DETAIL PROJECT REPORT

VISHWAKARMA YOJANA: VIII
AN APPROACH TOWARDS RURBANISATION
VAGUDAD Village
RAJKOT District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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Atmiya Institute of Science and Technology

NODAL OFFICER NAME
Prof. Devang M. Sarvaiya

YEAR:2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda,Ahmedabad– 382424 Gujarat

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Chandkheda, Ahmedabad – 382424 Gujarat.

CERTIFICATE

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

Detail Project Report for,
VILLAGE: Vagudad
DISTRICT: Rajkot

Under

Vishwakarma Yojana: Phase-VIII

In partial fulfillment to the project to offered by
GUJARAT TECHNOLOGICAL UNIVERSITY,CHANDKHEDA
During the academic year 2020-21.

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

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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College Name:	**Atmiya Institute of Technology and Science**
College Stamp:	

ABSTRACT

Vishwakarma yojana is provide the benefits of real work experience to engineering students and simultaneously apply their technical knowledge in the development of infrastructure in rural development. The students and Faculty Members meet all the stake-holders in a village, survey the existing facilities. Then they re-imagine and re-design the whole of the infrastructure of the village.

The students use their engineering skills to prepare detailed project reports for the infrastructure as a part of their Final Year project work. Through the Yojana, the students of GTU are getting real work experience and are able to apply their technical knowledge and practices to a real problem.

According to Census 2011 information Vagudad village is located in Lodhika Tehsil of Rajkot district in Gujarat, India. It is situated 16km away from district headquarter Rajkot. As per 2009 stats, Vagudad village is also a gram panchayat.

The total geographical area of village is 715.26 hectares. Vagudad has a total population of 797 peoples. There are about 142 houses in Vagudad village. Rajkot is nearest town to Vagudad which is approximately 16km away.

Main occupation of village is farming.There is closed type of drainage system in Vagudad. 80% of the houses are pucca while 20% of the houses are kutcha. There is one Primary school and one anganwadi. Village is connected with 24-hour electricity supply for residential.
There are many facilities which are lack in Vagudad village like health center, proper roads, govt. hospital, solid waste management plant, bus station community hall, and recreational centers.

We are given design to sustainable facilities such as Green house, Community hall, bore well etc...

By studying the current status and techno-economic survey of Vagudad village in Rajkot district of the 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 the area with the discussion of TDO, DDO and Sarpanch will help full in providing better facilities and services in village.

From the gap analysis, development plans for village development will be projected and planning proposals for Physical infrastructure, Social Infrastructure and Renewable Energy Source will be suggested for the village. The study will concentrate on the development of the village.

Key Words: rural development, physical amenities, sustainable development, reduce migration

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.

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

i. Background: -

- Raj Samadhiyala is located 22 kms away from Rajkot district.
- Nearly available village is Tramba which is 7 kms far and Sardhar is around 6.5 kms.
- There are no any political parties available in the village.
- The village is located nearer to Rajkot Bhavnagar highway.
- Village has total 48 check dams in which 41 constructed by village people and 7 lakes constructed with help of ISRO.

ii. Study Area Location: -

- Name: Raj Samadhiyala
- District: Rajkot
- State: Gujarat
- Language: Guajarati, Hindi, English
- Time zone: UTC/GMT +5:30hr.

Fig no: 1Top view of village

1.2 Concept of ideal village

The ideal village has good system of sanitation and drainage. Because filth and waste of the village should be recurrently maintained and removed away into the compost pits. An ideal village has very good drain system so that the polluted water of village is properly drained away and maintained clean.

- **House: -**
  The abode /house in an ideal village are very tidy and clean. The owners of these houses look to the house hygiene and house-drainage. The houses have sufficient windows to let in air and light.
- **Agriculture: -**
  People are well known about lasted technology for sowing and harvesting.
- **Educational facilities: -**
  There are Primary schools and High schools in an ideal village. Primary education is free and compulsory.

- **Medical facilities: -**
  In an ideal village, there are clinical facilities for villagers and animals. Hence, there are lots of dispensaries
- **Other facilities: -**
  We can find post-office, public library, playground, garden, Skill Development Centre etc… there.
- **People:-**
  People of an ideal village are very neat and clean. They have a sense of discipline and collaboration. They have a spirit of service and let go.
- **Conclusion: -**
  An ideal village makes all possible provision for development of her people. It is our main duty that we should develop every village of India to much higher level. The idea of an ideal village will certainly help us in discharge our duty.

1.2.1 Objectives

- To make the replica village a "hub" that could attract supply for the growth of different villages in it is locality.
- To Generate & maintain a society of co-operative living for wide-ranging and swift development.
- To contribute towards social empowerment by attractive all section of group of people in the task of rural development.
- To provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages.
- To contribute towards social empowerment by engaging all sections of the community in the task of village development.

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

Table 1: Live Case Studies of Ideal Village

Name	**Raj Samadhiyala**
District	**Rajkot**
State	**Gujarat**
Language	**Gujarati, Hindi, English**
Time zone	**UTC/GMT +5:30hr**
Pin code	**360490**
Lat/Long	**22'18'N/70'48'E**

1.2.3 The Idea of a model/Smart Village

- The ideas of "smart village" will also attention to multiple challenges such as unplanned urbanization, under development of village and smart villages. In smart village access sustainable energy services acts as a catalyst for development –enabling the provision of good education and health care, access to clean water, sanitation and nutrition, the growth of productive enterprise to boost income and enhanced security.

1.2.4 Ancient History of Civil

- The discovery of urban settlements of Mohenjo-Daro and Harappa indicate existence of civil engineering & architecture, which blossomed to a highly precise science of civil engineering and architecture and found expression in innumerable monuments of ancient India.

- Several sump pots and latrines built one above the other were uncovered on Mound ET at Harappa (now in Pakistan).

Fig no:2 Harappa

- Flush toilets were first used in the Indus Valley Civilization. These existed in most homes and were connected to a sophisticated sewage mechanism. The civilization was prominent in hydraulic engineering

Fig no:3 Indus Valley Civilization

- Bhakra Dam is a concrete gravity dam across the Sutlej River, and is in Bilaspur, Himachal Pradesh in northern India. The dam, located at a gorge near the (now submerged) upstream Bhakra village in Bilaspur district of Himachal Pradesh, is India's second tallest at **225.55 m** (740 ft.) high next to the **261m** Tehri Dam.

Fig no:4 Bhakra Nagad Dam

1.3 Detail study of Ideal village / Smart Village

- **Social scenario: -**

The population of village is record as 1758 n 2001. After 10 years it will decrease and reach 1467 in which male have 732 and 735 females. In this village, there is about ten different class of cast category.

- **Economic profile:-**

Education in raj samadhiyala is more that 95% of total population. The average annual income of village is 45 lakes. Main business of village is agriculture land. All people of village are pays regularly text to the grampachayat. In last there one shakarimandali which is give lone at low interest to farmers.

- **Physical & Demographical profile:-**

- Total area of village is 1089 hectors.
- As per 2011 census total population is 1467 which includes 732 male and 735 females.
- There are about 250 houses in the village.

- **Infrastructure detail:-**

- Water supply
- Bank
- Transportation facilities
- Hospital
- Education facilities

Fig no:5 Anganwadi

Fig no:6 Play ground

Fig no:7 Bio gas plnt

Fig no:8 CCTVcamera

Fig no:9 Street light

Fig no:10 Water Harvesting

1.4 SWOT analysis of Ideal village / Smart Village

Table 2: SWOT analysis

Strength	Weakness	Opportunities	Threats
Proper drainage facilities	No cinema hall or recreational facilities	To make whole village digital and Wi-Fi connected	Lack of awareness of villagers about educations
Transportation facilities	No public library	To rise the living standards of people	Lack of funds and technical knowledge in agricultural fields
Sanitation facilities	Layout of village	Improving in waste management	Education awareness
Communication hall	No facilities for higher secondary education	To increase education facilities	-

1.5 Future prospects of village:-

- For future prospect, the village raj samadhiyala can use more advanced technologies for agricultural prospect and for other requirements also.
- As prospects view, village can use more modern equipment and technology for agriculture point.
- Free WI-FI system improves the knowledge of people and gives result as a more awareness about all type of problems.
- It can also provide industrial area over the boundary of village.

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

- 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.
- To improvement allocated village
- To understand allocated village condition.
- We got ideas like which terms make it ideal village, which type of facilities available and how the management system of village was working as well react on some of problems.

Chapter 2: Literature Review

2.1 Introduction:-

- **Urban:-**
  An urban area is the region surrounding a city. Most people of urban areas have non-agricultural jobs. Urban areas are very developed, meaning there is a density of human structures such as houses, commercial buildings, roads, bridges, and railways. "Urban area" can refer to towns, cities, and suburban. According to census 2011, there are 7,935 towns, 4,041 statutory town and 3,894 census towns.
- **Rural**
  All the areas which are not characterized as urban area is called rural area. In which the population is very low compared to urban areas. Mainly they depend on agricultural activities. According to census 2011, there are 6, 40,867 villages in India. The area where more than 75% of male population is associated with agricultural activity is known as rural area.

Fig.-11: Urban Area

Fig.-12: Rural Area

2.2 Importance of the Rural development:-

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

2.3 Ancient Villages / Different Definition of: Rural Urban Villages:-

- **Rural:-**

- ✓ **United states census (2000 census):-**
- ✓ A rural area as comprising open country and settlements with fewer than 2500 residents' areas designated as rural can have population densities as high as 999 per square mile as 1 person per square mile.
- ✓ **United states development of agriculture (2002 form bill):-**
- ✓ A rural area as any area other than a city or town that has a population of greater than 50,000 inhabitants and the urbanized areas contiguous and adjacent to such town or a city.
- ✓ **National geographic society:-**
- ✓ A rural area is an open swath of land that has few homes or other buildings and not very many people.

➢ **Urban:-**

- ✓ **National geographic society:-**
- ✓ "Urban area" can refer to towns, cities, and suburbs. An urban area includes the city itself, as well as the surrounding areas. Many urban areas are called metropolitan areas, or "greater," as in Greater New York or Greater London.
- ✓ **United states census(2000 census):-**
- ✓ An urban area as "core census block groups or blocks that have a population density of at least 1,000 people per square mile (386 per square kilometer) and surrounding census blocks that have an overall density of at least 500 people per square mile (193 per square kilometer)"

2.4 Scenario: Rural / Urban village of Indian population growth: -

➢ **INDIA**

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

Table 3: Population of Rural and Urban Areas as Per Census 2001 And 2011

INDIA	2001	2011	DIFFERENCE
RURAL	74.3	83.3	9.0
URBAN	28.6	37.7	9.1

- Rural-Urban Distribution: 68.84% & 31.16
- Level of urbanization increased from 27.81% in 2001 census to 31.16% in 2011.

Table 4: Literacy Rates of Rural and Urban Areas as Per Census 2001 And 2011

INDIA	2001	2011	DIFFERENCE
RURAL	58.7	68.9	+10.2
URBAN	79.9	85.0	+5.1

- Literacy Rates (in %)
- The improvement in literacy rate in rural area is two times that in urban areas.

- The rural urban literacy gap which was 21.2% points in 2001, has come down to 16.1% points in 2011

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

- Total population 60,439,692
- Total population of male: - 31,491,260
- Total population of female: 28,948,432
- Total population growth in decade is 19.28%
- Out of total population of Gujarat, 42.60% people lives in urban region and rest in rural

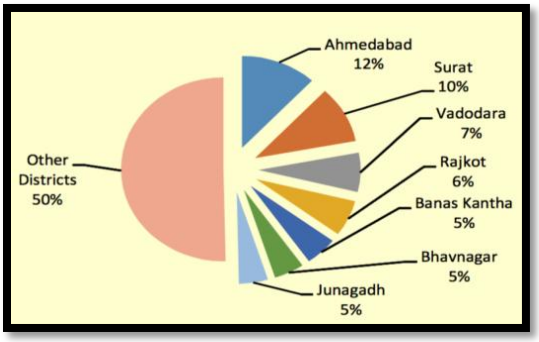


Fig.-13: Population In %

Table 5: Demographic Data of Gujarat As Per Census 2011

Description	Rural	Urban
Population	57.14	42.60 %
Total Population	34,694,609	25,745,083
Male Population	17,799,159	13,692,101
Female Population	6,895,450	12,052,982
Population Growth	9.31 %	36.00 %

2.6 Rural Development Issues - Concerns –Measures:-

➢ **Issues & Concerns**

- People are directly or indirectly dependent on agriculture and a large number of landowners have small and medium-sized landholding.
- Economy of the people living in rural areas is low.
- The price the farmers get for their produces less than in relation to the work they put in
- People have to migrate to the urban areas due to unavailability of education.
- The other rural problems are due to the fact that since the rural people do not live-in concentrated masses, the availability of specialized service to them is minimum.
- Very less people are employed in the rural areas.
- Lack of physical facilities in rural areas.
- Lack of recreational facilities.

- Market unavailable.

➢ **Measures**

- Sustainable development.
- Higher living standards.
- Enough basic physical amenities.
- Sanitation facilities.
- Higher education.
- More job opportunities.
- You can get support for improving the environment.
- You can be compensated for poor farming conditions.

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

Table 6: Various Infrastructure & Guidelines for Village.

Facilities	Planning commission norms	Required as per norms
	Education	
Anganwadi	Each village	**1**
Primary school	Each village	**1**
Secondary school	Each village	**2**
Higher Seconday school	Per 15,000 Population	**0**
College	Per 125,000 Population	**0**
Tech.Training Institute	Per 100,000 Population	**0**
Agriculture Research Center	Per 100,000 Population	**0**
	Medical Facility	
Gov./Panchayat Dispensary or Sub PHC or Health Centre	Each village	**1**
PHC & CHC	Per 20,000 Population	**0**
Child Welfare and Maternity Home	Per 10,000 Population	**1**
Hospital	Per 100,000 Population	**0**

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

- Land, water and forests are the primary resources of agricultural production, and are the capital vital to maintain human life and well-being. The use of these resources must be evenhanded with conservation to hold sustained national development, and to avoid environmental dilapidation and losses in agricultural productivity. The natural resource base provides many benefits to different groups of people in both urban and rural areas.
- Recent demographic pressures have changed the way that people use land, water and forests, and have contribute to a rife deterioration in the condition and productivity of these resources.
- In developing countries, population growth, migration, and resettlement are changing how people use land, and where they settle.

2.9 Other Projects / Schemes of Gujarat / Indian Government:-

- **MGNREGA:** (Mahatma Gandhi National Rural Employment Guarantee)

- MGNREGA Launched on 2nd February 2006 as a momentous initiative towards pro-poor growth. For the first time, rural communities have been given not just a development program but also a regime of rights. The National Rural Employment Guarantee Act, 2005 (NREGA) guarantees 100 days of employment in a financial year to

- **PMGSY:** (Pradhan Mantri Gram Sadak Yojana)

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

- **IAY:** (Indira Awas Yojana)

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

- **PPP:** (Public-Private-Partnership)

- Public-Private-Partnership or PPP is a mode of implementing government programmes/schemes in partnership with the private sector. The term private in PPP encompasses all non-government Agencies such as the corporate sector, voluntary organizations, self-help groups, partnership firms, individuals and community-based organizations, PPP, moreover, subsumes all the objectives of the service being provided earlier by the government, and is not intended to compromise on them. Essentially, the shift in emphasis is from delivering services directly, to service management and Coordination. The roles and responsibilities of the partners may vary from sector to sector. While in some schemes/projects, the private provider may have significant involvement in regard to all aspects of implementation; in others s/he may have only minor role.

Chapter 3: Smart (Cities/ Village) Concept Idea and its Visit

3.1 Introduction: Concepts, Definitions and Practices

In Smart Villages access to sustainable energy services acts as a catalyst for Development enabling the provision of good education and healthcare, access to clean water, sanitation and nutrition, the growth of productive enterprises to boost Incomes, and enhanced security, gender equality and democratic engagement.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

- **Smart City Vision**

❖ Urbanization is a growing trend. As more and more people gather together, smart systems and their integration need to be developed, not just to provide the necessary services to the people, but to do so effectively with the minimal impact on the environment.

- **Goals**

❖ Provide basic amenities as well as sustainable and smart infrastructure and increasing citizen's accountability towards it.

❖ Identify the transport facility and need resident and business group of people and advantage technology can be used to address problems of safety and other facility.

❖ Improved quality of life through improved physical and social infrastructure and clean and green environment.

❖ Safer city for all groups and sections of the city.

- **Smart Cities Standards:**

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

1. Strategic:-

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

✓ ISO 37101: Sustainable development & resilience of communities – Management systems– General principles & requirement.

2. Process

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

- **Smart Cities Performance Measurement Indicators**

- **Information and Communication Technology:** Internet or Wi-Fi facility, mobile network, etc.
- **Environmental sustainability:** Air quality, CO2 emissions, Energy, Indoor pollution, water, soil and noise.

- **Productivity:** Capital investment, Employment, Inflation, Trade, Savings, Export/import, Household income/consumption, Innovation, Knowledge economy.
- **Quality of life:** Education, Health, Safety, Convenience and comfort
- **Equity and social inclusion:** Inequity of income/consumption, Social and gender inequity of access to services and infrastructure, Openness and public participation, Governance.
- **Physical infrastructure:** piped water, sewage systems, electricity, waste management, knowledge infrastructure, health infrastructure, transport, roads, and buildings.

3.3 Technological Options:

➢ **Digital libraries**

- Digital libraries in schools across the city. Some 13 schools in Delhi have been selected for this. 3D printing labs have been set up in 10 schools.

➢ **LED lights**

- LED lights to replace streetlights, pelican crossing, 3D zebra crossing, street furniture, Wi-Fi network, CCTV cameras and environment sensors. In Delhi, pilot on Mother Teresa Crescent road.

➢**Water ATM:**

- Water ATM is device to extract water from mini sewage treatment plants and use water for gardening, house cleaning, washing of cloths, etc

Fig.-14: Digital Libraries

Fig.-15: LED Light

Fig.-16: Water ATM

➢ **Book parking through your smartphone**

Mobile app to pre-book parking slots for better regulation of parking spaces. In Delhi, the work awarded has been awarded for the same.

➢ **Smart toilets**

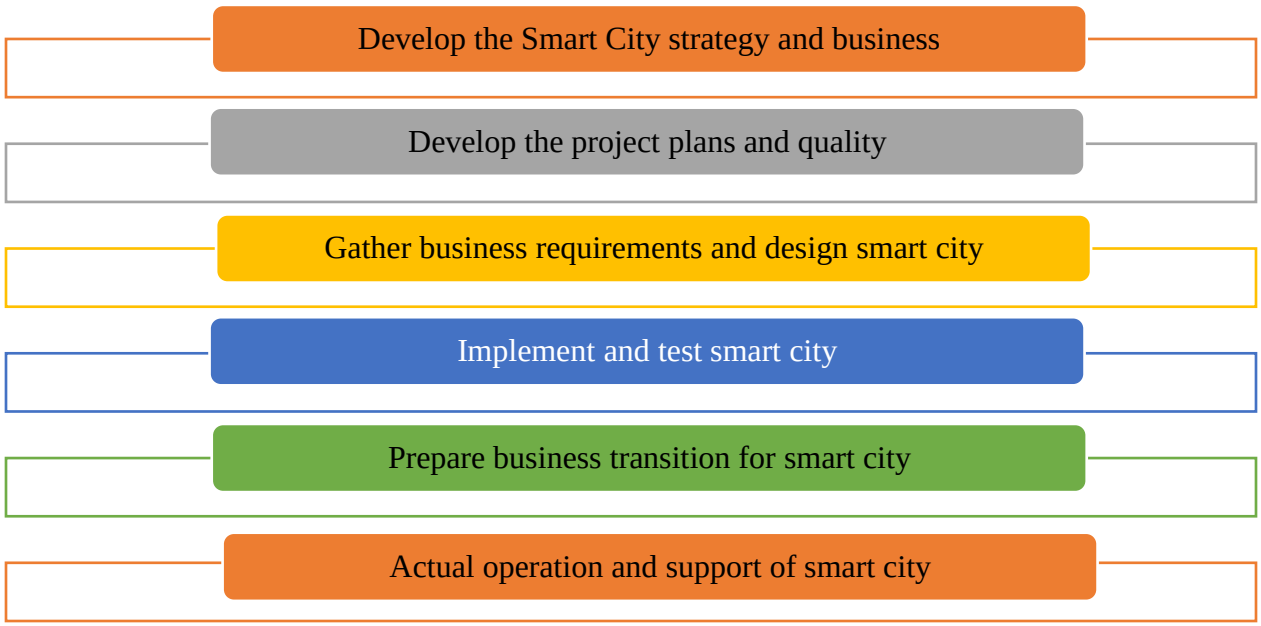
These smart toilets will have water ATM, vending machine and sanitary napkin vending machine.

Fig.-17: Book Parking

Fig.-18: Smart Toilet

3.4 Road Map and Safe Guards

Table 7: Road map and Safe guards



3.5 Issues & Challenges

➢ **Urban Water and Sanitation Challenges**

- More than 90% of the urban population has access to drinking water, and more than 60% of the population has access to basic sanitation.
- Indian city receives piped water 24 hours x 7 days a week.
- Less than 50% urban population has access to piped water.
- The Non-Revenue Water (NRW) means due to leakages, unauthorized connections, billing and collection inefficiencies, etc. is huge, estimated between 40-70% of the water distributed.
- Operations and maintenance cost recovery through user charges is hardly 30-40%.
- Most urban operations survive on large operating subsidies and capital grants**.**

➢ **Role of Indigenous Technologies**

- Businesses and governments are starting to recognize the role of technology in meeting the goals of urban infrastructure provisioning both today and in the long term.
- Dream of Smart cities can be achieved at accelerated pace with higher reliance on information and communications technology (ICT).
- The smart city transformation would be fueled by advance technology and the deployment of intelligence & information management systems.
- Digital disruptions including social media, mobility, Machine-to-Machine, Internet of Things, Big Data, and Cloud Computing will become the backbone of next generation smart cities.

➢ **Key Issues in development of Human Being**

- Ecosystem services
- Access to water.
- Food security.
- Health situation.
- Access to education.
- Sustainable livelihoods.

➢ **Education / Job Opportunity Development**

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

➢ **Governmental Issues**

- Government and policy makers are facing challenges such as increase in urban population from rural areas and huge gaps in infrastructure.
- Smart city would be a city with facilities like smart people, smart technology, smart energy, smart transportation, smart IT and communication and above all smart governance.
- This paper is an attempt to focus on the key issues and the challenges to develop new cities or improve the infrastructure facilities in our existing cities which are over populated and not properly managed.

3.6 Smart Infrastructure

- Smart infrastructure provides the foundation for all of the key themes related to a smart city, including smart people, smart mobility, smart economy, smart living, smart governance and smart environment. This section introduces some key components of smart city infrastructure and concludes by highlighting the need for an integrated approach in dealing with such infrastructure.

➢ **Intelligent Traffic Management**

- An intelligent traffic management system could help cities manage traffic flow more efficiently.
- Relevant technologies include 4G, 5G, low power wide area network (LPWAN), catering to the various end use applications that require different types of networks.
- Incumbents like Cisco and AT&T are providing cities with 4G and 5G services for traditional high bandwidth applications like traffic signal control, while startups like Sigfox and Activity have developed Low Power Wide Area Network (LPWAN) technologies to support the influx of low power sensors.
- Many cities have implemented some type of traffic management system upgrades – wireless networks, surveillance cameras, and connected streetlights – to improve their existing infrastructures.
- To implement a true advanced traffic management solution, it's far more complex than a single standalone technology, and requires a combination of connectivity, hardware, and software technologies to work together as one system.
- In addition to preparing for the next generation of transportation, one immediate benefit should be the reduction of emissions by reducing idling and sitting in traffic.
- A few illustrative examples of recent pilot programs being implemented in cities are listed below:

Fig.-19: Recent Pilot Programs

3.7 Cyber Security or any other concept:-

➢ **Cyber Security**

- Hybrid cloud workload protection platforms (CWPP) provide information security leaders with an integrated way to protect these workloads using a single management console and a single way to express security policy, regardless of where the workload runs.

➢ **Smart Data Centre**

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

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling:-

➢ **Green Buildings**

- Using sustainable building materials like recycled glass and steel, as well as renewable materials like bamboo and rubber.
- Installing energy-efficient windows and doors
- Using lower-VOC (volatile organic compounds) like paints and others.
- Constructing green roof systems that offer many benefits, including onsite gardens, rainwater management and protection from the effects of harmful UV light.
- Adding water harvesting and purification systems that don't just manage, but also make the most use of rainfall.
- Maximizing natural light, which cannot only save on energy costs, but can also help keep buildings warm in colder months.

➢ **District Cooling**

- District heating and Cooling Systems are a heat source plant that installs chillers and boilers for a group of neighboring buildings centrally for heating and cooling in district units.
- The cold water and hot water produced by the heat source plant is supplied to each building through regional pipes built inside the district to use for cooling and heating.

3.9 Strategic Options for Fast Development

- For developing smarter city, city and national leaders need to plan a comprehensive urbanization strategy, taking advantage of the latest developments in technology, creating employment opportunities, and supporting economic activities that will improve quality of life for citizens.
- Redevelopment will affect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density.
- Greenfield development will introduce most of the Smart Solutions in a previously vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision for affordable housing, especially for the poor.

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

➢ **Technologies**

- The government has taken various steps to create awareness among the masses for keeping the area surrounding them neat and clean.
- Swachh Bharat Abhiyaan was launched by Prime Minister of India on 2nd October 2015, which caught attention of everybody not only in India, but also in the world.
- Government is also paying special attention for cleaning of rivers, railway stations, tourist destinations and other public places.

➢ **Role of Indigenous Technologies**

- Bhabha Atomic Research Centre (BARC) has developed several water purification devices and desalination techniques, as a part of its research and development efforts towards the betterment of society. These technologies or products are backed by robust design concepts and pilot plant studies, which can cover the needs of households, communities, industries and metropolis.

- A novel idea of coating polysulfide on a porous candle resulted in the development of a "Point of Use" water purifier. Unlike other devices available in the market which only deactivates the micro-organisms, this device physically eliminates them. This device does not require any electricity or any addition of chemicals.
- Removal of suspended particulates, colour and odour are additional benefits available in these units. A typical unit provides nearly sufficient water per day at 3 meters pressure head and can withstand up to 40 psig pressure (2.76 bar).

3.11 Initiatives in village development by local self-government

- Transforming existing Indian cities into Smart Cities or building new ones is a colossal task. Cities need to be able to assess their current situation and determine the critical capabilities needed to enable a Smart City.
- In the past "government as provider" approach, the priorities were to secure budget allocations and develop projects.
- To help cities address these issues, the All-India Institute of Local Self-Government (AIILSG) is assisting Raipur, Bilaspur, Chandigarh, Karnal and Faridabad in preparing for the proposal for the nationwide City challenge being contested among 100 potential Smart Cities
- The Housing Policy and the NCU statement implicitly give higher priority to two other requirements
- The reform of policies and regulations that now inhibit development initiatives by the people
- More efficient resource management and the building of institutional capacity.

3.12 Smart Initiatives by District Municipal Corporation

- Urban India faces an enormous challenge: managing its gigantic load of solid waste.
- Recently Rajkot Municipal Corporation is taking a step for developing toward smart city.
- Its vision to develop Rajkot as smart, livable and iconic city of Gujarat with inclusive growth.
- Municipal incorporation occurs when such municipalities become self-governing entities under the laws of the state or region in which they are located. Frequently, this event is noticeable by the award or declaration of a municipal contract.

