Phase VIII

Vadhava village, Bardoli Taluka, Surat Dist.

Pin code: 394355

Subject: Approval of design proposal for Vadhava village

I sarpanch/talati of Vadhava village undersigned gives approval for following main design proposal given under Vishwakarma Yojana phase VIII- An approach towards rurbanisation by students of S. N. PATEL INSTITUTE OF TECHNOLOGY AND RESEARCH CENTRE, Umrakh.

- Civil:

1. Post office
2. Low-cost private toilet
3. Skill development center
4. Library
5. Bio rock Treatment plan
6. Party plot with plastic block

- Electrical:

1. Solar street light designing
2. Solar crop dryer
3. Prepaid energy meter

DATE: 03-5-2018

SIGN:

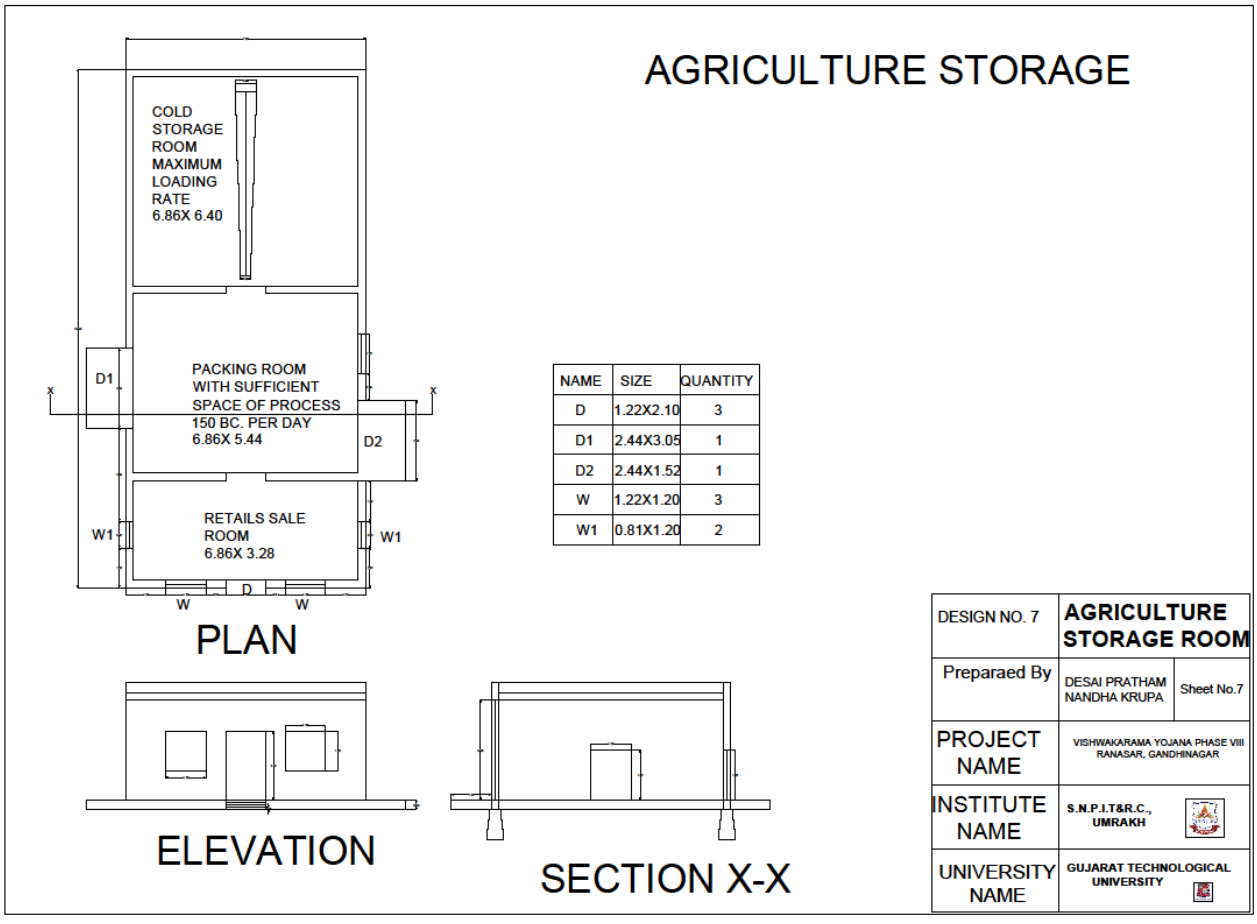
સરપંચ
વઘાવા ગ્રામ પંચાયત
તા. બારડોલી, જિ. સુરત

CHAPTER13

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(Agriculture storage room):-



H = 0.15+6.86+0.15=7.16*4=28.64m
V = 0.15+6.40+0.30+5.44+0.30+3.28+0.15=16.02*2=32.04m
NO. Of junction = 4
Total CL = 28.64+32.04=60.68m

Measurement Sheet of skill development center

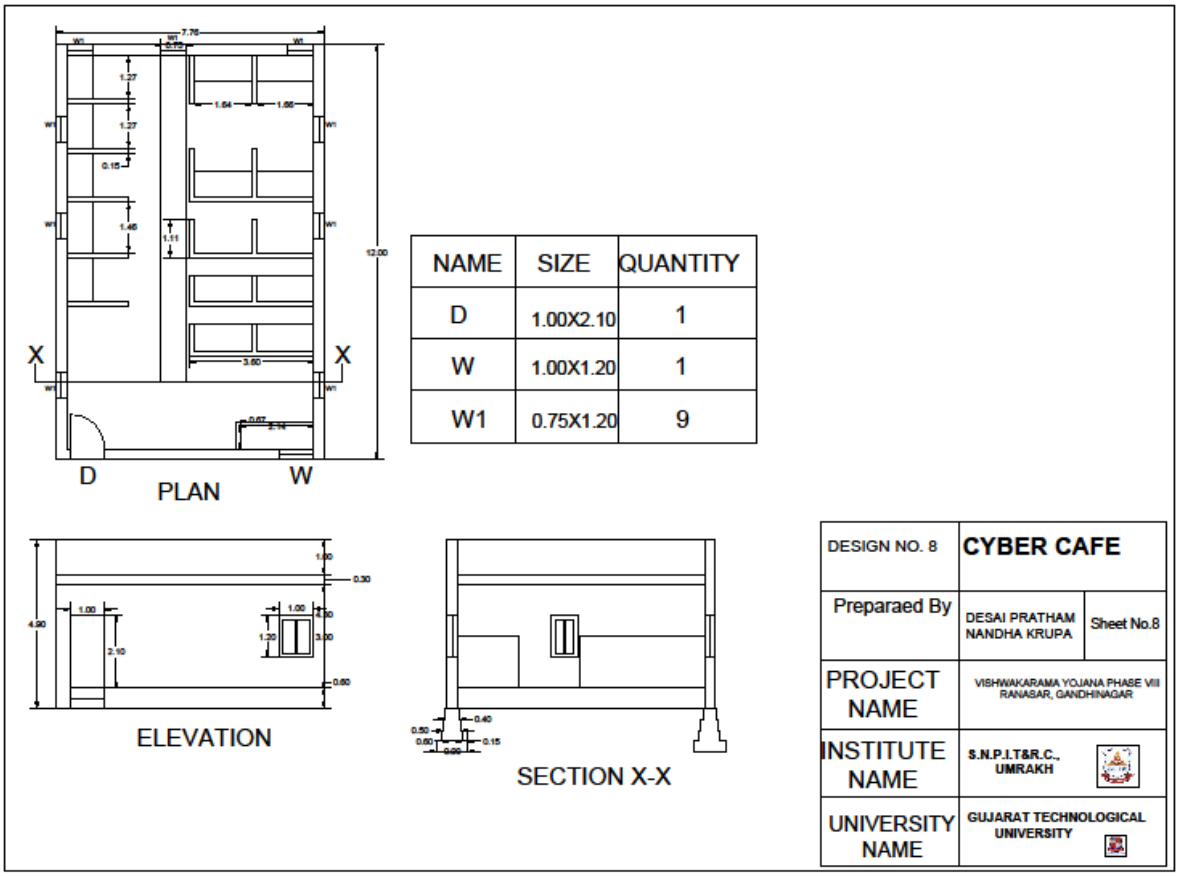
Sr. No.	Description	No.	Length(m)	Width(m)	Height(m)	Quantity(m^3)
1.	Excavation for foundation L= 60.68-(1.1/2)*4 = 58.48m	1	58.48	1.1	1.1	70.76
2.	PCC L= 60.58-(0.9/2)*4 = 58.88	1	58.88	0.9	0.2	10.509
3.	Brick work in foundation up to plinth level 1St Step, L=60.68-(0.6/2)*4 = 58.48m	1	58.48	0.6	0.3	10.706
	2nd Step, L=60.68-(0.5/2)*4 = 59.68m	1	59.68	0.5	0.3	8.95
	3rd Step, L=60.68-(0.4/2)*4 = 59.88m	1	58.88	0.4	0.85	20.359
						40.017
4.	Earthing filling work in plinth Cold storage room, 6.86*6.40	1	6.86	6.40	0.55	24.147
	Packing room, 6.86*5.44	1	6.86	5.44	0.55	20.525
	Retails sale room, 6.86*3.28	1	6.86	3.28	0.55	20.359
						57.047
5.	PCC plinth level L= 60.68-(0.4/2)*4 = 59.88m	1	59.88	0.4		23.952m^2
6.	Brick masonry in super structure L= 60.68-(0.3/2)*4 = 60.08m	1	60.08	0.3	3	54.072
	Deduction for doors & Windows					
	D= 1.22*2.10	3	1.22	0.3	2.10	2.306
	D1= 2.44*2.05	1	2.44	0.3	2.05	1.501
	D2=2.44*1.52	1	2.44	0.3	1.52	1.113
	W=1.22*1.20	3	1.22	0.3	1.20	1.318
	W1=0.81*1.20	2	0.81	0.3	1.20	0.583
						6.821
	Lintel quantity &	3	1.52	0.3	0.15	0.205

	Depth D= 1.22*2.10					
	D1= 2.44*2.05	1	2.74	0.3	0.15	0.123
	D2=2.44*1.52	1	2.74	0.3	0.15	0.123
	W=1.22*1.20	3	1.52	0.3	0.15	0.205
	W1=0.81*1.20	2	1.11	0.3	0.15	0.100
						0.756
	Total Brick masonry in SS= 54.072-6.821-0.756=46.495m^3					
7.	RCC slab L=7.46	1	7.46	16.32	0.2	24.349
	B= 16.32					
	H= 0.2					
8.	Brick masonry in parapet wall					
	H-wall = 7.46	1	7.46	0.3	1	2.238
	V-wall = 15.72	1	15.72	0.3	1	4.716
						6.954
9.	Wall plastering inside					
	Cold storage, 6.80*6.40					
	H-wall = 6.86	2	6.86		3	41.16
	V-wall = 6.40	2	6.40		3	38.4
	Packing room,6.86*5.44					
	H-wall = 6.86	2	6.86		3	41.16
	V-wall = 5.44	2	5.44		3	32.64
	Retail sales room, 6.86*3.28					
	H-wall = 6.86	2	6.86		3	41.16
	V-wall = 3.28	2	3.28		3	19.68
						214.20m^2
	D= 1.22*2.10	2.5	1.22		2.10	6.405
	D1= 2.44*2.05	0.5	2.44		2.05	2.501
	D2=2.44*1.52	0.5	2.44		1.52	1.854
	W=1.22*1.20	1	1.22		1.20	2.562
	W1=0.81*1.20	1	0.81		1.20	0.972
						14.294 m^2
	So, Total plastering work = 214.20-14.294 = 199.906 m^2					
10.	5cm thick mosaic tiles flooring Cold storage room, 6.86*6.40	1	6.86	6.40		43.904

	Packing room, 6.86*5.44	1	6.86	5.44		20.525
	Retails sale room, 6.86*3.28	1	6.86	3.28		20.359
						103.723

Sr. No.	Description	Quantity	Rate	Per	Amount(Rs.)
1.	Excavation for foundation up to 1.1m	70.761	100	M	7076.10
2.	PCC laying for foundation	10.598	1500	M	15867
3.	1st class brick masonry for foundation up to plinth	40.017	1600	M	64027.26
4.	Earthing work in plinth	57.047	75	M	4278.525
5.	PCC at plinth ,0.05m	23.952	200	M	4790.50
6.	Brick masonry ins	46.495	1500	M	69742.50
7.	Laying of RCC slab	24.369	2500	M	60922.50
8.	Reinforcement for slab & binding & placing in position	1924	45	KG	86.580
9.	12mm thick plaster	199.906	150	M	29985.90
10.	5cm thick mosaic tiles	103.723	200	M	20744.60
		Total			368323.25
		3% contingency			11672.036
		2% worker charge establishment			7366.465
		Total			387361.751
		10% contractor Profile			38736.175
		Grant Total			426097.926

13.1.2 Civil Design 2 (Cyber Café):-



Measurement Sheet of skill development center						
SR.NO	**Description**	**Count (Nos.)**	**Length (m)**	**Width (m)**	**Height (m)**	**Total Quantity (m^3)**
1.	Excavation for Foundation L =38.32	1	38.32	1.1	1.1	46.36
2.	P.C.C. L = 38.32	1	38.32	0.9	0.2	6.898
3.	Brick work in Foundation up to Plinth level 1st Step, L = 38.32	1	38.32	0.6	0.3	6.898
	2nd Step, L= 38.32	1	38.32	0.5	0.3	5.748

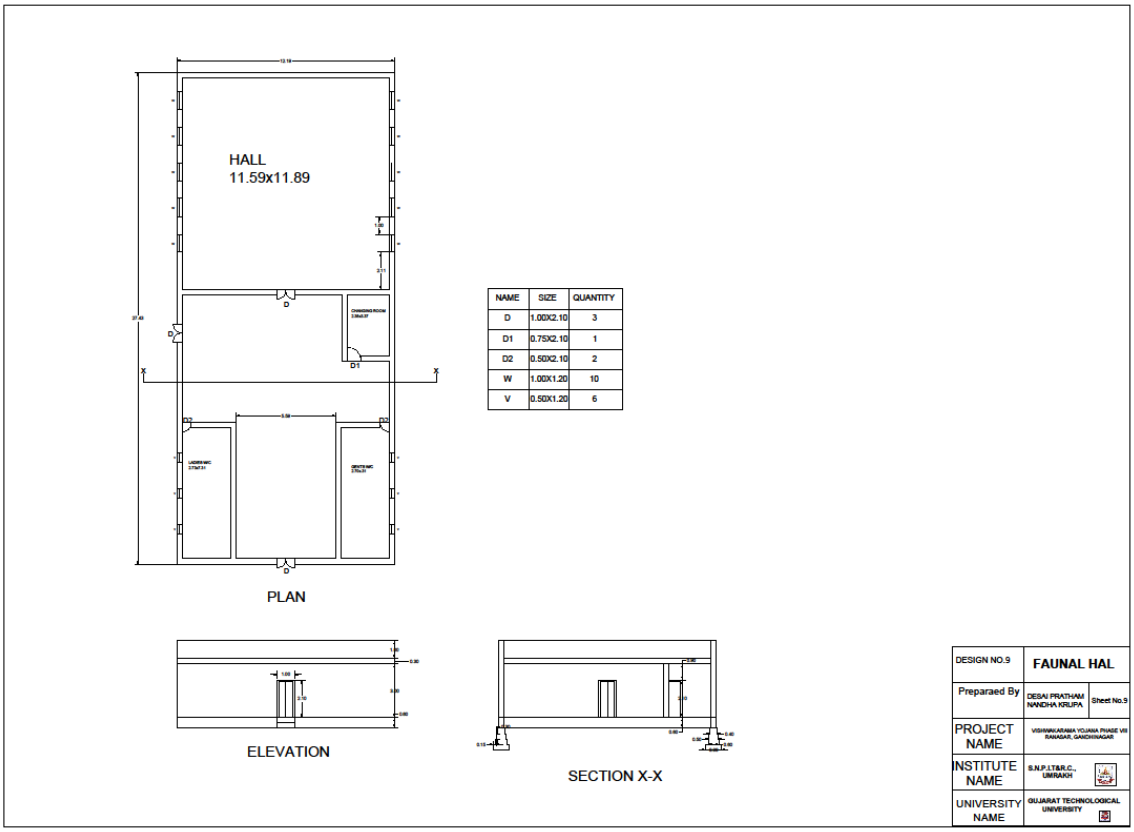
	3rd Step, L =38.32	1	38.32	0.4	0.3	4.598
	4th Step, L=38.32	1	38.32	0.3	0.3	9.772
						27.016
4.	Earth filling work in width Room – I 4.5*4.3	1	7.16	11.4	0.55	44.89
5.	PCC at plinth L= 38.32	1	38.32	0.3		11.492m^2
6.	Brick masonry in super structure 0.3m wall L = 38.32	1	38.32	0.3	3	34.48
	0.15m wall L= 34.04	1	34.04	0.15	1	5.106
						39.594
	Deduction of doors & windows D = 1.00*2.10	1	1.00	0.3	2.10	0.63
	W = 1.00*1.20	1	1.00	0.3	1.20	0.36
	W1 = 0.75*1.20	9	0.75	0.3	1.20	2.43
						3.42
	Lintel Quantity & Deduction D = 1.00*2.10	1	1.00	0.3	0.15	0.059
	W = 1.00*1.20	1	1.00	0.3	0.15	0.059
	W1 = 0.75*1.20	9	0.75	0.3	0.15	0.425
						0.523
	So, Brick work in super structure 39.594-3.42-0.543=35.631 m^3					
7.	RCC slab L=7.76 B=12.00 H=0.3	1	7.76	12.0	0.3	27.936
8.	Brick masonry in Parapet wall H-wall L=7.46	1	7.46	0.3	1	2.238
	V-wall1 L=11.4	1	11.4	0.3	1	3.420
						5.628
9.	Plastering work Inside plaster Room-I 4.5*4.3 H-wall	2	7.16		3	42.96
	V-wall	2	11.4		3	68.40
	Room-II 2.5*4.3 H-wall					
	V-wall					

	0.15 wall					
	H-wall =1.65	5	1.64		1	8.20
	H-wall 1=3.525	4	3.252		1	14.10
	V-wall =1.27	4	1.27		1	5.08
	V-wall 1=1.11	6	1.11		1	6.66
						145.4m^2
	Ventilation D=1.00*2.10	0.5	1.00		2.10	1.05
	W=1.00*1.20	0.5	1.00		1.20	0.60
	W1=0.75*1.20	4.5	0.75		1.20	4.05
						5.70 m^2
	Total wall plastering 145.4-5.70=139.70 m^2					
10.	5cm thick mosaic tiles flooring Area=7.16*11.4	1	7.16	11.4		81.62
	Deduction of 0.15m wall					
	H-wall =1.64m	5	1.64	0.15		1.23
	H-wall 1=3.525m	4	3.525	0.15		2.115
	V-wall =1.27m	4	1.27	0.15		0.765
	V-wall 1=1.11m	6	1.11	0.15		0.999
						5.106 m^2
	Total tiles required 81.26-5.106= 76.514 m^2					

ABSTRACTSHEET					
SR. NO.	Description	Quantity(m^3)	Rate	Per	Amount
1.	Excavation for foundation up to 1.1m	46.367	100	M	4636.70
2.	PCC Laying for foundation	6.898	1500	M	10347
3.	1st class brick masonry for foundation	27.016	1600	M	43225.6
4.	Earthing work in plinth	44.893	75	M	3366.975
5.	PPC at plinth 5cm=0.5m	11.496	200	M	2299.2
6.	Brick masonry in super structure	35.631	1500	M	53446.5
7.	Laying of RCC slab		2500	M	6984
8.	Rainforest for RCC slab & binding & placing in position	2205.625Kg	45	Kg	99253.145
9.	12mm thick plaster	139.70m^2	150	M	20955

10.	5cm thick mosaic tiles flooring	76.514 m^2	200	M	15302.8
		Total			322672.92
		3% co-ortigency			9680.18
		2% co-orkcharge establishment			6456.46
		Total			338806.57
		10% contractor Profile			33880.66
		Grant Total			372687.22