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

➢ **Sansad Adarsh Gram Yojana**

- Sansad Adarsh Gram Yojana is a rural development programme generally focusing upon the development in the villages and rural which includes social-infrastructure development, socio- cultural development.
- The programme was launched by the Prime Minister of India, Narendra Modi on the birth anniversary of Jayaprakash Narayan, on 11 October, 2014.

➢ **National Rural Health Mission**

- This mission serves health services to the poorest households in the remotest rural regions.
- The main aim of this mission provides accessible, affordable and good quality of health services to the rural household peoples.

➢ **Provision of Urban Amenities in Rural Areas**

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

➢ **Central Rural Sanitation Programme**

- This scheme aims at improving the quality of life of rural people and to provide privacy and dignity to women in rural areas.
- It led to the formulation of _Total Sanitation Campaign' approach in 1999.

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

- The so-called smart development of infrastructure is hardly strictly divided into two polarized sets of frameworks, rural and urban.
- Indian smart development, it is necessary to consider both spaces simultaneously, their mutual interconnections and take into account that significant changes in one will affect the other and another way around.
- Seen in the worldwide context, there are several initiatives promoting or using the concept of the Smart villages.
- Smart Village initiative: new thinking for off-grid communities worldwide and IEEE Smart Village: Empowering off-grid communities are both worldwide active and striving to meet the SDG 2030, especially goal 7, Affordable and Clean Energy.
- The first one promotes access to sustainable energy as a main catalyst for the development of good education and healthcare systems, access to clean water, sanitation, economic growth, enhanced security, gender equality, etc.
- The activities of the Initiative are taking place in six large regions, namely East Africa, West Africa, South Asia, South-East Asia, South America, and Central America, Caribbean, Mexico—the so-called developing world with limited possibilities to access (educational, electrical, economic and other) infrastructure.
- Smart development solutions were therefore mainly addressing the ways to create opportunities for local employment and alleviate the living conditions.

Chapter 4: Vagudad

4.1 Introduction

4.1.1 Introduction About Vagudad

- Vagudad is a Village in Lodhika Taluka in Rajkot District of Gujarat State, India.
- It is located 15 KM towards west from District headquarters Rajkot. 4 KM from Lodhika. 269 KM from State capital Gandhinagar.
- Vagudad Pin code is 360004 and postal head office is Rajkot Postal Colony.

4.1.2Justification/ need of the study

- In India there are 640 districts, (200 backward) 6,50,000 villages (1,25,000 backward)The Government takes responsibility for uplifting rural and poorer regions.
- There is lot of public spending to improve the infrastructure, water and sanitation in these areas.
- But not much improvement achieved in most of the villages. Vishwakarma Yojana helps in better and fast development of rural areas.
- By providing urban facilities in rural areas, decrease this rate of migration & also increase standard of living of people of rural areas.
- The basic need of this study is to provide facilities in the villages for the Rurban
- Development. Implement the different Physical and Social infrastructural facilities in the
- villages and to lessen the urban migration of people of the village.
- So, for this purpose information of village is to be collected like Drainage Facility, Education Facilities, Health Facilities, Transportation Facilities, Banking Facilities, and Public Toilets etc.

4.1.3Study Area

- From techno economic survey of Vagudad village we observe some physical and social facilities are batter like underground drainage, cement concrete road, primary school, and anganwadi.
- In the village lack of basic facilities like public toilet, community hall, public garden, general market, public library.

4.1.4Objectives of the study

- To study the existing facilities and parameters of village.
- To identify the issues and problems of the ―village.
- To analyze existing social and physical utilities as well as infrastructure.
- To Design and planning for village basic facilities and needs.
- To collect socio-economic data through techno-economic survey.
- To propose the inclusive planning suited for ideal village.

4.1.5 Scope of the Study

- To reduce urban city pressure and lower the migration rate.
- Due to providing urban facilities development of village will be possible.

- To improve health and livelihood of people.
- To improve education facility.

4.1.6 Methodology Frame Work for development of your village

Introduction of Vishwakarma Yojana (Phase VIII)

Ideal and Smart village visit for TECHNO- ECONOMIC SURVEY

GTU allotted village visit TECNO - ECONOMIC SURVEY

Meeting with sarpanch and Talati Mantri of village Vagudad

Meeting with village dwellers of Vagudad

Collection of data for physical, social, socio-cultural and other facilities available in village.

Find out problems in existing facilities and proposal for required facilities for development of village

Design proposal for physical and sustainable development

Literature review (Prepare Project)

4.1.7 List of Objects Available related to Civil methodology

- Green house
- Renovation of Grampachayat
- Bore well in cremation
- Water tank

4.2 VAGUDAD Study Area Profile

4.2.1 Study Area Location with brief History land use details

➢ **Study Area Location**

- The Vagudad village is situated in the Rajkot district with district code number 476.
- The gram panchayat for this village is Vagudad and its gram panchayat code is 000014. Lodhika is the Sub-district headquarter of this village and it is situated 16 kilometers away from this village.
- The district headquarters' name is Rajkot and as per distance concern it is 16 kilometers from the Vagudad village.

➢ **Land use details**

- We are observing different types of facility in Vajdi (Virda) Village by using techno economy survey and interaction with village Sarpanch, Talati Mantri and dwellers. The various facility and infrastructure are listed below:
- Primary School
- Grampachayat
- Temple

4.2.2 Base Location Map, Land Map, Gram Tal Map

Fig.-20: Base Location Map

4.2.3 Physical & Demographical Growth

Table 8: Physical & Demographical Growth

Total Households		**142**
Total Vagudad Village Population		797
Total Male Population		416
Total Female Population		381
Sex Ratio		109.18635170604

4.2.4 Economic Generation profile / Banks

- The major population of Vagudad village is Farming and other some people is doing business and services.
- Some people are engaged with labor work.

4.2.5 Actual Problem faced by Villagers and smart solution

Table 9: Problem Faced By Villagers and Smart Solution

Sr.no	Problems	Smart solution
1	In summer village does not have sufficient water	Water harvesting
2	There is no bus stand in village	Bus station
3	There is no school or college	School or College can be built
4	In village stolen activities are occur	CCTVcamera

4.2.6 Social Scenario-Preservation of traditions, Festivals, Cuisine

➢ **Social scenario**

- Vagudad Local Language is Gujarati.
- Vagudad Village Total population is 797 and number of houses are 142.
- Female Population is 47.8%.
- Village literacy rate is 63.0%
- Female Literacy rate is 24.7%.

➢ **Preservation of traditions**

- In this village all people are engaged to preservation of tradition because all people are connected to nature by profession like their occupation is Farming so people are daily connected with nature.

➢ **Festivals**

- In this village all people are enjoying all festivals like Diwali, Janmashtami, ide, Dhuleti etc.……

➢ **Cuisine**

- Generally,people of village are cuisine their food in old type of stove with to burn a wooden material etc.….
- But nowadays people are use morden stove.

4.2.7Migration reasons / Trends

- Nowadays people are migrating due to low facility of people.
- Unable to provide Morden lifestyle.
- Now a days Unemployment is big problem for migrate.
- The main problem of migration is poor education facility.

4.3. Data Collection of Vagudad

4.3.1 Methods for data collection

- We have conducted techno economic survey for data collection of Vagudad village. We havemet with sarpanch, Talati Mantri and dweller of village and understand village actual situation, condition and existing structure of village. Available facilities are listed as below:
- Demographical details.
- Geographical details.
- Occupational details.
- Physical Infrastructure facilities like sources of water, road network, transportation facility, sanitation facility, housing condition, etc.
- Social Infrastructure facilities like Primary health center, primary and secondary school, etc.
- Socio culture facilities like community hall, public library, public garden, village pond, etc.

4.3.2 Primary survey details

- Vagudad village is located in Rajkot district of Gujarat state. It is a small village with population of 797 people.
- Sarpanch of the village Vagudad is Maheshbhai Virda. Total area of the village is 715.26 hectares.
- The nearest town to the Vagudad is Rajkot which is 16 km away from village.
- The village has Gram Panchayat, Primary School, Anganwadietc.

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

- The population of Vagudad village is 797 among them 416 males and 381 females. Total number of households is 142.
- In Vagudad village 50% is Kutcha houses and 50% is Pucca houses.

4.3.4 No of Human being in One House

- The average size of family in village is 4 persons.

4.3.5 Material available locally in village and material out sourced by the villagers

- Low-cost rural houses from local materials, organic products and natural composts are available.
- Fuel products and farming materials are out sourced.

4.3.6 Geographical Detail

- Vagudad is the smallest village by area in the Rajkot district. The total Geographical area of village is 715.26 hector.

4.3.7 Demographical Detail-Caste Wise Population Details

➢ **Demographical Detail**

- The village population is 797, among them 416 are male and 381 are female.
- Child (aged under 6 years) population of village is 140 among them 72 are boys and 68 are girls.
- There are142 families in the village and an average 4 persons live in every family.

➢ **Caste Wise Population Details**

Table 10: Caste wise population details

Scheduled Tribes Population %	0.0 % (0)
Scheduled Caste Population %	4.3%(6)

4.3.8Occupational Detail

- Main Occupation of people in village is Farming.

4.3.9Agricultural Details / Organic Farming / Fishery

- In Vagudadvillage agricultural land is available for farming.Generally, people are use piped water is used for irrigation purpose.

4.3.10 Physical Infrastructure Facilities

- RCC Road Network
- Electric facility
- Underground drainage
- Grampachayat Building
- Primary School

4.3.11Tourism Development available in the village for attracting the tourist

- No tourism in this village

4.4 Infrastructure Details

- There is one primary school in village.

Fig.-21: Primary school

4.4.1 Drinking Water

- In village people get water from piped water system.

4.4.2Drainage Network

- In village well maintain Underground drainage facility is available. All drainage is fully covered with R.C.C. cap

4.4.3Transportation & Road Network

- All the internal street of village is constructed by cement concrete (C.C.).privet vehicles also available like rickshaw, private vehicle, etc.

Fig.-22Road network

4.4.4Housing condition

- House in village has good condition, near about 80% pucca house and 20% kutchha houses in village.

Fig.-23 Housing condition

4.4.5Social Infrastructure Facilities

➢ **Health Facilities**

- There is no Health center or any government dispensary in village.

- **Education Facilities**

- In village has well maintain Primary school Village has also Anganwadi or playground for children.

Fig.-24 Aganwadi

Fig.-25 Primary school

- **Community Hall**

- There is no community hall in village

- **Public Library**

- There is no public library in village.

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

- There is a one Gram Panchayat building in village which need repair and maintenance.

Fig.-26 Grampanchayat Building

4.4.7Technology Mobile/ WIFI / Internet Usage Details.

- All most 80% peoples have smart phone and they use internet, but there is no WiFi facility in village.

4.4.8Sports Activity as Gram Panchayat

- There is no sport activity as Gram Panchayat.

4.4.9 Socio-Cultural Facilities

- **Public Garden /Park/Playground**
- There is no public garden in village, but one Anganwadi (Playground) is available
- **Village Pond/Lake**
- Village has Nyari River.
- **Other Recreation Facilities**
- In Village there is one temple near Grampachayat building.

Fig.-27 Temple

4.4.10 Other Facilities

- There are no any other facilities in village.

4.4.11 Other Details

- There is one-gram panchayat in village.

4.6Existing Institution like - Village Administration – Detail Profile

- There is not any other institution except gram panchayat building.

4.6.1 Bachat Mandali

- In this Village no any type of Bachat Mandali is there.

4.6.2 DudhMandali

- In this Village no any type of DudhMandali is there.

4.6.3Mahila forum

- In this Village no any type of Mahila Forum is there.

4.6.4 Plantation for the Air Pollution

- This village has not any type of plantation for the air pollution.

4.6.5Rain Water Harvesting – Waste Water Recycling

- In this village people are not collecting rain water for future purpose and also there is not any type of waste water recycling unit.

4.6.6 Agricultural Development

- In Vagudad village agricultural land is available for farming.
- Generally, people are use piped water is used for irrigation purpose.

4.6.7 Any Other

- It has a gram Panchayat for many working purposes.

Chapter 5:Technical Options with Case Studies

5.1 Concept

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying

Protecting Your Building Materials

Plan before you buy

- Plan the timing of your purchases so that delivery is just-in-time for the required building stage
- Avoid keeping materials in storage for too long as this ties up your funds and may lead to damage, spoilage and pilfering.

Safe and correct storage of materials

- Identify storage requirements for building materials that you have to store, and plan a place to store them.
- Ensure building materials are stored correctly to avoid damage by damp, excess moisture, rain or daylight.
- Store materials safely to prevent theft.
- This could help you save money and reduce delays in your project caused by having to restock materials.

What you can do to reduce waste

What is waste?

Waste is anything that goes into a skip and ends up in landfill.

How to reduce waste?

- Industry measures show that 13% of waste is new, unused material – take steps to reduce this waste by finding a supplier who accepts returns or exchanges.
- A huge 60% of skipped material is packaging – work with your suppliers to take back and reuse packaging.
- Exchange material – what might appear of no value to you may be of value to someone else. There are many exchange schemes available.
- Crush and reuse aggregates. If you are not able to carry this out, find someone who does.

Dry Lining Waste

Working with plasterboard

- Try to design rooms with the same dimensions as standard sizes of plasterboard. This will reduce cut-offs and wastage of materials, which can save your business money.
- Work accurately to avoid wastage and minimize the production of dust when cutting frames to size.
- Minimize air and water pollution; this will benefit the environment and the local community.
- Do not leave plasterboard uncovered as it can spoil very quickly.

Disposal of plasterboard

- Plasterboard has to be separated from other materials in a landfill site, and disposal of this waste costs more than disposing of other types of waste.
- Landfill tax and disposal charges increase every year.
- Find out if your supplier will take off-cuts back as it often works out cheaper.

Concrete and Mortar

Protect the environment and your local community

- Minimize onsite concrete dust, air and water pollution. Avoiding this type of pollution will help protect the environment and reduce the risk of prosecution.
- Take measures to ensure the health and safety of workers on the site (welfare and dust reduction) and the local community.

Working with mortar

- Lime mortars are preferable to Portland cement mortars in terms of recycling.
- Bricks bonded with lime mortar can be reused if the building is demolished in later years, which will help reduce waste in the future.
- Ash or brick dust can be added to lime mortar to enhance durability and shorten required setting times.

Purchase of concrete, mortar and plaster

- To prevent over-ordering of materials, plan the quantities in advance.
- Timely ordering is important, especially if buying ready-mixed mortar.
- Take care to store these materials correctly to reduce waste and damage.

Planning your Building Supplies

Smart specification

- Think before you buy and plan your building supplies to keep wastage of materials to a minimum**.**
- Calculate the quantities of materials you will need for the job and do not over-order more than you need for the sake of convenience.
- Timely ordering of materials ensures that supplies arrive when required, and reduces storage where they could be damaged or stolen.
- If you require a small amount of a materials which is only available in bulk, use a materials exchange scheme or plan to use the material for future jobs.
- Think about specifying materials that have a good recycle content as this will help to reduce your carbon footprint.

Contractors and suppliers of materials

- Try to use local suppliers for reclaimed and recycled building products.
- Find out if contractors and suppliers have an environmental policy.

Using the Best Materials for the Job

Smart specification

- Ensure you use the correct materials for the job to avoid poor workmanship, which can lead to rework.
- Avoid rework as it costs money and wastes time and materials.
- Use local, natural and sustainable materials and sustainable construction techniques.
- Look out for the Forest Stewardship Council's trademark on timber and wood products indicating that wood comes from a sustainably managed forest.
- Use renewable or recycled materials to benefit the environment.
- Minimize the use of chemical treatments
- Avoid materials that have damaging effects on the environment.
- Choose alternatives to PVCu window frames such as ethylene-based plastics or modern timber.

5.1.2 Soil Liquefaction

- Soil liquefaction, also called earthquake liquefaction, ground failure or loss of strength that causes otherwise solid soil to behave temporarily as a viscous liquid.
- The phenomenon occurs in water-saturated unconsolidated soils affected by seismic *S* waves (secondary waves), which cause ground vibrations during earthquakes.

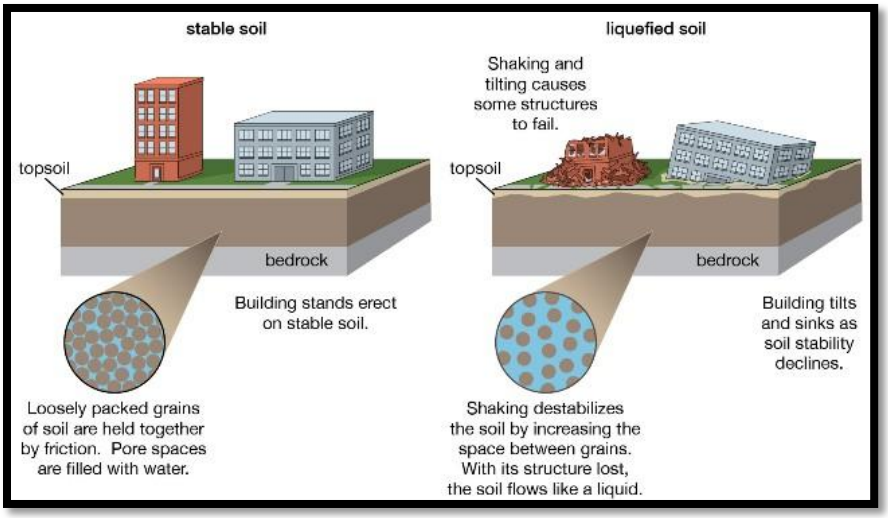


Fig.-28: Soil Liquefaction

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

5.1.3 Sustainable Sanitation

➢ **Sustainable Sanitation**

- Sustainable sanitation is a sanitation system designed to meet certain criteria and to work well over the long-term. Sustainable sanitation systems consider the entire "sanitation value chain", from the experience of the user, excreta and wastewater collection methods, transportation or conveyance of waste, treatment, and reuse or disposal.The Sustainable Sanitation Alliance (SuSanA) includes five features (or criteria) in its definition of "sustainable sanitation": Systems need to be economically and socially acceptable, technically and institutionally appropriate and protect the environment and natural resources.

➢ **Principles for planning and implementing sustainable sanitation systems**

The following principles for planning and implement sanitation system were developed by the water supply and sanitation collaborative council as the "Bellagio Principles for Sustainable Sanitation" during its 5th Global Forum in November 2000:

- Human dignity, quality of life and environmental security at household level should be at the centre of any sanitation approach.
- In line with good governance principles, decision making should involve participation of all stakeholders, especially the consumers and providers of services.
- Waste should be considered a resource, and its management should be holistic and form part of integrated water resources, nutrient flow and waste management processes.
- The domain in which environmental sanitation problems are resolved should be kept to the minimum practicable size (household, neighborhood, community, town, district, catchments, city).

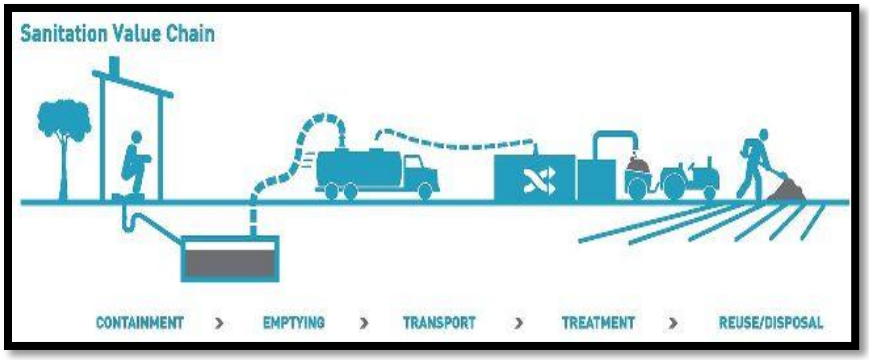


Fig.-29: Sanitation Value Chain

5.1.4Transport Infrastructure / System

- It refers to the framework that supports transport system.
- Transport infrastructure consists of the fixed installations including roads, railways, airways, waterways, canals and pipelines and terminals such as airports, railway stations, bus stations, warehouses, trucking terminals.

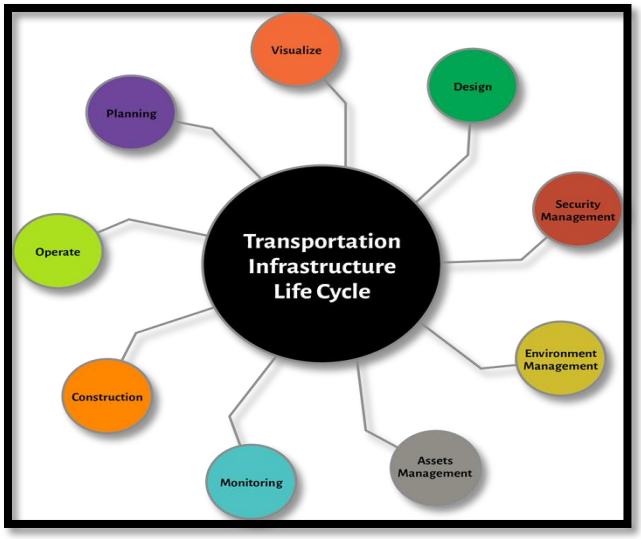


Fig.-30: Transport Infrastructure Life Cycle

5.1.5 Vertical Farming

- Vertical farming is the practice of producing food on vertically inclined surfaces. Instead of farming vegetables and other foods on a single level, such as in a field or a greenhouse, this method produces foods in vertically stacked layers commonly integrated into other structures like a skyscraper, shipping container or repurposed warehouse.
- Using Controlled Environment Agriculture (CEA) technology, this modern idea uses indoor farming techniques. The artificial control of temperature, light, humidity, and gases makes producing foods and medicine indoor possible. In many ways, vertical farming is similar to greenhouses where metal reflectors and artificial lighting augment natural sunlight. The primary goal of vertical farming is maximizing crops output in a limited space.

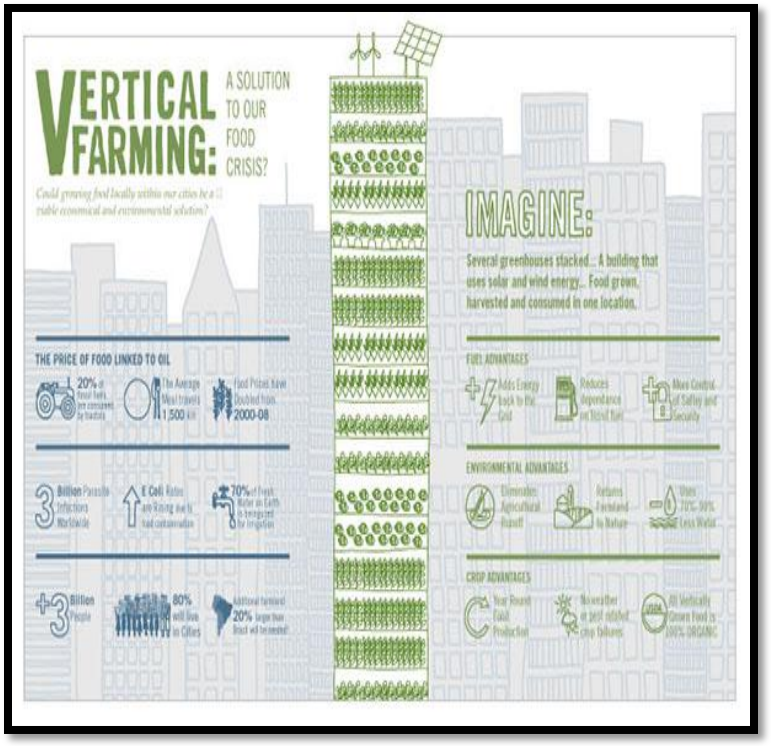


Fig.31:Vertical Farming

There are four critical areas in understanding how vertical farming works:

- Physical layout
- Lighting
- Growing medium
- Sustainability features
- Firstly, the primary goal of vertical farming is producing more foods per square meter. To accomplish this goal, crops are cultivated in stacked layers in a tower life structure.
- Secondly, a perfect combination of natural and artificial lights is used to maintain the perfect light level in the room. Technologies such as rotating beds are used to improve lighting efficiency.
- Thirdly, instead of soil, aeroponic, aquaponic or hydroponic growing mediums are used. Peat moss or coconut husks and similar non-soil mediums are very common in vertical farming. Finally, the vertical farming method uses various sustainability features to offset the energy cost of farming. In fact, vertical farming uses 95 percent less water.
- Vertical farming has a lot of promise and sounds like the farm of the future. However, there are a few stumbling blocks to consider before rushing full-speed ahead into vertical farming.

Advantages

- It offers a plan to handle future food demands

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

Disadvantages

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

5.1.6Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

1. Corrosion mechanism

- Reinforced concrete uses steel to provide the tensile properties that are needed in structural concrete. It prevents the failure of concrete structures which are subjected to tensile and flexural stresses due to traffic, winds, dead loads, and thermal cycling.
- Standard terminology defines corrosion as "the chemical or electrochemical reaction between a material, usually a metal, and its environment that produces a deterioration of the material and its properties."
- When reinforcement corrodes, the formation of rust leads to a loss of bond between the steel and the concrete and subsequently delamination and swelling.
- If left unchecked, the integrity of the structure can be affected. Reduction in the cross sectional area of steel reduces its strength capacity.

2. Prevention

There are a variety of methods for preventing corrosion or at least to slow down the corrosion process. The most common are listed below.

- **Galvanization**

Galvanized reinforcing steel is effectively and economically used in concrete where unprotected reinforcement will not have adequate durability. The susceptibility of concrete structures to the intrusion of chlorides is the primary incentive for using galvanized steel reinforcement. Galvanized reinforcing steel is especially useful when the reinforcement will be exposed to the weather before construction begins. Galvanizing provides visible assurance that the steel has not rusted and requires no on-site repair, unlike most other coatings.

- **Catholic protection (CP)**

In this process the anodes, power supply and control systems are permanent, and a range of anodes can be used. The aggressive anodic reaction is isolated to a corrosion resistant anode while the harmless catholic reaction occurs at the surface of the steel reinforcement. This process creates additional hydroxyl ions, rebuilds the passive alkaline layer and repels chloride ions.

- **Re-alkalization**

This system is the equivalent of desalination for carbonated structures. It relies on the principle that the hydroxyl ions produced at the cathode re-alkalize the concrete from the reinforcement

outwards. This is linked with a wet anode at the surface that contains calcium carbonate, which moves under electro-osmotic pressure and re-alkalizes the concrete from the surface inwards

3. Repair Measures

- **Patch Repair**

By far the most common repair technique is the application of concrete patches to damaged or deteriorated concrete. Furthermore, when other remediation techniques are being applied in order to limit the extent of on-going corrosion mechanisms or to prevent their re-occurrence. Patch repairs are also used to reinstate the spalled or delaminated areas of concrete.

- **Corrosion Inhibitors**

Corrosion Inhibitors are one of a variety of techniques that can be employed in an effort to suppress and control the rate of steel corrosion in concrete structures particularly in the case of hidden or latent damage, although their long-term effectiveness in reinforced concrete is still open to debate and the subject of detailed research. Due to the large number of commercially available concrete corrosion inhibitors, which vary widely in their respective formulations and inhibitive properties, categorization is difficult. However, it is possible to divide concrete corrosion inhibitors into two generic categories.

- **Surface Treatments**

  Three generic types of Surface Treatment are available for the decoration and protection of concrete surfaces, designed to control chemical ingress as well as moisture movement. They are described as follows:

- **Pore-liners**

  These are hydrophobic impregnation treatments such as silicone impregnated, which line the pores of the concrete. They repel water and therefore prevent it from entering the concrete, but continue to allow water vapor to escape.

- **Pore blockers**

  These are materials that partially or completely block the in concrete. They may accomplish this by either reacting with the concrete to produce pore-blocking products or by physically blocking the pores.

- **Film-formers**

  These are coating systems based on either organic resin such as styrene butadiene and acrylic copolymers or inorganic resins such as potassium silicate, which form a protective/decorative film on the surface of the concrete.

5.1.7 Sewage treatment plant

- Sewage **treatment** is the process of removing contaminants from municipal wastewater, containing mainly household sewage plus some industrial wastewater. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater (or treated effluent) that is safe enough for release into the environment. A by-product of sewage treatment is a semi-solid waste or slurry, called sewage sludge. The sludge has to undergo further treatment before being suitable for disposal or application to land.

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

Sewage treatment generally involves three stages, called primary, secondary and tertiary treatment.

Primary treatment

- It consists of temporarily holding the sewage in a quiescent basin where heavy solids can settle to the bottom while oil, grease and lighter solids float to the surface. The settled and floating materials are removed and the remaining liquid may be discharged or subjected to secondary treatment. Some sewage treatment plants that are connected to a combined sewer system have a bypass arrangement after the primary treatment unit.

Secondary treatment

- It removes dissolved and suspended biological matter. Secondary treatment is typically performed by indigenous, water-borne micro-organisms in a managed habitat. Secondary treatment may require a separation process to remove the micro-organisms from the treated water prior to discharge or tertiary treatment.

Tertiary treatment

- It is sometimes defined as anything more than primary and secondary treatment in order to allow ejection into a highly sensitive or fragile ecosystem (estuaries, low-flow rivers, coral reefs...). Treated water is sometimes disinfected chemically or physically (for example, by lagoons and microfiltration) prior to discharge into a stream, river, bay, lagoon or wetland, or it can be used for the irrigation of a golf course, greenway or park.

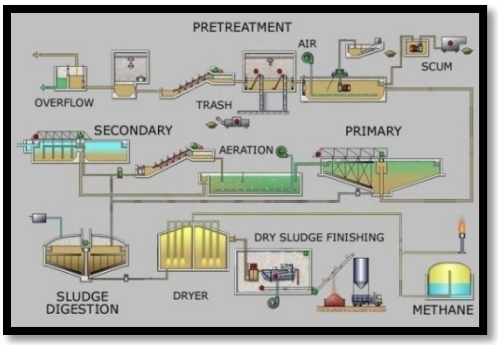


Fig.- 32: Sewage Treatment Plant

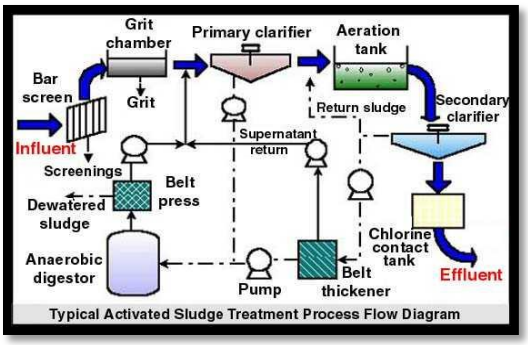


Fig.- 33: Sewage Treatment Plant FlowDiagram

Chapter 6: Swatch Bharat Abhiyan

6.1 Type of swatchhta needed in Vagudad

- The internal streets and Roads are very clean.
- There Public sanitation in whole village.
- Also, at some places where there is no usage of land, it has become quite polluted and is necessary to clean those places.

Fig.34: Village road

- At some area which doesn't have any cleanness in this village.
- So there are required to clean some area.
- If there are not properly clean then many mosquitoes are made.
- And it may causes of malaria etc.

Fig.35: Drainage

- Many time in marriage season people are wasting paper dish anywhere. In this village to clean it.

Fig.36: Paper dish

6.2 Guidelines for the process of the implementation in Vagudad

- Arrange the program related to clean village.
- Keep supporting who are engaged with SBM (Swachh Bharat mission).

- Public awareness is necessary for clean village.
- Provide technical support for clean village.
- Arranging for regular cleaning of school toilets and proper disposal of solid and liquid waste.
- Prioritization of construction and maintenance of anganwadi toilets.
- These activities can be undertaken as part of Swachh Bharat through SBM (G) or in convergence with other schemes.

Fig.-37 Posters regarding cleaniness

6.3 Actual Activity done by Students for making Vagudad village clean

- Awareness web talk with Sarpanch and Talati and with some students related to importance of cleaning.
- Vagudad village is comparatively clean village than other.
- We are go to over allocated village and meeting with children in their school and we have arrange a seminar related to clean India Children are very excited to attempt a seminar.
- Then children and their staff are cleaning garden.After complete clean garden then children are ready to clean their class room and school.

Fig.-38: meeting with children

Fig.39 : working with children

Chapter 7:Village Condition Due to Covid-19

7.1 Taken steps in Vagudad village related to existing situation

- The nation-wide lockdown imposed in India from March 25 to May 31, 2020 following the breakout of the Covid-19 pandemic affected rural India in diverse ways.
- This was only to be expected given the great variation in production systems and socio-economic conditions in villages across agro-ecological zones.
- This note analyses the impact of the lockdown – which brought almost all economic and public activity in India to a halt – on a select group of villages based on a rapid assessment survey conducted by the Foundation for Agrarian Studies (FAS) in April 2020.
- The survey was conducted through telephone interviews of 52 informants from 21 villages across 10 States of India.
- The FAS had already conducted detailed socio-economic surveys of 19 of the 21 villages under its India-wide programe of village studies (Project on Agrarian Relations in India) during the last decade.
- All the necessary steps and preventions were taken by students while working.Wearing masks and maintaining social distancing were the priorities.
- The COVID-19 pandemic has brought the entire nation to a halt.
- Health officials and medical professionals are struggling with containing the disease, and testing and treating affected people.
- Sarpanch and other community members are provide masks and sanitizer door to door.
- They are also provide tablet of corona virus.

7.2 Activities Done by Students for Vagudad village

- Students Spread awareness regarding the pandemic situation to the dwellers and sarpanch.
- Also organized web meet with TCM and Sarpanch and also with some students.
- We have advice to awareness from Covid-19.
- The lockdown coincided with the end of the rabi and/or beginning of the summer season of the agricultural year in India. As we shall see, the impact of the lockdown on agricultural operations was distinctly different between irrigated and rainfed villages.
- The Covid-19 pandemic started as an urban phenomenon in India. But it is now spreading at a faster rate in rural areas.
- An HT analysis on August 26 had shown that 55% of new Covid-19 cases reported in August were in districts where the rural population had a share of more than 60%.
- These districts had reported only about 23% of new cases in April.
- We advised them to wear mask whenever they go out in public.
- We advised them to keep sanitizer along them whenever they go out in public or meet anyone.

7.3 Any other steps taken by the students / villagers

- The COVID-19 pandemic has brought the entire nation to a halt.
- Health officials and medical professionals are struggling with containing the disease, and testing and treating affected people.
- Last night, Prime Minister Narendra Modi announced a three-week, nation-wide,complete lockdown to contain the spread of this virus, as the number of reported positive cases in India crossed 500.
- In light of this, it is pertinent to take stock of our rural areas.
- The risk of spread in rural areas is heightened. This is due to a number of factors, including lack of awareness, a limited supply of clean water, low levels of nutrition, and most importantly, ill-equipped and insufficient public health centers and district hospitals.
- Incresed awareness and showed some scientific reasons of the pandemic to dwellers.

Chapter 8: Sustainable Design Planning Proposal (Prototype Design)- Part- I

8.1 Design Proposals

Different facilities in Vagudad village which we observed as below,

1. Physical Infrastructure facility:
- Piped water supply to dweller and plot/yard
- Underground drainage
- Cement concrete road
- Transportation facility
- Electricity distribution

2. Social Infrastructure facility:
- Anganwadi
- Primary school

3. Socio-culture Infrastructure facility:
- temple

8.1.1 Sustainable Design

- In this part we have decide to design a greenhouse as sustainable design.
- A greenhouse is a structure with walls and roof made chiefly of transparent material, such as glass, in which plants requiring regulated climatic conditions are grown.
- These structures range in size from small sheds to industrial-sized buildings.
- A miniature greenhouse is known as a cold frame.
- The interior of a greenhouse exposed to sunlight becomes significantly warmer than the external temperature, protecting its contents in cold weather.
- Many commercial glass greenhouses or hothouses are high tech production facilities for vegetables, flowers or fruits.
- The glass greenhouses are filled with equipment including screening installations, heating, cooling, lighting, and may be controlled by a computer to optimize conditions for plant growth.
- Different techniques are then used to evaluate optimality degrees and comfort ratio of greenhouses, such as air temperature, relative humidity and vapour-pressure deficit, in order to reduce production risk prior to cultivation of a specific crop.

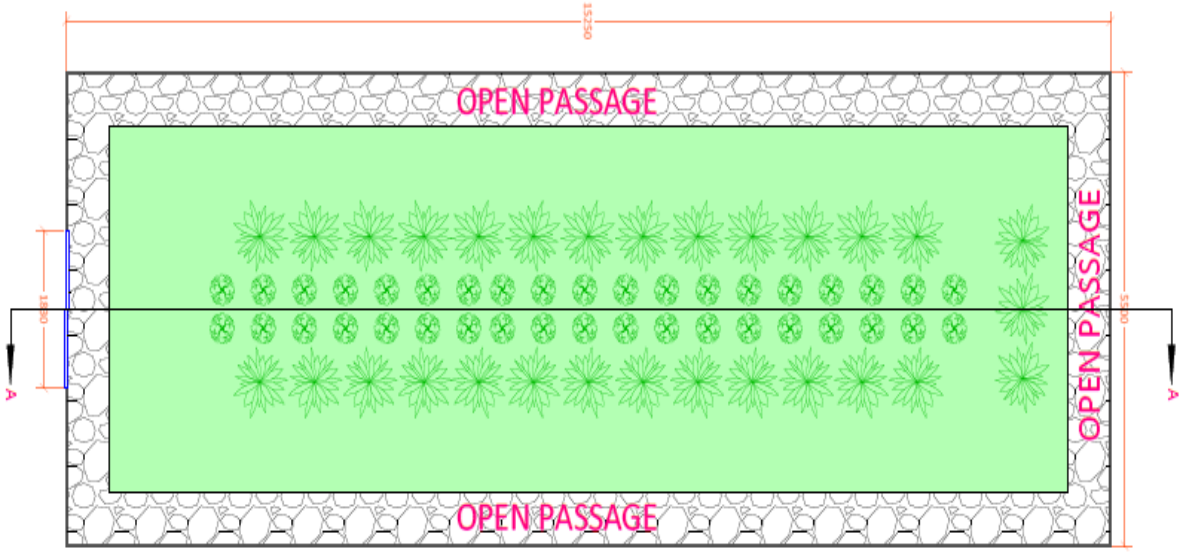


Fig.40: Plan of green house

Table 11: Measurement and abstract sheet of Green house

Sr no	Description Of Item	Quantity	Rate/Unit	Total
1	G.I. Pipe of 25 mm. φ for foundation	50 x 1.20 =60m	65	3900
2	G.I. Pipe of 15 mm. φ for arches and top M.S Flates 19x8m	25 x 6 = 150m 25 x 1 = 25m Total=175	25	4375
3	For sides for holding mesh and UV film and front & backside &for purlins	120.00m run 80Kg.	16.50	1320
4	M.S. 'L' angle19x19x3m for front and end frames and door	28m run 20Kg.	17.50	350
5	Plastic beading 25 mm width	150 m	4	600
6	UV stabilised film (200 micron)	175 m2	20	3500
7	Mesh 40-60 size all round (1.15m width)	65 m2	22	1430
8	Door frame and fitting			425
9	Hardware like Bolts and nuts, welding rods, Aluminium oxide, Painting etc.			650
10	Earth work and concreting of foundation with 1: 3: 6			400
11	Labour cost			550
			Total	17500
			Contractor's Profit (10%)	1750
			Water Charges (5%)	875
			Total Amount in Rs	20125

8.1.2 Physical Design

- As a physical design we have decided to design a RCC tank.

Fig.41:3D of RCC Tank

Table 12: Measurement sheet of water tank

Sr. no	Description Of Item	Nos.	Length(m)	Breadth(m)	Height(m)	Quantity
1	Bottom slab	1	4	5	0.15	$3m^3$
2	Top slab	1	6.3	7.3	0.15	$6.90m^3$
3	Column	4	0.25	0.9	2.5	$0.56m^3$
					Total	**$10.46m^3$**
4	Plaster					
	Side wall 1	2	4	-	1.65	$6.6m^2$
	Side wall 2	2	5	-	1.65	$8.25m^2$
	Bottom	1	4	5	-	$20m^2$
					Total	**$34.85m^2$**
5	Excavation for earth		6	0.8	0.8	$3.84m^3$
					Total	**$3.84m^3$**

Table 13: Abstract sheet of water tank

Sr.no	Description of item	Quantity	Unit	Rs.	Amount
1	Cement	135	Bags	280	37800
2	Sand	5.65	M^3	800	4520
3	Aggregate	8.35	M^3	1000	8350
4	Excavation	3.84	M^3	85	326.4
5	Smooth plaster inside &Bottom (1:3)	34.85	M^2	150	5227.5
				Total	**56223.9**
				Add2% of water charge	1124.4
				Add 3% of Contingencies	1686.7
				Total	**59035**

8.1.3 Social Design

- As a social design we have decided to design a bore well in cremation.

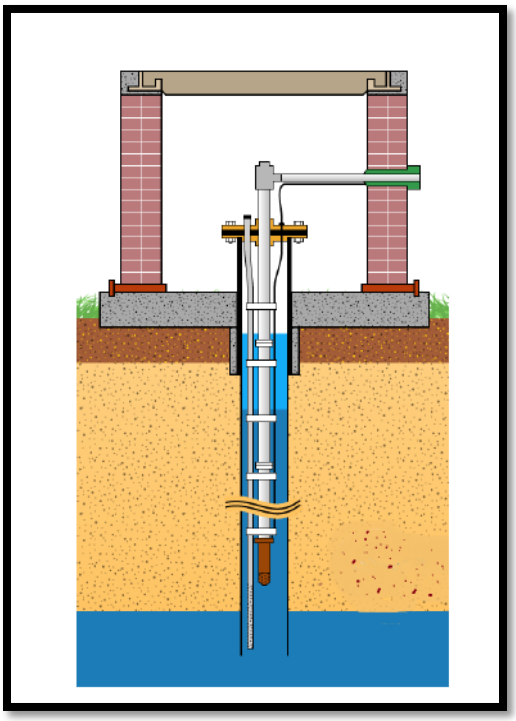


Fig.42: Bore Well

Borewell drilling cost

- Up to 100 feet: 60 to 70 Rs/feet
- Above 100 feet and below 200 feet: 80 to 100 Rs/feet
- Above 200 feet: 100 plus Rs

The casing has to be done for first 20 to 40 feet while drilling. The casing length required depends on soil type. The casing costs about 200 Rs per feet.

- Calculation for 200 feet bore well digging
- For first 100 feet: Rs. 60/feet =100*60 =Rs. 6,000
- From 100 to 200 feet: Rs. 80/feet =100*80 = Rs. 8,000
- For 40 feet casing: 40*200 = Rs. 8,000
- Miscellaneous charges: Rs. 1000
- Total cost= 6,000+8,000+8,000+1000= Rs.23,000

Equipment required for new bore well

- Submersible motor pump
- Starter box
- Bore pipes

- Cable wire
- Service wire
- Gate valves
- Clips and Misc. GA wires

Total cost of bore well

Assumptions

- Established transformer
- Existing bore well
- Bore well depth: 200 feet
- Recommended pump set: Texmo

Here is the cost of components of bore well

- Texmo submersible pump set = Rs. 26,000
- Starter box (L&T) =Rs. 4,500
- Cable wires = Rs. 10,000
- Bore pipes = Rs.5,000
- Service wire = Rs. 5,000
- Gate valve and other Misc. item = Rs.2,000
- Fixing charges for other labour = Rs.2,500
- Total equipment and labour cost =Rs. 52,000
- Total cost for 200 feet bore well with all equipment.
- Bore well digging cost + Total equipment cost = Rs. 75,000
- So, total cost of bore well is 75,000.

8.1.4 Socio-Cultural design

- As a social-cultural design we have decided to do renovation of gram panchayat building.

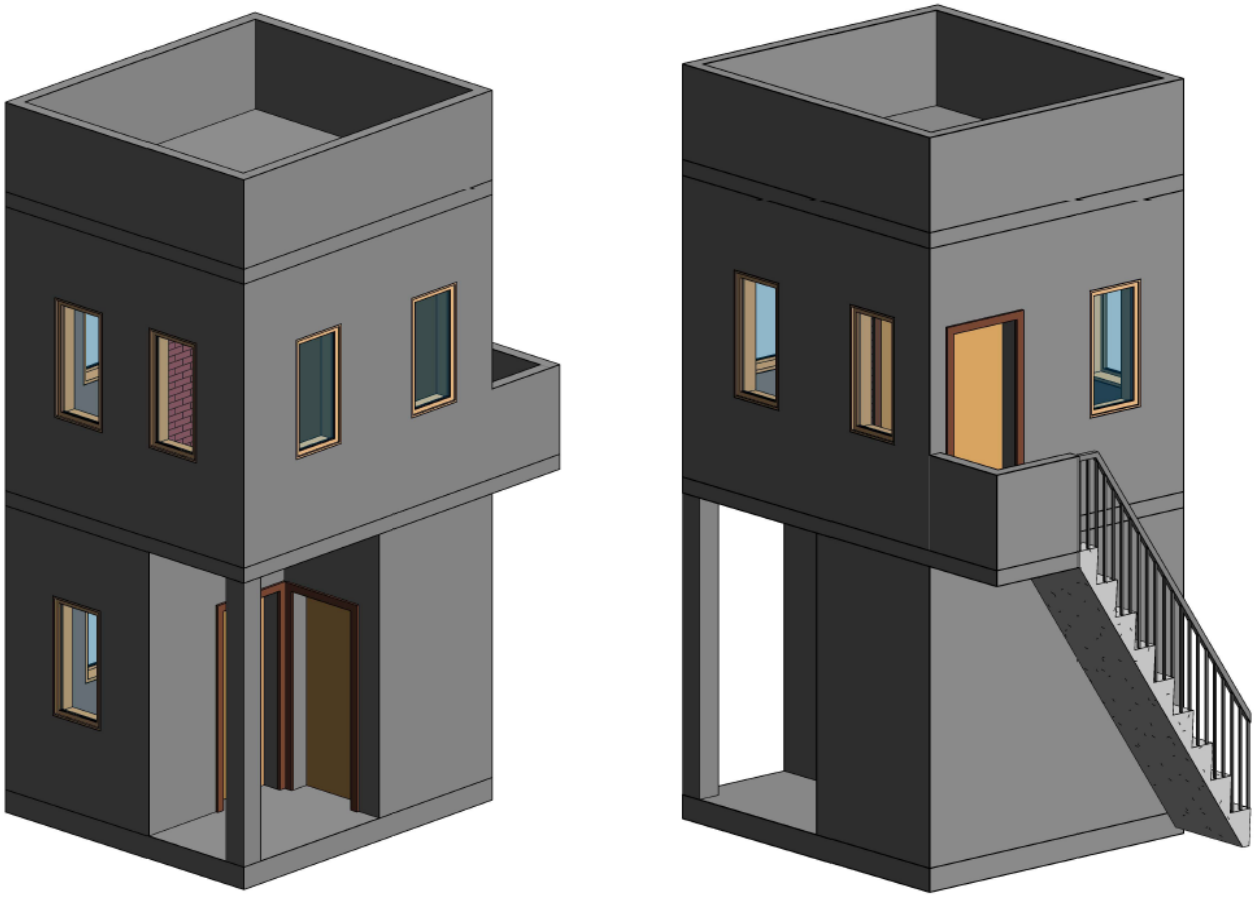


Fig.-43:3D view of Gram Panchayat Building

Maintenance of gram panchayat building

- For 1m length 12 mm wide and 6mm deep including 12mm thick plaster in wall of 100 m2.
- Wet quantity of mortar = area * thickness
  = 100 * 0.012
  = 1.20 cum
- Adding 30% for filling up joint, uneven surface etc. the quantity of mortar
  =1.2+ (1.2*0.3)
  =1.2+0.36
  =1.56 cum
- Increasing by 25% for dry volume, the total quantity of dry material
  =1.56+ (0.25*1.56)
  =1.56*0.39
  =2 cum
- For proportion of cement mortar (1:3)

Cement = 0.5m^3
Volume of 1 bag of cement = 0.035m^3
Cement bags required = (0.5\0.035)
= 14.28 nos
Considering cost of 1m^3 cement mortar (1.3) = 4200 Rs.,
Thus total cost for 2m^3 can be consider as = 8400 Rs.

Table 14: crack filling cost

DESCRIPTION	**TOTAL COST**
2m3 of cement mortar (1.3) (with 15 bagscement and 1.5m3 sand)	8400 Rs.

Table 15: tiles fitting cost

Sr.no	**Description of item**	**Quantity**	**Unit**	**Rate**	**Total**
1	Cement	22	Bags	350	7700
2	Sand	3	Cum	1000	3000
3	Tiles	150	No	27	4050
4	Laying & polishing	60	Sq feet	150	9000
5	Thickness of flooring	50	Mm		
6	Area of room	75	Sq feet		
7	Proportion of mortar	1:4	-		
8	Wet volume of mortar	3	Cum		
9	Dry volume of mortar	3.75	Cum		
10	Cement	0.75	Cum		
11	Cement bags	22	-		
12	sand	3	Cum		
13		1.062	Brass		
				Total	**23750**

8.1.5 Smart Village Design

- As a smart village design, we have decided to design Reverse vending machine.
- A reverse vending machine is a device that accepts used (empty) beverage containers and returns money to the user.
- The machines are popular in places that have mandatory recycling laws or container deposit legislation.
- In some places, bottlers paid funds into a centralized pool to be disbursed to people who recycled the containers. Any excess funds were to be used for general environmental cleanup

Fig.-44:Vending Machine

- **Process of reverse vending machine**
- In this block diagram we explain the step procedure of proposed Reverse Vending Machine(RVM) working.
- In the block diagram waste plastic materials acts as an input and then check by several sensors. First machinecheck through the sensors that Is the plastic material received? Is the material made of Plastic? Is the plasticempty? According to that, weight sensor weighs the received plastic item and give output to user in form ofcoins as per the weight of item.

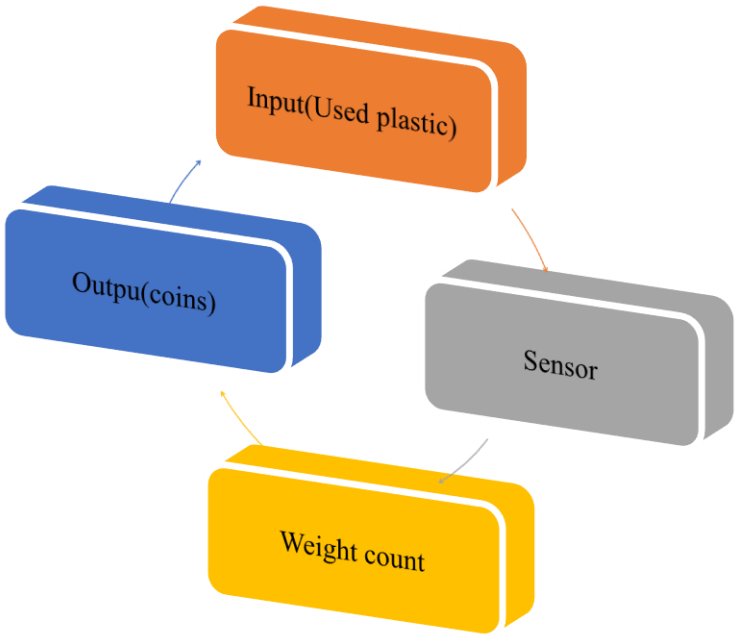


Fig.-45 flow diagram of RVM

Table 16: Input and Output of RVM

Sr.no	Input (Weight of Empty Container)	Output(coins)
1	84-166	1
2	167-249	2
3	250-330	3
4	331-410	4
5	411-495	5
6	496-580	6
7	581-660	7
8	661-750	8

8.1.6 Heritage design

- As a heritage design we have decided to design a community hall.

Fig.-46: Community Hall

Table 17: Measurement sheet of community hall

Sr. no	Description of item	Nos	Length(m)	Breadth(m)	Height (m)	Quantity
1	**Excavation for foundation**		23.46	0.91	0.81	17.29m^3
					Total	**17.29m^3**
2	**P.C.C. in foundation**		23.46	0.91	0.50	10.67m^3
					Total	**10.67m^3**
3	**Brick work in foundation**					
	Step 1		22.66	0.61	0.30	4.14m^3
	Step 2		23.86	0.51	0.20	2.43m^3
	Step 3		25.06	0.41	0.46	4.72m^3
					Total	**11.23m^3**
4	**Brick work**					
	Brick work (9”)	55	26.28	0.23	3.50	1189.22m^3
	Brick work (4”)	3	13.14	0.10	3.50	13.8m^3
					Total	**1203.02m^3**
5	**Deduction from wall**					
	D	2	2.14	0.23	2.30	2.26m^3

	D1	4	0.92	0.23	2.13	1.80m^3
	D2	6	0.75	0.10	1.98	0.89m^3
	W	3	1.52	0.23	1.40	1.46m^3
	W	1	1.52	0.10	1.40	0.21m^3
	W1	3	1.21	0.10	1.40	0.50m_3
	W2	3	0.95	0.10	1.40	0.40m^3
					Total	**7.52m^3**
6	**R.C.C. lintel & chajja**					
	Door	2	2.25	0.25	0.15	0.17m^3
	Door 1	4	1.21	0.25	0.15	0.18m^3
	Door 2	6	1.06	0.25	0.15	0.23m^3
	Window for 9”	3	1.82	0.25	0.15	0.20m^3
	Window for 4”	1	1.82	0.25	0.15	0.07m^3
	Window 1	3	0.10	0.25	0.15	0.02m^3
	Window 2	3	0.10	0.25	0.15	0.02m^3
	Ventilation	2	0.76	0.10	0.15	0.02m^3
	Window chajja	4	1.82	0.25	0.15	0.27m^3
	Door chajja	2	2.44	0.25	0.15	0.02m^3
					Total	**1.20m^3**
7	**Parapet wall**					
	wall	1	35.40	0.23	0.91	7.40m^3
					Total	**7.40m^3**
8	**Plaster**					
	Outside plaster		34.75		4.50	156.38m^2
					Total	**156.38m^2**
9	**Deduction from outside plaster**					
	Door	2	2.25	-	2.29	10.30m^2
	Window	4	1.40	-	1.50	8.40m^2
					Total	**18.70m^2**
10	**Inner side plaster**					
	Office room	1	2.5	-	3.5	8.75m^2
	Training hall	1	6	-	8	48m^2
	Central kitchen	1	2.5	-	2.5	6.25m^2
	Kitchen	1	2.5	-	2.5	6.25m^2
	Living room	1	2.5	-	3.5	8.75m^2
	Bath	1	1.2	-	1.8	2.16m^2
	Balwadi	1	3.5	-	6	21m^2
	Store room	1	2.5	-	3.5	8.75m^2
	Toilet	1	2.5	-	2.5	6.25m^2
	Demonstration hall	1	6	-	8	48m^2
					Total	**164.16m^2**
11	**Celling plaster**					
	Office room		2.29	1.98	-	4.53m^2

	Training hall		4.11	2.16	-	8.88m^2
	Central kitchen		2.34	2.57	-	6.01m^2
	Kitchen		1.52	1.22	-	1.85m^2
	Living room		1.52	1.22	-	1.85m^2
	Bath		1.22	0.91	-	1.11m^2
	Balwadi		1.22	2.13	-	2.60m^2
	Store room		2.34	0.96	-	2.24m^2
	Toilet		1.37	2.16	-	2.95m^2
	Demonstration hall		1.22	2.18	-	2.65m^2
					Total	**34.67m^2**

Table 18: abstract sheet of community hall

Sr.no	Description Of Item	Quantities	Rate	Unit	Amount
1	Excavation	17.29	85	m^3	1470
2	PCC	10.67	3200	m^3	34144
3	Brick work in foundation	11.23	3200	m^3	35936
4	Brick work in super-structure	1203.02	3500	m^3	4210570
5	RCC work in slab,chajja & lintel	15.74	8800	m^3	138512
6	Plaster work in c.m.(1:3) for inside & outside & celling	355.21	150	m^2	53281
7	Wood work for door & window	45.94	7800	m^2	358332
8	Marble flooring	55.90	500	m^2	27950
9	Cement	1882	350	Bag	658700
10	Sand	9.28	800	m^3	7424
11	Aggregate	15.56	1000	m^3	15560
12	Bricks	72861	4	No	291444
13	Steel(HYSD)	725	50	Kg	36250
14	Binding wire	8.25	20	Kg	165
				Total	**5,869,738**
				Add 3% of contingencies	**176092**
				Add 2% of water charge	**117395**
				Add 5% of plumbing charge	**293486**
				Add 10% of electric charge	**586974**
				Total	**7,043,685**

8.2 Recommendations of the Design

- In Village there was no Green house so we decided to provide it because it is unique and essential as sustainable design.
- As a Socio cultural design we have decided to do renovation gram panchayat.
- There is no any type of heritage like statue, gate, chabutra and community hall etc… so we decided to design community hall as heritage design.
- In village there is no Vending machine so we have decided to design vending machine as a smart design.
- In village there is no rcc tank for water storage so we have decided to design rcc tank for physical design.
- In village there is lack of bore well in cremation so we have decided to design bore well as a social design.