13.1.3 Civil Design 3 (FAUNAL HONE):-



CALCULATION

H1= 0.3+2.73+0.3+5.59+0.3+2.73+0.3=12.25

H2= (0.3+11.19+0.3)*2=23.58

H= H1+H2 = 12.25+23.58= 35.58

V= 2*(0.3+26.8+0.3) = 54.8

CL = 54.8+35.58 =90.38

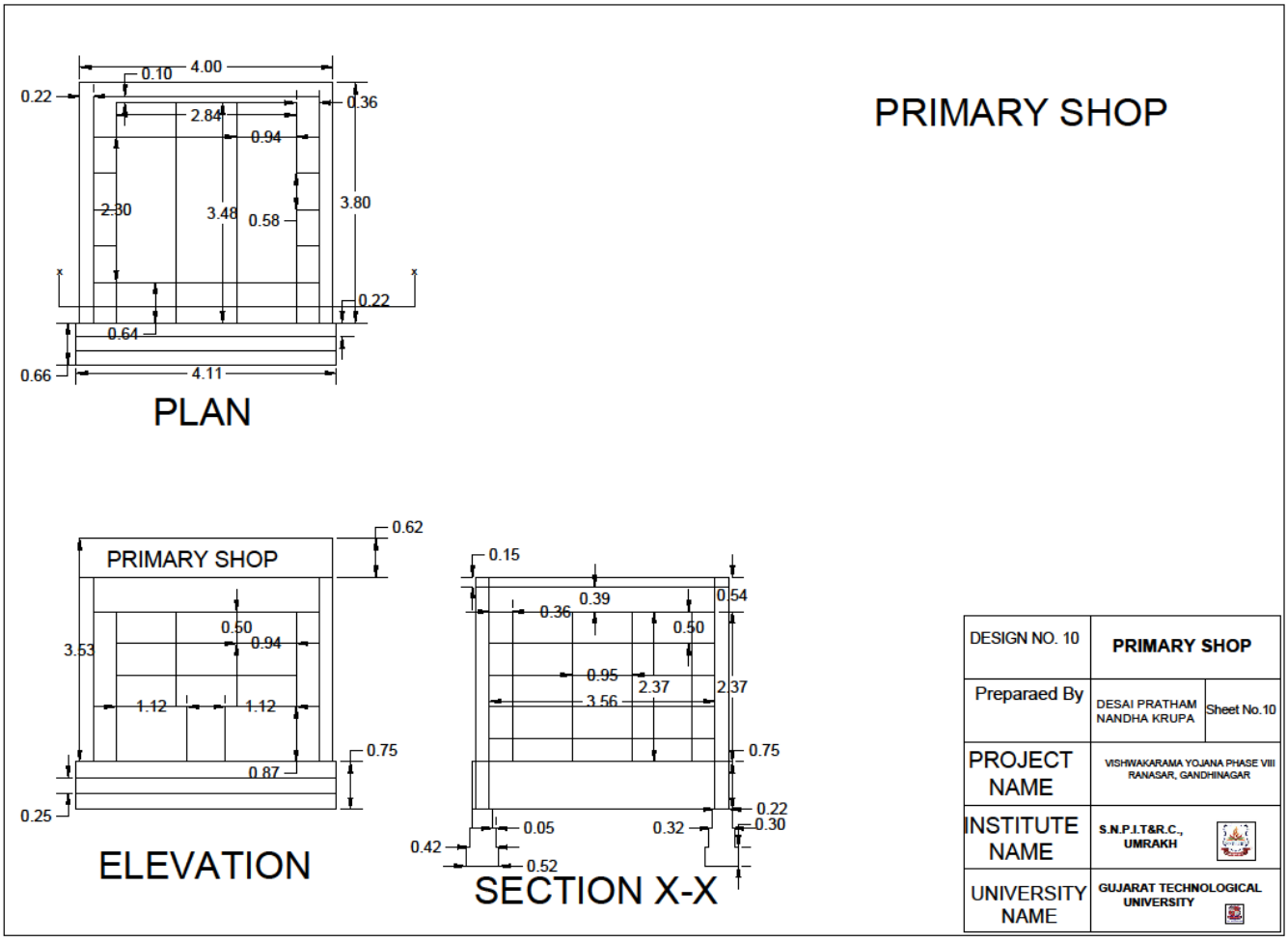
NO. of joint = 6

Measurement Sheet of skill development center						
SR. NO	**Description**	**Length (m)**	**Width (m)**	**Height (m)**	**Count (Nos.)**	**Total Quantity (m^3)**
1.	Excavation for Foundation L = 90.38-(1.1/2)*6 = 87.08 M B = 0.15+0.90+0.15 = 1.10 M H = 0.30+0.30+0.30+0.30 = 1.20 M	87.08	1.1	1.2	1	116.00
2.	P.C.C. L = 90.38-(0.90/2)*6 = 87.68 M	87.68	0.9	0.2	1	13.58
3.	Brick work in Foundation up to Plinth level 1st Step L =90.38- (0.6/2)*6 = 88.56 M	88.56	0.6	0.3	1	15.94
	2nd Step L = 90.38 (0.5/2)*6 = 88.88 M	88.88	0.5	0.3	1	12.06
	3rd Step L = 90.38- (0.4/2) *6 = 89.18 M	89.19	0.4	0.85	1	29.53
	TOTAL=29.53+12.06+15.94=57.53					
4.	Earth filling work in width Room – I 11.59*11.89	11.59	4.3	0.55	1	27.41
	Room- II 2.73*7.31	2.73	4.3	0.55	2	12.91
	Room- III 2.35*3.37	2.35	4.3	0.55	1	5.56
						45.88
5.	DDC at plinth level 5cm = 0.05 m L = 90.38- (0.3/2) * 6 = 89.84	89.48	0.40		1	35.79
6.	Brick masonry in super structure L = 90.38 – (0.3/2) * 6 = 89.41	89.48	0.3	3	1	80.53
	Deduction of doors & windows D = 1*2.10	1	0.3	2.10	3	1.89

	D1 = 0.75*2.10	0.75	0.3	2.10	1	0.47
	D2= 0.50*2.10	0.50	0.3	2.10	2	0.63
	W = 1*1.20	1	0.3	1.20	10	3.6
	V = 0.50*1.20	0.50	0.3	1.20	6	1.08
						7.67
	Lintel Quantity & Deduction D = 1.*2.10	1	0.3	0.15	2	0.09
	W = 1.*0.9	1	0.3	0.15	10	0.45
	V = 0.50*1.20	0.5	0.3	0.15	6	0.14
						0.68
	So, Brick work in super structure 80.53-7.67-0.68= 72.18 m^3					
7.	RCC slab S1, Length	12.19	27.43	0.3	1	100.31
8.	Brick masonry in Parapet wall H-wall L=12.25	12.25	0.3	1	1	3.67
	H1-wall L=23.58	23.58	0.3	1	1	7.07
	V- wall L=54.8	54.8	0.3	1	1	4.93
						16.67
9.	Plastering work Inside plaster Room-11.59*11.89 H-wall	11.59		3	2	27
	V-wall	11.89		3	2	25.8
	Room-II 2.73*7.31 H-wall	2.73		3	2	15
	V-wall	7.31		3	2	25.8
	Room-III 2.35*3.37 H-wall	2.35		3	2	21
	V-wall	3.37		3	2	27
						293.4
	Ventilation D=1*2.10	1	0.3	2.10	1	6.3
	D1 = 0.75*2.10	0.75	0.3	2.10	2	0.95
	D2= 0.50*2.10	0.50	0.3	2.10	10	3.15
	W = 1*1.20	1	0.3	1.20	6	2.16
	V = 0.50*1.20	0.50	0.3	1.20	1	0.18
						12.74
	TOTAL= 293.4-12.74=280.74					
10.	5cm thick mosaic tiles flooring Room-I	11.59	4.3	0.55	1	11.59
	Room-II	2.73	4.3	0.55	2	2.73
	Room-III	2.35	4.3	0.55	1	2.35
						45.88

ABSTRACTSHEET					
SR. NO.	Description	Quantity(m^3)	Rate	Per	Amount
1.	Excavation for foundation up to 1.1m	116.00	100	M	11600
2.	PCC Laying for foundation	13.58	1500	M	20370
3.	1^{st} class brick masonry for foundation	57.53	1600	M	92048
4.	Earthing work in plinth	45.88	75	M	3441
5.	DPC at plinth 5cm=0.5m	35.79	200	M	7158
6.	Brick masonry in super structure	72.18	1500	M	108270
7.	Laying of RCC slab	100.31	2500	M	250775
8.	Rainforest for RCC slab & binding & placing in position	2647Kg	45	Kg	119115
9.	12mm thick plaster	28.74m^2	150	M	4311
10.	5cm thick mosaic tiles flooring	45.88m^2	200	M	9776
		Total			626864
		3% co-ortigency			18805
		2% co-orkcharge establishment			12537
		Total			658206
		10% contractor Profile			65821
		Grant Total			724027

13.1.4 Civil Design 4 (Primary shop):-



Measurement Sheet of skill development center						
SR. NO	**Description**	**Length (m)**	**Width (m)**	**Height (m)**	**Count (Nos.)**	**Total Quantity (m^3)**
1	TOP ROOF	4.1148	4.1148	0.1524	1	**2.580231**
2	WALL 9"	4.1148	0.2286	3	4	**8.282**
3	PLINTH WALLWITH STAIRS	4.1148	0.2286	0.762	4	**3.575**
4	FLOOR	4.1148	4.1148	0.1524	1	**2.58**
5	PCC	4.1148	0.90	0.4	1	**5.02**

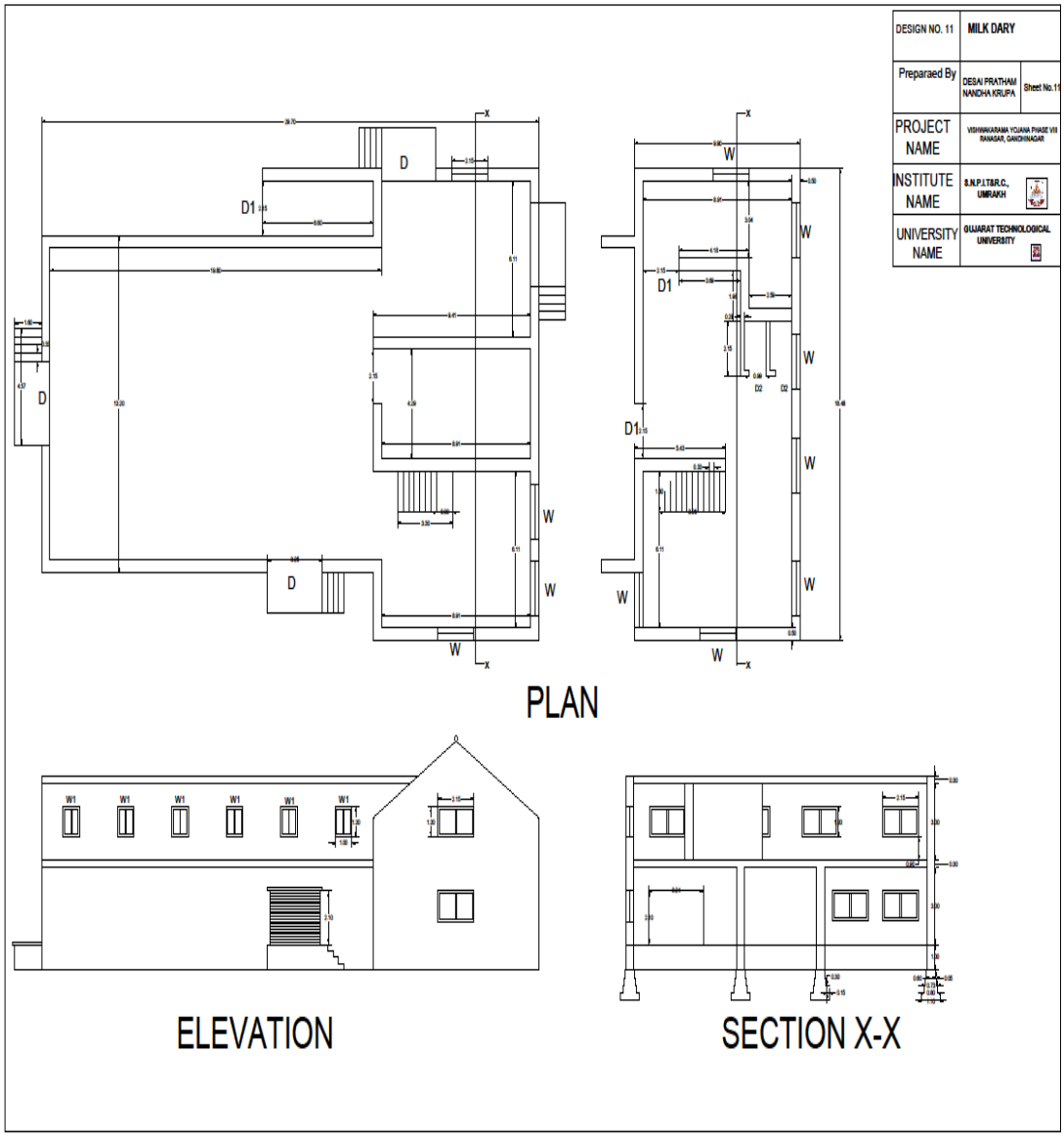
6	BASIC WALL:00.30	18.3	1.2	0.4	1	**2.2**
7	BASIC WALL:0.40	18.3	1.6	0.4	1	**2.94**
8	BASIC WALL: GENERIC - 0.50	18.3	2	0.4	1	**3.66**
9	EXCAVATION	22	1.2	1.5	1	**3.6**

ABSTRACTSHEET					
SR NO.	**Description**	**Quantity (m^3)**	**rate**	**per**	**Amount**
1	BASIC WALL: 9" EXTERIOR 1	8.282678	130	Ft^2	**50700**
2	TOP ROOF	2.580231	3500	m^3	**9030.81**
3	FLOOR	2.580231	3500	m^3	**9030.81**
4	PLINTH WALLWITH STAIRS	3.575851	90	Ft^2	**15153.3**
5	EXCAVATION	1.215*4	350	m^3	**1701**
6	PCC	5.02	3500	m^3	
7	BASIC WALL:00.30	2.94	90	Ft^2	**7200**
8	BASIC WALL:0.40	2.2	90	Ft^2	**7200**
9	BASIC WALL: GENERIC - 0.50	3.66	90	Ft^2	**7200**
				GRAND TOTAL	**92061**

13.1.5 Civil Design 5(MILK DAIRY):-

CALCULATION**:-**

H1= 0.15+4.50+0.30+2.50+0.30+5.00+0.15



= 12.90*2
= 25.80 M

H2 = 0.15+3.50+0.15
=3.80 M

H3 = 0.15+6.00+0.15
=6.30 M

H = H1+ H2+ H3

= 25.80+3.80+6.30
= 35.90 M
V1 = 0.15+4.30+0.30+4.50+0.15
= 9.40 M
V2 = 10.00+0.15+0.15
= 10.30*2
= 20.60 M
V3 = 0.15+0.15+4.30
= 4.60*3
= 13.80 M
V = V1+V2+V3
= 9.40+20.60+13.80
= 43.80 M
CL = 79.7 M
NO.T =Junction = 6
L= CL – (w/2)*6
CL = 79.7 m

Measurement Sheet of skill development center

SR.NO	**Description**	**Length (m)**	**Width (m)**	**Height (m)**	**Count (Nos.)**	**Total Quantity (m^3)**
1.	Excavation for Foundation L = 79.7-(1.1/2)*6 = 76.4 M B = 0.15+0.90+0.15 = 1.10 M H = 0.30+0.30+0.30+0.20 = 1.10 M	76.4	1.6	1.1	1	92.44
2.	P.C.C. L = 79.7-(0.90/2)*6 = 77 M	77	0.9	0.2	1	13.86
3.	Brick work in Foundation up to Plinth level 1st Step L = 79.7- (0.6/2)*6 = 77.9 M	77.9	0.6	0.3	1	14.02
	2nd Step L = 79.7- (0.5/2)*6 = 78.2 M	78.2	0.5	0.3	1	11.73
	3rd Step L = 79.7- (0.4/2) *6 = 78.5 M	78.5	0.4	0.85	1	26.70

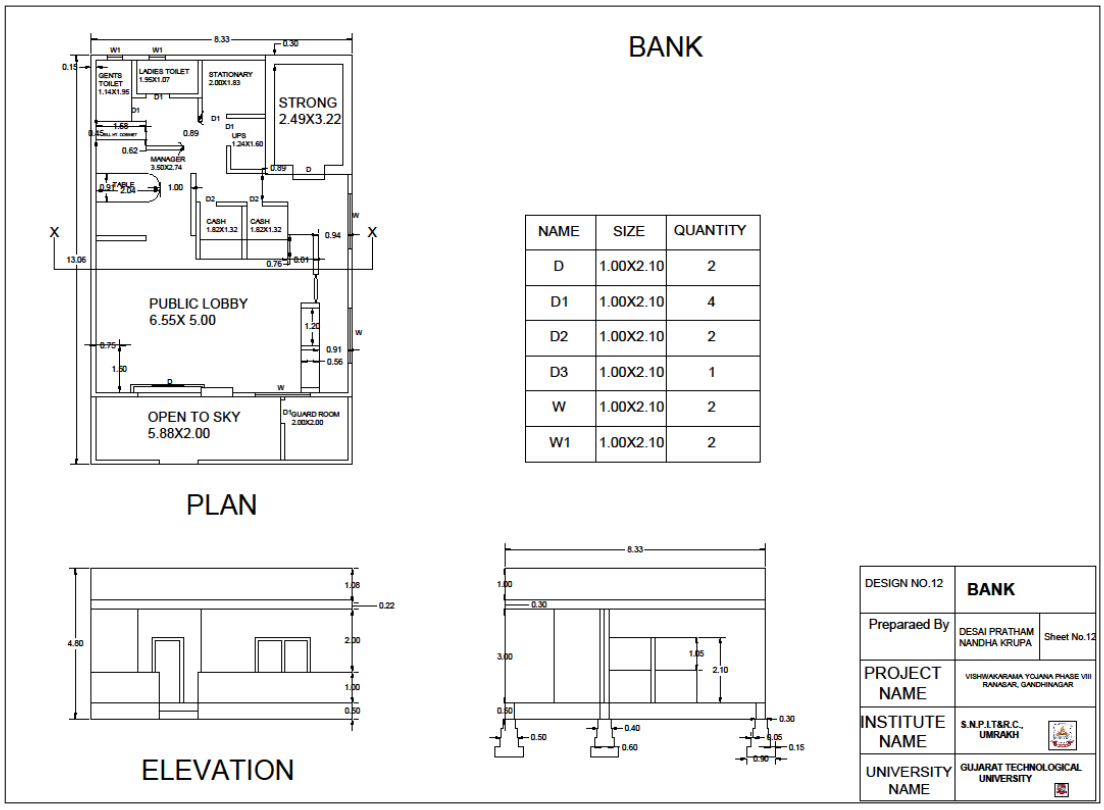
4.	Earth filling work in width Room – I 4.5*4.3	4.5	4.3	0.55	1	10.64
	Room- II 2.5*4.3	2.5	4.3	0.55	1	5.91
	Room- III 5.0*4.3	5.0	4.3	0.55	1	11.82
	Room- IV 3.5*4.5	3.5	4.5	0.55	1	8.66
	Room- V 6*4.3	6	4.5	0.55	1	33
						70.03
5.	DDC at plinth level 5cm = 0.05 m L = 79.7- (0.3/2) * 6 = 78.5	78.5	0.40		1	31.20
6.	Brick masonry in super structure L = 78.7 – (0.3/2) * 6 = 78.8	78.8	0.3	3	1	70.92
	Deduction of doors & windows D = 1*2 = 1	1	0.3	2	1	0.6
	D1 = 1.1*1.9 = 4	1.1	0.3	1.9	5	3.13
	W1 = 1.2*0.9 = 4	1.2	0.3	0.9	4	1.19
						4.92
	Lintel Quantity & Deduction D1 = 1.1*1.9 = 4	1.4	0.3	0.15	4	0.252
	W1 = 1.2*0.9 = 4	1.5	0.3	0.15	4	0.248
						0.50
	So, Brick work in super structure 70.92-4.92-0.5 = 65.5 m^3					
7.	RCC slab S1, Length	25.8	4.6	0.12	1	14.24
	S2, Length	3.8	4.8	0.12	1	2.19
	S3, Length	6.3	10.3	0.12	1	7.79
						24.22
8.	Brick masonry in Parapet wall H-wall L=25.8	25.8	0.3	1	1	7.74
	V-wall1 L=9.1	9.1	0.3	1	1	2.73
	V- wall2 L=5.2	5.2	0.3	1	1	1.56
						12.03
9.	Plastering work Inside plaster Room-I 4.5*4.3 H-wall	4.5		3	2	27
	V-wall	4.3		3	2	25.8
	Room-II 2.5*4.3	2.5		3	2	15

	H-wall					
	V-wall	4.3		3.	2	25.8
	Room-III 3.5*4.5 H-wall	3.5		3	2	21
	V-wall	4.5		3	2	27
	Room-IV 5*4.5 H-wall	5		3	2	30
	V-wall	4.3		3	2	25.8
	Room-VI 6*10 H-wall	6		3	2	36
	V-wall	10		3	2	60
						293.4
	Ventilation D=1*2=1	1		2	1	2
	D1=1.1*1.9=5	1.1		1.9	2.5	5.23
		1.2		0.9	2	2.16
						9.39
						284.01
10.	5cm thick mosaic tiles flooring Room-I	4.5	4.3		1	19.35
	Room-II	2.5	4.3		1	10.75
	Room-III	3.0	4.3		1	21.50
	Room-IV	3.5	4.5		1	15.75
	Room-V	6	10		1	60
						127.35

ABSTRACTSHEET					
SR. NO.	Description	Quantity(m^3)	Rate	Per	Amount
1.	Excavation for foundation up to 1.1m	92.44	100	M	924.4
2.	PCC Laying for foundation	13.86	1500	M	20790
3.	1^{st} class brick masonry for foundation	52.45	1600	M	83920
4.	Earthing work in plinth	70.03	75	M	5252.25
5.	DPC at plinth 5cm=0.5m	31.2	200	M	6240
6.	Brick masonry in super structure	65.5	1500	M	98250
7.	Laying of RCC slab	24.22	2500	M	66.55
8.	Rainforest for RCC slab & binding & placing in position	1910 Kg	45	Kg	85950
9.	12mm thick plaster	28401m^2	150	M	42601.5

10.	5cm thick mosaic tiles flooring	127.35 m^2	200	M	25470
		Total			438267.75
		3% co-ortigency			13148.033
		2% co-orkcharge establishment			8765.35
		Total			460181.14
		10% contractor Profile			46018.11
		Grant Total			506199.25

13.1.6 Civil Design 6 (Bank):-



Calculation:-

H1= 0.15+1.14+.3+.15+1.95+.15+2+2.49+.3 =8.63m
H2= 0.15+5.88+.15+2+.15 = 8.33m
H3= 0.15+8.03+.15=8.33m
H = H1+H2+H3 = 8.63+8.33+8.33=25.29m
V1= 0.15+2+.15+5+3.65+1.95+.15= 13.05m
V2= 0.15+2+.15+6.64+3.22+.3=12.46m
V= V1+V2 = 13.05+12.46 = 25.51m
CL=50.6m
No. of junction=6

L= CL – (w/2)*6
CL = 50.6 m

Measurement Sheet of skill development center						
SR.NO	**Description**	**Count (Nos.)**	**Length (m)**	**Width (m)**	**Height (m)**	**Total Quantity (m^3)**
1.	Excavation for Foundation L =50.6 -(1.1/2)*6 = 47.3 M B = 0.15+0.90+0.15 = 1.10 M H = 0.30+0.30+0.30+0.30 = 1.20 M	1	47.3	1.10	1.20	62.43
2.	P.C.C. L =50.6 -(0.9/2)*6 = 47.9 M	1	47.9	0.9	0.2	8.62
3.	Brick work in Foundation up to Plinth level 1st Step L = 50.6- (0.6/2)*6 = 48.8 M	1	48.8	0.6	0.3	8.78
	2nd Step L = 50.6- (0.5/2)*6 = 49.1 M	1	49.1	0.5	0.3	7.37
	3rd Step L = 50.6- (0.4/2) *6 = 49.4 M	1	49.4	0.4	0.85	9.88
4.	Earth filling work in width Room – I 2.0*2.0	1	2.0	2.0	0.55	2.2
	Room- II 2.49*3.22	1	2.49	3.22	0.55	4.41
	Room- III 2.00*1.83	1	2.00	1.83	0.55	2.01
	Room- IV 1.95*1.07	1	1.95	1.07	0.55	1.15
	Room- V 1.14*1.95	1	1.14	1.95	0.55	1.22
						10.99
5.	DDC at plinth level 5cm = 0.05 m L = 50.6- (0.5/2) * 6 = 49.1	1	49.1	0.40		19.64
6.	Brick masonry in super	1	49.1	0.30	3	44.19

	structure L = 50.6– (0.5/2) * 6 = 49.1					
	Deduction of doors & windows D = 1*2.10	2	1.20	0.3	2.10	1.51
	D1 = 0.75*2.10	4	0.75	0.3	2.10	1.89
	D2 = 0.50*2.10	2	0.50	0.3	2.10	0.63
	D3 = 0.90*2.10	1	0.90	0.3	2.10	0.57
	W = 1.75*1.20	2	1.75	0.3	1.20	1.26
	W1 = 0.50*1.20	2	0.50	0.3	1.20	0.36
						3.22
	Lintel Quantity & Deduction D = 1*1.2	2	1.4	0.3	0.15	0.13
	W = 1.2*1.7	2	1.5	0.3	0.15	0.14
	W1= 1.2*1.75	2	1.5	0.3	0.15	0.14
						0.41
	So, Brick work in super structure 44.19-3.22-0.41 =40.56 m^3					
7.	RCC slab S1, Length	1	2	2	0.3	1.2
	S2, Length	1	8.03	10.61	0.3	25.56
						26.76
8.	Brick masonry in Parapet wall H-wall L=25.29	1	25.29	0.3	1	7.59
	V-wall1 L=13.05	1	12.05	0.3	1	3.62
	V- wall2 L=12.46	1	12.46	0.3	1	3.74
						14.95
9.	Plastering work Inside plaster Room-I 2.0*2.0 H-wall	2	2		3	12
	V-wall	2	2		3	12
	Room-II 2.49*3.22 H-wall	2	2.49		3	14.94
	V-wall	2	3.22		3	19.32
	Room-III 2.00*1.83 H-wall	2	2		3	12
	V-wall	2	1.83		3	10.98
	Room-IV 1.95*1.07 H-wall	2	1.95		3	11.70
	V-wall	2	1.07		3	6.42
	Room-V 1.14*1.95	2	1.14		3	6.84

	H-wall					
	V-wall	2	1.95		3	11.70
						117.90
	Ventilation D= 1*2.10	1	1		2.10	2.10
	D1 = 0.75*2.10	2	0.75		2.10	3.15
	D2 = 0.50*2.10	1	0.50		2.10	1.05
	D3 = 0.90*2.10	0.5	0.90		2.10	0.95
	W = 1.75*1.20	1	1.75		1.20	2.10
	W1 = 0.50*1.20	1	0.50		1.20	0.60
						9.95
						107.95
10.	5cm thick mosaic tiles flooring Room-I	2	2		1	4
	Room-II	2	2.49		1	4.98
	Room-III	2	2		1	4
	Room-IV	2	1.95		1	3.90
	Room-V	2	1.14		1	2.28
						19.16

ABSTRACTSHEET					
SR. NO.	Description	Quantity(m^3)	Rate	Per	Amount
1.	Excavation for foundation up to 1.1m	62.43	100	M	6243
2.	PCC Laying for foundation	8.62	1500	M	12930
3.	1st class brick masonry for foundation	26.03	1600	M	41648
4.	Earthing work in plinth	10.99	75	M	824.25
5.	DPC at plinth 5cm=0.5m	19.64	200	M	3928
6.	Brick masonry in super structure	40.56	1500	M	60840
7.	Laying of RCC slab	26.76	2500	M	66900
8.	Rainforest for RCC slab & binding & placing in position	2373 Kg	45	Kg	106785
9.	12mm thick plaster	107.95m^2	150	M	16192.5
10.	5cm thick mosaic tiles flooring	19.16m^2	200	M	3832
		Total			320122.75
		3% co-ortigency			9603.68
		2% co-orkcharge establishment			6402.46

		Total	336128.89
		10% contractor Profile	33612.89
		Grant Total	369741.78

13.1.7 Auto Irrigation System using Soil Moisture Sensor and PIC Microcontroller:-

Introduction:

Irrigation is defined as artificial application of water to land or soil. Irrigation process can be used for the cultivation of agricultural crops during the span of inadequate rainfall and for maintaining landscapes. An automatic irrigation system does the operation of a system without requiring manual involvement of persons. Every irrigation system such as drip, sprinkler and surface gets automated with the help of electronic appliances and detectors such as computer, timers, sensors and other mechanical devices.

An automatic irrigation system does the work quite efficiently and with a positive impact on the place where it is installed. Once it is installed in the agricultural field, the water distribution to crops and nurseries becomes easy and doesn't require any human support to perform the operations permanently. Sometimes automatic irrigation can also be performed by using mechanical appliances such as clay pots or bottle irrigation system. It's very hard to implement irrigation systems because they are very expensive and complex in their design. By taking some basic points into considerations from experts' support, we have implemented some projects on automatic irrigation system by using different technologies.

In unmistakable nursery vegetable speedy improvement in The sustenance creation technology, the steady expansion of Sustenance solicitation requires control. For a country Like India, where the economy is generally subject to water Frameworks, it is a clear, definite technique in an age. It also Helps in proficient, removing human agriculture and Isotropic climatic conditions, still bumble in changing Available levels of soil clamminess and we are not prepared To make full use of agrarian resources. Extend their net Benefits. The main reason for this is the non-attendance of Deluges and the lack of land Irrigation is the fake use of

Water to water in the soil store. The generally reliable Extraction of water to help generate yields. In yield age earth Decreases the water levels a result of which part of the Earth is usually used in dry zones and during precipitation That continues to occur in un immersed areas. Another Deficiency, yet notwithstanding secure plants against frost Critical reason for this is the direct result of the Unconstrained use of Irrigation Water Types, as a result of Which a lot of water goes into the waste surface water Framework. The most enormous Drip Irrigation advantage is That water is given in close proximity to the root zone of the Sprinkler water frame. As a result, the plants spill by stream,

Objectives of the study:

Water is a very precious resource and must be properly utilized. Agriculture is one of those areas which consume a lot of water. Irrigation is a time consuming process and must be done on a timely basis.

The aim of the article is to develop an auto irrigation system which measures the moisture of the soil and automatically turns on or off the water supply system. human involvement once installed. The circuit is based on PIC microcontroller and also a soil moisture sensor.

A properly configured soil moisture sensor can save up to 60 percent of water used in irrigation. The designed system can be used in turf grass or with small garden plants.

Circuit Design of Auto Irrigation System using Soil Moisture Sensor:

The aim of the project is to control a motor based on the moisture in the soil. The design of the circuit is as follows. PIC 16F877A is the main processing IC. A 12 MHz crystal oscillator is connected across OSC1 and OSC2 (Pins 13 and 14). The crystal is connected with two 33pF capacitors. The Master Clear pins is normally connected to Vcc via a pull-up resistor. A bypass button is connected to ground. This button is used to reset the microcontroller. The output of the soil moisture sensor is given to RA0 (Pin 2) of the PIC microcontroller. An LCD is used to display the key messages. The data pins of the LCD are connected to Port B of the PIC (Pins 33 – 40). The control pins of the LCD are connected to the Port C.

The connections are as follows: RS pin of LCD to RC0 (Pin 15) of PIC, RW to RC1 (Pin 16) and E to RC3 (Pin 18).In order to drive the relay which is connected to the motor, a transistor is used. The input to the transistor is given from RC2 (Pin 17) of PIC microcontroller. One terminal of the relay coil is supplied with a 12 V DC. The other end of the coil is connected to the collector of the transistor. The contacts of the relay are given to the motor and AC supply.

An LED is connected between the DC supply and the collector and glows only when the motor is running.

Circuit Diagram:

Component Description:

PIC 16F877A: The microcontroller used in the project is PIC 16F877A. It is an 8-bit microcontroller. The main functions of the microcontroller are reading the values from the soil moisture sensor, displaying appropriate messages on the LCD and controlling the relay to the motor. PIC microcontrollers are a group of specific Microcontroller chips created by microcontroller Technology in chandler Arizona. The abbreviation PIC Represents peripheral interface controller despite the fact that That term is seldom utilized now a days. A normal Microcontroller incorporates processor and memory and Peripherals. Here we use6 PIC microcontroller, it is quick a direct Result of utilizing RISC engineering. When contrasting with Different microcontrollers, control utilization is extremely Less and writing computer programs is additionally simple.

Soil Moisture Sensor Module: A soil moisture sensor is used to measure the volumetric water content of soil. The sensor used in the project is shown below.

Component	*Part No / Value / Keyword*
IC1	and digital out)
IC2	PIC 16F877A Microcontroller
X1	12 MHz Crystal Oscillator
C1 and C2	33 pF
R1	4.7 KΩ
R2	10 KΩ Pot
R3	2.2 KΩ
R4	1 KΩ
B1	Push Button
T1	BC547
D1	1N4007
RE1	12V Relay (JQC-3F)
LED1	Red LED
M1	Motor
LCD1	16X2 LCD Display

Component Description:

PIC 16F877A: The microcontroller used in the project is PIC 16F877A. It is an 8-bit microcontroller. The main functions of the microcontroller are reading the values from the soil moisture sensor, displaying appropriate messages on the LCD and controlling the relay to the motor. PIC microcontrollers are a group of specific Microcontroller chips created by microcontroller Technology in chandler Arizona. The abbreviation PIC Represents peripheral interface controller despite the fact that That term is seldom utilized now a days. A normal Microcontroller incorporates processor and memory and Peripherals. Here we use6 PIC microcontroller, it is quick a direct Result of utilizing RISC engineering. When contrasting with Different microcontrollers, control utilization is extremely Less and writing computer programs is additionally simple.

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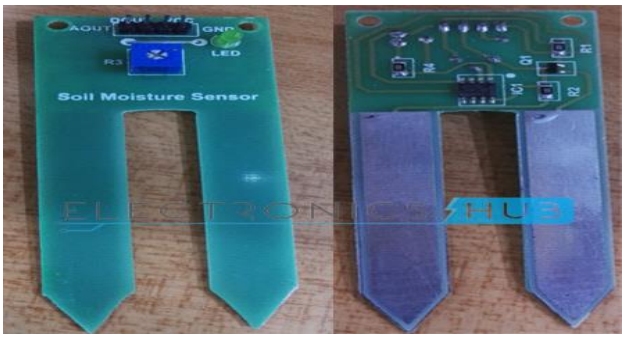
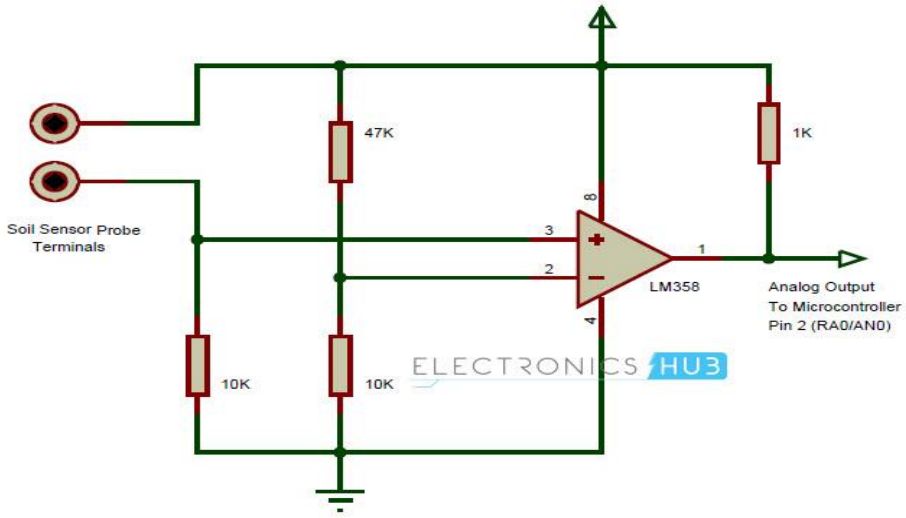


It consists of two prongs, which must be inserted in the soil, an LM358, which acts as a comparator and a pot to change the sensitivity of the sensor. If the soil moisture sensor is not available, the following circuit can be used as an alternative. The circuit shown below has a fixed sensitivity. This can be changed by implementing a pot in place of one of the resistors connected to the non-inverting terminal of the comparator.



MOISTURE LEVEL TABLE AND GRAPH:

Topsoil: Soil included meet sand and residue measures and Somewhat less mud. Sand particles are the largest of the Three segments. Sand does not clutch humidity, but it gives Great circulation of air. On the contrary end, dirt particles Are a lot littler and effectively conservative. That makes Earth an extraordinary material for blocks of structure, but Not very good to allow water, air, and roots of plants Through. (Field Capacity: 0.74 in)

Mud: Mud soil consists of small particles that are hard and Willing to be compacted effectively. This compaction makes It difficult to plant or even scoop inside the soil. While mud Soil can be difficult to work with, the development of Specific plants can very well be helpful. It can clutch the Underlying foundations of plants better and give a steadier Condition than numerous different kinds of soil. (Field Capacity: 0.54 in)

Mud Loam: A finished soil that breaks into hard when dry hunks or Knots. When the clammy soil is squeezed between the thumb and the finger, a dainty strip will be framed that breaks promptly, supporting scarcely its own weight. (Field Capacity: 4.2 in)

Silly Clay: Sediment has larger particles than dirt and in nature is Essentially inorganic. A silty earth soil has a higher level of Mud than residue. (Field Capacity: 0.61 in)

Sandy Loam: Sandy topsoil soils have a high sand convergence that Gives them an abrasive atmosphere. In greenhouses and Gardens, sandy topsoil soils are capable of rapidly depleting Excess water, yet they are unable to hold notable water or Supplement measures for your plants.

Plants developed in This kind of soil will require the water system and treatment To be visited gradually. (Field Capacity: 0.45 in)

Loamy Sand: Typically, this kind of dirt consists of sand mixed with a Larger portion of sediment and mud. Numerous individuals Lean for their planting towards loamy sand soil as this type Of soil regularly takes into consideration great flow. (Field Capacity: 0.35 in)

Sand: This type of soil is anything but difficult to develop at the Same time, as it takes into account more flow than required, Watering it normally is essential, especially in the middle of Summer days. Since sandy soils do not allow water to pool Around the roots, plants that tend to experience the root rot's Ill effects are a decent decision. (Field Capacity: 0.22 in)

Application:

- The circuit can be used to measure the loss of moisture in the soil over time due to evaporation and intake.
- Minimizes water waste and improves plant growth.
- The circuit is designed to work automatically and hence, there is no need for any human intervention.
- The project is intended for small gardens and residential environment. By using advanced soil moisture sensor, the same circuit can be expanded to large agricultural fields

Advantages:

- An Automatic Watering System Can Save Water.
- An Automatic Watering System Will Save Time.
- An Automatic Watering System Will Save Gardener Effort.
- Water Can Be Directed To Where It Really Needs To Be.
- Water Can Be Delivered At Optimal Levels For Plant Growth.
- An Automatic Watering System Can Reduce Weeds.
- An Automatic Watering System Can Protect the Soil Ecosystem.

Project estimation and costing:

Component	Price
IC1	20/-
PIC 16F877A Microcontroller	185/-
33 PF Capacitor-2	6/-
4.7k ohm R1	1/-
10k ohm pot R2	10/-
1k ohm R3	1/-
2.2k ohm R4	1/-
Push button	25/-
BC547 T1 IN/-4007 D1/-	2/-
12V relay (jqc-3f)RE1	20/-
Red LED	1/-

Motor M1	70/-
16*2 LCD display	125/-
Total Cost	1468/-

Conclusion:

This paper proposing the system for soil moisture content Level testing with PIC microcontroller. In order to validate Our proposed system, the soil moisture level database values Were compared with our observed moisture level values. For Example, from the comparison table for the soil type clay Value is 19.75 and reading from the soil moisture table value Is 20.Its show that our observed values is almost equal to the Values in soil moisture table. Hence, our proposed system Can be applied to any type of soil to measure the moisture..

13.1.8 Fire alarm:

Introduction:

A smoke detector is a device that detects smoke, typically as an indicator of fire. Commercial, industrial, and mass residential devices issue a signal to a fire alarm system, while household detectors, known as smoke alarms, generally issue a local audible or visual alarm from the detector itself.

Types of Smoke Detector: There are two main kinds of smoke detectors. Such as-

(i) Photoelectric smoke detectors :

A photoelectric smoke detector is characterized by its use of light to detect fire. Inside the alarm, there's a light-sensing chamber. In this chamber, an LED light shoots a beam of light in a straight light across the chamber. The alarm detects smoke; when smoke enters the chamber, it deflects the LED light from the straight path into a photosensor in a different compartment in the same chamber. As soon as light beams hit this sensor, the alarm begins to sound.

(ii) Ionization smoke detector:

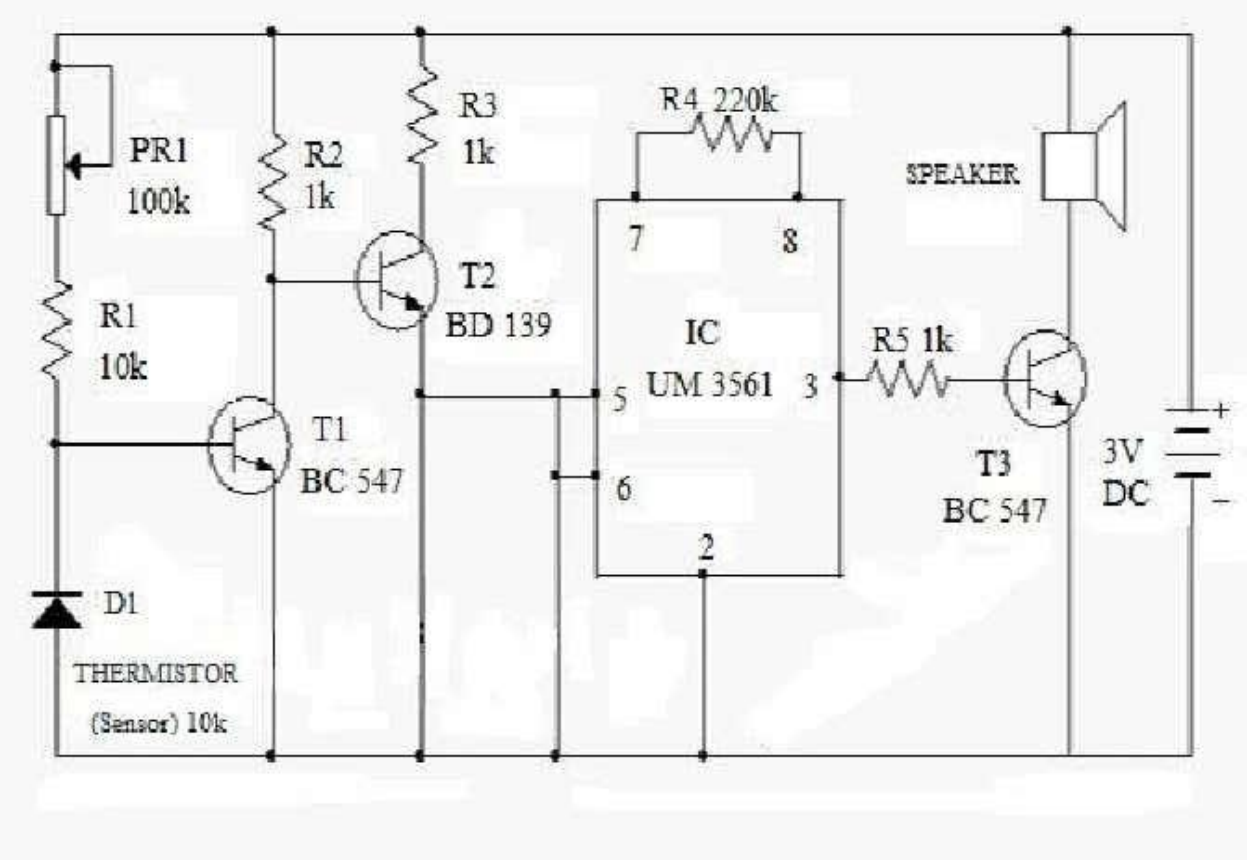
Generally, ionization alarms are more responsive to flaming fires. The term "flaming" fires refers to fires resulting from flammable liquids, wood or paper starting on fire. This type of fire produces a lot of flames with a limited amount of smoke. Most house fires are categorized as fast-flaming fires, which is why ionization alarms are popular in homes. To be safe, we recommend having both types of home fire detectors installed, or installing combination alarms that detect multiple types of fires.

Ionization chambers are the essential difference between ionization alarms and photoelectric alarms. Within the ionization chamber, there are two plates with voltage in between them. If an electron in this space is knocked out of place due to smoke entering the chamber, it causes ionization, and, in response, the fire alarm goes off.