8.3 Suggestions / Benefit of the villagers

- In village there was no any green house so we have designed it.
- The condition of gram panchayat is very poor so we decided to renovate it.
- There is no community hall so we decided to design it.
- As a smart design we have decided to design vending machine.
- As a physical design we have decided to design rcc tank.
- There is no bore well in cremation so we have decided to design it.

Chapter 9:Future development of the village for the PART-IIdesign

- After completion of visit & data collection the project carried out in the current semester by the group members which includes the design of a sustainable facilities for vagudad village,lodhika,Rajkot,Gujarat.
- Future scope would be study over other different urban amenities that would be sustainable in rurak areas of saurastra.
- The village still lacks in maintenance of the building and various structures. Taking this into consideration the estimation of rehabilitation with other necessary amenities will be designed in the next semester.

Chapter 10: Conclusion of the Entire village activities

The motive of Vishwakarma Yojana phase - VIII 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. Introduction of village, Geographical details,
Demo-graphical details, Occupational detail and different types of Infrastructure facilities like about
Sanitation, Transportation, Road Network, Drainage Line, Water Supply, Education Viability, Irrigation etc. And **Smart Village Survey** concludes about Value of Education: Health and Cleanliness of village. And we find about which **smart facilities** can be subjected as per requirement
of village dweller and village authorities.

By use of Gap Analysis we compare all the available facilities and required facilities in Nyara village. We observe available amenities in village like, road network, drinking water facility, educational facility, health facility, sanitation facility, transportation facility, and renewable source
facility. We also observe which facilities are required for batter growth of village by interaction with
different authorities of ideal village and smart village.

- Green house(Sustainable design)
- Rcc tank(Physical design)
- Bore well in cremation(Social design)
- Renovation of gram panchayat(Socio cultural design)
- Vending machine(Smart design)
- Community hall(Heritage design)

And lastly this project is helped us to understand our skills and make it even batter. We got deep knowledge about development of village and various infrastructure facility design of village. Lastly
we enjoyed the informational as well as practical journey of civil work.

Chapter 11:References reffered for this Project

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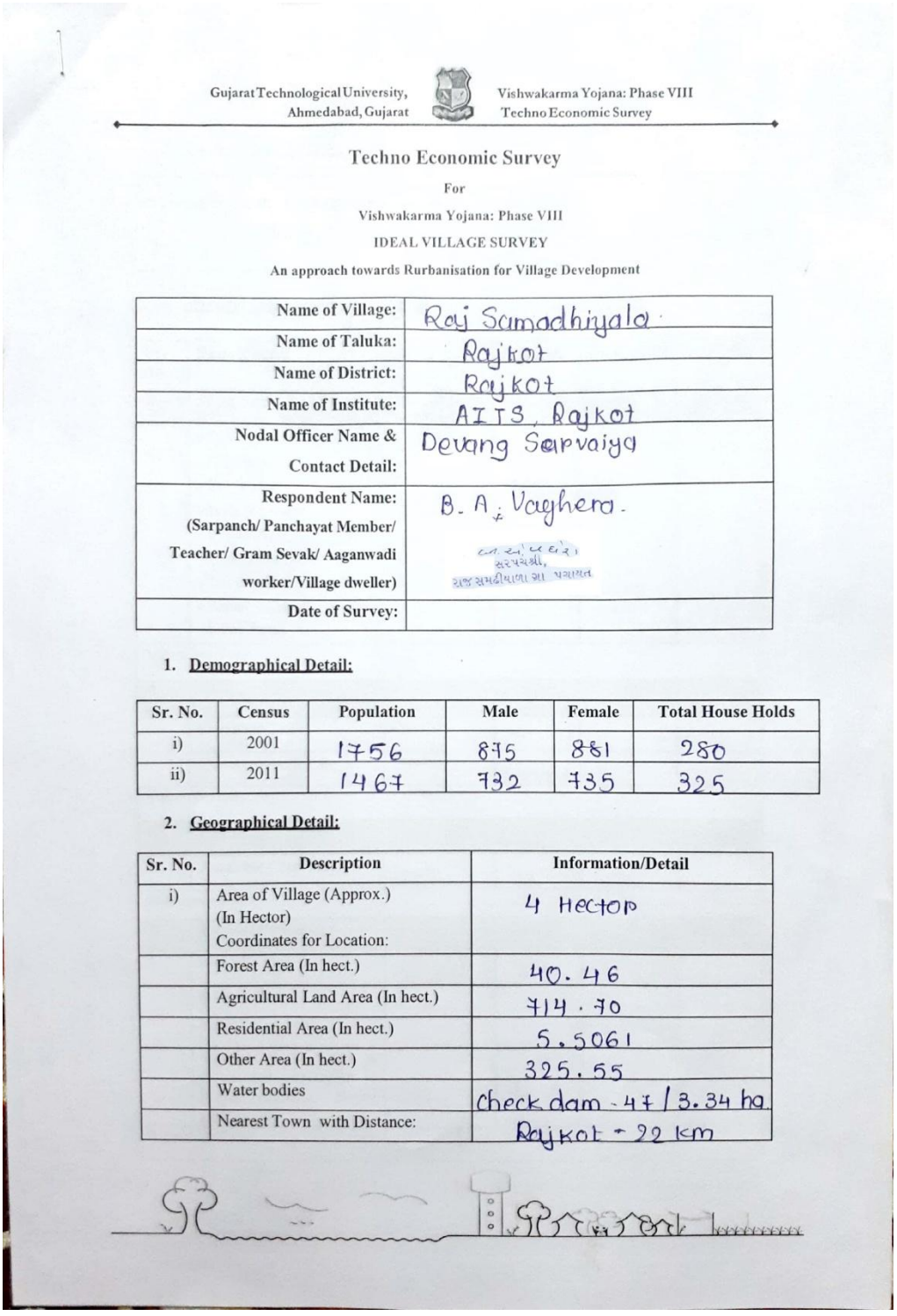
Chapter 12: Annexure

12.1 Scanned copy of Ideal Village Survey Form



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	Raj Samadhiyala
Name of Taluka:	Rajkot
Name of District:	Rajkot
Name of Institute:	AITS, Rajkot
Nodal Officer Name & Contact Detail:	Devang Sarvaiya
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	B. A. Vaghera. સરપંચશ્રી, રાજ સમઢીયાળા ગ્રા. પંચાયત
Date of Survey:	

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	1756	875	881	280
ii)	2011	1467	732	735	325

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	4 Hector
	Forest Area (In hect.)	40.46
	Agricultural Land Area (In hect.)	714.70
	Residential Area (In hect.)	5.5061
	Other Area (In hect.)	325.55
	Water bodies	check dam - 47 / 3.34 ha
	Nearest Town with Distance:	Rajkot - 22 km

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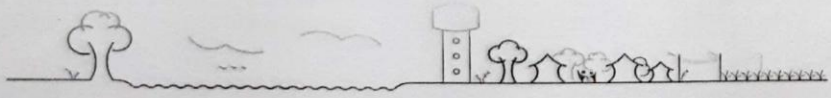
3. **Occupational Details:**

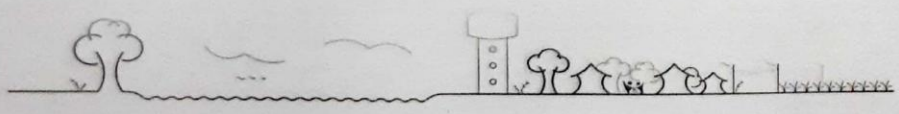
Name of Three Major Occupation groups in Village	1. Farmer 2. Dairy 3. Spinning mill

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	✓			
	• RO Water	✓	✓		
	• Well (Covered/ Uncovered)	✓			
	• Hand pumps				
	• Tube well/ Borehole	✓	✓		
	• River/ Canal/ Spring/ Lake/ Pond	✓	✓		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	-		
	Underground Sump	Capacity:	100000		
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	Yes	✓		
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	closed	✓		
	If Open than Pucca / Kutchcha				
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	NO	✓		
Suggestions if any:					



E.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	All weather	✓		
	Main road	C.C. road	✓		
	Internal streets	C.C. road	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms. 100m.	SH Rajkot-Bhavnagar Highway	✓		
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO 22 km Bhaktinagar			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	yes good			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	All type of Transportation available.			
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes. Govt. more than 6 hrs.			
	Power supply for Domestic Use	✓			
	Power supply for Agricultural Use	✓			
	Power supply for Commercial Use	✓			
	Road/ Street Lights	✓	✓		



	Electrification in Government Buildings/ Schools/ Hospitals	yes			
	Renewable Energy Source Facilities (Y/ N)	✓			
	LED Facilities	✓			
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	✓ 5			
	Location New gomtal - 2 Condition visitor lenure - 1 Harijan vas - 2				
	Community Toilet (With bath/ without bath facilities)	Cricket ground - 1 community bath at smashan			
	Solid & liquid waste Disposal system available	yes			
	Any facility for Waste collection from road	yes gram panchayat employee			
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	well tube well Borewell - 2			
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	5 | 95			

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

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K.	Health Facilities:				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	PHC sub center Sub center NO			
	Private Clinic/Private Hospital/ Nursing Home	NO			
	If any of the above Facility is not available in village than approx. distance from village: ...4....kms. Sardhar & Kasturbadham				
Suggestions if any:					

L.	Education Facilities:				
	Aaganwadi/ Play group	✓			
	Primary School	✓			
	Secondary school	✓			
	Higher sec. School	-	Sardhar & Kasturbadham		
	ITI college/ vocational Training Center	22 Km Rajkot			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	-	RK University Tramba - 7 Km		
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

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

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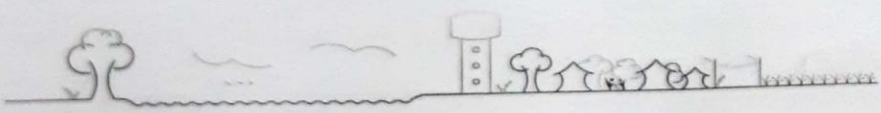
	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	NO			
	Public Garden Location: Condition:	Yes good			
	Village Pond Location: Condition:	Yes			
	Recreation Center Location: Condition:	NO			
	Cinema/ Video Hall Location: Condition:	Yes good			
	Assembly Polling Station Location: Condition:	primary school good.			
	Birth & Death Registration Office Location: Condition:	gram panchayat good			
If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:					
N.	**Other Facilities**				
	Post-office	Sub Post office			
	Telecommunication Network/ STD booth	NO			



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	General Market	NO			
	Shops (Public Distribution System)	yes			
	Panchayat Building	yes			
	Pharmacy/Medical Shop	NO			
	Bank & ATM Facility	NO			
	Agriculture Co-operative Society	NO			
	Milk Co-operative Soc.	yes			
	Small Scale Industries	yes - 2 big industries.			
	Internet Cafes/ Common Service Center/Wi Fi	Wifi yes			
	Other Facility	CCTV camera.			
Suggestions if any:					

6. Sustainable /Green Infrastructure Facilities:

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

7. Data Collection From Village

Village Base Map Available: Hard Copy/Soft Copy	yes.

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Techno Economic Survey

Recent Projects going on for Development of Village	Paving block near visitor center
Any NGO working for village development	NO.

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)	- secondary school building - 42 checkdam & lack - Mahila gram panchayat - free wifi	
2.	Additional Information/ Requirement		

9. Smart Village Proposal Design

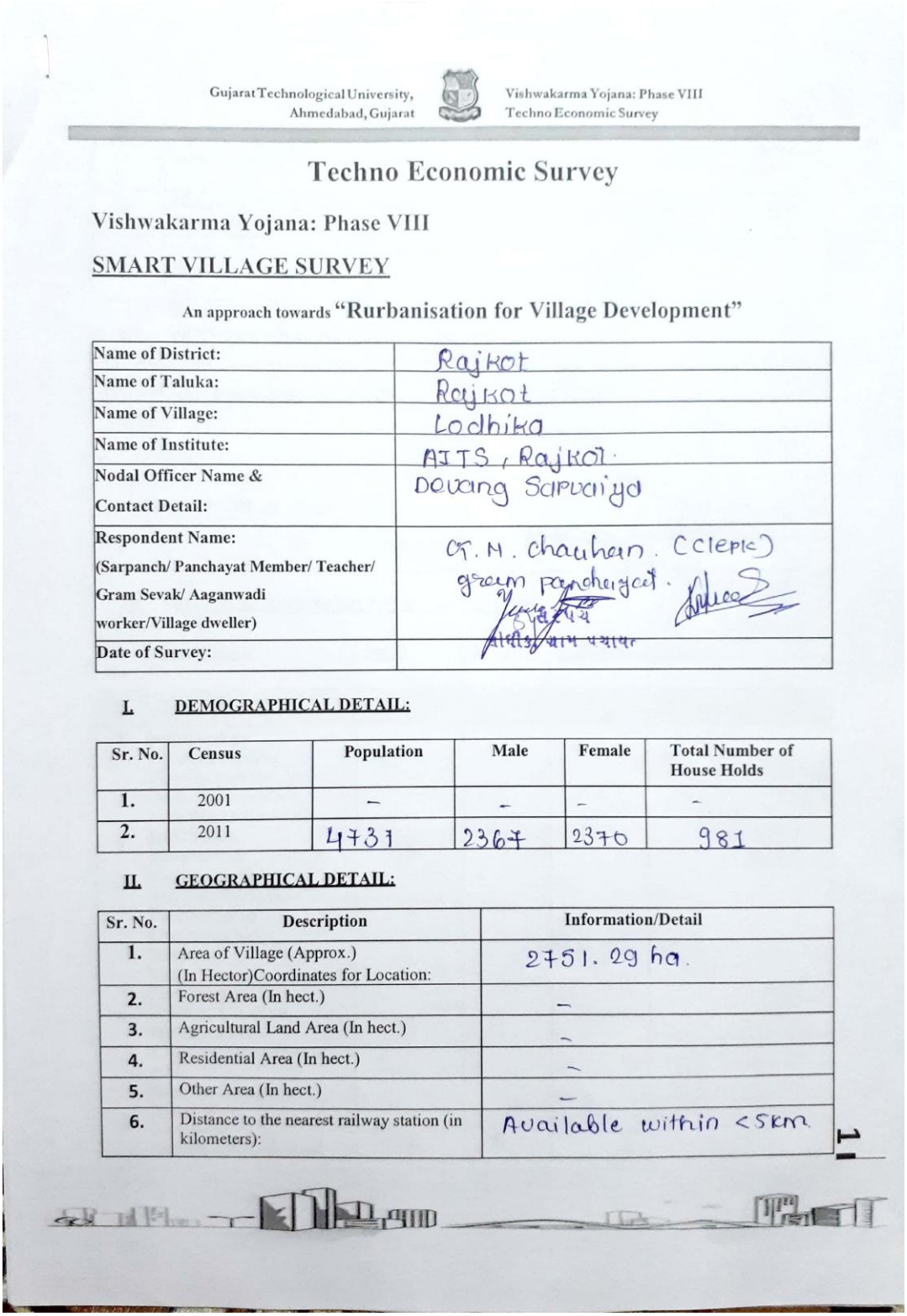
Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

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

સરપચશ્રી,
રાજ સમઢીયાળા ગ્રા પચાયત

12.2 Scanned copy of Smart Village



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

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Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

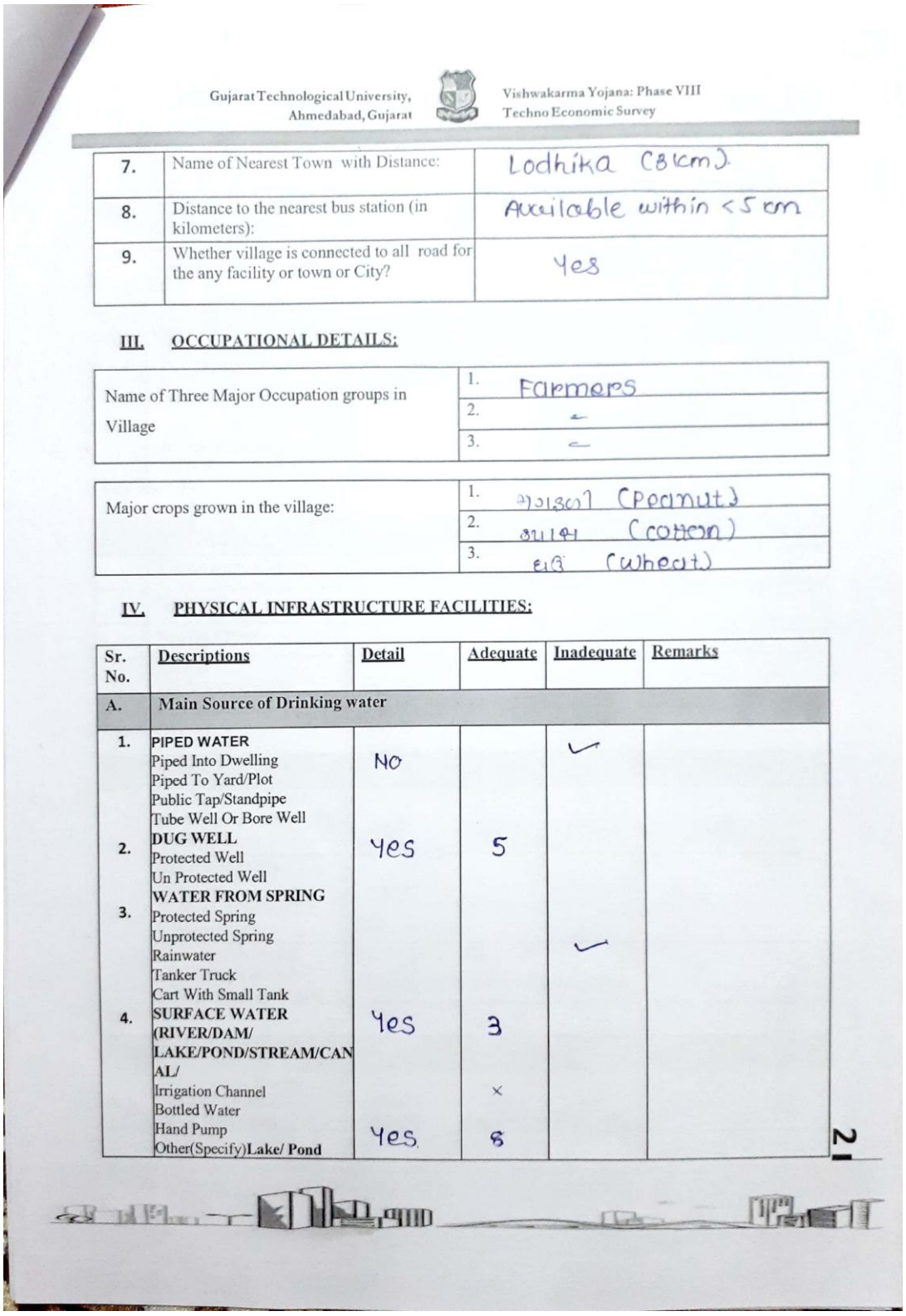
Name of District:	Rajkot
Name of Taluka:	Rajkot
Name of Village:	Lodhika
Name of Institute:	AITS, Rajkot.
Nodal Officer Name & Contact Detail:	Dayang Sarvaiya
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Gt. M. Chauhan. (Clerk) gram panchayat.
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	-	-	-	-
2.	2011	4731	2367	2370	981

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	2751.29 ha.
2.	Forest Area (In hect.)	-
3.	Agricultural Land Area (In hect.)	-
4.	Residential Area (In hect.)	-
5.	Other Area (In hect.)	-
6.	Distance to the nearest railway station (in kilometers):	Available within <5km



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7.	Name of Nearest Town with Distance:	Lodhika (8 km)
8.	Distance to the nearest bus station (in kilometers):	Available within <5 km
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

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

Major crops grown in the village:	1.	મગફળી (Peanut)
	2.	કપાસ (cotton)
	3.	ઘઉં (wheat)

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER**			✓	
	Piped Into Dwelling	No			
	Piped To Yard/Plot				
	Public Tap/Standpipe				
	Tube Well Or Bore Well				
2.	**DUG WELL**	Yes	5		
	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/**	Yes	3		
	Irrigation Channel		×		
	Bottled Water				
	Hand Pump				
	Other(Specify)**Lake/ Pond**	Yes	8		

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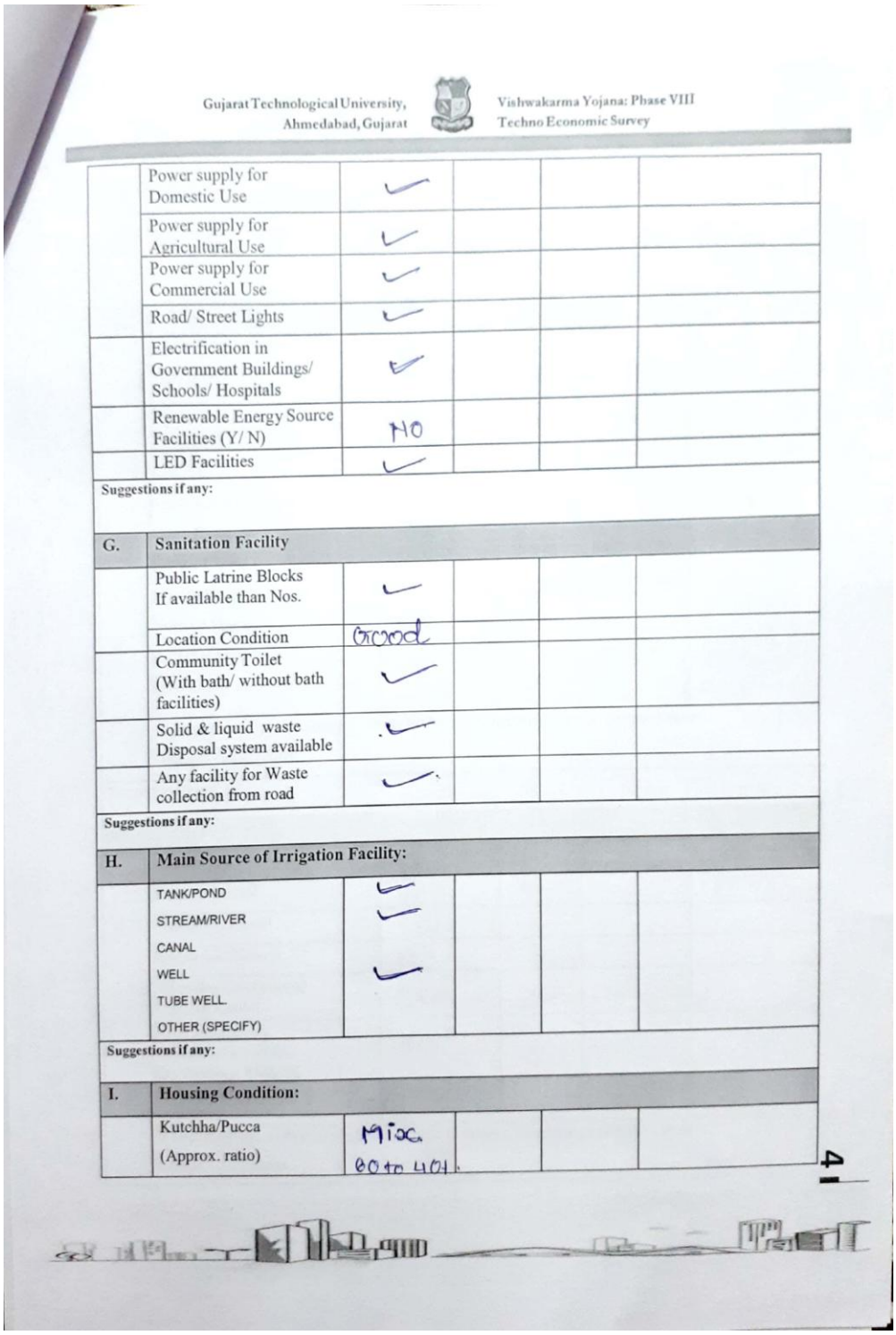
Suggestions if any:						
B.	Water Tank Facility					
	Overhead Tank	Capacity:	1 Lac.	✓		
	Underground Sump	Capacity:	2.5 lac.	✓		
Suggestions if any:						
C.	The Type of Drainage Facility					
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	Yes - close				
Suggestions if any:						
D.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM					
	Village approach road	Ribada. (All weather Road).				
	Main road	cc road.				
	Internal streets	✓				
	Nearest NH/SH/MDR/ODR Dist. in kms.	35 km				
Suggestions if any:						
E.	Transport Facility					
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	X 20 km +				
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	✓ Less 5 km				
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	All type of transportation available				
Suggestions if any:						
F.	Electricity Distribution					
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	✓ Govt.	more than 6 hrs.			