Objectives of the study:

A smoke detector's purpose is a simple one, to give you ample notification in case of a fire in your house. Without a smoke detector, by the time you realize that there is a fire, your house could be so badly engulfed that you cannot find a safe exit or the smoke can be so overwhelming that you suffocate trying to get out. The National Fire Protection Association reports that while 75 percent of homes have at least one working smoke alarm, between 2003 and 2006, 66 percent of fire deaths happened in homes with no working smoke alarm.

Circuit diagram:



Working of the circuit:

Normally, led are high lighting & then LDR resistance are very low. Then the transistor Q1 off & collector current of Q1 flowing to the base of transistor Q2 & it on. Then collector current of Q1 flowing to the emitter. Then transistor Q3 off. The collector current of Q3 pass to the base of Q4 transistor & it on. The current are passing from collector to emitter. Then transistor Q5 off & Speaker no alarm. But when fire breakout LDR resistance increased & transistor Q1 on, current are flowing collector to emitter. Then transistor Q2 off. The collector current of Q2 flowing to the base of the Q3 transistor. This current on transistor Q3 & current flowing collector to emitter. Then transistor Q4 off. The collector current of Q4 flowing to the baseof transistor Q5 & it on. Then current flowing collector to emitter & speaker alarming.

A regulated 9V/500mA power supply that can be used for powering the basic fire alarm circuit and its modified versions is shown above. Transformer T1 is a 230V primary, 12V secondary, 500mA step down transformer. D1 is a 1A bridge which performs the job of rectification. Capacitor C1 filters the rectifier output and C2 is the AC by-pass capacitor. IC1 (7809) is a 9V fixed positive voltage regulator. The output of the rectifier+filter section is connected to the input of 7805 and a regulated steady 9V is obtained at its output. S1 is the ON/OFF switch. F1 is a 500mA safety fuse.

Components required:

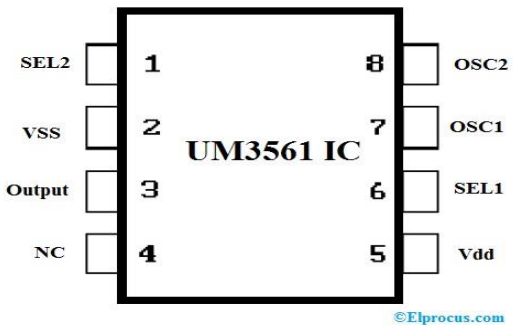
- IC UM3561
- Thermistor
- Transistor
- 8 pin IC base
- Resistor
- Battery
- Speaker

IC UM3561:

The IC UM3561 comprises an oscillator as well as selector circuits. A compact sound module can be constructed with only a few additional components. The UM3561 contains a programmed mask ROM to simulate siren sound. There is a tone generator within UM3561, which is able to generate different tones using the oscillator clock and according to the data given by the ROM. Each data stored in the ROM corresponds to each tone and it can be selected by using the address of the data location. The typical operating voltage of UM3561 is 3V and the Operating Current Idd is 150µA. The output current of UM3561 is 3mA.

Thermistor:

The term thermistor comes from “thermal” and “resistor”. A thermistor is a type of resistor whose resistance is reliant on temperature; it’s a resistance thermometer. They’re made from metallic oxide which is moulded into a bead, disk, or cylindrical shape and then enclosed with epoxy or glass.



Thermistors don’t work well with extreme temperatures, but they are perfectly suited for measuring the temperature at a certain point; they’re precise when they’re used within a limited temperature range i.e. within 50 °C of the target temperature; this range is dependent on the base resistance.

Transistor:

The transistor is a semiconductor device that can both conduct and insulate. A transistor can act as a switch and an amplifier. It converts audio waves into electronic waves and resistors,

controlling electronic current. Transistors have a very long life, smaller in size, can operate on lower voltage supplies for greater safety, and required no filament current. The first transistor was fabricated with germanium. A transistor performs the same function as a vacuum tube triode but using semiconductor junctions instead of heated electrodes in a vacuum chamber. It is the fundamental building block of modern electronic devices and found everywhere in modern electronic systems.

8 pin IC base:
IC sockets are generally for preventing damage to IC's from soldering and while testing multiple circuits.

These are made from Black Thermoplastic and tin-plated alloy contacts. One end is notched to aid in identification. They can be mounted end to end to suit longer IC's

Overall height above PCB: 4.8mm

PCB hole required: 0.6mm

Pitch Width: 7.62mm (0.3in)

Pin Pitch: 2.54mm (0.1in)

Pins: 8 pins

Resistor:
Resistors are one of the simplest varieties of electronic components. A resistor is a two-terminal device that has a fixed relationship between the current passing through the device and the voltage drop across the device.

This relationship is described in Ohm's law, which states that "the strength of a direct current is directly proportional to the potential difference and inversely proportional to the resistance of the circuit".

Battery:
A battery is an electrochemical cell (or enclosed and protected material) that can be charged electrically to provide a static potential for power or released electrical charge when needed. A battery generally consists of an anode, a cathode, and an electrolyte. Common types of commercial batteries and some of their characteristics and advantages are summarized in the following table. Battery types not shown include the Zinc-Air, Flooded Lead Acid, and Alkaline batteries.

Speaker:
Speakers are made up of a cone, an iron coil, a magnet, and housing (case). When the speaker receives electrical input from a device, it sends the current through the causing it to move back and forth. This motion then vibrates the outer cone, generating sound waves picked up by our ears.

Application:

- Fire alarm system is a number of device working together to detect and warn people through visual and audio appliances when smoke, fire, carbon monoxide or other emergencies are present.
- These alarm may be activated from smoke detectors and heat detectors.
- They may also be activated via manual fire alarm activation devices such as manual call points or pull stations. Fire alarm Sounders can be set to certain frequencies and different tones including low, medium and high, depending on the country manufacturer of the device.
- These alarms may be activated from smoke detectors and heat detectors.

Advantages:

- Quick acting-provides for earlier detection than other types of smoke detectors or thermal detectors.
- It can detect fires that are in the incident stage or detect other aerosol type smoke products.
- Provide early warning.
- Low cost than thermal detector but it is very useful in emerged stages, not affected by dusty or dirty environments.
- Responds faster than smoke detectors and minimum maintenance only and suitable for protection of property.

Project estimation and costing:

Component	Range	Quantity	Price
IC UM3561	-	1	70/-
Thermistor	10k	1	10/-
Transistor	BC547 BD139	2 1	2/- 1/-
8 Pin IC Base	-	1	5/-
Resistor	1K 10k 220k	3 1 1	3/- 1/- 1/-
Batter	3v	1	140/-
Speaker	3v	1	140/-
Total Cost			379/-

Conclusion:

Smoke detectors are devices created and designed to alarm by voice signals when Lighting energy reduce safe levels. They are supposed to alert people if there is a danger of fire, and they are required in public places, especially ones where fire accidents are more likely to happen, such as kitchens.

13.1.9 Earth Fault Detector foe electrical cable:

Introduction:

Till the last decades, a million miles of cables are threaded in the air across the country. But currently, it is laid in the underground, which is larger than an earlier method. Because, underground cables are not affected by any adverse weather conditions like pollution, heavy rainfall, snow, and storm, etc. But, when any problem occurs in cable, it is very difficult to find the exact location of the fault due to not knowing the exact location of the cable. Day by day, the world is becoming digitized so the project is proposed to find the location of the fault in a digital way. When the fault occurs, the process of repairing related to that particular cable is very difficult. The fault of the cable mainly occurs due to many reasons. They are: inconsistent, any defect, weakness of the cable, insulation failure, and breaking of the conductor. To overcome this problem, here is a project namely an underground cable fault distance locator, used to find the location of the fault for underground cable.

For most of the worldwide operated low voltage and medium voltage distribution lines underground cables have been used from many decades. To reduce the sensitivity of distribution networks to environmental influences underground high voltage cables are used more and more. Underground cables have been widely used in power distribution networks due to the advantages of underground connection, involving more security than overhead lines in bad weather, less liable to damage by storms or lightning. It is less expensive for shorter distance, eco- friendly and low maintenance.

But if any fault occur in cable, then it is difficult to locate fault. So this project is used to detect the location of fault in digital way. The requirement of locating the faulty point in an underground cable in order is to facilitate quicker repair, improve the system reliability and reduced outage period.The underground cable system is very useful for distribution mainly in metropolitan cities, airport and defense services.

Types of Faults:

A fault in a cable can be classified into different types such as

Open Circuit Fault:

This type of fault is better than short circuit fault, because when they open circuit fault occurs, then the flow of current through an underground cable becomes zero. This fault can be occurred by a disruption in the conducting path. Such faults occur when one or more phase conductors break.

Short Circuit Fault:

Short circuit fault can be divided into two types, namely symmetrical and unsymmetrical faults.

In symmetrical fault, three phases are short-circuited in this type of fault. This type of fault is also called a three-phase fault due to this reason.

In unsymmetrical fault, the magnitude of the current is not equal and displaced by 120 degrees.

Different Methods of Fault Location:

Online Method

The online method uses and processes the sampled current and voltages to determine the fault points. This method for underground cables is less than the above lines.

Offline Method

This method uses a special instrument to test out the service of cable in the field. The offline method is classified into two methods such as the tracer method and the terminal method.

Tracer Method

In this method fault of the cable can be detected by walking on the cable lines.The fault location is denoted from the electromagnetic signal or audible signal. This method is used to find the fault location very accurately.

Terminal Method

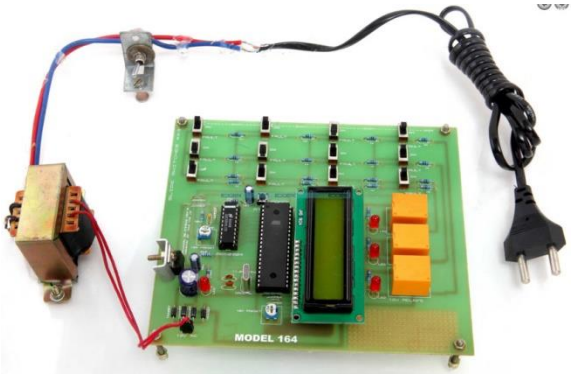
The terminal method is used to detect the location of the fault in a cable from one end or both the ends without tracking. This method is used to find general areas of the fault to accelerate tracking on buried cable.

Underground Cable Fault Distance Locator Circuit:

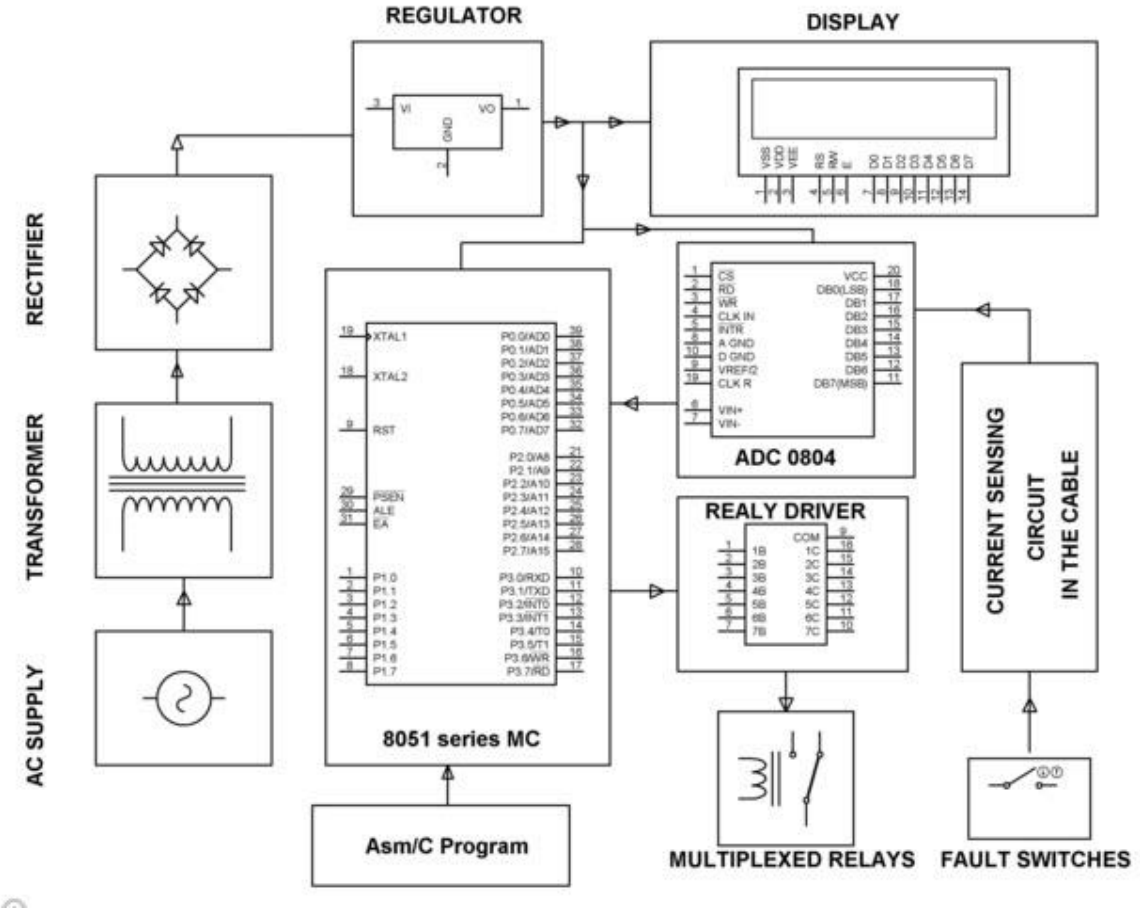
The main concept of this project is to find the distance of underground cable fault from the base station in kilometers. In many urban areas, cable fault is a common problem. When a fault occurs due to some reason, the process of fault tracking without knowing the location related to that particular cable is very difficult. The proposed system is designed to track the exact location of the fault occurred in the cable.

This project uses the Ohms Law concept, when a low voltage DC is applied to the feeder end through a series resistor, then the current would differ based on the location of fault occurred in the cable. In case is there any short circuit occurred from line to ground, then the voltage across series resistor alters accordingly, then it is fed to an analog to digital converter to develop exact data, which the pre-programmed 8051 microcontrollers will display in kilometers.

The proposed system is designed with a set of resistors to signifying the length of a cable in kilometers, and the fault creation is designed with a set of switches at every known kilometer (KM) to cross-check the exactness of the same. The fault happening at a specific distance and the particular phase is displayed on an LCD interfaced to the 8051 microcontrollers.



Circuit diagram:



Required components:

- Transformer
- Rectifier
- Relay driver
- Regulator
- Multiplexed relays
- ATD
- Display
- Microcontroller

Power Supply:

The 230V AC power supply is the first step down to 12V AC using a step-down transformer. This is then converted to the DC using a bridge rectifier. The AC ripples are filtered out by using a capacitor and given to the input pin of the voltage regulator 7805.At the output pin of this regulator, we get a constant 5V DC which is used for MC and other ICs in this project.

Microcontroller:

It is a smaller computer and it has on-chip RAM, ROM, I/O ports.The main features of 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

Analog to Digital Converter:

- Analog to digital converters find huge application as an intermediate device to convert the signals from analog to digital form.
- These digital signals are used for further processing by the digital processors.
- Various sensors like temperature, pressure, force, etc. convert the physical characteristics into electrical signals that are analog in nature.

The features of the ADC include the following:

- Compatible with micro controllers, access time is 135ns.
- Logic inputs and outputs meet both MOS and TTL voltage level specifications.
- Works with 2.5V (LM336) voltage reference.
- On-chip clock generator.
- 0V to 5V analog input voltage range with a single 5V supply.
- 20-pin molded chip carrier or small outline package.
- Operates ratio metrically or with 5 VDC, 2.5 VDC, or analog span adjusted voltage reference.

Relay:

- A relay is an electrical\ functioned switch.
- The flow of current through the coil of the relay makes magnetic field which attracts a lever and changes of the switch contacts.
- The coil current can be on/off so relays have to switch locations and have double throw (changeover) switch contacts.
- These allow switching one circuit to a second circuit which can be entirely separate from the first.
- For instance, 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.
- MC ULN2003 relay driver IC is used to drive a relay through.

Relay Driver ULN2003:

- ULN is a Relay driver application
- This is a monolithic high voltage & high current Darlington transistor arrays.

- It comprises of 7-NPN Darlington pairs that feature high voltage o/ps with common-cathode clamp diode for inductive loads ON.
- The collector-current rating of a single Darlington pair is 500mA.
- The Darlington pairs may be paralleled for higher current capability
- The ULN works as an inverter.
- If the logic at i/p 1B is high, then the o/p at its corresponding pin 1C will be low.

Liquid Crystal Display (LCD):

- Most common LCDs connected to the microcontrollers are 16×2 and 20×2 displays.
- This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.
- The standard is referred to as HD44780U, which refers to the controller chip which receives data from an external source (and communicates directly with the LCD.
- If an 8-bit data bus is used the LCD will require 11 data lines(3 control lines plus the 8 lines for the data bus)
- The three control lines are referred to as EN, RS, and RW.
- EN=Enable (used to tell the LCD that you are sending it data)
- RS=Register Select.When RS=0; data is treated as a command & When RS=1; data being sent is text data.
- R/W=Read/Write.When RW=0; the data written to the LCD & When RW=0; the data reading to the LCD.

Software Requirements:

- Keil an ARM Company makes C compilers, macro assemblers, real-time kernels, debuggers, simulators, integrated environments, evaluation boards, and emulators for ARM7/ARM9/Cortex-M3, XC16x/C16x/ST10, 251, and 8051 MCU families.
- Compilers are programs used to convert a High-Level Language to object code. Desktop compilers produce an output object code for the underlying microprocessor, but not for other microprocessors. i.e., the programs written in one of the HLL like ‘C’ will compile the code to run on the system for a particular
- processor like x86 (underlying microprocessor in the computer).
- For example, compilers for Dos platform is different from the Compilers for Unix platform So if one wants to define a compiler then the compiler is a program that translates source code into object code.

Advantages:

- Maintenance is very less, fewer faults and higher efficiency.
- These instruments are applicable to all kinds of cables ranging from 1 kV to 500 kV, and all types of faults are,
- Short circuit faults
- Cable faults
- Resistive faults
- Intermittent faults
- Sheath faults
- Water trees

- Partial discharges

Estimation and cost:

Component	Price
8051 microcontroller	90/-
Transformer	100/-
Rectifier	70/-
Relay Driver ULN2003	70/-
ADC	160/-
Regulator	20/-
Relay	75/-
16*2 LCD	130/-
Total Cost	715/-

Conclusion:

As a conclusion, the objectives of this project are achieved. The first objective is to develop a

Portable detector for exact fault location and distance fault. The system is battery operated and pin-

Point fault accurately in the system. Secondly, to develop prototype underground cable for a

Development of underground cable fault distance locator. The locator is represented by a line robot Which sense the electromagnetic field produced in afault cable. Next, to construct the performance Prototype that used in measures the fault distance by using Tracer method. The final prototype able to

Perform with the desired way on how this system operates in real life.

CHAPTER 14
Technical Options with Case Studies:-

14.1 Civil Engineering:-

14.1.1 Advanced Earthquake Resistant:-

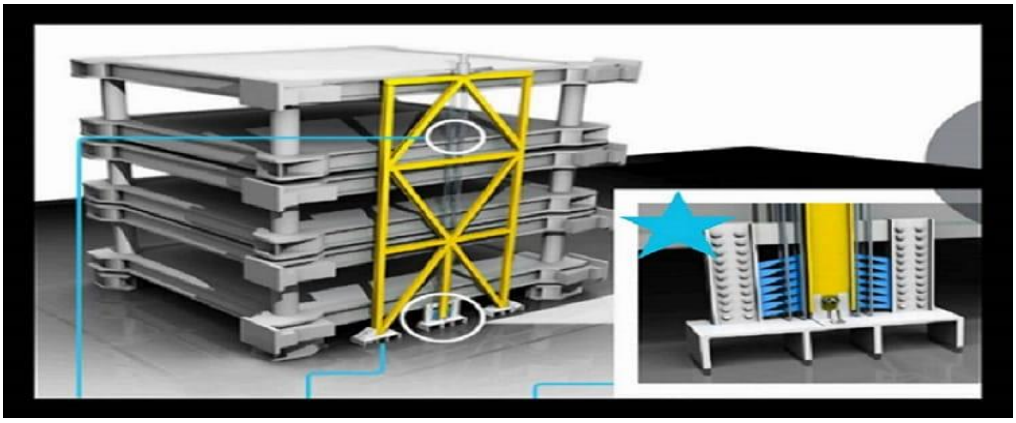
Earthquake-resistant structures are structures designed to protect buildings from earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake-resistant construction is to erect structures that fare better during seismic activity than their conventional counterparts.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

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

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

1. Base Isolation

2. Energy Dissipation Devices



Base Isolation Method of Earthquake Resistant Design

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

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

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

Energy Dissipation Devices

The second of the major new techniques for improving the earthquake resistance of buildings also relies upon damping and energy dissipation, but it greatly extends the damping and energy dissipation provided by lead-rubber bearings. As we've said, a certain amount of vibration

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

Construction Methods

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

GUIDELINES FOR EARTHQUAKE RESISTANT CONSTRUCTION

In addition to the main earthquake design code 1893 the BIS(Bureau of Indian Standards)has published other relevant earthquake design codes for earthquake resistant construction Masonry structures (IS-13828 1993) • Horizontal bands should be provided at plinth ,lintel and roof levels as per code • Providing vertical reinforcement at important locations such as corners, internal and external wall junctions as per code. • Grade of mortar should be as per codes specified for different earthquake zones. • Irregular shapes should be avoided both in plan and vertical configuration. • Quality assurance and proper workmanship must be ensured at all cost without any compromise. In RCC framed structures (IS-13920) • In RCC framed structures the spacing

of lateral ties should be kept closer as per the code • the hook in the ties should be at 135 degree instead of 90 degree for better anchoragement. • The arrangement of lateral ties in the columns should be as per code and must be continued through the joint as well.

14.1.2 Seismic Retrofitting of Buildings:-

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

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

Strategies

Seismic retrofit (or rehabilitation) strategies have been developed in the past few decades following the introduction of new seismic provisions and the availability of advanced materials (e.g. fiber-reinforced polymers (FRP), fiber reinforced concrete and high strength steel).