3



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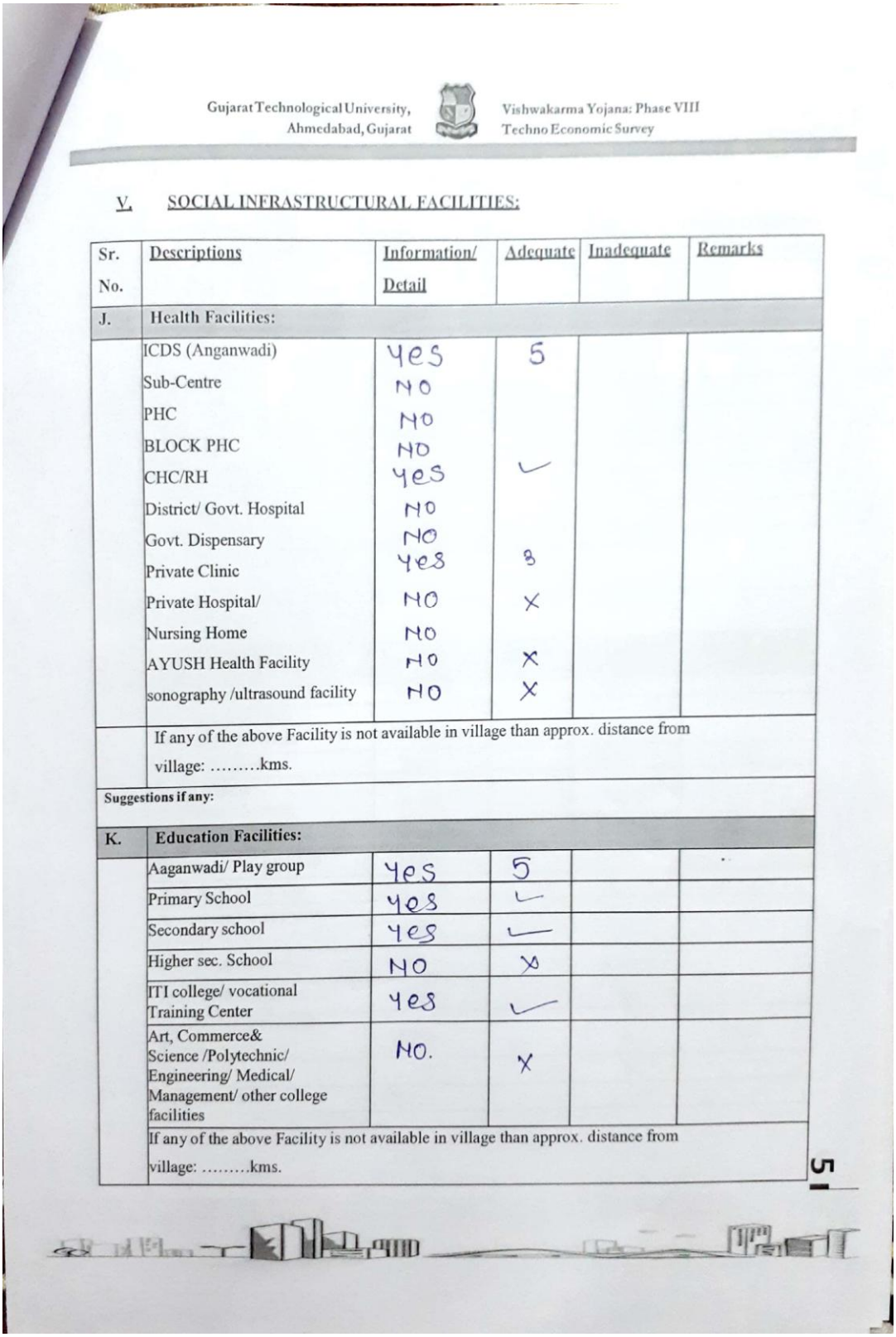
	Power supply for Domestic Use	✓			
	Power supply for Agricultural Use	✓			
	Power supply for Commercial Use	✓			
	Road/ Street Lights	✓			
	Electrification in Government Buildings/ Schools/ Hospitals	✓			
	Renewable Energy Source Facilities (Y/ N)	NO			
	LED Facilities	✓			
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	✓			
	Location Condition	Good			
	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)	Mix. 60 to 40.			



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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)	YES	5		
	Sub-Centre	NO			
	PHC	NO			
	BLOCK PHC	NO			
	CHC/RH	YES	✓		
	District/ Govt. Hospital	NO			
	Govt. Dispensary	NO			
	Private Clinic	YES	3		
	Private Hospital/	NO	X		
	Nursing Home	NO			
	AYUSH Health Facility	NO	X		
	sonography /ultrasound facility	NO	X		
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	YES	5		
	Primary School	YES	✓		
	Secondary school	YES	✓		
	Higher sec. School	NO	X		
	ITI college/ vocational Training Center	YES	✓		
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	NO.	X		
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				

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Suggestions if any:

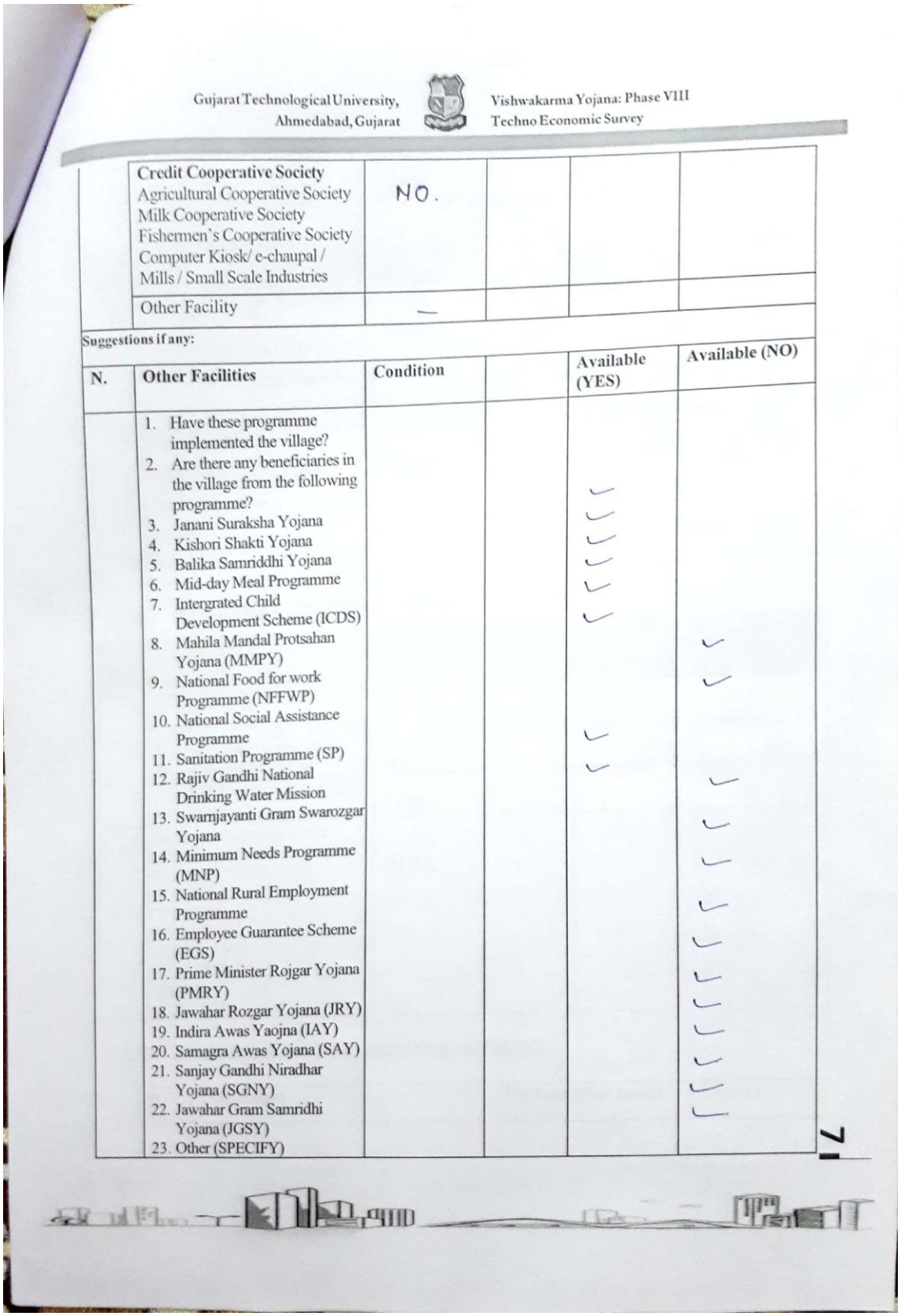
L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	Good.		2	
	Public Library (With daily newspaper supply: Y/N)	Yes		✓	
	Public Garden	NO		X	
	Village Pond				
	Recreation Center	NO		X	
	Cinema/ Video Hall	No		X	
	Assembly Polling Station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

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

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	Good		✓	
	Telecommunication Network/ STD booth	Yes		✓	
	General Market	NO		4	NO
	Shops (Public Distribution System)	Yes		✓	
	Panchayat Building	Yes.		✓	
	Pharmacy/Medical Shop	Yes		1	
	Bank & ATM Facility	Yes		✓	
	Agriculture Co-operative Society	Yes.		✓	
	Milk Co-operative Soc.	Yes		✓	
	Small Scale Industries	NO.		X	
	Internet Cafes/ Common Service Center/Wi Fi	NO.		X	
	Youth Club	NO		X	
	Mahila Mandal	Yes		✓	

6



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

Suggestions if any:

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

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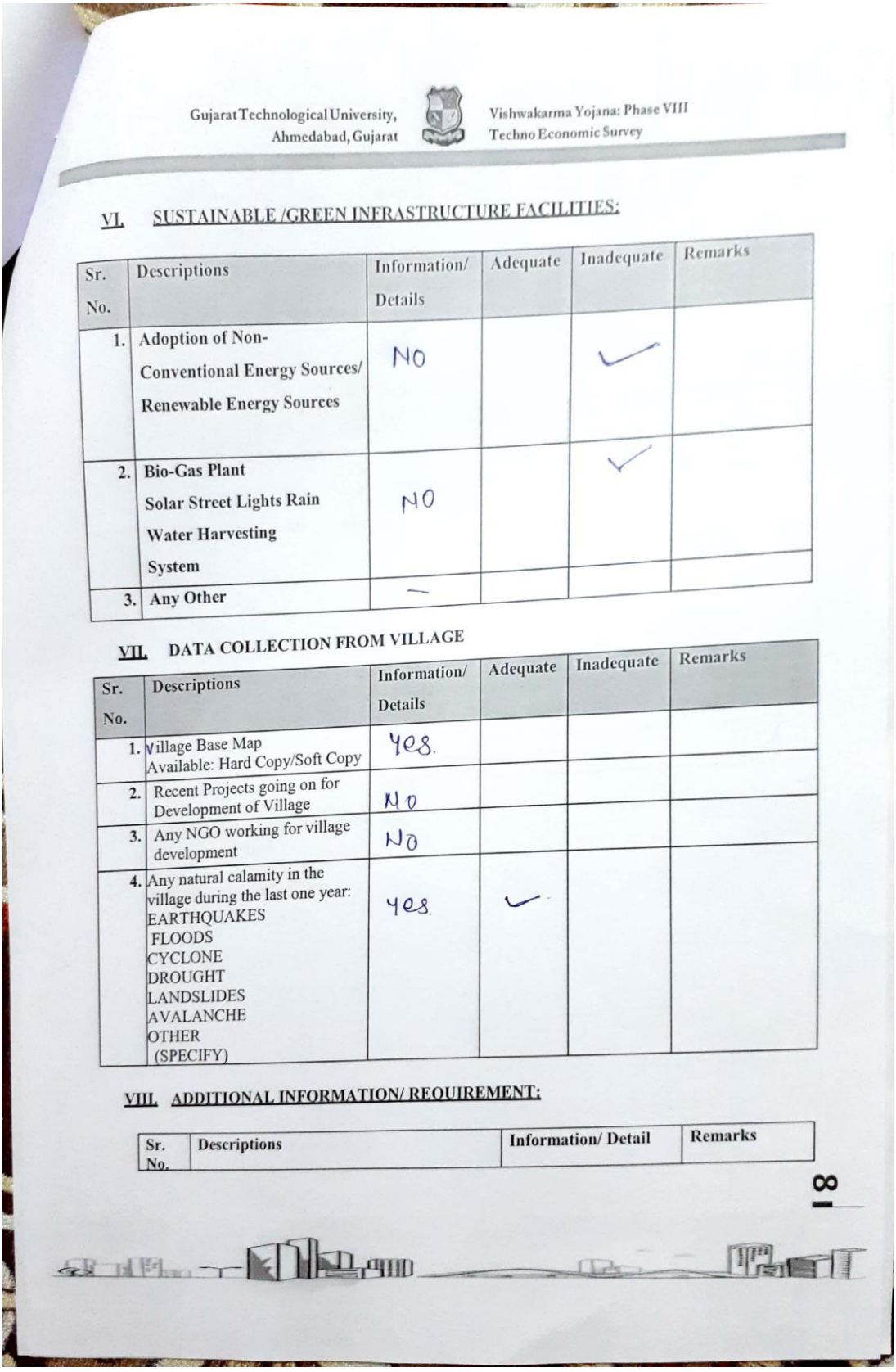

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

8

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

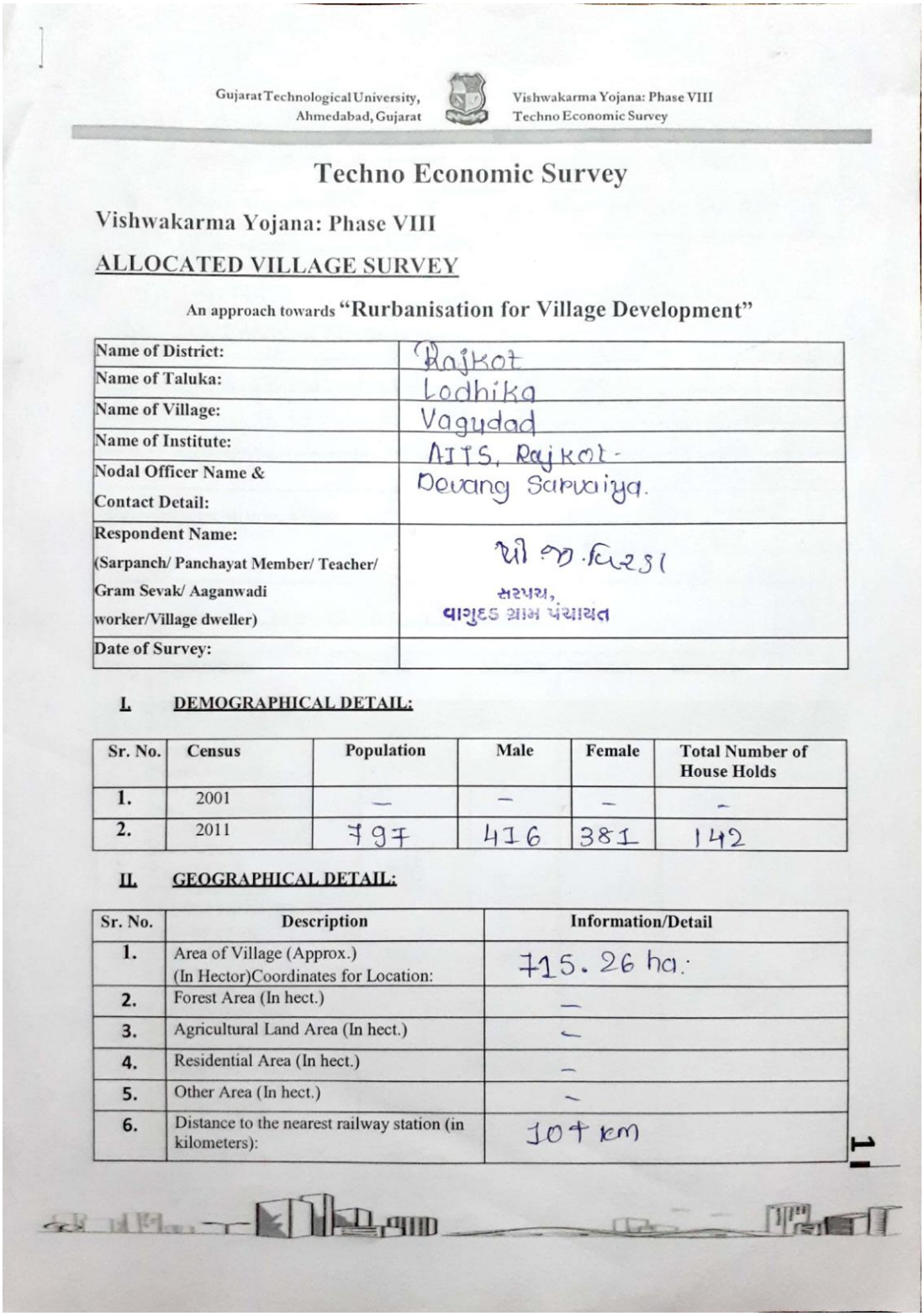
IX. Smart Village / Heritage Details

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

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

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

12.3 Scanned copy of allocated village Survey Form.



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Techno Economic Survey

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Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

Name of District:	Rajkot
Name of Taluka:	Lodhika
Name of Village:	Vagudad
Name of Institute:	AITS, Rajkot.
Nodal Officer Name & Contact Detail:	Devang Sarvaiya.
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	પી.ડી.વિરડા સરપંચ, વાગુદડ ગ્રામ પંચાયત
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	–	–	–	–
2.	2011	797	416	381	142

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	715.26 ha.
2.	Forest Area (In hect.)	–
3.	Agricultural Land Area (In hect.)	–
4.	Residential Area (In hect.)	–
5.	Other Area (In hect.)	–
6.	Distance to the nearest railway station (in kilometers):	10+ km

7.	Name of Nearest Town with Distance:	Rajkot → 16 km
8.	Distance to the nearest bus station (in kilometers):	Available within 10+ km
9.	Whether village is connected to all road for the any facility or town or City?	Yes

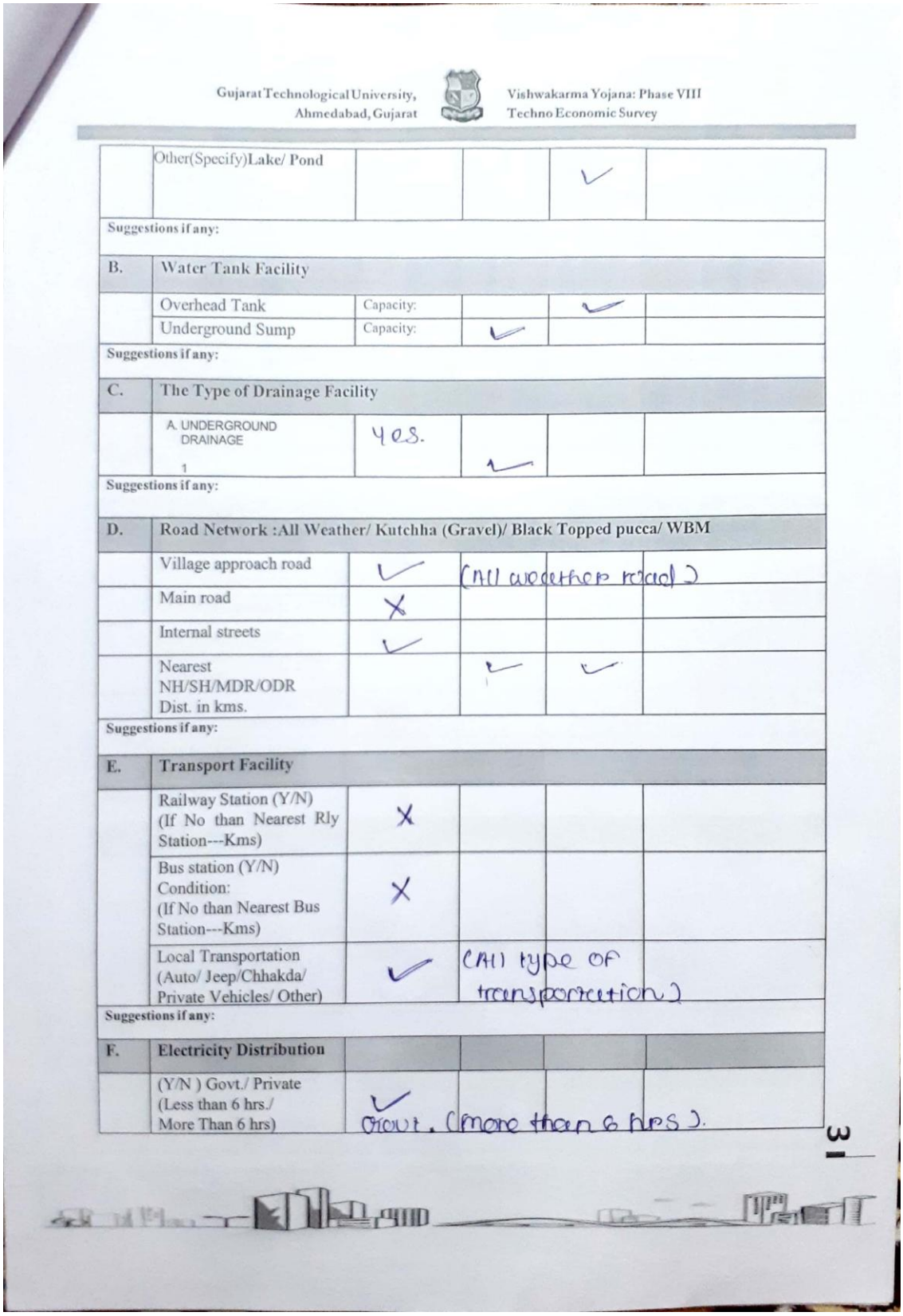
III. OCCUPATIONAL DETAILS:

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

Major crops grown in the village:	1.	મગફળી (Peanut)
	2.	કપાસ (Cotton)
	3.	ઘઉં (Wheat)

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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



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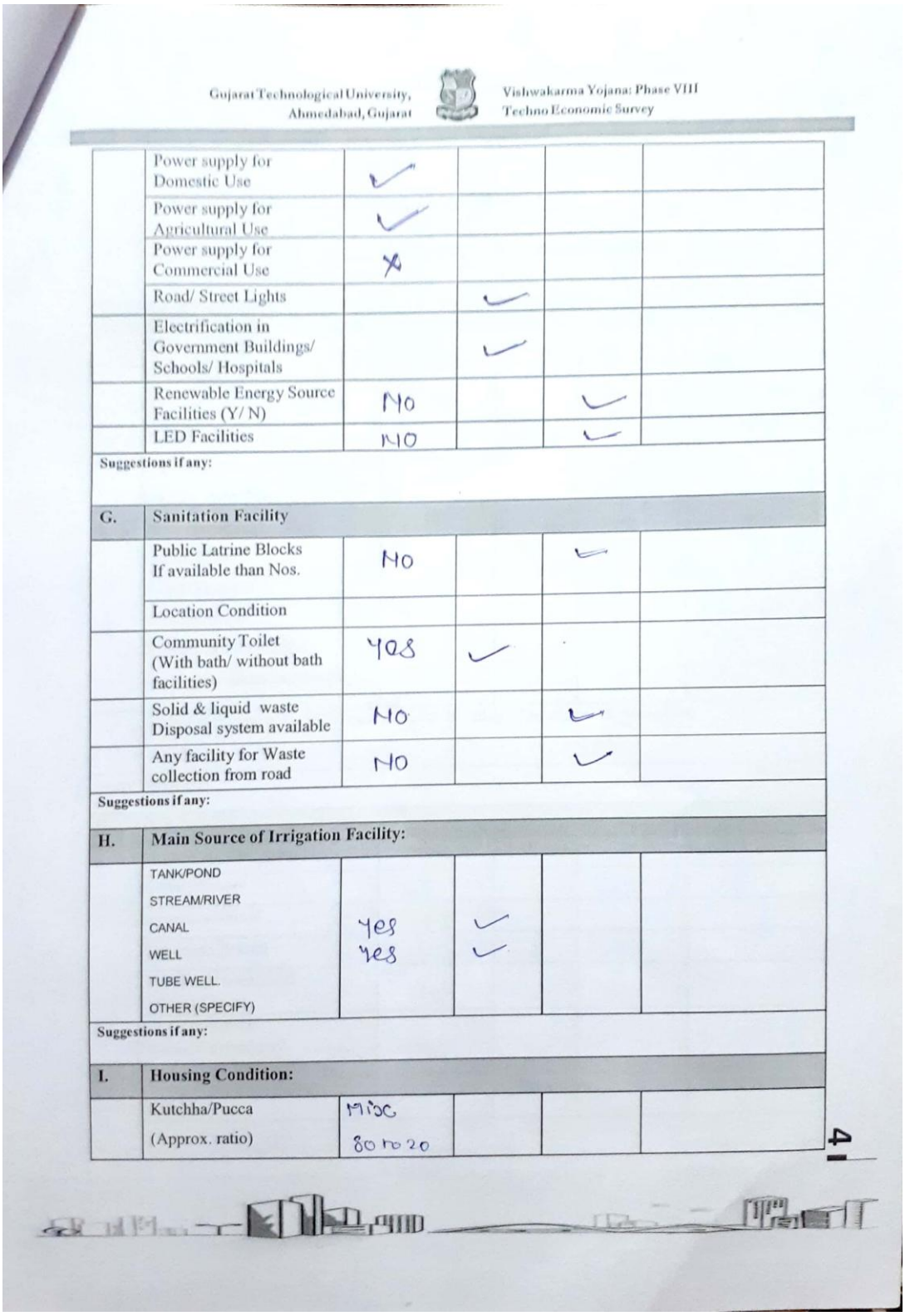
	Other(Specify)Lake/ Pond			✓	
Suggestions if any:					
B.	Water Tank Facility				
	Overhead Tank	Capacity:		✓	
	Underground Sump	Capacity:	✓		
Suggestions if any:					
C.	The Type of Drainage Facility				
	A. UNDERGROUND DRAINAGE 1	Yes.	✓		
Suggestions if any:					
D.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	✓	(All weather road)		
	Main road	X			
	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)	X			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	X			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	✓	(All type of transportation)		
Suggestions if any:					
F.	Electricity Distribution				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	✓ Govt. (more than 6 hrs).			



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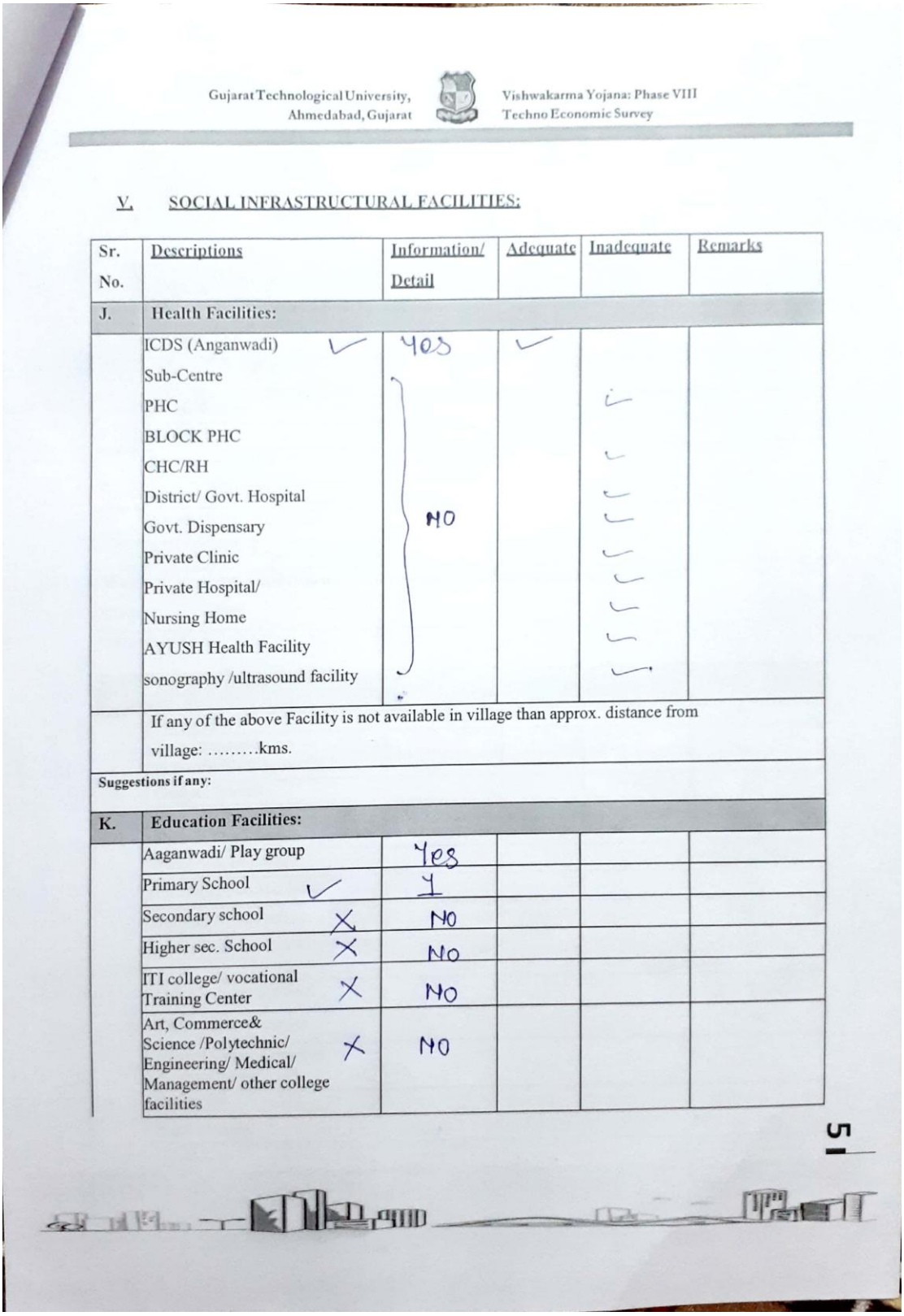
	Power supply for Domestic Use	✓			
	Power supply for Agricultural Use	✓			
	Power supply for Commercial Use	X			
	Road/ Street Lights		✓		
	Electrification in Government Buildings/ Schools/ Hospitals		✓		
	Renewable Energy Source Facilities (Y/ N)	NO		✓	
	LED Facilities	NO		✓	
Suggestions if any:			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

4



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V. SOCIAL INFRASTRUCTURAL FACILITIES:

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

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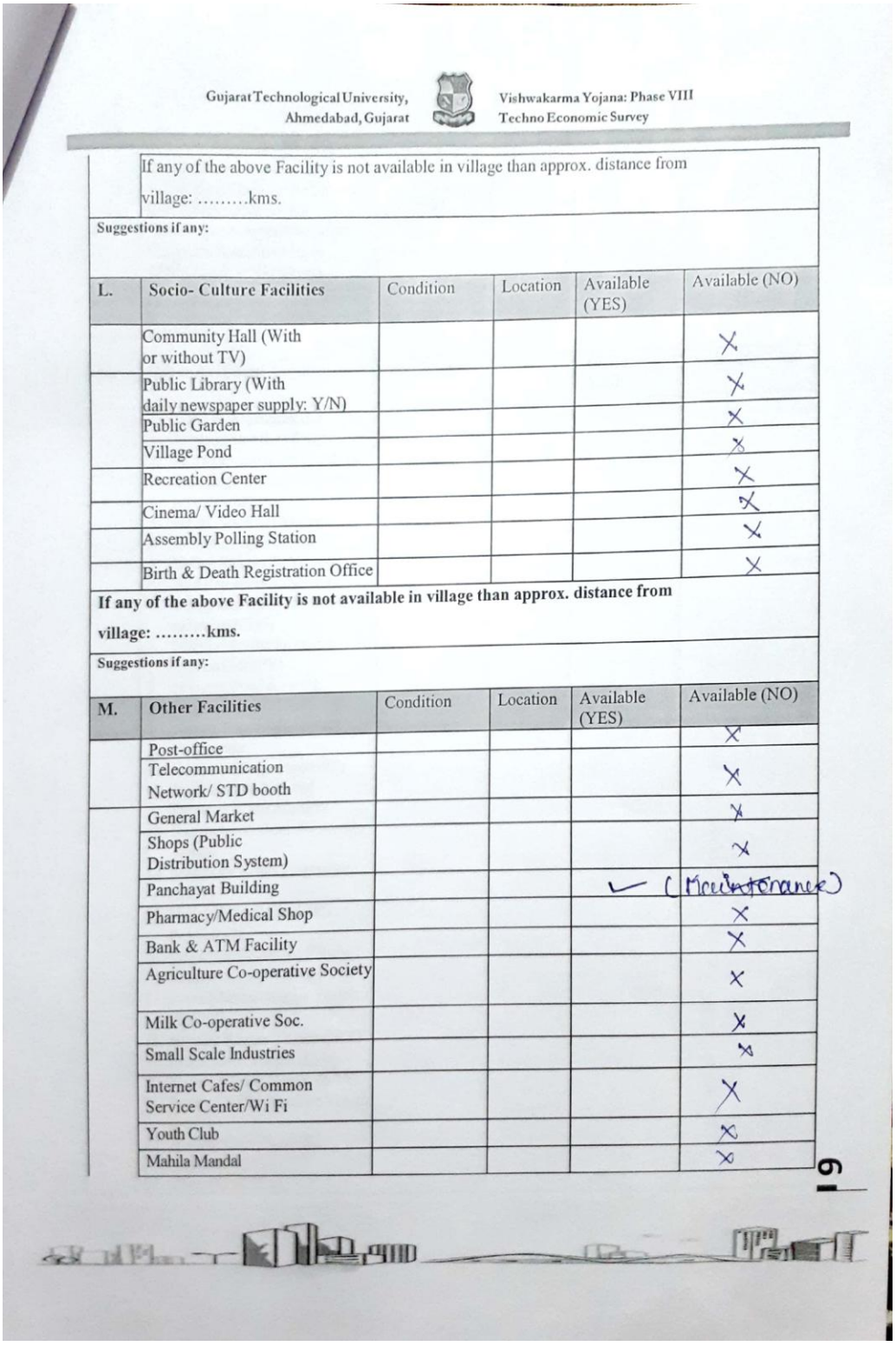

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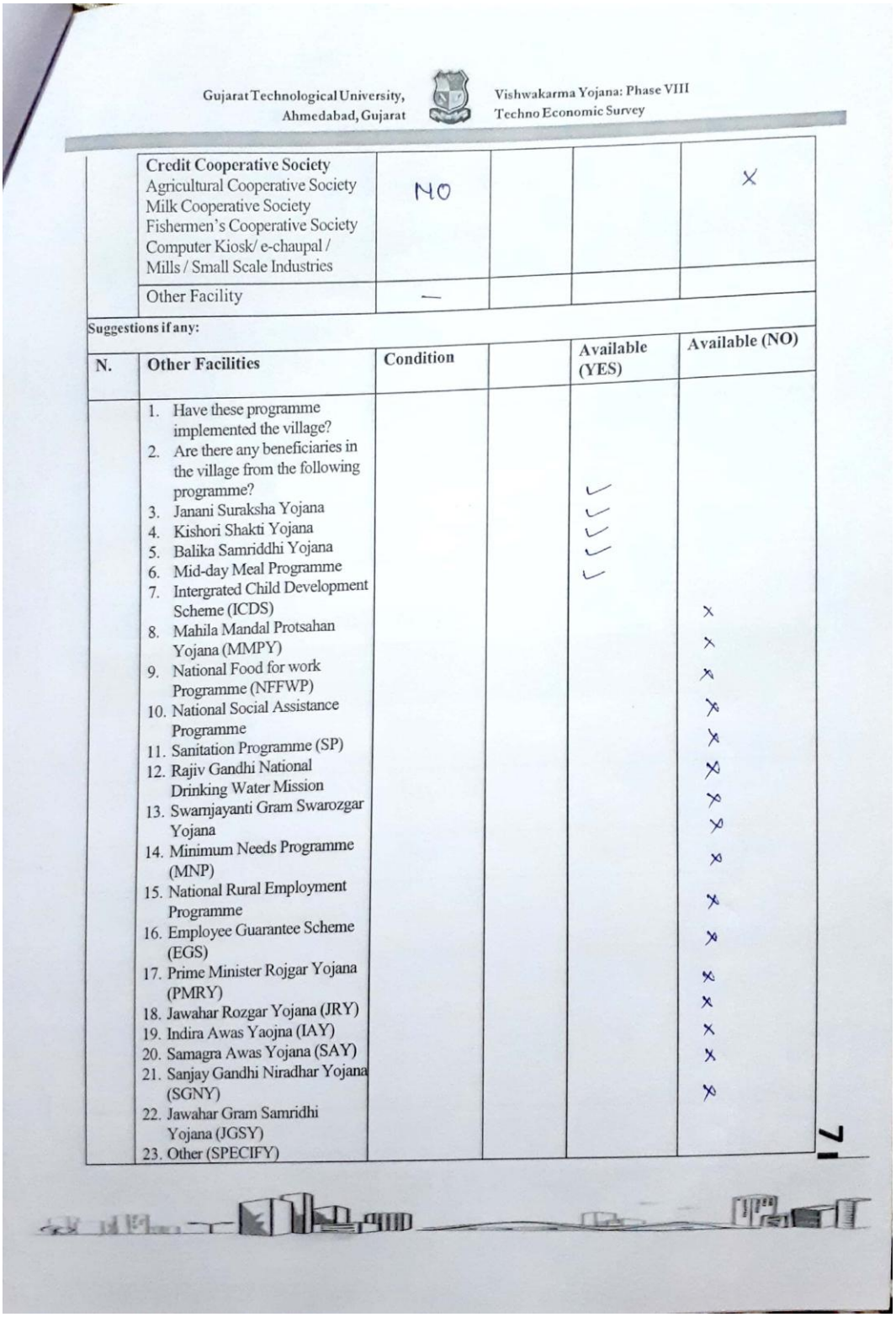
	If any of the above Facility is not available in village than approx. distance from village: .....kms.
Suggestions if any:	

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

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

Suggestions if any:

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



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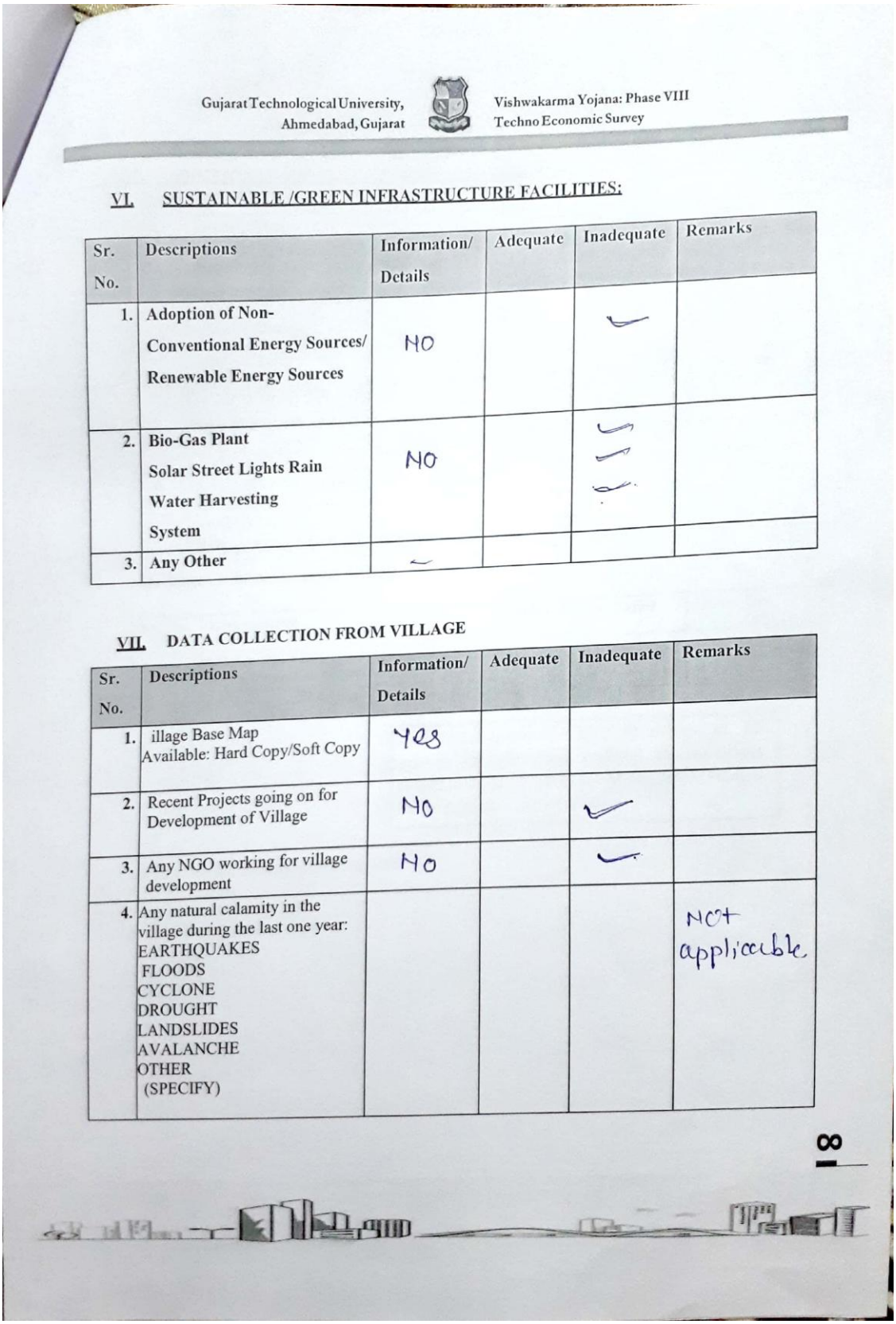
	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	NO			X
	Other Facility	—			

Suggestions if any:

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

7



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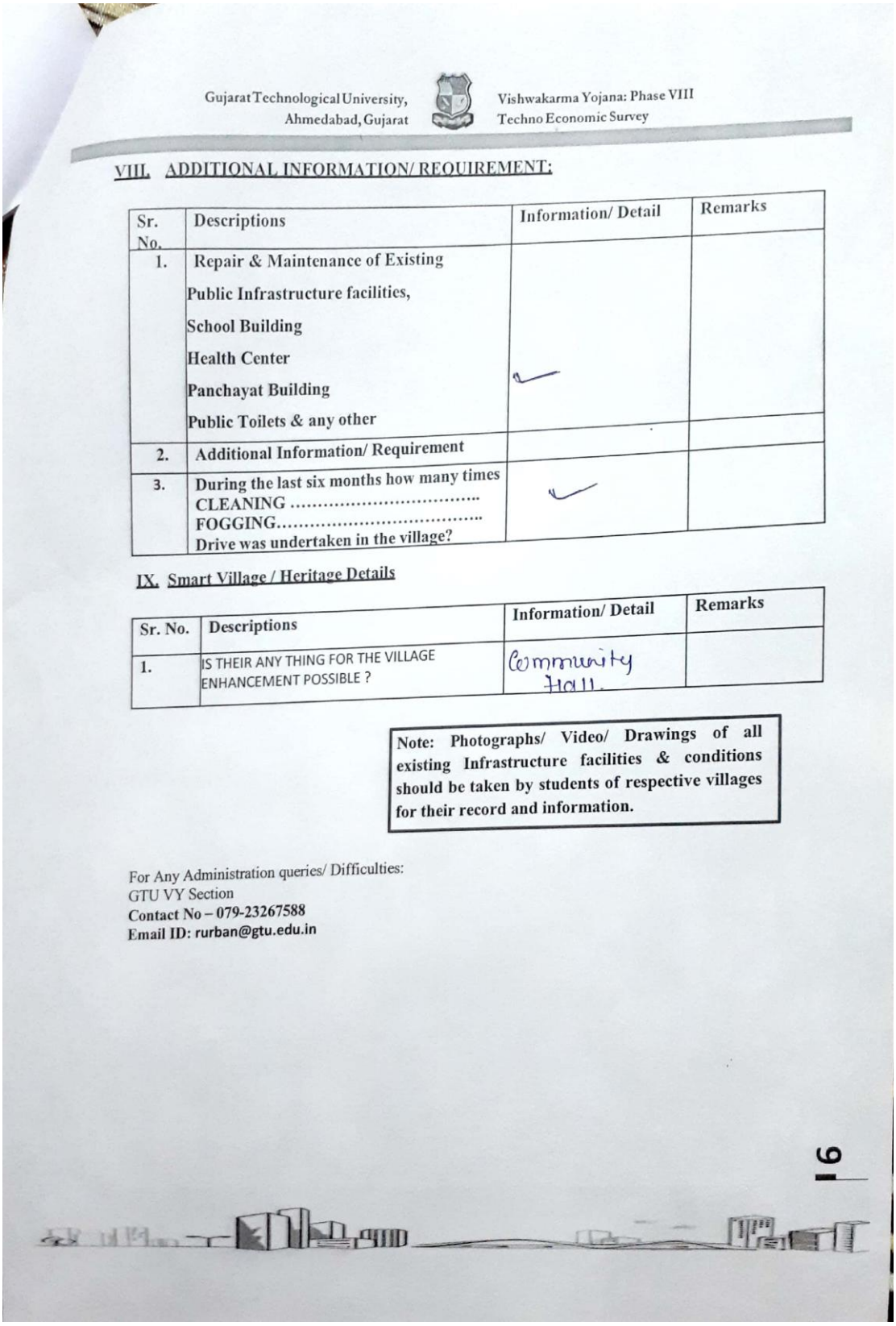
VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

8



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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	✓	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?	✓	

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	Community Hall.	

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

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Email ID: rurban@gtu.edu.in

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12.4 Gap Analysis

Table 19:Gap analysis

Village Facilities	**Planning Commission/UDPFI Norms**	**Village**	**Vagudad**	
		Population	**797**	
		Existing	**Required as per Norms**	**Gap**
	Social Infrastructure Facilities			
	Education			
Anganwadi	Each or Per 2500 population	**1**	**2**	**1**
Primary school	Each Per 2500 population	**1**		
Secondary School	Per 7,500 population	**0**	**1**	**-1**
Higher Secondary School	Per 15,000 Population	**0**	**1**	**-1**
College	Per 125,000 Population	**0**	**0**	
Tech. Training Institute	Per 100000 Population	**0**	**0**	
Agriculture Research Centre	Per 100000 Population	**0**	**0**	
Skill Development Center	Per 100000 Population	**0**	**0**	
	Health Facility			
Govt/Panchayat Dispensary or Sub	Each Village	**0**	**1**	**-1**
Primary Health & Child Health	Per 20,000 population	**0**	**0**	
Child Welfare and Maternity Home	Per 10,000 population	**0**	**0**	
Multispecialty Hospital	Per 100000 Population	**0**	**0**	
	Public Latrines			
	1 for 50 families (if toilet is not there in home, especially for slum pockets & kutcha house)	**0**	**1**	**-1**
	Physical Infrastructure Facilities			
	Transportation	**Adequate**	**InAdequate**	
Pucca Village Approach Road	Each village	Yes		
Bus/Auto Stand provision	All Villages connected by PT (S.T.Bus or Auto)		**Yes**	
Drinking Water (Minimum 70 lpcd)		**Yes**		
Over Head Tank	1/3 of Total Demand		**Yes**	
U/G Sump	2/3 of Total Demand		**Yes**	
Drainage Network - Open		**Yes**		
Drainage Network – Close		**Yes**		
Waste Management System			**Yes**	

	Socio Cultural Infrastructure Facilities	Existing	Required as per Norms	Gap
Community Hall	Per 10000 Population	**0**	**1**	**-1**
Public Library	Per 15000 Population	**0**	**1**	**-1**
Cremation Ground **Post Office**	Per 20000 Population	**0**	**1**	**-1**
Gram Panchayat Building	Each individual/group	**1**	**1**	**0**
Post Office	Per 10,000 population	**0**	**1**	**-1**
APMC	Per 100000 Population	**0**	**1**	**-1**
Fire Station	Per 100000 Population	**0**	**1**	**-1**
Public Garden	Per village	**0**	**1**	**-1**
Police post	Per 40,000Population	**0**	**1**	**-1**
Shopping Mall		**0**	**1**	**-1**

12.5 Summary of All Villages Designs as Part-I and Part-II

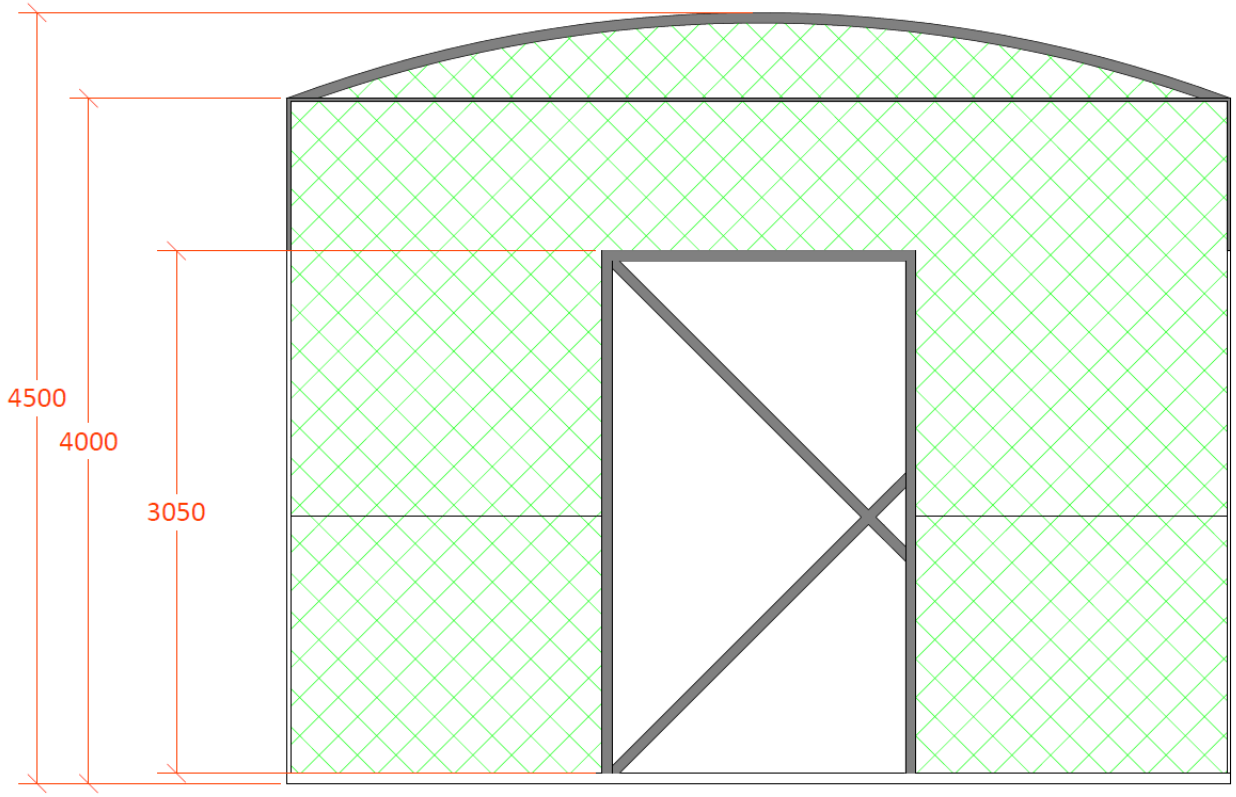
Table 20:Summary of all village designs

Sr no	Village	Discipline	Part 1	Part 2
1	**Vagudad**	**Civil**	Green house	Rain water harvesting system
			Bore well in cremation	Bank
			Rcc tank	Post office
			Vending machine	Clock tower
			Community hall	RO plant
			Renovation of gram panchayat	Septik tank
2	Moviya	Civil	Bus stand	
			Hospital	
			Library	
			Water filtration plant	
			Bio gas plant	
			Drinking water tank for animals	
3	Nyara	Civil	Honey bee breeding center	
			Anganwadi	
			High school	
			Garden	
			CCTVcamera and speakers	
			Entrance gate of village	