Increasing the global capacity (strengthening). This is typically done by the addition of cross braces or new structural walls.

Reduction of the seismic demand by means of supplementary damping and/or use of base isolation systems.

Increasing the local capacity of structural elements. This strategy recognises the inherent capacity within the existing structures, and therefore adopts a more cost-effective approach to selectively upgrade local capacity (deformation/ductility, strength or stiffness) of individual structural components.

Selective weakening retrofit. This is a counter-intuitive strategy to change the inelastic mechanism of the structure, while recognising the inherent capacity of the structure.

Allowing sliding connections such as passageway bridges to accommodate additional movement between seismically independent structures.

Addition of seismic friction dampers to simultaneously add damping and a selectable amount of additional stiffness.

Recently more holistic approaches to building retrofitting are being explored, including combined seismic and energy retrofitting. Such combined strategies aim to exploit cost savings by applying energy retrofitting and seismic strengthening interventions at once, hence improving the seismic and thermal performance of buildings

Techniques

Common seismic retrofitting techniques fall into several categories:

External post-tensioning

The use of external post-tensioning for new structural systems have been developed in the past decade. Under the PRESS (Precast Seismic Structural Systems), a large-scale U.S./Japan joint research program, unbonded post-tensioning high strength steel tendons have been used to achieve a moment-resisting system that has self-centering capacity. An extension of the same idea for seismic retrofitting has been experimentally tested for seismic retrofit of California bridges under a Caltrans research project and for seismic retrofit of non-ductile reinforced concrete frames.Pre-stressing can increase the capacity of structural elements such as beam, column and beam-column joints. External pre-stressing has been used for structural upgrade for gravity/live loading since the 1970s.

Base isolators

Main article: Base isolation

Base isolation is a collection of structural elements of a building that should substantially decouple the building's structure from the shaking ground thus protecting the building's integrity and enhancing its seismic performance. This earthquake engineering technology, which is a kind of seismic vibration control, can be applied both to a newly designed building and to seismic upgrading of existing structures. Normally, excavations are made around the building and the

building is separated from the foundations. Steel or reinforced concrete beams replace the connections to the foundations, while under these, the isolating pads, or base isolators, replace the material removed. While the base isolation tends to restrict transmission of the ground motion to the building, it also keeps the building positioned properly over the foundation. Careful attention to detail is required where the building interfaces with the ground, especially at entrances, stairways and ramps, to ensure sufficient relative motion of those structural elements.

Supplementary dampers

Supplementary dampers absorb the energy of motion and convert it to heat, thus damping resonant effects in structures that are rigidly attached to the ground. In addition to adding energy dissipation capacity to the structure, supplementary damping can reduce the displacement and acceleration demand within the structures.[17] In some cases, the threat of damage does not come from the initial shock itself, but rather from the periodic resonant motion of the structure that repeated ground motion induces. In the practical sense, supplementary dampers act similarly to Shock absorbers used in automotive suspensions.

Tuned mass dampers

Tuned mass dampers (TMD) employ movable weights on some sort of springs. These are typically employed to reduce wind sway in very tall, light buildings. Similar designs may be employed to impart earthquake resistance in eight to ten story buildings that are prone to destructive earthquake induced resonances.

Slosh tank

A slosh tank is a large container of low viscosity fluid (usually water) that may be placed at locations in a structure where lateral swaying motions are significant, such as the roof, and tuned to counter the local resonant dynamic motion. During a seismic (or wind) event the fluid in the tank will slosh back and forth with the fluid motion usually directed and controlled by internal baffles – partitions that prevent the tank itself becoming resonant with the structure, see Slosh dynamics. The net dynamic response of the overall structure is reduced due to both the counteracting movement of mass, as well as energy dissipation or vibration damping which occurs when the fluid's kinetic energy is converted to heat by the baffles. Generally the temperature rise in the system will be minimal and is passively cooled by the surrounding air. One Rincon Hill in San Francisco is a skyscraper with a rooftop slosh tank which was designed primarily to reduce the magnitude of lateral swaying motion from wind. A slosh tank is a passive tuned mass damper. In order to be effective the mass of the liquid is usually on the order of 1% to 5% of the mass it is counteracting, and often this requires a significant volume of liquid. In some cases these systems are designed to double as emergency water cisterns for fire suppression

Active control system

Very tall buildings ("skyscrapers"), when built using modern lightweight materials, might sway uncomfortably (but not dangerously) in certain wind conditions. A solution to this problem is to include at some upper story a large mass, constrained, but free to move within a limited range, and moving on some sort of bearing system such as an air cushion or hydraulic film. Hydraulic

pistons, powered by electric pumps and accumulators, are actively driven to counter the wind forces and natural resonances. These may also, if properly designed, be effective in controlling excessive motion – with or without applied power – in an earthquake. In general, though, modern steel frame high rise buildings are not as subject to dangerous motion as are medium rise (eight to ten story) buildings, as the resonant period of a tall and massive building is longer than the approximately one second shocks applied by an earthquake.

Adhoc addition of structural support/reinforcement

The most common form of seismic retrofit to lower buildings is adding strength to the existing structure to resist seismic forces. The strengthening may be limited to connections between existing building elements or it may involve adding primary resisting elements such as walls or frames, particularly in the lower stories. Common retrofit measures for unreinforced masonry buildings in the Western United States include the addition of steel frames, the addition of reinforced concrete walls, and in some cases, the addition of base isolation.

Connections between buildings and their expansion additions

Frequently, building additions will not be strongly connected to the existing structure, but simply placed adjacent to it, with only minor continuity in flooring, siding, and roofing. As a result, the addition may have a different resonant period than the original structure, and they may easily detach from one another. The relative motion will then cause the two parts to collide, causing severe structural damage. Seismic modification will either tie the two building components rigidly together so that they behave as a single mass or it will employ dampers to expend the energy from relative motion, with appropriate allowance for this motion, such as increased spacing and sliding bridges between sections

Typical retrofit solutions

Soft-story failure

This collapse mode is known as soft story collapse. In many buildings the ground level is designed for different uses than the upper levels. Low rise residential structures may be built over a parking garage which have large doors on one side. Hotels may have a tall ground floor to allow for a grand entrance or ballrooms. Office buildings may have retail stores on the ground floor with continuous display windows.

Traditional seismic design assumes that the lower stories of a building are stronger than the upper stories; where this is not the case—if the lower story is less strong than the upper structure—the structure will not respond to earthquakes in the expected[clarification needed] fashion. Using modern design methods, it is possible to take a weak lower story into account. Several failures of this type in one large apartment complex caused most of the fatalities in the 1994 Northridge earthquake.

Typically, where this type of problem is found, the weak story is reinforced to make it stronger than the floors above by adding shear walls or moment frames. Moment frames consisting of inverted U bents are useful in preserving lower story garage access, while a lower cost solution

may be to use shear walls or trusses in several locations, which partially reduce the usefulness for automobile parking but still allow the space to be used for other storage.

Beam-column joint connections

Beam-column joint connections are a common structural weakness in dealing with seismic retrofitting. Prior to the introduction of modern seismic codes in early 1970s, beam-column joints were typically non-engineered or designed. Laboratory testings have confirmed the seismic vulnerability of these poorly detailed and under-designed connections. Failure of beam-column joint connections can typically lead to catastrophic collapse of a frame-building, as often observed in recent earthquakes.

For reinforced concrete beam-column joints – various retrofit solutions have been proposed and tested in the past 20 years. Philosophically, the various seismic retrofit strategies discussed above can be implemented for reinforced concrete joints. Concrete or steel jacketing have been a popular retrofit technique until the advent of composite materials such as Carbon fiber-reinforced polymer (FRP). Composite materials such as carbon FRP and aramic FRP have been extensively tested for use in seismic retrofit with some success. One novel technique includes the use of selective weakening of the beam and added external post-tensioning to the joint in order to achieve flexural hinging in the beam, which is more desirable in terms of seismic design.

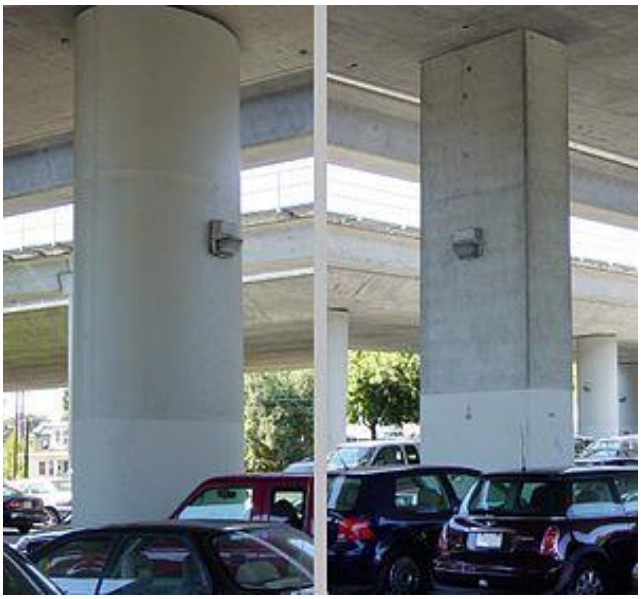
Widespread weld failures at beam-column joints of low-to-medium rise steel buildings during the Northridge 1994 earthquake for example, have shown the structural defiencies of these 'modern-designed' post-1970s welded moment-resisting connections.A subsequent SAC research project [4] has documented, tested and proposed several retrofit solutions for these welded steel moment-resisting connections. Various retrofit solutions have been developed for these welded joints – such as a) weld strengthening and b) addition of steel haunch or 'dog-bone' shape flange.

Following the Northridge earthquake, a number of steel moment -frame buildings were found to have experienced brittle fractures of beam to column connections. Discovery of these unanticipated brittle fractures of framing connections was alarming to engineers and the building industry. Starting in the 1960s, engineers began to regard welded steel moment-frame buildings as being among the most ductile systems contained in the building code. Many engineers believed that steel moment-frame buildings were essentially invulnerable to earthquake induced damage and thought that should damage occur, it would be limited to ductile yielding of members and connections. Observation of damage sustained by buildings in the 1994 Northridge earthquake indicated that contrary to the intended behavior, in

many cases, brittle fractures initiated within the connections at very low levels of plastic demand. In September, 1994, The SAC joint Venture, AISC, AISI, and NIST jointly convened an international workshop in Los Angeles to coordinate the efforts of various participants and to lay the foundation for systematic investigation and resolution of the problem. In September 1995 the SAC Joint Venture entered into a contractual agreement with FEMA to conduct Phase II of the SAC Steel project. Under Phase II, SAC continued its extensive problem-focused study of the performance of moment resisting steel frames and connections of various configurations, with the ultimate goal of developing seismic design criteria for steel construction. As a result of these studies it is now known that the typical moment-resisting connection detail employed in steel moment frame construction prior to the 1994 Northridge earthquake had a number of features that rendered it inherently susceptible to brittle fracture.

Reinforced concrete column burst

Reinforced concrete columns typically contain large diameter vertical rebar (reinforcing bars) arranged in a ring, surrounded by lighter-gauge hoops of rebar. Upon analysis of failures due to earthquakes, it has been realized that the weakness was not in the vertical bars, but rather in inadequate strength and quantity of hoops. Once the integrity of the hoops is breached, the vertical rebar can flex outward, stressing the central column of concrete. The concrete then simply crumbles into small pieces, now unconstrained by the surrounding rebar. In new construction a greater amount of hoop-like structures are used.



One simple retrofit is to surround the column with a jacket of steel plates formed and welded into a single cylinder. The space between the jacket and the column is then filled with concrete, a process called grouting. Where soil or structure conditions require such additional modification, additional pilings may be driven near the column base and concrete pads linking the pilings to the pylon are fabricated at or below ground level. In the example shown not all columns needed to be modified to gain sufficient seismic resistance for the conditions expected. (This location is about a mile from the Hayward Fault Zone.

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

A wide variety of modern methods of construction (MMC) techniques and products have been developed that have completely changed the behavior of construction industry from what it was before. This change is amazing and is in the way to bring more and more developments in this sector.

What are Modern Methods of Construction?

Modern construction methods (MMC) are methods that are developed in construction industry with proper planning and design so that each project reduces the construction time, cost and maintain overall sustainability

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

Types of Modern Methods of Construction

The different MMC used in construction field includes:

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

Precast Flat Panel System

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

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

3D Volumetric Construction

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

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

Flat Slab Construction

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

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

Precast Concrete Foundations

For the rapid construction of foundation, the precast concrete system can be employed. This method is more suited for a bespoke design. Here, the elements required for the construction of foundation are constructed separately in the factory (off site) and brought to the site and assembled. The manufactured product must have the assured quality as specified by the designer.

The foundation assembled is mainly supported by concrete piles. During assembling, both the systems are connected together. These foundation systems helps in increasing the productivity, increase quality, decrease the soil excavation quantity. This is best suited for extreme and adverse weather conditions. When the construction is dealt on a highly contaminated ground, this system of construction is a best choice.

The twin wall system has two walls slabs that are separated as shown in the figure-6. The two slabs are separated by a cast in lattice girders. The procedure involves:

The wall units are placed in the site.

The twin units are propped temporarily.

The wall units are later joined by means of reinforcing.

The gap between the wall units are filled by means of concrete.

This system of construction is faster than normal construction methods and economical. The twin wall system is mainly employed in association with the construction of precast floors.

Insulating Concrete Formwork

The system of insulating concrete formwork (ICF) have twin walled panels that are either polystyrene panels or blocks are employed. These are built quickly to create the formwork as the wall of the buildings.

The formwork that is made is filled with concrete. This concrete is factory produced that have quality assurance so that a ready – mixed concrete. Mostly the mix is ready mix concrete. Higher level of thermal insulation is provided by expanded polystyrene blocks. The concrete core will provide good robustness and better sound insulation.

Precast Cladding Panels

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

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

Concrete Walls and Floors

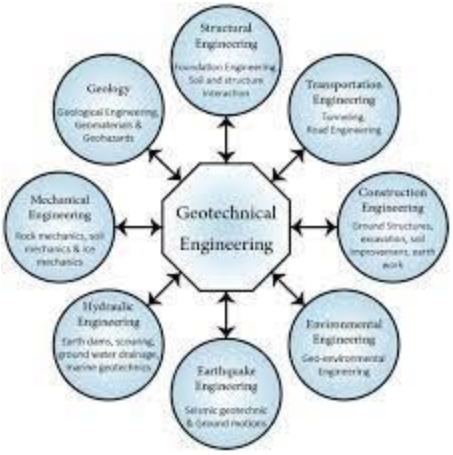
Concrete walls are mainly applied for seat walls, retaining wall, decorative exterior, and interior finishes. The concrete is also used a flooring material. As per the latest technology, the concrete floors can be provided with good finish to provide smooth and attractive flooring. When

compared with any other material, the concrete floors provide a wide variety of material for applications like acid-stained painted, radiant floors, overlays, and micro toppings. The concrete flooring can also be called as cement flooring. When compared with other flooring types, concrete flooring is affordable and maintenance is easy. Proper sealing of concrete flooring can be cleaned by a dust mop.

14.1.4 Engineering Aspects of Soil mechanics - Environmental Impact Assessment

An Environmental Impact Assessment is a formal method of judging the impact that any new developmental project would have on the environment and its constituents. This can include changes that the project would create in the physical aspects of existing geography, chemical changes to the atmosphere including air and water, biological changes that affect plant, animal and human life, cultural impact of a project on the society in the area, and other socio-economic effects that the project can have.

Such an assessment allows problems to be foreseen, so that the design and planning of the projects is modified to reduce any negative effects. It is now fashionable to build green buildings which have a positive effect on the environment.



There is historical precedent for the now mandatory Environmental Impact Assessments (EIA). Past efforts by governments have resulted in bans on activities that caused noxious odors, garbage dumps were positioned at places far away from habitation, and commercial activities were restricted to town centers.

Objectives of Environmental Impact Assessment

The objective of an EIA is to predict the environmental impact project would have on all aspects of the environment. Once this is done, a study has to be made to see if the impacts can be reduced in any way. The project has then to be modified to suit the local environment and all predictions and likely options presented to decision makers for final decisions.

You can gain a better understanding of EIA by understanding how any typical project can affect the environment of a particular area. Take for example the building of a new road in a city.

The alignment of the road may require that certain lands have to be leveled or new embankments created. Cutting of the land and the new embankments would affect the geography of the area and probably upset its drainage pattern. This would require re-planning existing methods of treating the run-off and could cause existing watercourses to be modified. The new road may require the removal of existing green cover and this could affect the living conditions in that area. The traffic going through that area can cause pollution problems from vehicles which also includes an increase in sound pollution. The emissions from the vehicles can affect already existing atmospheric pollutants which in turn could affect human health, animal health and affect greenery in the area. The road may affect existing structures in the area which may have to be removed and can cause changes in the economic wellbeing of the persons who are using those structures.

A positive impact of the new road may mean a reduction in traffic congestion, its positive effect on pollution, and the economic advantage of these two aspects.

For any environmental impact assessment, complete data on all these aspects as they are at present has to be made so that any changes can be reasonably judged to existing standards required for good living. The deterioration or increase in these living standards has then to be highlighted by the EIA before any final decision on the project can be undertaken.

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

Abstract: An important part of the environmental degradation suffered by the planet is caused by the discharge of untreated or poorly treated wastewater. Industrial, urban, and agricultural wastewater contain many different types of pollutants such as biodegradable and no biodegradable organic matter, suspended solids, turbidity, nutrients, heavy metals, pesticides, pathogens, etc. All of these pose a threat to the environment and human health, so the selected treatment techniques must be adapted to their nature in order to optimize their removal. In addition to efficiency, wastewater treatment methods must be sustainable, not only from an environmental point of view, but also economically and ethically. As a result, no technological dependence should be generated in less developed countries or communities. Therefore, this Special Issue deals with improvements in various aspects of wastewater treatment including different aspects of water treatment such as the development of mathematical models, the application of life cycle techniques, or the experimental optimization of wastewater treatment methods. Thirteen articles were accepted covering some of the most relevant fields of wastewater treatment: activated sludge, nanoparticle treatment, constructed wetlands, energy–water nexus, nutrient recovery, eco-friendly sorbents, and reverse osmosis.

Keywords: water treatment; activated sludge; modeling; constructed wetland; advanced oxidation techniques; reverse osmosis; sorbents.

14.2 Electrical Engineering

14.2.1 Design of Power Electronics converter

As the technology for the power semiconductor devices and integrated Circuit develops, the potential for applications of power electronics become Wider. There are already many power semiconductor devices that are Commercially available, however, the development in this direction is Continuing. The power semiconductor devices or power electronic converter fall Generally into six categories :

- 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 Switches

Power Electronics defined as Power Electronics defined as the application of solid State (devices) electronics for the control and Conversion of electric power..
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.

Power Electronics Application:

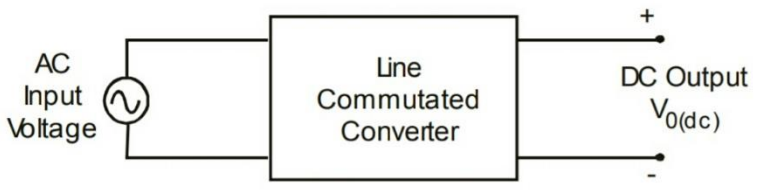
Power Electronics Application Power electronics have already found an important place in Modern technology and are now used in a great variety of high-Power product, including heat controls, light controls, electric Motor control, power supplies, vehicle propulsion system and High voltage direct current (HVDC) systems.

POWER ELECTRONIC SWITCHING DEVICES:

1. Uncontrolled turn on and off (Power Diode)
2. Controlled turn on uncontrolled turn off (Thyristors)
3. Controlled turn on and off characteristic (Power Transistor, BJT, MOSFET, GTO, IGBT)
4. Continuous gate signal requirement (BJT, MOSFET, IGBT)
5. Pulse gate requirement (SCR, GTO)
6. Bipolar voltage-withstanding capability (SCR, GTO)
7. Unipolar voltage-withstanding capability (BJT, MOSFET, GTO, IGBT)
8. Bidirectional current capability (TRIAC)
9. Unidirectional current capability (SCR, GTO, BJT, MOSFET, IGBT)

AC to DC converter (controlled rectifier):

Controlled rectifiers are line commutated ac to dc power converters which are Used to convert a fixed voltage, fixed frequency ac power supply into variable dc Output voltage.
The input supply fed to a controlled rectifier is ac supply at a fixed rms. Voltage and at a fixed frequency. We can obtain variable dc output voltage by using Controlled rectifiers. By employing phase controlled thyristors in the controlled Rectifier circuits we can obtain variable dc output voltage and variable dc (average) Output current by varying the trigger angle (phase angle) at which the thyristors are Triggered. We obtain a uni-directional and pulsating load current waveform, which has A specific average value. The thyristors are forward biased during the positive half cycle of input supply And can be turned ON by applying suitable gate trigger pulses at the thyristor gate Leads. The thyristor current and the load current begin to flow once the thyristors are Triggered (turned ON) say at $\omega t = \alpha$. The load current flows when the thyristors Conduct from $\omega t = \alpha$ to β. The output voltage across the load follows the input Supply voltage through the conducting thyristor. At $\omega t = \beta$,



when the load current Falls to zero, the thyristors turn off due to AC line (natural) commutation. In some bridge controlled rectifier circuits the conducting thyristor turns off, When the other thyristor is (other group of thyristors are) turned ON. The thyristor remains reverse biased during the negative half cycle of input Supply. The type of commutation used in controlled rectifier circuits is referred to AC Line commutation or Natural commutation or AC phase commutation. When the input ac supply voltage reverses and becomes negative during the Negative half cycle, the thyristor becomes reverse biased and hence turns off. There Are several types of power converters which use ac line commutation. These are Referred to as line commutated converters.