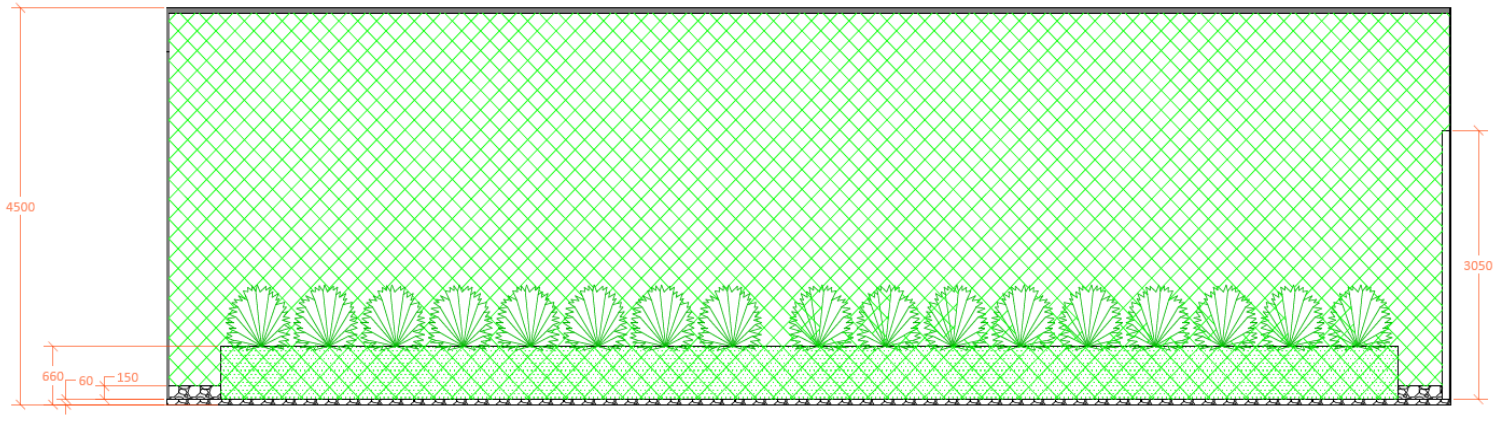
12.6 Detail drawing

12.6.1Green house

- **Elevation**



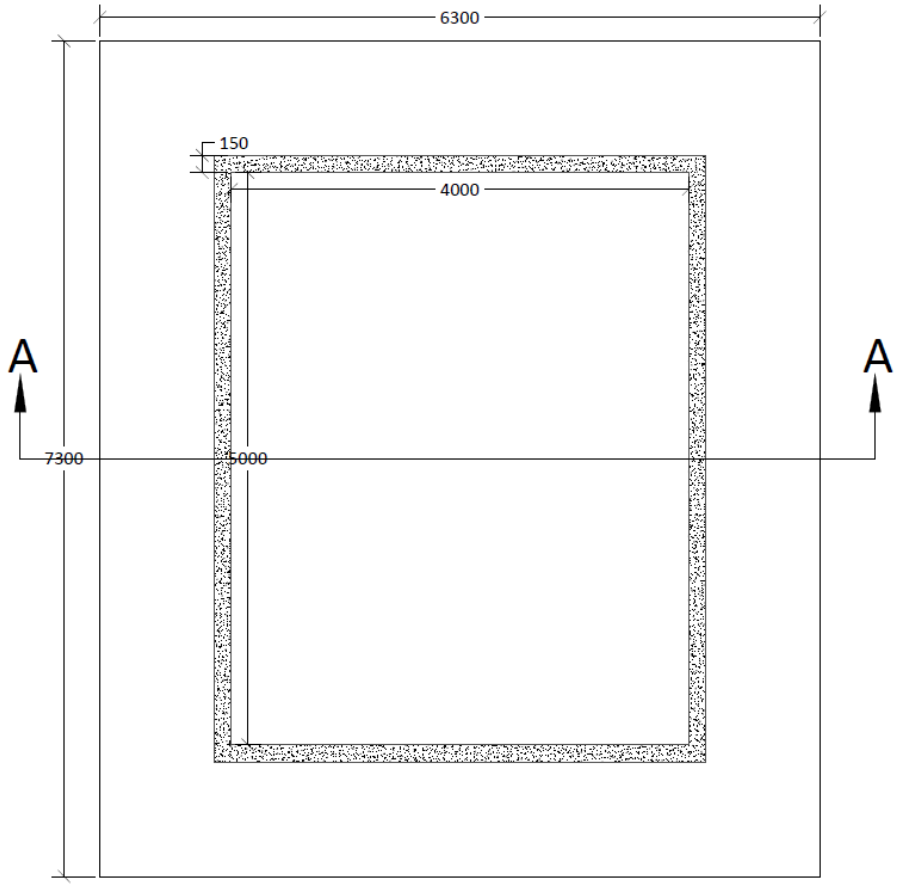
- **Section**



Section AA

12.6.2RCC Tank

- **Plan**



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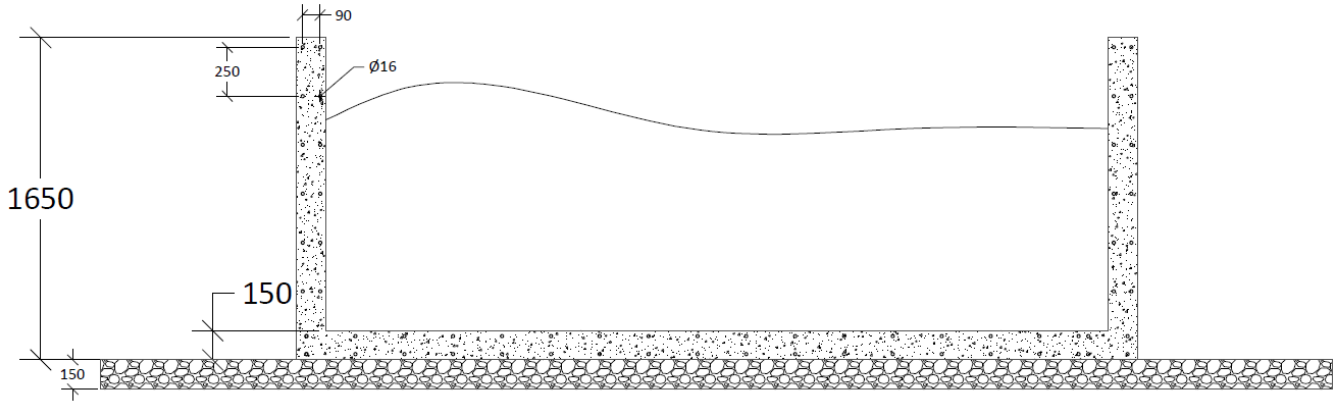
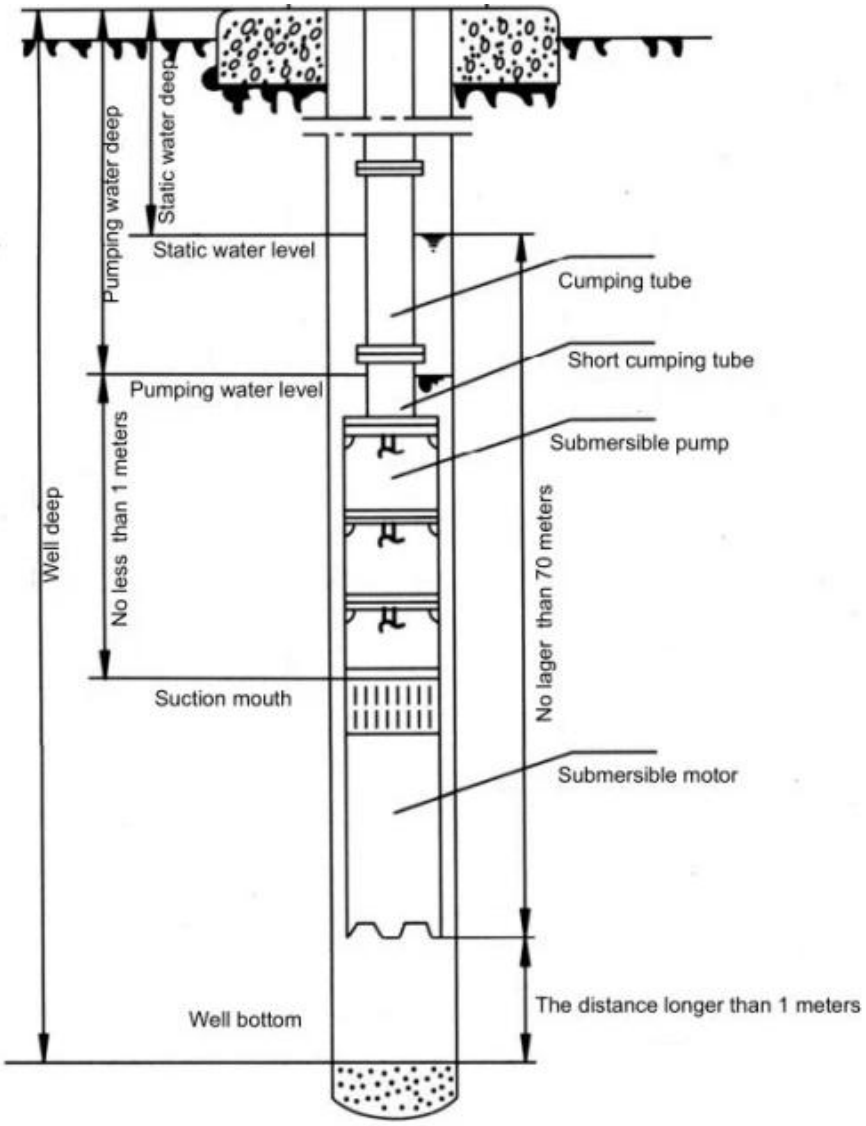


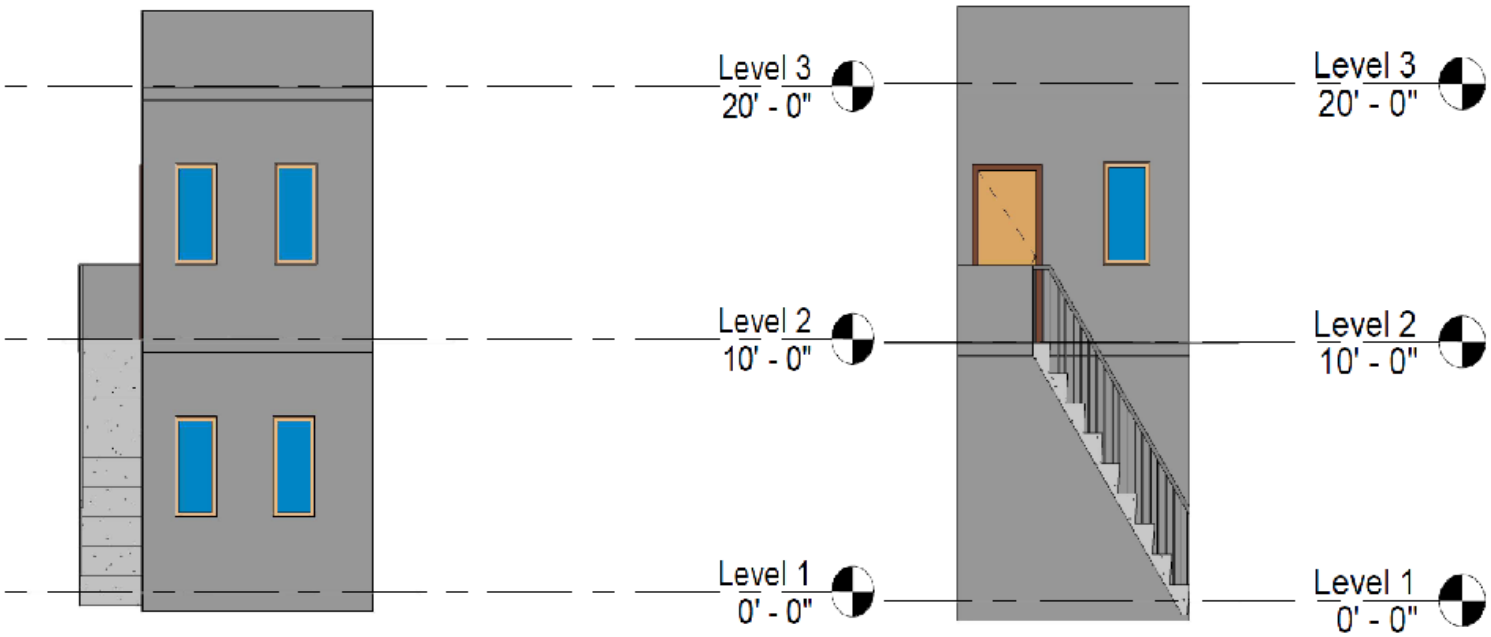
Section AA

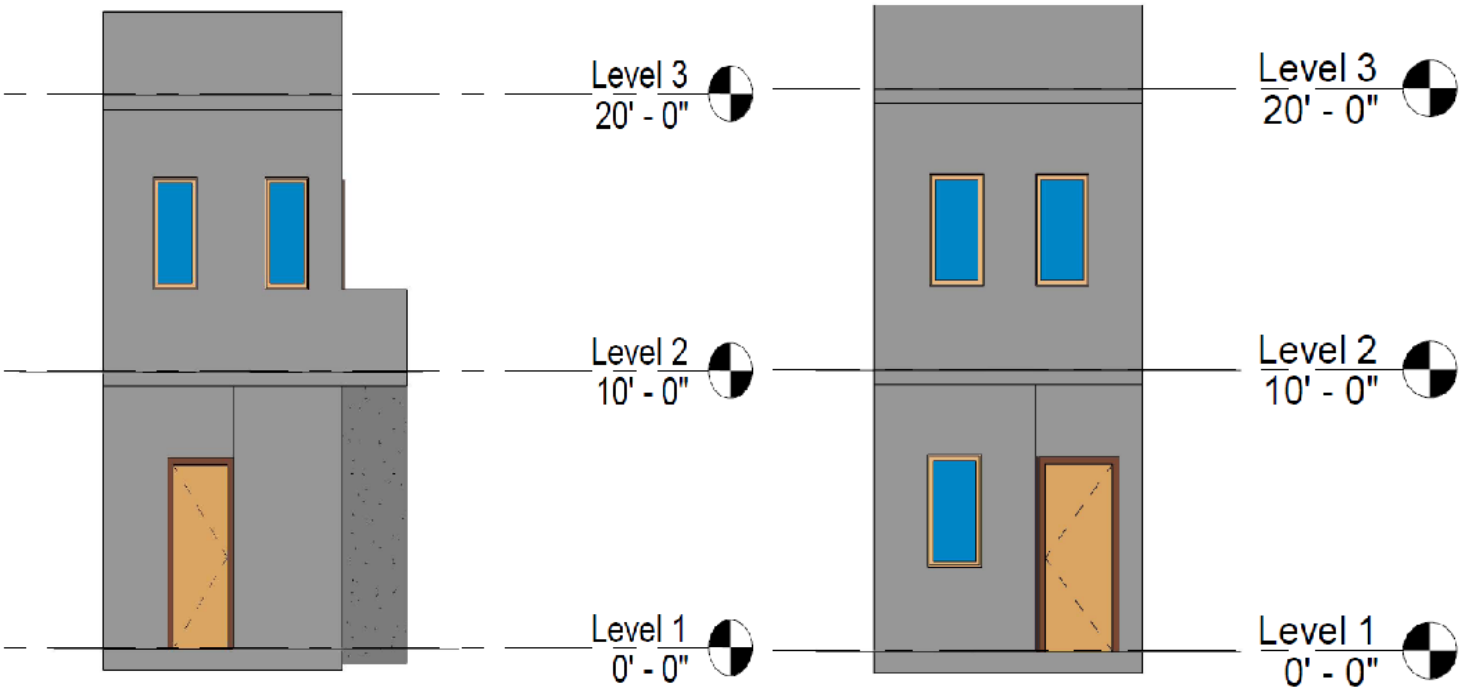
12.6.3Bore well



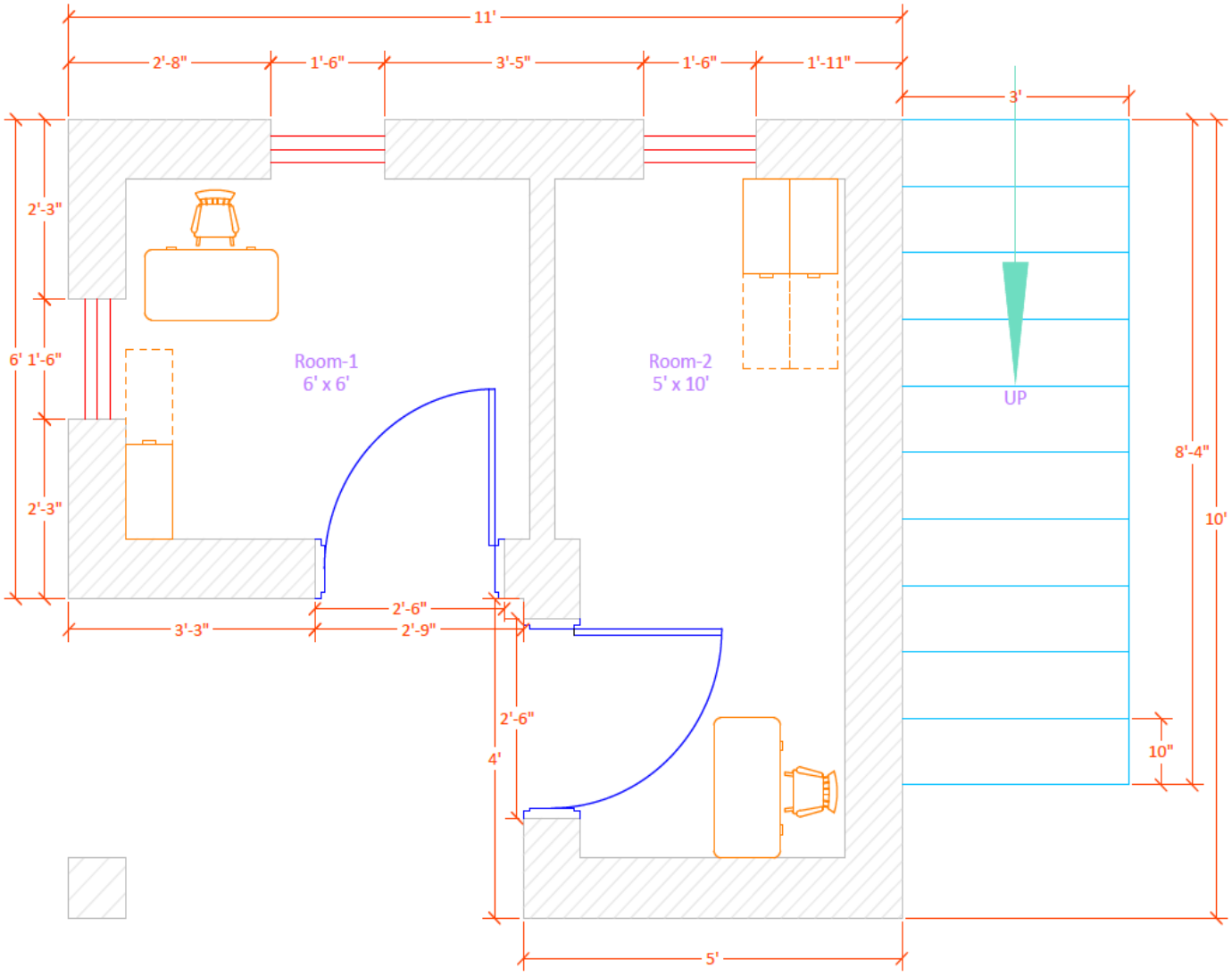
12.6.4Gram Panchayat building

- **Sections**

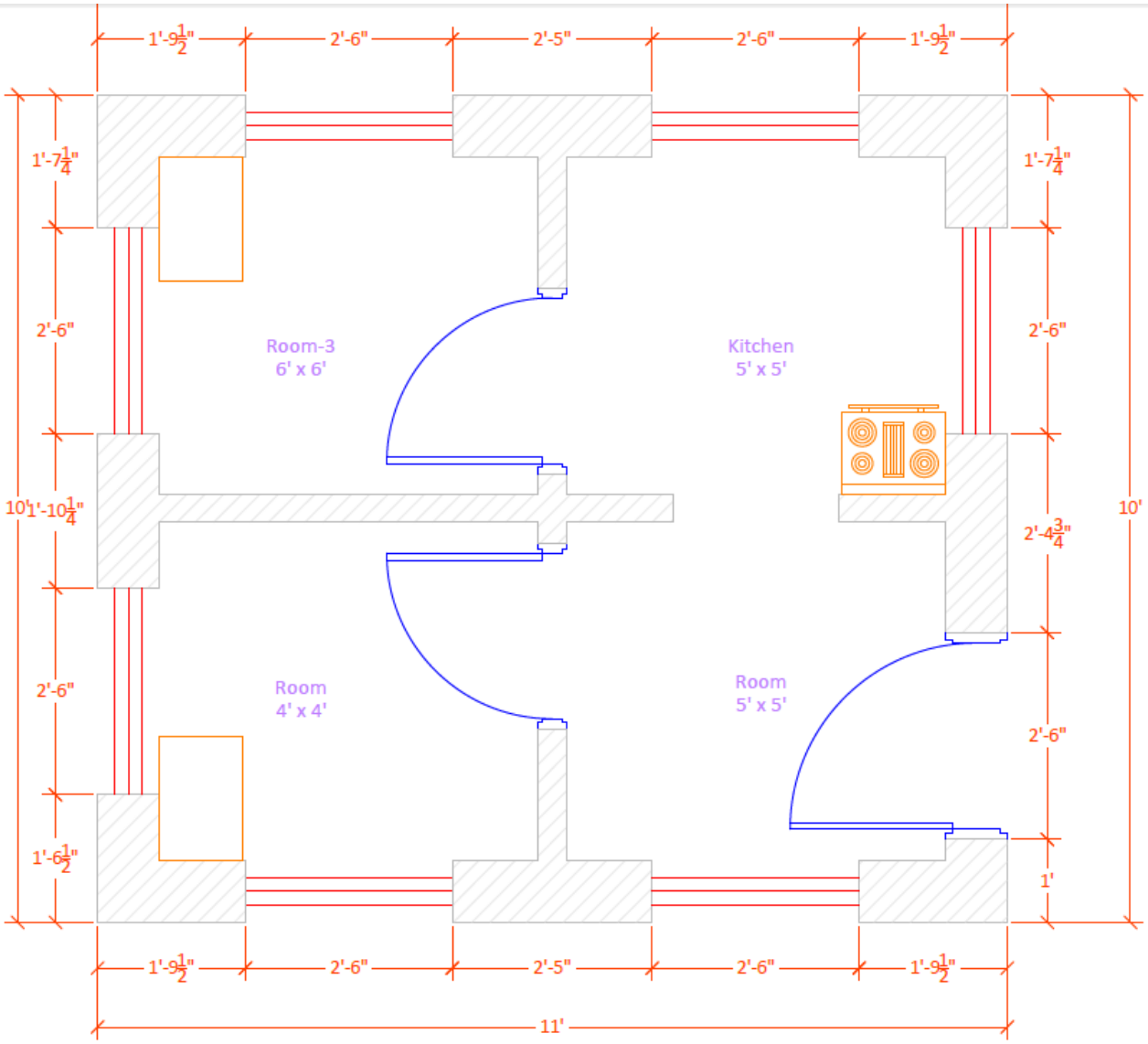




- **Plan of Ground floor**

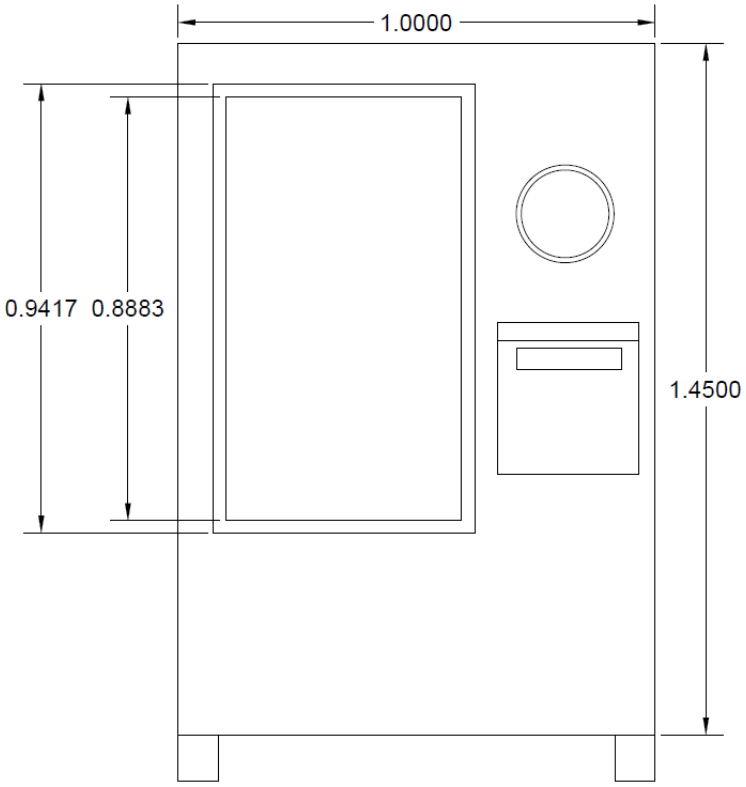


- **Plan of First floor**



12.6.5 Reverse Vending Machine

- The recycler places the empty bottle or can into the receiving aperture; the horizontal in-feed system allows the user to insert containers one at a time.
- An alternative system, found in many older machines, is one in which the user opens a door by hand and places the empty container in a pan. When the door is released and closed, the process continues.
- The bottle or can is then automatically rotated; the bottle/can is then scanned by an omnidirectional UPC scanner, which scans the beverage container's UPC.
- Some systems use the container form, embossing, material or other identification parameters to match the container against the database in addition to or instead of the barcode.

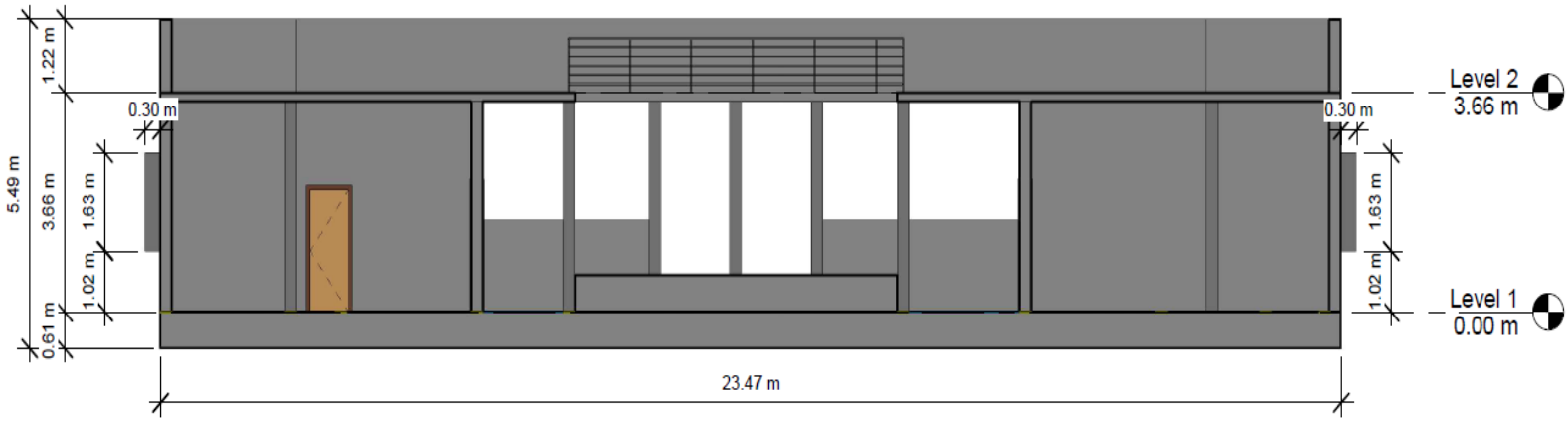


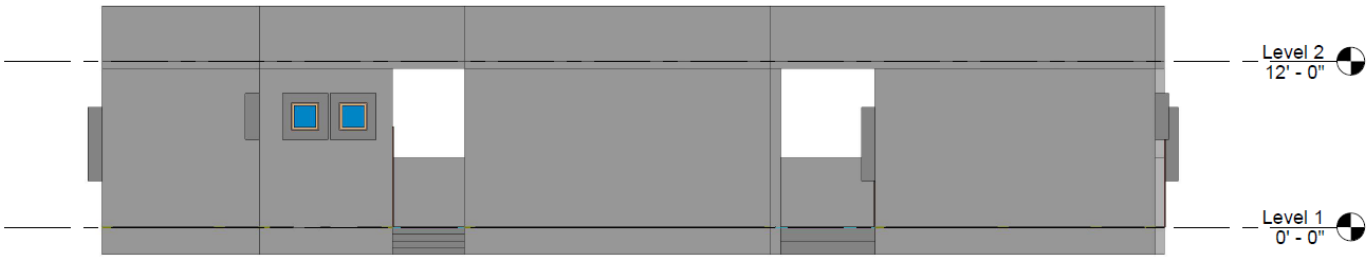
- Once a container is scanned, identified (matched to database) and determined to be a participating container, it is processed and typically crushed (for one-time-use containers) to reduce its size, to avoid spillages of liquid and to increase storage capacity.
- Refillable containers are collected and sorted by hand to be brought back to the bottling company.