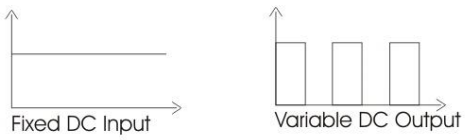
- Different types of line commutated converters are:
- Phase controlled rectifiers which are AC to DC converters.
- AC to AC converters
- AC voltage controllers, which convert input ac voltage into Variable ac output voltage at the same frequency.
- Cyclo converters, which give low output frequencies.

All these power converters operate from ac power supply at a fixed rms input Supply voltage and at a fixed input supply frequency. Hence they use ac line Commutation for turning off the thyristors after they have been triggered ON by the gating signals.

DC to DC chopper:

DC to DC converter is very much needed nowadays as many industrial applications are dependent upon DC voltage source. The performance of these applications will be improved if we use a variable DC supply. It will help to improve controllability of the equipments also. Examples of such applications are subway cars, trolley buses, battery operated vehicles etc. We can control and vary a constant DC voltage with the help of a chopper. Chopper is a basically static power electronics device which converts fixed DC voltage/power to variable DC voltage or power. It is nothing but a high speed switch which connects and disconnects the load from source at a high rate to get variable or chopped voltage at the output.

Chopper can increase or decrease the DC voltage level at its opposite side. So, chopper serves the same purpose in DC circuit transfers in case of ac circuit. So it is also known as DC transformer.



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

Principle and Working:

A soft starter is any device that controls the acceleration of an electric motor using controlling the applied voltage. 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

Defining Soft Starting:

Now let us shift our particular attention to soft starting. In technical terms, a soft starter is any device that reduces the torque applied to the electric motor. It generally consists of solid-state devices like thyristors to control the application of supply voltage to the motor. The starter works on the fact that the torque is proportional to the square of the starting current, which in turn is proportional to the applied voltage. Thus the torque and the current can be adjusted by reducing the voltage at the time of starting the motor.

There can be two types of control using soft starter:
Open Control: A start voltage is applied with time, irrespective of the current drawn or the speed of the motor. For each phase, two SCRs are connected back to back and the SCRs are conducted initially at a delay of 180 degrees during the respective half-wave cycles (for which each SCR conducts). This delay is reduced gradually with time until the applied voltage ramps up to the full supply voltage. This is also known as Time Voltage Ramp System. This method is not relevant as it doesn't control the motor acceleration.

Closed-Loop Control: Any of the motor output characteristics like the current drawn or the speed is monitored and the starting voltage is modified accordingly to get the required response. The current in each phase is monitored and if it exceeds a certain set point, the time voltage ramp is halted.Thus the basic principle of the soft starter is by controlling the conduction angle of the SCRs the application of supply voltage can be controlled.

Components of a basic soft starter:
Power switches like SCRs which need to be phase controlled such that they are applied for each part of the cycle. For a 3 phase motor, two SCRs are connected back to back for each phase. The switching devices need to be rated at least three times more than the line voltage.

Control Logic using PID controllers or Microcontrollers or any other logic to control the application of gate voltage to the SCR, i.e. to control the firing angle of SCRs to make the SCR conduct at the required part of the supply voltage cycle.

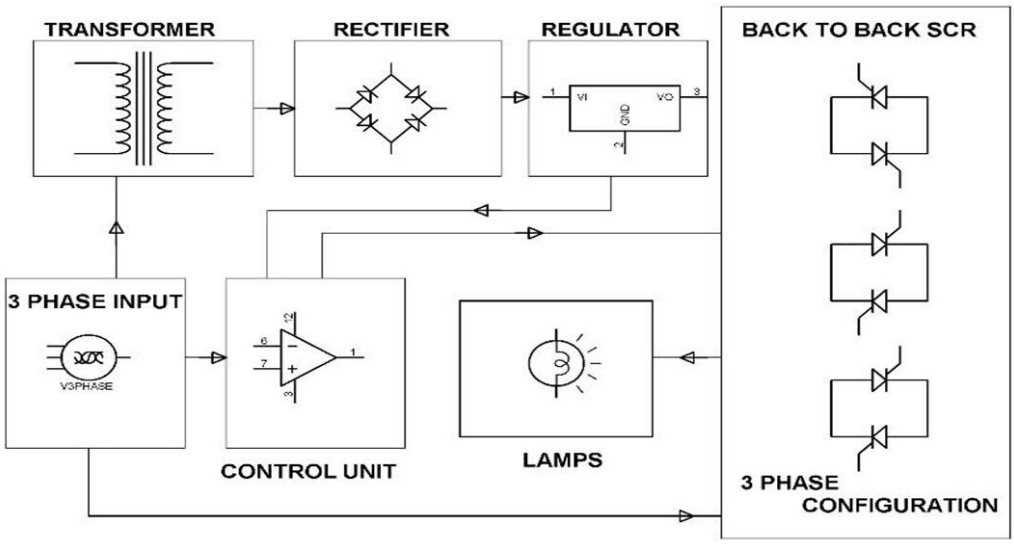
Working Example of Electronic Soft Start System for 3 phase induction motor:

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 optoisolator to control the application of gate voltage to each SCR in each phase.

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



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.

The 3rd comparator LM339 produces a High pulse width signal for every high-level voltage, which decreases gradually as the level voltage reduces. This signal is inverted and applied to the Optoisolator, which provides gate pulses to the SCRs. As voltage level falls, the pulse width of the Optoisolator increases and more the pulse width, lesser is the delay and gradually the SCR is triggered without any delay. Thus by controlling the duration between the pulses or delay between applications of pulses, the firing angle of SCR is controlled and the application of supply current is controlled, thus controlling the motor output torque.

The whole process is an open-loop control system where the time of application of gate triggering pulses to each SCR is controlled based on how earlier the ramp voltage decreases from the level voltage.

14.2.3 Advanced Wireless Power Transfer System

Introduction:

Major problems in power system is the losses occurring during the transmission of electrical power. The loss of percentage during the transmission is approximated as 26%. The main cause for power loss during transmission is the resistance of wires used in the grid. According to WRI (world resource institute), the electricity grid of India has the highest percentage (27-40%) of power transmission losses in the world. For this reason, Telsa has proposed methods of electricity transmission using an electromagnetic induction method.

The Serbian scientist "Nikola Telsa" was the first one to research and propose the concept of wireless power transfer in the year 1899, since then many scientists have been working to make his vision a reality. In the same year he has continued research on wireless power transmission in Colorado Springs and writes, the inferiority of the induction method would come into view immense as compared with the distributed charge of ground and air method. In the year 1961, William C. Brown publishes an article exploring possibilities of microwave power transmission. In the year 2009, Sony shows a wireless electrodynamics induction powered TV set.

What is Wireless Power Transfer?

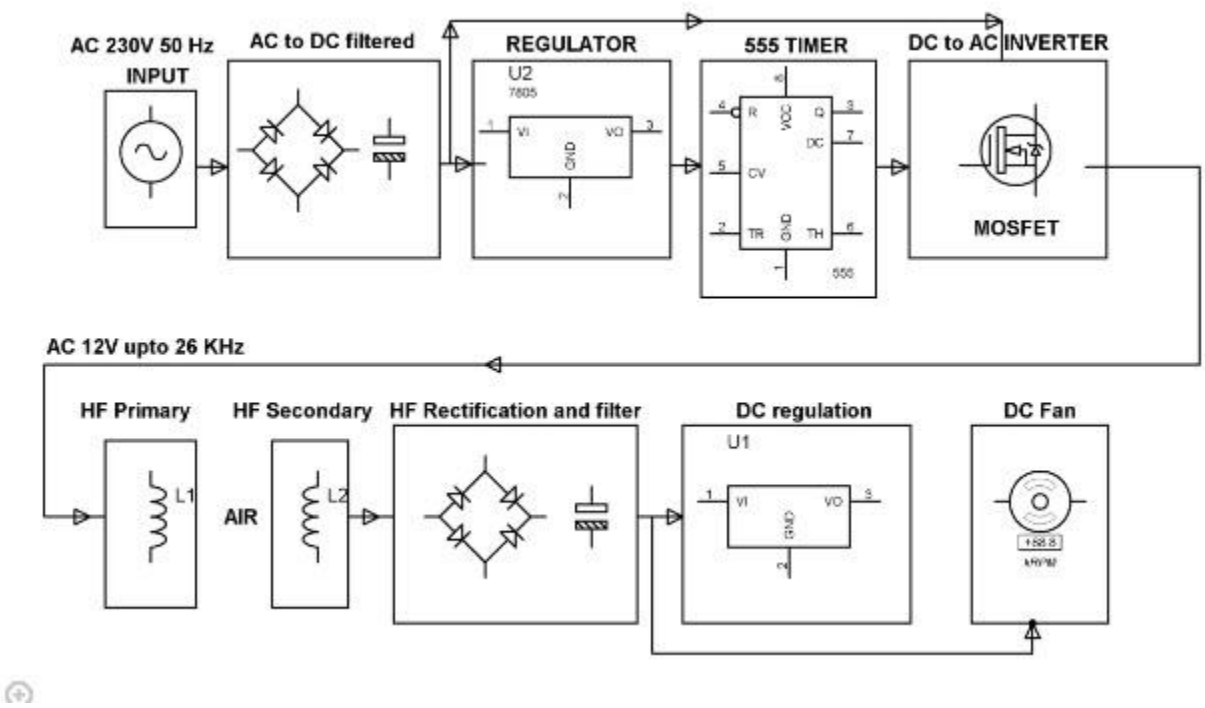
Wireless power can be defined as the transmission of electrical energy from a power source to an electrical load without connecting wires. It is reliable, efficient, fast, low maintenance cost, and it can be used for short range or long range. The basic working principle of wireless power transfer is, two objects having similar resonant frequency and in magnetic resonance at powerfully coupled rule tends to exchange the energy, while dissipating relatively little energy to the extraneous off-resonant objects.

Moreover, this method can be involved in a variety of applications, like to charge mobile phones, laptops wirelessly. And also this kind of charging gives a far lower risk of electrical shock as it would be galvanically isolated. This is an emerging technology, and further, the distance of power transfer can be improved as the study across the world is still going on.

Hardware Requirements of Wireless Power Transfer:

The hardware requirements of wireless power transfer include HF-Transformer, HF-diodes, rectifier, basic Transistors, Two air filled inductor coils, Voltage regulator and BLDC fan.

Circuit diagram:



Project working:

The main concept of this project is to design a device for the concept of wireless power transfer to eliminate the use conventional copper cables and also current carrying wires. This project is built upon using a circuit which converts AC 230V 50Hz to AC 12V, High frequency (HF). The output is fed to a tuned coil shaping as main of an air core transformer. The minor coil develops a voltage of HF 12volt.Thus the power transfer can be done by the primary to the secondary that is divided with 3cm distance. So the transfer could be seen as the primary transmits and the secondary receives the power to run a load. In addition, this method can be used in several applications, like to charge gadgets like mobile phone, laptop battery, iPod, propeller clock wirelessly. And also this type of charging offers a far lower risk of electrical shock as it would be galvanically isolated. This is an Emerging Technology, and in future, the distance of power transfer can be improved as the study across the world is still going on.

Estimation and cost:

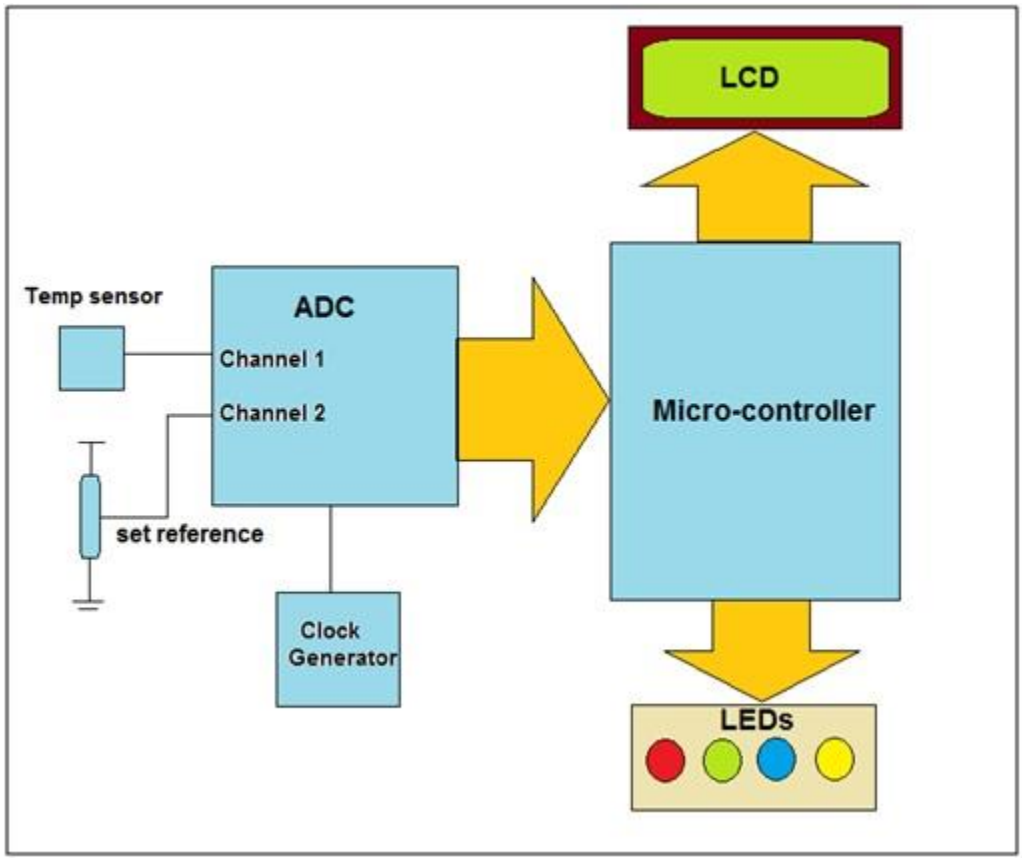
Component	Price
Transformer	200Rs.
Diodes	50Rs.
Rectifier.	90Rs.
Transistors	25Rs.
Air filled inductor coil.	300Rs.
Voltage regulator.	10Rs.
Total=	675Rs.

14.2.4 Industrial Temperature Controller

Temperature controllers are used in most of the manufacturing industries. The industries like textile mill, pharmaceutical industry, oil refinery etc. all requires temperature controller. The temperature controllers are used to maintain constant temperature of process or plant or any material. In such temperature controller system there is one reference temperature called set point or set temperature that is the desired temperature that must be maintained. This reference temperature is set by external means. Also it can be always adjustable according to requirements. Once this temperature is set the system tries to maintain it by sensing the current temperature and controlling it using heater, cooler or compressor etc. It senses current temperature, compares it with reference temperature and generates error signal. Then based on this error signal it controls heating element (or cooling element). If set temperature is more then error signal is negative and vice versa. So here I have given one such temperature control system that senses current temperature using temperature sensor. It compares it with the set temperature that is set by external reference. And it gives indication of error signal as positive or negative.

- If error is positive that means current temperature is more than set temperature that has to be reduced.
- If error is negative that means current temperature is less than set temperature and it is required to increase it.

Block diagram:



As shown in above figure, major building blocks of system are temperature sensor, Analog to Digital Converter (ADC), micro-controller, LCD, clock generator and LED indicators.

Temperature sensor: It's a transducer. It gives corresponding voltage (or current) output as change in temperature. It can be calibrated to degree Celsius. Otherwise it has to be calibrated first.
Reference potentiometer: It sets reference temperature between min to max value. The system operation depends upon this set temperature value.

ADC: Its analog to digital converter with built in multiplexer. It takes two analog inputs one from temperature sensor and another from reference potentiometer. It gives 8-bit digital output corresponding selected analog input. To get the digital output of any one channel, micro controller will select the required channel and takes digital output.

Clock generator: ADC requires clock signal for its operation. This clock signal is generated by IC555 based clock generator.

Micro controller: it controls operation of ADC and LCD. It takes digital output of both channels and displays them on LCD. It takes suitable decision by comparing two temperatures. Also it gives different indications on LEDs.

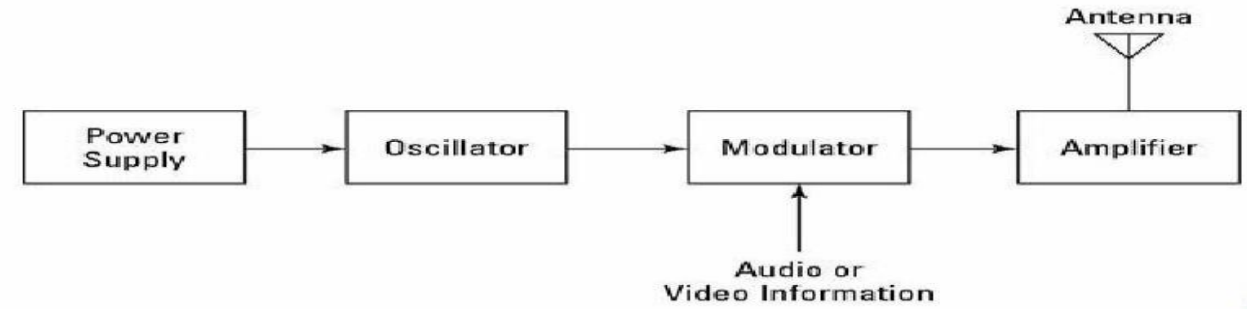
Working and operation:

- Microcontroller first latches address of channel 1 in to ADC. Then it asserts start signal to smart conversion. It waits for end of conversion (EOC) signal from ADC. When it gets it, it takes digital input from P1 and after processing it displays it on LCD as set temperature
- Next microcontroller latches address of channel 2. Again it asserts start signal and waits for EOC. When it gets EOC, takes digital input – process it – displays it on LCD as current temperature
- Then microcontroller take difference of these two temperature values that is the error. If error is positive then it indicates this on BLUE LED. If error is negative then it gives indication on YELLOW LED
- This process is continuously repeated after every two second

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

This project is developed for the users to have accident alert in modern traffic system. This device can be used in highly accidental area and pin drop curves to avoid accidents.
It Consists of two transmitters and two receivers.
One transmitter is connected first (One arm of the curve) and a receiver is fixed just opposite to the transmitter. The other transmitter is connected at the same side(Other arm of the curve) and the receiver is fixed just opposite to the second transmitter. When the vehicle passes the first transmitting and receiving unit(One arm of the curve), it senses that one vehicle is crossing. When it crosses the second unit(Other arm of the curve), it also senses. The microcontroller unit calculates the speed=displacement/time taken. If the speed exceeds the particular value, it sends signal to the other side vehicle to be alert. It also alerts the other side vehicle when some one

crosses one side. Also it captures the high speed vehicle. Thus the high speed vehicle can be traced easily. This project is very much used in traffic controller. It is very accurate and cost effective.



Radio transmitters:

A radio transmitter consists of several elements that work

Together to generate radio waves that contain useful information such as audio, video, or digital data.

Power supply:

Provides the necessary electrical power to operate the transmitter.

Oscillator:

Creates alternating current at the frequency on which the transmitter will transmit. The oscillator usually generates a sine wave, which is referred to as a Carrier wave.

Modulator:

Adds useful information to the carrier wave. There are two main ways to add this information. The first, called amplitude modulation or AM, makes slight increases or decreases to the intensity of the carrier wave. The second called frequency modulation or FM, makes slight increases or decreases the frequency of the carrier wave.

Amplifier:

Amplifies the modulated carrier wave to increase its power. The more powerful the amplifier, the more powerful the broadcast.

Antenna:

Converts the amplified signal to radio waves.

Radio receivers:

A radio receiver is the opposite of a radio transmitter. It uses an antenna to capture radio waves, processes those waves to extract only those waves that are vibrating at the desired frequency, extracts the audio signals that were added to those waves, amplifies the audio signals, and finally plays them on a speaker.

Antenna:

Captures the radio waves. Typically, the antenna is simply a length of wire. When this wire is exposed to radio waves, the waves induce a very small alternating current in the antenna.

RF amplifier:

A sensitive amplifier that amplifies the very weak radiofrequency (RF) signal from the antenna so that the signal can be processed by the tuner.

Tuner:

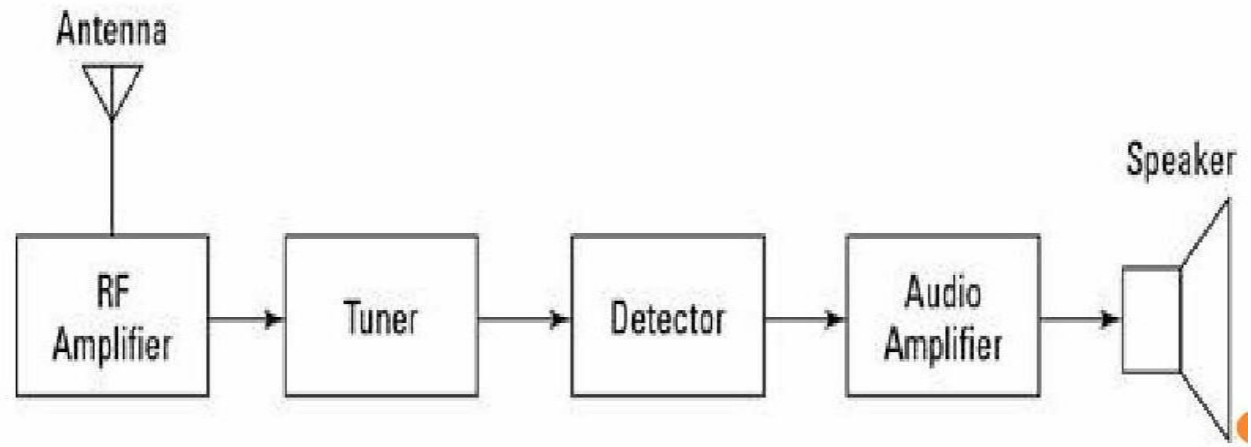
A circuit that can extract signals of a particular frequency from a mix of signals of different frequencies. On its own, the antenna captures radio waves of all frequencies and sends them to the RF amplifier, which dutifully amplifies them all.

Detector:

Responsible for separating the audio information from the carrier wave. For AM signals, this can be done with a diode that just Rectifies the alternating current signal. What's left after the diode has its Way with the alternating current signal is a direct current signal that can be fed to an audio amplifier circuit. For FM signals, the detector circuit is a little more complicated.

Audio amplifier:

This component's job is to amplify the weak signal that comes from the detector so that it can be heard. This can be done using a simple transistor amplifier circuit.



RX5019/5020 is a pair of radio remote control transmitter / receiver-specific components. Use of its fixed operating frequency change is not easy, the circuit is simple, easy to install, simply plug in the power and signal lead wire can be put Into use. They can be used alone, can also be used in combination, is an ideal radio remote control transmitter / receiver devices. RX5020 wireless remote control receiver pin diagram form the general environment in the absence of blocking transmission range of up to 3 ~5km, buildings in the city up to l ~ 3km. If the fixed occasions, can set up a coaxial cable and antenna in the height of the rod is connected, so that the air signal transmission of up to 8km.

CHAPTER 15

Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society.

1. POST OFFICE:

In our village VADHAVA, The Post office is available but condition of the Post office is not good and size (area) of Post office is very small. For problem in post services are not solved by village Post office. So villagers are go outside of village for any problems of post services and huge size post like any electronic item etc.also taken by other Post office which is outside of the village. So we are design Post office for solve the problem of villagers.

In design of post office large size waiting room and sitting room provided. Recepnist office is also provided for any queries, problem and information about post services. Two main offices are also provided in design for any kind of work of post services and solutions of post problems. For any problem by officer and problem not solved so for complaints of officers one head office is provided. Gent's and ladies toilet are also provided. For drinking is purpose small kitchen (water) is provided. One staff room is also provided. For huge size of Post services large size storage room is provided. The Post office is made by low cost.

2. LOW COST TOILET:

Gramalaya has been implementing for more than two and half decades various toilet technology depending on the terrain with the support of Water Aid and Water.org for the last 20 years. There are several designs and technologies available for installing a household type sanitary latrine. Therefore, it is important to give several technological options or informed choices to the user to choose and own and maintain a sanitary latrine without much external support but several inter-related factors play important role in installing a sanitary latrine to a rural household.

3. SKILL DEVELOPMENT CENTER:

Tilor-made, need-based programmes would be initiated for specific age groups which can be like language and communication skills, life and positive thinking skills, personality development skills, management skills, behavioural skills, including job and employability skills. The course methodology of "Skill India" would be innovative, which would include games, group discussions, brainstorming sessions, practical experiences, case studies etc.

4. LIBRARY:

Public library provide following facilities in village,

- Poetry, literature
- Personality development books like You Can Win!
- English grammar books like Wren & Martin
- Dictionaries – English to local language translation
- Aptitude and mathematics books for Competitive examinations like Ramanuja Test and CV Raman Tests (for Secondary schools)

- State, India and World maps
- Depending on the students‟ interest, books on gardening, farming etc can also be added so that students will be aware of backyard farming.

5. BIO-ROCK WATER TREATMENT PLAN FOR SCHOOL:

BIOROCK offers a complete range of compact and non-electric residential waste water treatment plants, denominated into 6, 8, 10, 15 & 30 person systems. If installed in parallel the treatment units can also cater for 60, 90, 120 people and so on. BIOROCK power-free Waste Water Treatment Plants offers an ideal solution for residential, domestic wastewater treatment. BIOROCK provides a revolutionary, efficient and reliable compact wastewater treatment solution. Very compact, our systems are free from any blower or air diffusors. They don't need any electricity for the treatment process, leading to minimal maintenance and repair costs, the lowest operational costs and the longest dislodge intervals. These unique advantages lead to significant costs savings for the user compared to conventional wastewater treatment plants, as the reliability of the system is maximized with no possible breakdowns thus no need for expensive spare parts.

6. PARTY PLOT:

We design open party plot in village. It is very useful in various function like birthday party , get to gather function , marriage function , and many other gathering function**.**

7. AGRICULTURE STORAGE ROOM:

Storage is an important marketing function, which involves holding and preserving goods from the time they are produced until they are needed for consumption.

- The storage of goods, therefore, from the time of production to the time of consumption, ensures a continuous flow of goods in the market.
- Storage protects the quality of perishable and semi-perishable products from deterioration;
- Some of the goods e.g., woolen garments, have a seasonal demand. To cope with this demand, production on a continuous basis and storage become necessary;
- It helps in the stabilization of prices by adjusting demand and supply;
- Storage is necessary for some period for performance of other marketing functions.
- Storage provides employment and income through price advantages.

8. CYBER CAFÉ:

People in rural areas can live at some distance from other communities, settlements, villages or towns. There may be only a small number of people and this does not allow the economies of scale which benefit urban residents.

In this means many people in rural communities live at some distance from services of all kinds (such as shops and post offices, schools and colleges, doctors, advice and benefit offices, and cinemas and theatres).

Although some people in rural areas have well-paid, regular employment, for others work may be scarce, irregular and/or badly paid. Just as in urban areas, it's possible to be poor or deprived.

Information technology and the Internet are tools which can help to minimise some of these challenges. In doing so, rural communities can be strengthened - not only geographical

communities but also those other groups of which people are members: young people, business, the agricultural community, and so on.

The 'snapshots' in this article begin to draw out out the benefits and challenges of using the Internet, together with some advice for others thinking of using it.

9. FUNERAL HOME:

Funeral homes arrange services in accordance with the wishes of surviving friends and family, whether immediate next of kin or an executor so named in a legal will. The funeral home often takes care of the necessary paperwork, permits, and other details, such as making arrangements with the cemetery, and providing obituaries to the news media. The funeral business has a history that dates to the age of the Egyptians who mastered the science of preservation. In recent years many funeral homes have started posting obituaries online and use materials submitted by families to create memorial websites

10. PRIMARY SHOP:

A pharmacy is a shop where therapeutic drugs are sold. Sometimes a pharmacy is also called a drug store. A pharmacy is the place where most pharmacists practice the profession of pharmacy. Pharmacists play a major role in providing healthcare services by means of community pharmacy services in rural areas where physicians are not available or where physician services are too costly for meeting the healthcare necessities.

11. MILK DAIRY:

Managerial

The milk producers of the village with the support of the milk union form a village dairy cooperative society. The milk producers become members by buying a minimum of one share of the society and paying an entrance fee as per the bye-laws. All these members form the general body of the society, which has the supreme powers subject to the State Cooperative Act, Rules and Bye-laws.The society has an elected Managing Committee (MC) including the Chairman from amongst the member producers as per the provisions of the bye-laws. All the positions of the MC are honorary. The committee employs paid staff to run the day-to-day affairs of the society. The number of such staff depends upon the size of the business of the society.

The provisions of the bye-laws govern the term of the MC and the Chairman of the society. The committee decides policy matters and frames guidelines for efficient running of the society. The committee holds its monthly meetings to discuss issues pertaining to society, members, milk producers, suggestions/guidelines provided by the Milk Union and other relevant matters.

Operational

The society’s major operations can be classified in two groups: milk trading and providing input services. Milk trading involves reception, testing, local and sample milk sale, dispatch of milk to milk union, payment and accounts keeping. Input services include animal health coverage, breeding, supply of cattle feed, fodder development, clean milk production and extension services to producer members.

12. BANK:

Banks offer a diverse variety of programs to attract and hold customers. Compare the offerings of different banks and do not be afraid to switch if another bank is better at suiting your needs — but first, make sure that you understand what those needs are. Do you need multiple locations

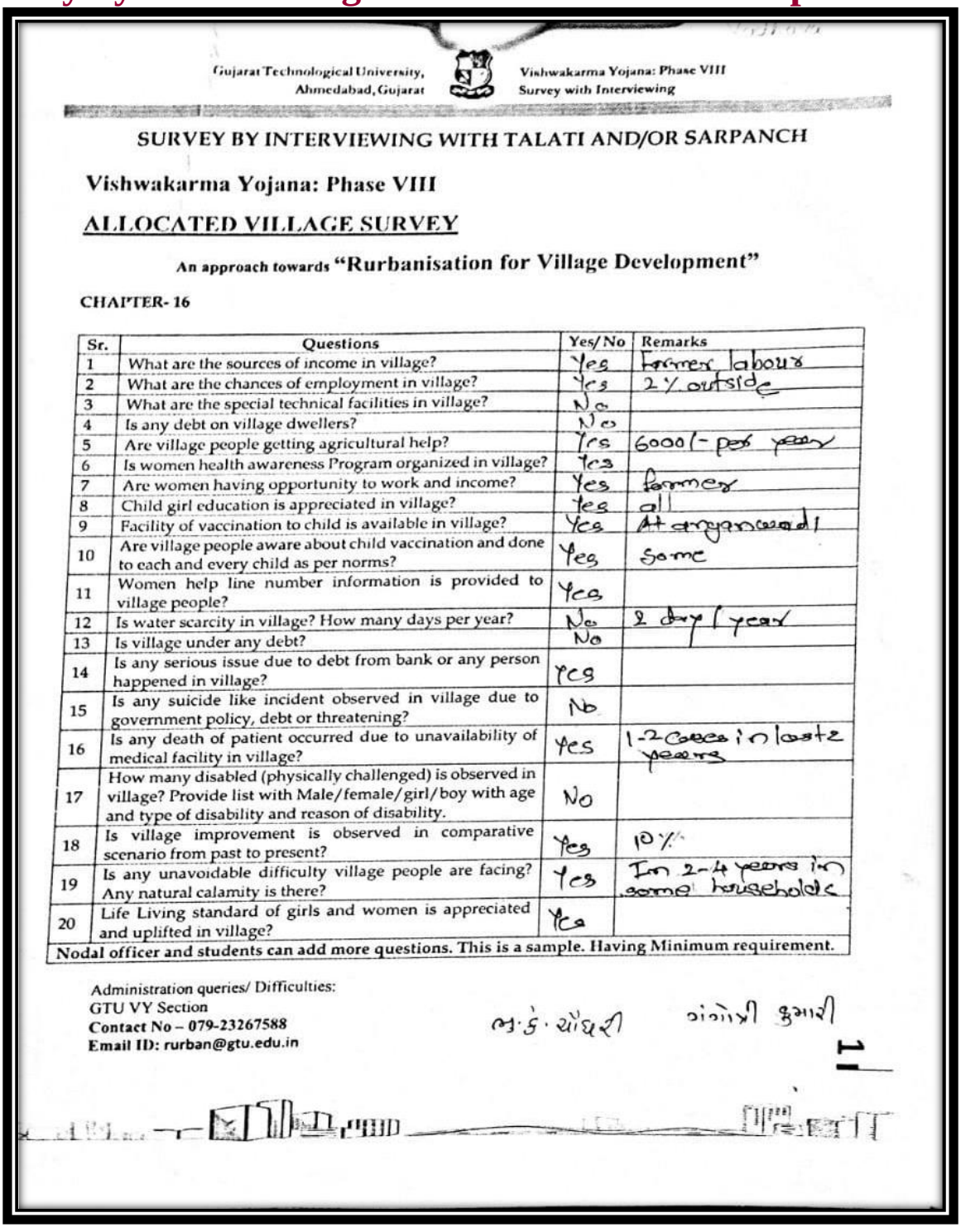
and ATMs? Is online banking important to you? Do you prefer mobile apps? Is a smaller minimum balance required based on your cash flow? Examine your banking needs in detail.
Once you are confident that you know what you are looking for in a bank, you can make an educated comparison and maximize your benefits. Don't forget to consider banks that are completely online with no physical branches. Their lower overhead costs can result in better rates for you.

SR. NO.	Design Name	Period	Amount Expenditure	Benefit
I				
1	Post office	9 month	632969	In our village VADHAVA, The Post office is available but condition of the Post office is not good and size (area) of Post office is very small.
2	Low cost Toilet	2 week	1515	It is important to give several technological options or informed choices to the user to choose and own and maintain a sanitary latrine without much external support but several inter-related factors play important role in installing a sanitary latrine to a rural household.
3	Skill development center	2 month	531739	The course methodology of "Skill India" would be innovative, which would include games, group discussions, brainstorming sessions, practical experiences, case studies etc.
4	Library	3 month	446363	A Library is a building or room containing collections of books, periodicals, and sometimes films and recorded music for use or borrowing by the public or the members of an institution.
5	Bio-rock Treatment plant	1 month	250000	These unique advantages lead to significant costs savings for the user compared to conventional wastewater treatment plants, as the reliability of the system is maximized with no possible breakdowns thus no need for expensive spare parts.
6	Party Plot with Plastic block.	3.5 month	575532	It is very useful in various function like birthday party, get to gather function , marriage function , and many other

				gathering function**.**
II				
7	Agriculture Storage room	2.5 month	426098	This April, for the first time, the Kunbi tribal community in Joida will harvest their crop of pickling mangoes without a trace of nervousness.
8	Cyber Café	1 month	3726687	People in rural areas can live at some distance from other communities, settlements, villages or towns.
9	Funeral Home	3 month	724027	Through an assignment of life insurance, a beneficiary can assign all or a portion of her life insurance benefits to a funeral home.
10	Primary shop	1.5 month	92061	A pharmacy is the place where most pharmacists practice the profession of pharmacy.
11	Milk dairy	12 month	506199	The milk producers of the village with the support of the milk union form a village dairy cooperative society.
12	Bank	3 month	369742	If you have decided that your current bank is not for you, speak with them and give them a chance to retain your business. You have leverage as a customer; don't be afraid to use it.

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	Farmer labours
2	What are the chances of employment in village?	Yes	2% outside
3	What are the special technical facilities in village?	No	
4	Is any debt on village dwellers?	No	
5	Are village people getting agricultural help?	Yes	6000/- per year
6	Is women health awareness Program organized in village?	Yes	
7	Are women having opportunity to work and income?	Yes	farmer
8	Child girl education is appreciated in village?	Yes	all
9	Facility of vaccination to child is available in village?	Yes	At anganwadi
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	Some
11	Women help line number information is provided to village people?	Yes	
12	Is water scarcity in village? How many days per year?	No	2 day / year
13	Is village under any debt?	No	
14	Is any serious issue due to debt from bank or any person happened in village?	Yes	
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	No	
16	Is any death of patient occurred due to unavailability of medical facility in village?	Yes	1-2 cases in laste years
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	No	
18	Is village improvement is observed in comparative scenario from past to present?	Yes	10%
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	Yes	In 2-4 years in some households
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	

Nodal officer and students can add more questions. This is a sample. Having Minimum requirement.

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

CHAPTER 17

Irrigation / Agriculture Activates and Agro Industry, alternate Technics and Solution

For ages, farmers across the world have had to be resourceful when rain fails to come. To take matters into their own hands, they've used technologies like irrigation systems to overcome water deficits and maximize crop yields.

Irrigation systems, however, are inefficient. About half of all irrigation water is wasted due to runoff, wind, and evaporation. That's because most irrigation systems rely on simple timers and controllers for scheduling. A much more efficient approach is to use water only when needed and apply exactly the right amount.

That, among other things, is what the Internet of Things helps farmers do. IoT makes farm management smarter by enabling farmers to improve efficiency through wise resource consumption.

In this article, you'll learn about:

The benefits of a smart irrigation system

Growing at a CAGR of 15.3%, the smart irrigation market is expected to reach $2.1 billion by 2025 as agribusinesses and farmers actively embrace smart irrigation technology to improve their day-to-day operations.

The advantages of smart irrigation are far-reaching. By monitoring soil moisture levels, a smart water irrigation system allows farmers to automate their irrigation processes and reduce water use. In addition to more efficient consumption of resources, other benefits include:

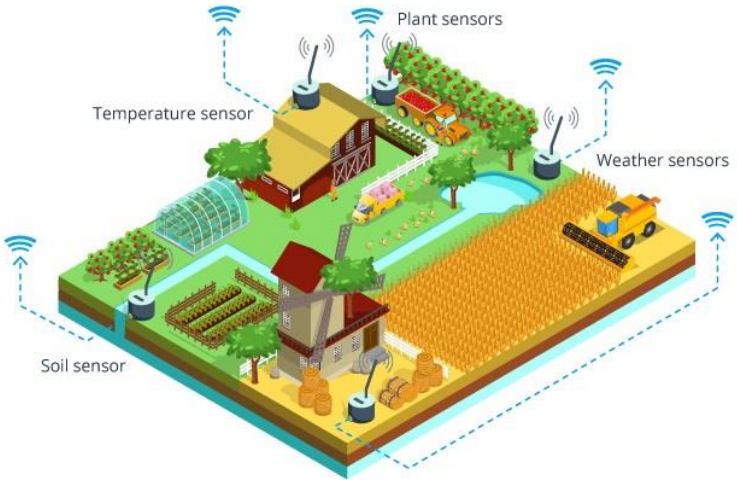
- Cost savings due to minimized water waste
- Reduced human efforts
- A unified view of soil characteristics, including moisture and nutrient contents
- Smart notifications in case of abnormalities
- Better long-term landscape health
- IoT ecosystem for smart irrigation

To achieve these advantages, smart water irrigation systems make extensive use of IoT sensors. These sensors, placed in the field, send real-time data to a central gateway that then automatically switches on a water pump whenever moisture or temperature values are outside the predetermined range.

Wireless low-power networks like LoRa are used to empower IoT sensors and make it possible for information to flow in real time to and from the central gateway. The entire smart irrigation system can be managed by an end user through a custom cloud-based platform or mobile application.

Types of IoT sensors for smart irrigation of farmlands

Depending on the type of data to be captured, soil, weather, and plant IoT sensors can be used in a smart irrigation solution.



Soil sensors

Soil-based sensors gather relevant data about volumetric water content, salinity, electrical conductivity, and other crucial parameters. Located at key points across the field, these sensors send data to a smart water irrigation system to help farmers gain quick insights into the soil's state and predict irrigation needs.

Weather sensors

Also called evapotranspiration (ET) sensors, weather sensors measure ultra-local environmental conditions like water evaporation from the soil surface and plant transpiration. Combined with data provided by a GIS-based solution, these sensors can help generate more accurate water predictions.

Plant sensors

Plant-mounted sensors are still new but show great promise in gauging a plant's water status. Attached to a plant's stalk or fruits, a sensor can track minute changes like swelling or shrinking and alert farmers to insufficient water content or yield-reducing tendencies in the field.

Extending the capabilities of a smart irrigation solution

An IoT-based irrigation system can be further enhanced with functionality that uses advanced software. You can customize your smart water irrigation solution and integrate third-party APIs to tap into additional valuable data and inform your decision-making on irrigation of farmlands.

Weather monitoring

One way to do that is to incorporate satellite data and weather reports from weather stations to better schedule your irrigation activities. Knowing that rain is forecasted, the system can wait and automatically recalculate the amount of required water based on actual precipitation received.

Location technology

Precision mapping also helps agribusinesses drive smart farming by optimizing costs and gaining deep insights. Reusable maps that bring together data from sensors and images from satellites and drones enable farmers to keep an eye on critical land characteristics.

Artificial intelligence

AI is becoming the bedrock of automation in farming. Apart from its use in novel but still rarely used agricultural robotics systems, AI helps to automate simple tasks like labelling data, building reports, and sending notifications. Such small steps to automation through AI are becoming easier to implement while their impact on agribusinesses is critical and can be seen in just a few months.

How technology reinforces each type of irrigation system

Based on how water is distributed throughout the field, you can choose from different types of irrigation systems that can be enhanced with smart irrigation software. The most common are flood, sprinkler, center pivot, drip, and micro-irrigation systems. Let's see how technological solutions for smart irrigation can improve the efficiency of each type.

Sprinkler irrigation

In a sprinkler irrigation system, water is pumped through pipes and then distributed via high-pressure overhead sprinklers. These sprinklers can be set in a central location in the field or can be located on a moving platform.

Role of software: Thermal and acoustic rain sensors recognize rainfall and measure its intensity to schedule the next irrigation after rain stops. A smart irrigation system analyzes data and calculates the water budget for the next month. Sprinklers get automated notifications to prevent extensive water use and overwatering due to rain.

Center pivot irrigation

This is the most popular form of sprinkler irrigation and is also known as water-wheel and circle irrigation. A typical center pivot system consists of a long irrigating pipeline attached to a central tower and moves slowly over the field in a circular pattern, irrigating plants with sprayers.

Role of software: The system that controls circle irrigation sprinklers obtains data insights from in-field sensors to adjust the water stream or angle of flow. This helps to reach plants that are far from the water source and save those nearest from overwatering. By analyzing weather data and soil moisture, the system plans irrigation and calculates potential yield and harvest times.

Drip irrigation

In this type of irrigation, water is distributed directly to the roots of plants through pipes with small openings called drippers. This allows farmers to significantly reduce evaporation and runoff.

Role of software: For this type of irrigation, the main challenge is the visibility of the watering process. The system notifies the user through an app about starting and finishing irrigation. It also measures soil parameters before and after irrigation.

Micro-irrigation

Micro-irrigation is a low-pressure, low-volume system that offers precise control over watering. The system applies water directly to the plant's roots, improving irrigation efficiency and ensuring uniform distribution.

Role of software: The system can plan the exact dosage for each plant as the amount of water is precisely controlled. AI algorithms can be applied to recognize plants and adjust watering appropriately.

No matter what type of irrigation system you choose, equipping it with powerful IoT sensors will help you gain data-driven, actionable insights and stay on top of your irrigation needs.

The bottom line

Agriculture is by far the largest consumer of water, accounting for about 70% of global freshwater withdrawals. What's aggravating is that a huge percentage of this water is lost due to inefficient and outdated irrigation techniques.

Smart irrigation technology is set to fix these problems through the use of IoT-powered agricultural sensors that enable farmers to closely monitor field conditions and adjust irrigation practices accordingly. This results not only in more efficient water management but in higher crop yields and lower costs.

CHAPTER 18

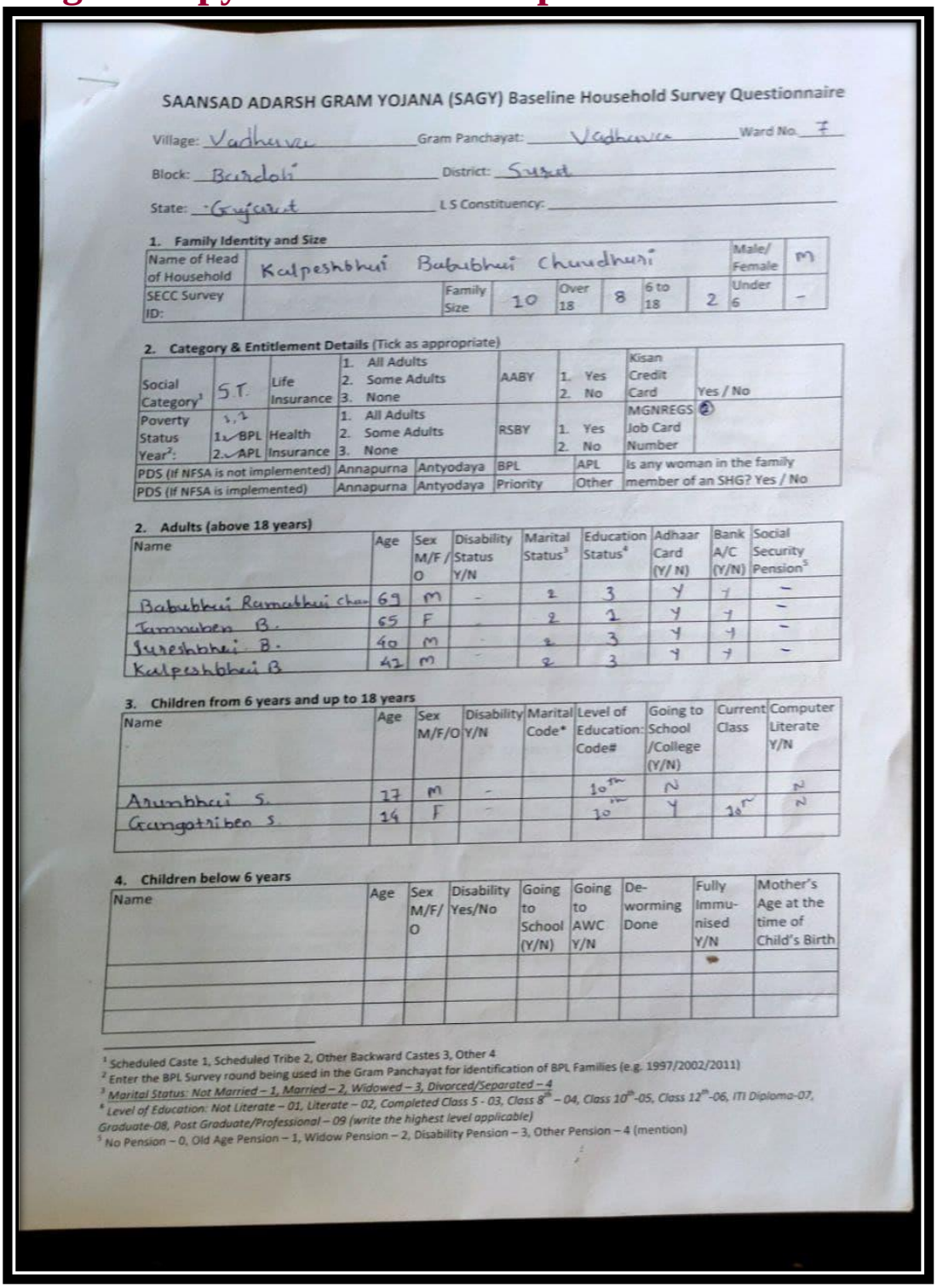
Social Activities – Any Activates Planned By Students

In the activity we did in the village we taught the villagers how to make compost for farming from whatever waste there is and also advised them to build platforms for the thirsty birds to drink water and sit and feed them in summer. We painted on the walls of the village to awaken the villagers and maintain cleanliness. We also trained the villagers to pay online light bills and recharge their mobiles. We taught the villagers how to make compost from waste. In which the first pit was dug and the waste was filled in and the pit was closed for a few weeks and the waste was used to make compost for farming. We also showed the villagers the measures to maintain cleanliness. Which are as follows?

1. You should grow trees must and should.
2. In your village waste thing not see in your village on soil.
3. You should clean a gutter where water flow.
4. You should say people daily clean your home and other side of home.
5. You should help together.
6. You should use one society for clean. I hope it help.
7. Firstly spread awareness about cleanliness
8. Tell them the importance of cleanliness
9. If we have clean surrounding so we would not suffer from any kind of disease.
10. You can have have a team that helps to clean village.
11. You can tell them not to throw garbage out side.
12. You can even have the prize distribution that is if any person of village is seen to be clean keep his/her house clean , surroundings clean and helping others to clean and also making other aware about cleanliness so would be awarded by the prize.

CHAPTER 19

SAGY Questionnaire Survey form with the Sarpanch Signature (Scanned copy attachment in the soft copy report and original copy in hardbound report



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Vadhava Gram Panchayat: Vadhava Ward No. 7

Block: Bardoli District: Surat

State: Gujarat L S Constituency:

1. Family Identity and Size

Name of Head of Household	Kalpeshbhai Babubhai Chaudhari						Male/ Female	M
SECC Survey ID:		Family Size	10	Over 18	8	6 to 18	2	Under 6	-

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	S.T.	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, 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]
Babubhai Ramabhai Cha...	69	M	-	2	3	Y	Y	-
Jamnaben B.	65	F	-	2	1	Y	Y	-
Sureshbhai B.	40	M	-	2	3	Y	Y	-
Kalpeshbhai B	42	M	-	2	3	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
Arunbhai S.	17	M	-		10th	N		N
Gangotriben S.	14	F	-		10th	Y	10th	N

4. Children below 6 years

Name	Age	Sex M/F/O	Disability Yes/No	Going to School (Y/N)	Going to AWC Y/N	De-worming Done	Fully Immu-nised Y/N	Mother's Age at the time of Child's Birth

[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		

9. House & Homestead Data

Own House: Yes / No	No. of Rooms: 4
Type: Kutcha / Semi Pucca / Pucca	
Toilet: Private / Community / Open Defecation	
Drainage linked to House: Covered / Open / None	
Waste Collection System	Door Step / Common Point / No Collection System
Homestead Land: Yes / No	Kitchen Garden : Yes / No
Compost Pit: Individual/ Group/ None	Biogas Plant: Individual/ Group/ None

10. Source of Water (Distance from source in KMs)

Source of Water		Distance
Piped Water at Home	Yes / No	
Community Water Tap	Yes / No	
Hand Pump (Public / Private)	Yes / No	
Open Well(Public / Private)	Yes / No	
Other (mention):		

11. Source of Lighting and Power

Electricity Connection to Household: Yes / No
Lighting: Electricity/Kerosene/Solar Power
Mention if Any Other: _____
Cooking: LPG/Biogas/Kerosene/Wood/Electricity
Mention if Any Other: _____
If cooking in Chullah: Normal/ Smokeless

12. Landholding (Acres)

1. Total	4	2. Cultivable Area	
3. Irrigated Area	4 acres	4. Uncultivable Area	

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	Yes
Sharecropping /Farming Leased Land	–
Animal Husbandry	✓
Pisciculture	–
Fishing	–
Skilled Wage Worker	–
Unskilled Wage Worker	✓
Salaried Employment in Government	–
Salaried Employment - Private Sector	–
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/ River	
Drip or Sprinkler Irrigation: Drip /Sprinkler / None	

16. Agricultural Produce in a normal year (Top 3)

Name	Unit	Quantity
Sugarcane		101 Tone

17. Livestock Numbers

Cows: 4	Bullocks: 4	Calves:
Female Buffalo: 4	Male Buffalo:	Buffalo Calves:
Goats/ Sheep: 3	Poultry/ Ducks:	Pigs:
Any other: Type		No.
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): 10 / day		

18. What games do Children Play

19. Do children play musical instrument (mention)

Schedule Filled By:
Principal Respondent:
Date of Survey:

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

I. Basic Information

a. Gram Panchayat: Vadhava.
b. Block: Bardoli
c. District: Surat
d. State: Gujarat.
e. Lok Sabha Constituency: Gujarat.
f. Number of Wards in the Gram Panchayat: 8
g. Number of Villages in the Gram Panchayat: 1

h. Names of Villages:

Demographic Information

Number of Households 250. Total Population 1241 Male 563 Female 678

SC HHs _____ 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	Madhi
b.	Nearest Primary Health Centre (PHC)	N	Madhi
c.	Nearest Community Health Centre (CHC)	N	Madhi
d.	Nearest Post Office	N	Madhi
e	Nearest Bank Branch (Any)	N	Bardoli
f.	Nearest Bank with CBS Facility	N	Bardoli
g.	Nearest ATM	N	Madhi
h.	Nearest Primary School	1	
i.	Nearest Middle School	4	
j.	Nearest Secondary School	N	Madhi
k.	Nearest Higher Secondary School / +2 College	N	Madhi
l.	Nearest Graduate College	N	Madhi
m	Nearest ITI / Polytechnic Centre	N	Madhi
n	Kisan Seva Kendra	N	Madhi

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	khoj
p	Nearest Agro Service Centre	N	khoj
p	MSP based Government Procurement Centre	N	Karcachaka
q	Milk Cooperative /Collection Centre	N	Karachaka
r	Veterinary Care Centre	N	Karachaka
s	Ayurveda Centre	N	khoj
t	E – Seva Kendra	N	Karachaka
u	Bus Stop	N	khoj
v	Railway Station	N	Karachaka
w	Library	N	Karachaka
x	Common Service Centre	N	Karachaka

IV. Sports Facilities in the Gram Panchayat

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

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 2

b. Number of villages without Angan Wadi Centres –

Names of such villages: _____

c. Schools (Number)

Primary Private: – Primary Govt.: 1

Middle Private: – Middle Govt.: –

Secondary Private: – Secondary Govt.: –

Higher Secondary Private: – Higher Secondary Govt: _____

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention)	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)	–	–	Yes	–	–	Boradli	
b.	Kerosene	–	–	No	–	–	–	–
c.	Other (mention)	–	–	Sugar, Salt	–	–	–	–

2

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

VII. Coverage of Villages under different Facilities & Services

	Parameter	Villages Status[1]	Names of Villages Covered	Names of Villages not Covered
a.	Piped Water Supply Coverage to Villages	Covered ✓ / Not Covered	Utara.	Null
b.	Hand Pump Coverage in Villages:	Covered Null / Not Covered Null.	Null	Null
c.	Coverage under Covered Drains:	Covered Yes. / Not Covered	Utara	Null
d.	Coverage under Open Drains:	Covered Null / Not Covered	Null.	Null
e.	Villages with Household Electricity Connection (Numbers)	Connected 500. / Not Connected		

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	2511.	d.	Pasture / Grazing Land	-	g.	Check Dam	-
b.	Irrigated Land	-	e.	Forests/ Plantations	-	h.	Wells/Bore Wells	-
c.	Un-irrigated Land	03752	f.	Other Common Land	7362	i	Tanks /Ponds	-

[1] Mention the number of Villages Covered and Not Covered

3

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	0
b)	Number of Households receiving pension (old age, widow, disability)	0
c)	Number of eligible Households who are not receiving pension	~~15~~ 5
d)	Number of Households eligible for Ration Card	0.
e)	Number of eligible HHs having ration cards	261.
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	0
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	0
h)	Number of active Job Card holders under MGNREGA	0.
i)	Number of Job Card holders who completed 100 days of work during 2013-14	0
j)	Number of shops selling alcohol	0
k)	Number of BPL families	115
l)	Number of landless households	0
m)	Number of IAY beneficiaries	.0
n)	Number of FRA[2] beneficiaries	0
o)	Number of Community Sanitary Complexes	0
p)	Number of Households headed by single women	10
q)	Number of Households headed by physically handicapped persons	0
r)	Total number of Persons with Disability in the village	0
s)	Number of SHGs	0
t)	Number of active SHGs	0
u)	Number of SHG Federations	0
v)	Number of Youth Clubs	~~Null~~ 0
w)	Number of Bharat Nirman Volunteers	0

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey
		સરપંચ વધાવા ગ્રામ પંચાયત તા. બારડોલી, જિ. સુરત	22/02/2021

[2] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

4

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

This questionnaire should be filled for each of the villages in the selected Gram Panchayat[1]

I. Basic Information

a. Village: Vadhava

b. Ward Number: 7

c. Gram Panchayat: Vadhava

d. Block: Bardoli

e. District: Surat

f. State: Gujarat

g. Lok Sabha Constituency: Bardoli

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

i. Names of Habitations / Hamlets:

Demographic Information

Number of Households 267 Total Population 1211 Male 563 Female 648

SC HHs _____ 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	
b.	Nearest Middle School	Y	
c.	Nearest Secondary School	N	Khaj
d.	Kisan Seva Kendra	N	khaj
e.	Milk Cooperative /Collection Centre	N	khaj
g.	Health Sub Centre	N	Karachaka
h.	Bank	N	Bardoli
i.	ATM	N	Karachaka
j.	Bus Stop	N	Karachaka
k.	Railway Station	N	Bardoli

[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	Kosadhoka.
m	Common Service Centre	N	Kosadha bej
n	Veterinary Care Centre	N	Kosadha bej.

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: 1

iii. Drinking Water Facilities

a.Piped Water Supply Coverage to Habitations: All *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:

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

If 3 mention the name of the habitations not covered:

b. Coverage under Open Drains: None *(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: None.

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: All

b.Coverage under Street Lighting: All*(1-All 2-None 3-Some)*

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

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): 2

b.Mini Stadium : N Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 2

c. Schools (Number)

Primary Private: 1 Primary Govt.: -

Middle Private: - Middle Govt.: -

Secondary Private: - Secondary Govt.: -

Higher Secondary Private: - Higher Secondary Govt: -

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	2577	d.	Pasture / Grazing Land	-	g.	Check Dam	-
b.	Irrigated Land	-	e.	Forests/ Plnatations	-	h.	Wells/Bore Wells	-
c.	Un-irrigated Land	3452	f.	Other Common Land	1962	I	Tanks /Ponds	-

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	Null
2	Number of active Job Card holders who have completed 100 days of work	Null
3	Number of shops selling alcohol	Null
4	Number of BPL families	115
5	Number of landless households	Null
6	Number of IAY beneficiaries	Null
7	Number of FRA beneficiaries	Null
8	Number of common sanitation complexes	Null
9	Number of SHGs	Null
10	Number of active SHGs	Null
11	Existence of SHG Federation in the Village (Yes / No)	Null
12	Number of Youth Clubs	Null
13	Number of Bharat Nirman Volunteers	Null

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey
	સરપંચ વઘાવા ગ્રામ પંચાયત તા. બારડોલી, જિ. સુરત		22/02/2021

CHAPTER 20

TDO-DDO-Collector email sending Soft copy attachment in the report

9/9/21, 12:03 PM SNPIT & RC College Mail - Development scenario of Vadhava village,Bardoli,Surat.

SNPIT&RC

sandip mistry <sandip.mistry@snpitrc.ac.in>

Development scenario of Vadhava village,Bardoli,Surat.

1 message

sandip mistry <sandip.mistry@snpitrc.ac.in> Thu, Sep 9, 2021 at 12:03 PM
To: tdo-bardoli@gujarat.gov.in, ddo-sur@gujarat.gov.in
Cc: Vishwakarma Yojana <rurban@gtu.edu.in>

Respected Sir/Madam

I am professor Sandip K. Mistry from S.N. Patel Institute of technology & R.C. Our B.E. final year students of Shree Sitaram Naranjibhai Patel Institute of Technology and Resreach Center,Umrakh,Baradoli,Surat affiliated to Gujarat Technological University-GTU. GTU has been assigned to Vishwakarma Yojanaa-VY in which students survey various villages and Designs various amenities To Deliver it to them making them ideal for living better life as per requirements & village problem statements.

As a part of Vishwakarma Yojana's guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about **Vadhava Village** profile of issues for development and our design work for them which is as below.

Village : Vadhava		**Population: 1211(As of Census 2011)**
Key Issue	**Remark**	**Design Given**
Water Scarcity	Water storage capacity of ESR-UG is enough but supply at the household is not enough to commence daily needs, here water is supplied every other day for nearly half an hour. Canal is there for irrigation water. Water can't be bored due to salinity of ground water.	· Biorock Treatment Plan
Solid Waste Management	Open waste disposal can be seen everywhere in the village.	· Waste utilization through composting (due to farming is one the main occupation)
Toilet	Almost 90% have household toilet , under SBA toilet was needed.	· Low cost Toilet
Recreational Area	Currently only Village does not have any recreational place except for one temple near gamtal.	· Post office · Bank · Milk Dairy · Agriculture storage room · Library · Cyber café
Community Place	Grampanchayat faces difficulties in conducting gramsabha, village does not have any place for gatherings or for celebration.	· Skill Development center · Funeral home · Primary shop · Party plot

SR. No.	Design Name	Period (Months)	Amount Expenditure	Benefits
1	Post Office	9	632969	Recreational area
2	Low cost Toilet	2	1515	Sanitation
3	Skill Development center	2	531739	Skill Person develop
4	Library	3	446363	Educational growth

5	Biorock Treatment Plan	3.5	250000	Economic Sewage treatment & irrigation water
6	Party plot with plastic block	1	575532	Refreshment purpose
7	Agriculture storage room	2.5	426098	storage purpose
8	Cyber café	1	3726687	knowledgeable thing
9	Funeral home	3	724027	Function purpose
10	Primary shop	1.5	92061	equipment
11	Milk Dairy	12	506199	easy to get milk
12	Bank	3	369742	financial purpose

Please find herewith attached,
1. Detailed Project Report Of VADHAVA Village.

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Mr. Sandip K. Mistry
Assistant Professor,
Civil Engineering Department,
S.N.P.IT& R.C,Umrakh,
Bardoli.
9428380875

VADHAVA_SNPITRC_VY-8_PART-2.pdf
14272K

CHAPTER 21

Comprehensive report for the entire village:

An ideal Indian village will be so constructed as to lend itself to perfect sanitation. It will have cottages with sufficient light and ventilation built of a material obtainable within a radius of five miles of it. The cottages will have courtyards enabling householders to plant vegetables for domestic use and to house their cattle. The village lanes and streets will be free of all avoidable dust. It will have wells according to its needs and accessible to all. It will have houses of worship for all, also a common meeting place, a village common for grazing its cattle, a co-operative dairy, primary and secondary schools in which industrial education will be the central fact, and it will have Panchayats for settling disputes. It will produce its own grains, vegetables and fruit, and its own Khadi. This is roughly my idea of a model village. In the present circumstances its cottages will remain what they are with slight improvements. Given a good zamindar, where there is one, or co-operation among the people, almost the whole of the programmer other than model cottages can be worked out at expenditure within means of the villagers including the zamindar or zamindars, without Government assistance. With that assistance there is no limit to the possibility of village reconstruction. But my task just now is to discover what the villagers can do to help themselves if they have mutual co-operation and contribute voluntary labour for the common good. I am convinced that they can, under intelligent guidance, double the village income as distinguished from individual income. There are in our villages' inexhaustible resources not for commercial purposes in every case but certainly for local purposes in almost every case. The greatest tragedy is the hopeless unwillingness of the villagers to better their lot.
The very first problem the village worker will solve is its sanitation. It is the most neglected of all the problems that baffle workers and that undermine physical well-being and breed disease. If the worker became a voluntary Bhangi, he would begin by collecting night-soil and turning it into manure and sweeping village streets. He will tell people how and where they should perform daily functions and speak to them on the value of sanitation and the great injury caused by its neglect. The worker will continue to do the work whether the villagers listen to him or no. Harijan, 9-1-1937

According to Census 2011 information the location code of Ninat village is 510668. Ninat village is located in Surat district in Gujarat, India. It is located 22km away from Bardoli, which is sub-district of Ninat village. The geographical area of village is 2015.48 hectares. Ninat has a total population of 5100 peoples. There are about 1199 houses in Ninat village. Modasa is nearest town to Ninat which is approximately 27km away.

The social dimension supports the social development of poor and low-income households, promotes gender equality and women's empowerment, and provides social safety nets for vulnerable groups. The political dimension improves the opportunities for the poor and low-income people in rural areas to effectively and equally participate in the political processes at the village level.

The village plays an important role in maintaining the ecological balance as it is a place which is covered by greenery which overcomes the green cover which is less in the cities, and it is a shelter for various animals. Everyone loves their village as they enjoy living in that village and

they also like the environment which is present in the town. The village is a very peaceful place where there is very little noise which makes a suitable environment for old people.

The overall goal of our Village Development work is that people in poor rural villages have access to their most basic needs, improved education and health, and a means of sustaining their livelihoods and increasing their standard of living. More specifically, they have access to clean, safe drinking water within or near their homes. Sufficient lighting in their homes. A safe and adequate shelter that withstands the elements.

That why we provided the design which is help to live there life. Also we provided the estimated of construction cost, also we provide the plan of the design to easy to build the structure. Thereis the civil engineering designs are:-

1. POST OFFICE
2. LOW COST TOILET
3. SKILL DEVELOPMENT CENTER
4. LIBRARY
5. BIO-ROCK WATER TREATMENT PLAN FOR SCHOOL
6. PARTY PLOT WITH PLASTIC BLOCK
7. AGRICULTURE STORAGE ROOM
8. CYBER CAFÉ
9. FUNERAL HOME
10. PRIMARY SHOP
11. MILK DAIRY
12. BANK

Also we design the electrical design which can help in the living and agriculture use. There is the Electrical engineering design:

1. **AUTO IRRIGATION SYSTEM USING SOIL MOISTURE SENSOR AND PIC**
2. **FIRE ALARM**
3. **EARTH FAULT DETECTOR FOE ELECTRICAL CABLE**

For this all design we refer the some form to which design or element required the village. Then we plan the design. We plan the design and the we calculated the estimate cost and then give the approximate time to build the design.