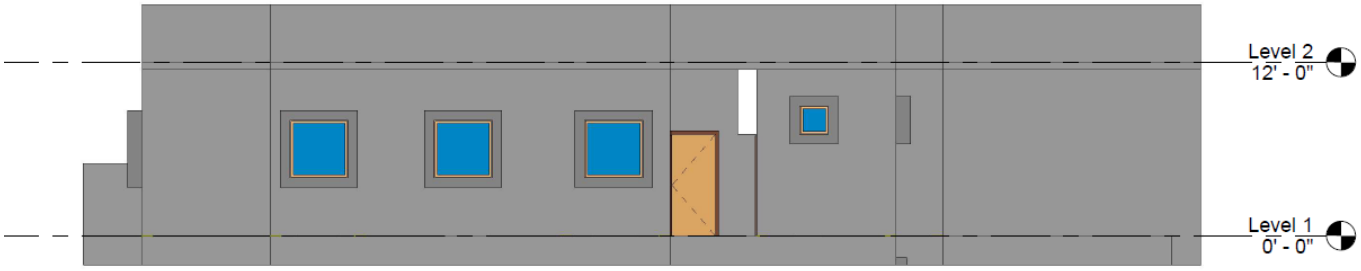
12.6.6Communiy Hall

- **3D view of community hall**

- **Sections**




Level 2
12' - 0"
Level 1
0' - 0"


Level 2
12' - 0"
Level 1
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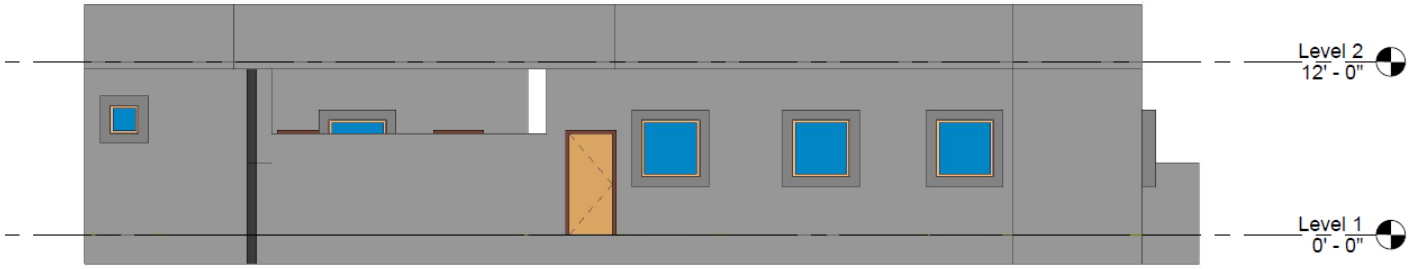
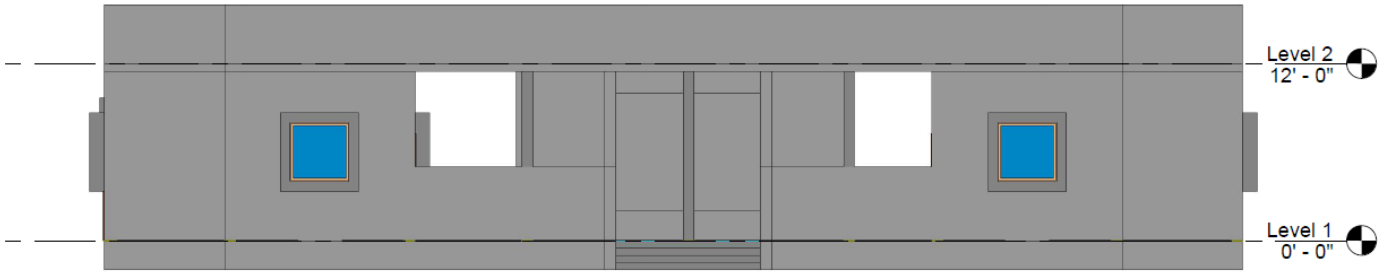
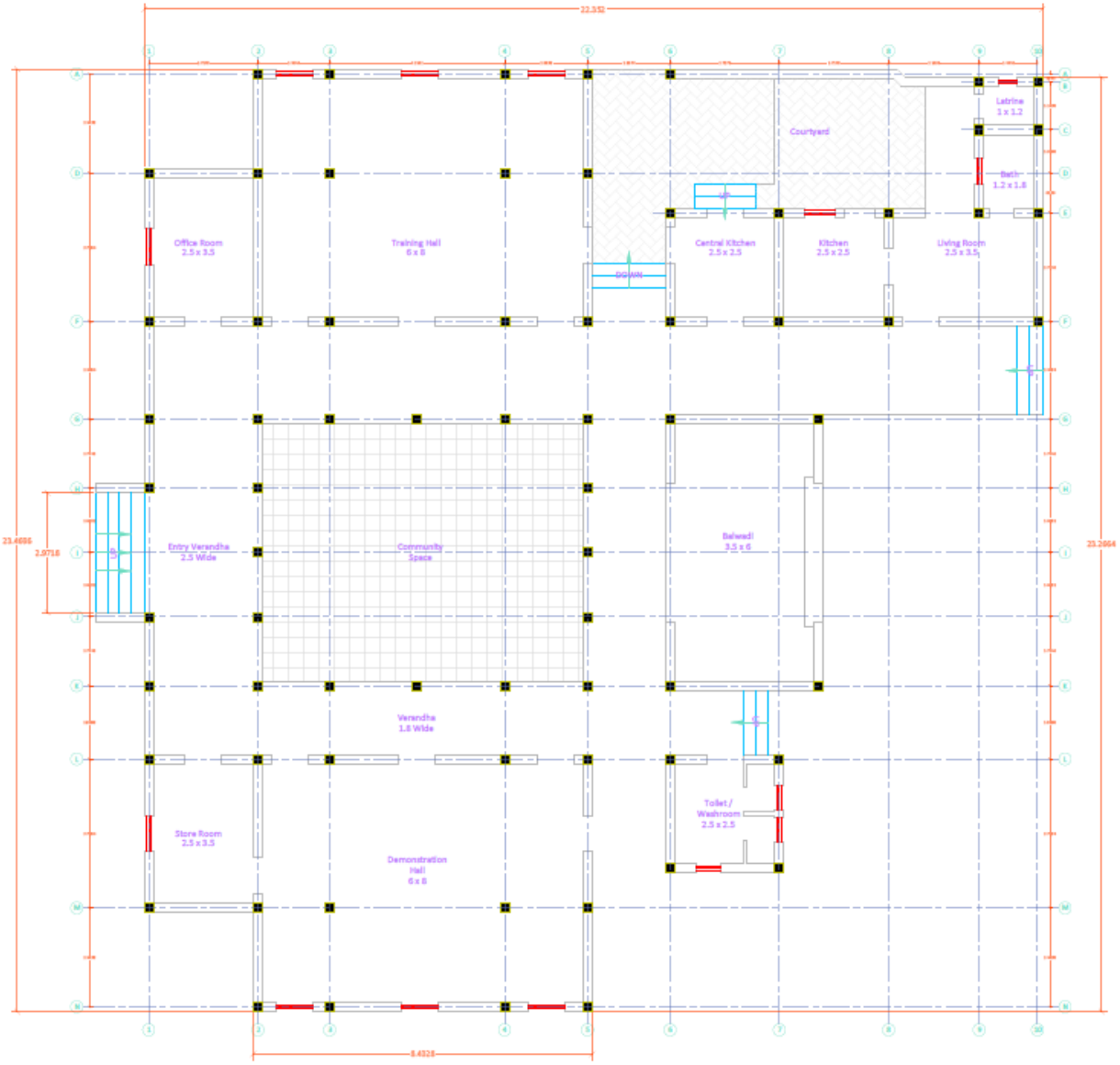
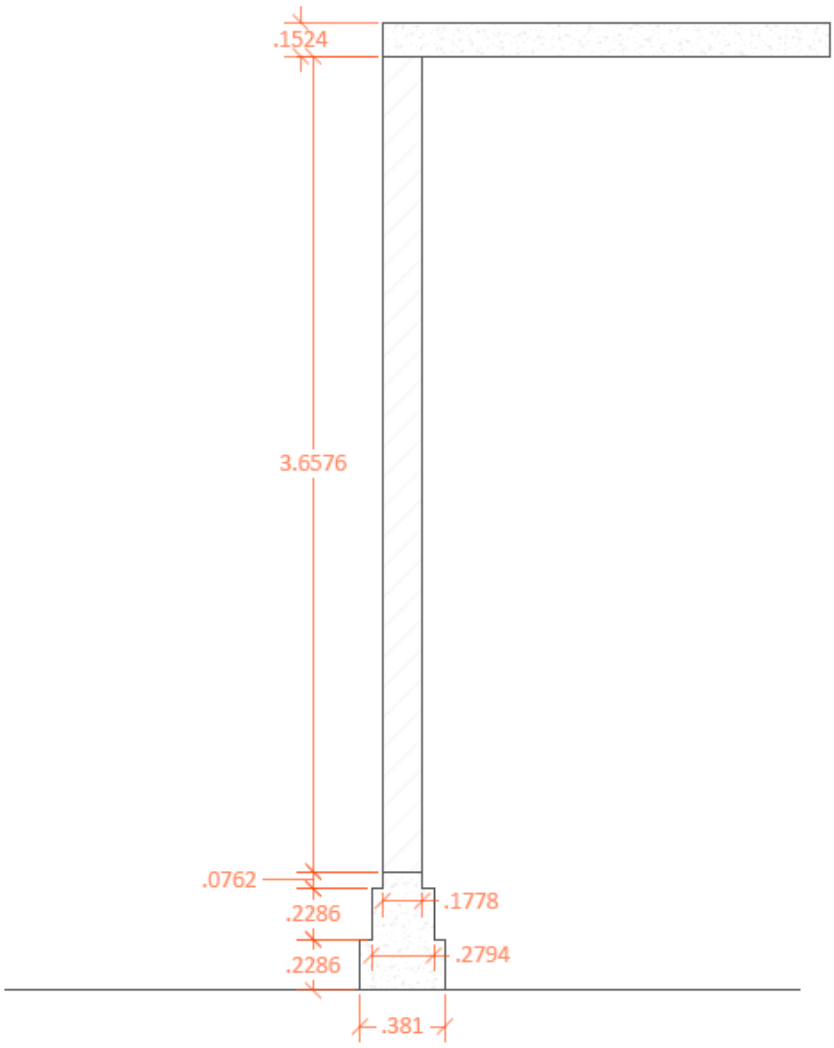

Level 2
12' - 0"
Level 1
0' - 0"


Level 2
12' - 0"
Level 1
0' - 0"

- **Plan of community hall**



- **Footing of community hall**



12.7Summary of Good Photographs

Fig no: 47 Interaction with faculty in ideal village

Fig no:48 Gram panchayat

Fig no:49 Rules of village

Fig no:50Awards

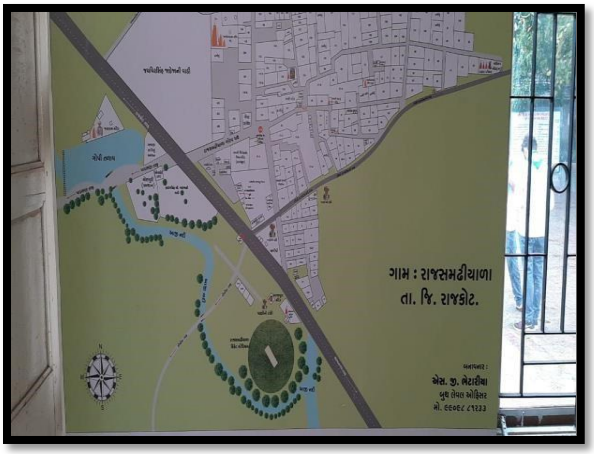


Fig no:51 Base map

Fig no:52Projector room

Fig no:53Aanganvadi

Fig no:54 Primary school

Fig no:55 Temple

Fig no:56 Cricket ground

Fig no:57 Primary school

Fig no:58 Internal roads

12.8Village Interaction Report with the photograph

A ReportOn
Interactive
Presentation(Vishwakarma Yojana: Phase- VIII)
At Vagudad Village, Rajkot.
28 November 2020

We visited the village and interact with various authorities of village like Sarpanch, Talati mantri as well as people of village. We explained what is Vishwakarma Yojana and main aim of vishwakarma project. We conduct techno-economic survey of village to identify various existing facilities.
We have also visited various places like gram-panchyat, bus stands, temples, Primary school and other amenities. Existing condition of various amenities as well as various infrastructure was examined by us like, road condition, housing condition, drainage system, etc.

Fig no: 59 Interaction with Sarpanch

VY-PHASE-VIII-PART-II

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

13.1Design Proposals

- In Tachometric survey done by us, we observed that the basic facilities required in a village are Physical infrastructure, Social infrastructure, Socio-cultural infrastructure. Physical infrastructure includes sources of drinking water, Water Tanks, Drainage systems, Road networks, Electricity distribution, Sanitation facilities and irrigation system. Social infrastructure includes Schools, colleges, Anganwadi, Hospitals, sub centers, Clinics. Socio-cultural facilities include Community halls, public library, public garden, pond, recreation center, cinema hall, Assembly polling station, Birth and death registration office, etc.

13.1.1Sustainable design

- As a sustainable design we have decided to design rain water harvesting system.
- Rainwater harvesting is the simple process or technology used to conserve Rainwater by collecting, storing, conveying and purifying of Rainwater that runs off from rooftops, parks, roads, open grounds, etc. for later use.
- Rainwater harvesting systems consists of the following components:

1. Catchment- Used to collect and store the captured Rainwater.
2. Conveyance system – It is used to transport the harvested water from the catchment to the recharge zone.
3. Flush- It is used to flush out the first spell of rain.
4. Filter – Used for filtering the collected Rainwater and remove pollutants.
5. Tanks and the recharge structures: Used to store the filtered water which is ready to use.

- The process of rainwater harvesting involves the collection and the storage of rainwater with the help of artificially designed systems that run off naturally or man-made catchment areas like- the rooftop, compounds, rock surface, hill slopes, artificially repaired impervious or semi-pervious land surface.
- The benefits of rainwater harvesting system are listed below.

- Less cost.
- Helps in reducing the water bill.
- Decreases the demand for water.
- Reduces the need for imported water.
- Promotes both water and energy conservation.
- Improves the quality and quantity of groundwater.
- Does not require a filtration system for landscape irrigation.

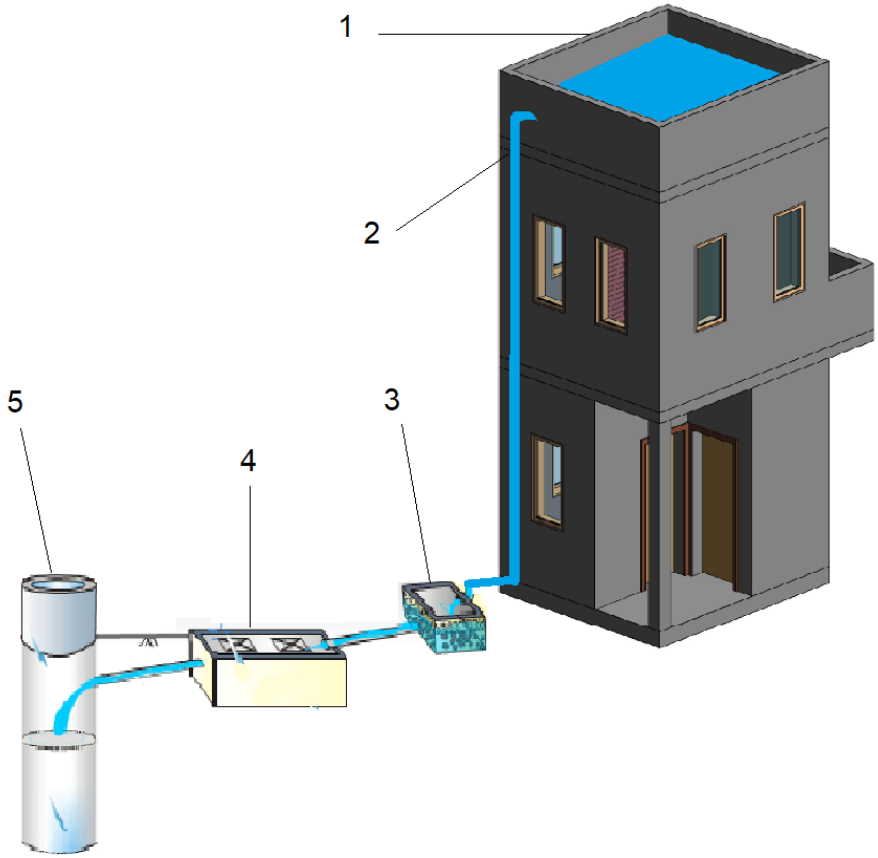


Fig no: 60 Rain water Harvesting

❖ **Components**

1. Catchment

- The catchment of a water harvesting system is the surface which directly receives the rainfall and provides water to the system.
- It can be a paved area like a terrace or courtyard of a building, or an unpaved area like a lawn or open ground.
- A roof made of reinforced cement concrete (RCC), galvanised iron or corrugated sheets can also be used for water harvesting.

2. Transportation

- Rainwater from the rooftop should be carried through down to take water pipes or drains to the storage/harvesting system. Water pipes should be UV resistant (ISI HDPE/PVC pipes) of the required capacity.
- Water from sloping roofs could be caught through gutters and down take the pipe. At terraces, the mouth of each drain should have wire mesh to restrict floating material.

3. First flush

- A first flush device is a valve that ensures that runoff from the first spell of rain is flushed out and does not enter the system.
- This needs to be done since the first spell of rain carries a relatively larger amount of pollutants from the air and catchment surface.

4. Filter

- The filter is used to remove suspended pollutants from rainwater collected over roof.
- A filter unit is a chamber filled with filtering media such as fibre, coarse sand and gravel layers to remove debris and dirt from water before it enters the storage tank or recharge structure.
- Charcoal can be added for additional filtration.

(i) Charcoal water filter

A simple charcoal filter can be made in a drum or an earthen pot. The filter is made of gravel, sand and charcoal, all of which are easily available.

(ii) Sand filters

Sand filters have commonly available sand as filter media. Sand filters are easy and inexpensive to construct. These filters can be employed for treatment of water to effectively remove turbidity (suspended particles like silt and clay), colour and microorganisms.

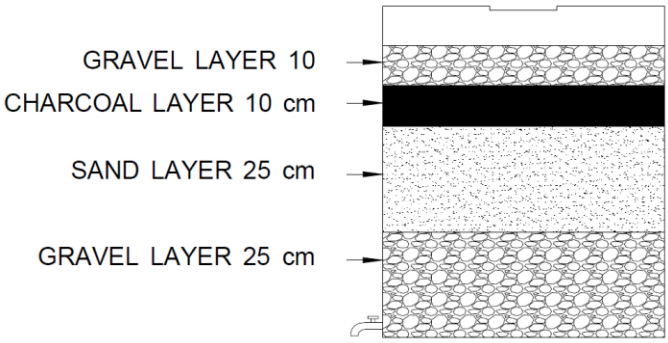


Fig no :61 Charcoal water filter

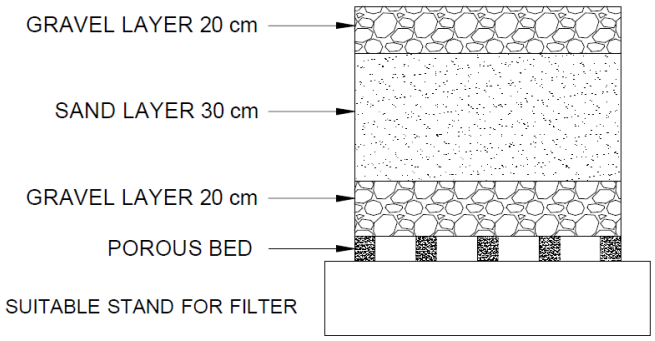


Fig no :62 Sand filter

5. Recharge pit

- Recharge pits are closed well like structure, which is covered by filling the stones, after digging the land to make a pit.
- The pit, if aimed for recharging the borewell, must be constructed near the borewell, as close as possible. In another case, the selection of the site becomes the most important step in the construction of recharge pit.
- Recharge pit can be constructed with any shape and size. Its size should remain proportional to rainwater catchment area, but the ideal size is considered to be 1-2 meters wide and 2-3 meters deep. The percolation rate of the soil also contributes towards the size of the recharge pit.
- The excavated recharge pit once dug, is ready to be filled with jelly and sand. Jellies of different sizes are arranged at the bottom of the pit, which forms a large gap to allow water to pass through them.
- The smaller sized jellies are put on the top so that they could support the top layer of sand.
- A mesh between the layer of sand (for covering the top of the pit) and small-sized jellies is helpful in preventing the sand from escaping at the bottom of the pit.

Table 21: Measurement and abstract sheet of rain water harvesting system

Sr.no	Item description	Unit	Rate
1	Excavation in soils	M^3	90
2	Excavation in rocks	M^3	150
3	Brickwork with cement mortar (1:6)	M^3	1400
4	Plain cement concrete (1:3:6)	M^3	1500
5	Reinforced cement concrete (1:2:4) cu. m. 4700.00Including steel bars, shuttering etc	M^3	4700
6	PVC piping for rainwater pipes - 110 mm diameter - 200 mm diameter	M	165 275
7	Making borehole in metre 165.00Soft soil (with 150 mm diameter PVC casing)	M	180

Table 22: Capacity and cost of Rain water harvesting system

	Capacity of water harvesting system in litres				
	5000	6000	7000	9000	10000
Total cost in Rs.	12430	12975	13970	14380	15800

13.1.2Physical design

- As a physical design we have decided to design a bank.

Fig no: 63 Bank

Table 23: Measurement sheet of bank

Sr no.	Description Of Item	Nos	L(m)	B(m)	H(m)	Quantity
1	Excavation for foundation	-	44.64	0.91	0.84	32.90
					Total	32.90m^3
2	P.C.C in foundation	-	44.64	0.91	0.30	12.19
					Total	12.19m^3
3	Brick work in foundation					
	1 step	-	45.84	0.61	0.30	8.39
	2 step	-	46.24	0.51	0.20	4.72
	3 step	-	46.64	0.41	0.46	8.81
					Total	21.82m^3
4	Brick work					
	Brick work (9”)	-	47.36	0.23	3.50	38.12
	Brick work (4”)	-	20.83	0.10	3.50	7.29
					Total	45.41m^3
5	Deduction from wall					
	D	1	2.13	0.23	2.29	1.12
	D1	3	0.9144	0.23	2.13	1.34
	D2	6	0.76	0.10	1.98	0.90
	W	4	1.52	0.23	1.37	1.92
	W	1	1.52	0.10	1.37	0.21
	W1	2	1.21	0.10	1.37	0.33
	W2	2	0.91	0.10	1.37	0.25
					Total	12.14m^3
6	R.C.C lintel & chajja					
	Door	1	2.43	0.23	0.15	0.084
	Door1	3	1.21	0.23	0.15	0.125
	Door2	6	1.06	0.23	0.15	0.095
	Window for 9”	4	1.82	0.23	0.15	0.251
	Window for 4”	1	1.82	0.10	0.15	0.024
	Window 1	2	0.10	0.23	0.15	0.045
	Window 2	2	0.10	0.23	0.15	0.036
	Ventilation	2	0.76	0.23	0.15	0.052
	Window chajja	4	1.82	0.30	0.15	0.33
	Door chajja	1	2.44	1.52	0.15	0.556
					Total	1.59m^3
7	Parapet wall					
		1	33.81	0.23	0.91	7.08
					Total	7.08m^3
8	Plaster					
	Outside plaster	-	34.75	-	4.572	158.86
					Total	158.86m^2
9	Deduction from outside plaster					
	Door	1	2.13	-	2.29	4.88

	Window	4	1.52	-	1.37	8.33
					Total	13.21m^2
10	Inner side plaster					
	Staff room	2	2.29	-	3.5	16.03
		2	1.98	-	3.5	13.86
	Locker room	2	4.11	-	3.5	28.77
		2	2.16	-	3.5	15.12
	Record room	2	2.34	-	3.5	16.38
		2	2.57	-	3.5	17.99
	Cash counter	2	1.52	-	3.5	10.64
		2	1.22	-	3.5	8.54
	Office(1)	4	1.22	-	3.5	17.03
	Office(2)	2	1.22	-	3.5	8.54
		2	0.91	-	3.5	6.37
	Manager office	2	2.34	-	3.5	16.38
		2	2.13	-	3.5	14.91
	Gents toilet	2	1.37	-	3.5	9.59
		2	0.96	-	3.5	6.72
	Ladies toilet	2	1.37	-	3.5	9.59
		2	1.066	-	3.5	7.46
	Bank hall	2	6.86	-	3.5	48.02
		2	2.44	-	3.5	17.08
	Front of staff room	2	4.27	-	3.5	29.89
		2	2.64	-	3.5	18.48
	Parapet	2	9.52	-	0.91	17.33
		2	7.39	-	0.91	13.45
					Total	368.22m^2
11	Ceiling plaster					
	Staff room		2.29	1.98		4.53
	Locker room		4.11	2.16		8.86
	Record room		2.34	2.57		6.01
	Cash counter		1.52	1.22		1.85
	Office(1)		1.22	1.22		1.49
	Office(2)		1.22	0.91		1.11
	Manager office		2.34	2.13		4.98
	Gents toilet		1.37	0.96		1.32
	Ladies toilet		1.37	1.066		1.46
	Bank hall		6.86	2.44		16.73
					Total	48.34m^2

Table 24: Abstract sheet of bank

Sr.no	Description of item	Quantity	Rate	Unit	Amount
1	Excavation	32.90	85	M^3	2796
2	PCC	12.92	3200	M^3	39008

3	Brick work in foundation	21.82	3200	M^3	69824
4	Brick work in super structure	43.55	3500	M^3	141225
5	RCC work in slab, lintel & chajja	12.74	8800	M^3	112112
6	Plaster work in c.m.(1:3) for inside & outside & celling	562.21	150	M^2	84331
7	Wood work for door and window	35.94	7800	M^2	280332
8	Marble flooring	49.91	500	M^2	24955
9	Cement	101	350	Bag	35350
10	Sand	5.28	800	M^3	4224
11	Aggregate	10.56	1000	M^3	10560
12	Bricks	31320	4	Nos	125280
13	Steel(HYSD)	525	50	Kg	26250
14	Binding wire	5.25	20	Kg	105
				Add 3% of contingencies	14,345.30
				Add 2% of water charge	28,690.59
				Add 5% of plumbing charge	47,817.65
				Add 10% of electric charge	95,635
				Total	9,56,353/-

13.1.3Social design

- As a social design we have decided to design septic tank.

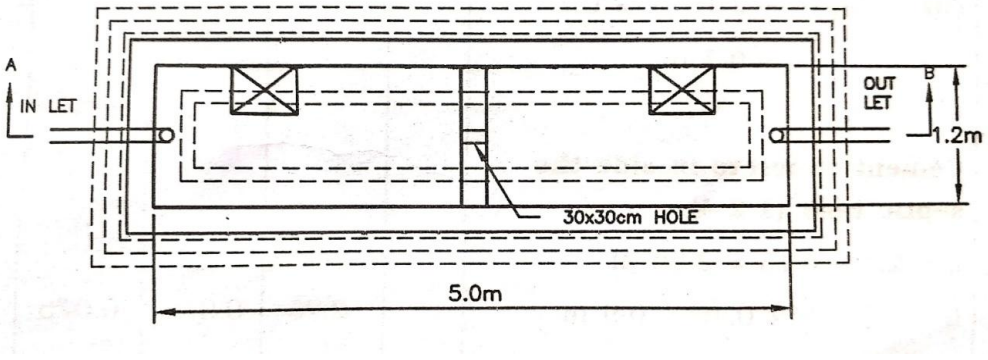


Fig no: 64 Septic tank

Table 25: Measurement sheet of septic tank

Sr.no	Item	No	L(m)	B(m)	H(m)	Quantity
1	Excavation for foundation					
	1.Excavation in soft soil	1	5.9	2.1	0.75	$9.29m^3$
	L=5+2*0.3+2*0.05+2*0.1=5.9m					
	B=1.2+2*0.3+2*0.05+2*0.1=2.1m					
	H=0.75m					

	2.Excavation in hard soil	1	5.9	2.1	0.75	9.29m^3
	H=0.75m					
	3.Excavation in murrum	1	5.9	2.1	0.5	6.20m^3
	H=0.3+0.20=0.5m					
2	Cement concrete for wall foundation(1:4:8)					
	Long walls	2	5.9	0.7	0.2	1.65m^3
	L=5.9m					
	B=0.7m					
	H=0.2m					
	Short walls	2	0.7	0.7	0.2	0.2m^3
	L=2.1-2*0.7=0.7m					
3	Total cement concrete (1:2:4)					
	Slab	1	7.4	3	0.15	3.33
	L=6+2*0.2+2*0.2+2*0.3=7.4m					
	B=2.4+2*0.3=3m					
	Lintel	1	2.7	0.2	0.15	0.08
	L=2.4+2*0.15=2.7m					
	B=0.2m					
	Assume 15cm bearing at each end of lintel					
	Floor	1	6.8	2.4	0.1	1.63
	L=6+2*0.2+2*0.2=6.8m					
	B=2.4m					
					Total	5.04m^3
	Deduction for man hole	3	0.6	0.5	0.15	0.14m^3
					Net	4.90m^3
4	Brick masonry					
	Long walls					
	First step: L=8.6-2*0.2=8.2m	2	8.2	0.9	0.3	4.43
	Second step: L=8.2-2*0.2=7.8m	2	7.8	0.5	0.6	4.68
	Third step: L=7.8-2*0.2=7.4m	2	7.4	0.3	1.2	5.33
	Short walls					
	First step: L=1.6+2*0.2=2m	2	2	0.9	0.3	1.08
	Second step: L=2+2*0.2=2.4m	2	2.4	0.5	0.6	1.44
	Third step: L=2.4m	2	2.4	0.3	1.2	1.73
	Baffle wall(left side)	1	2.4	0.2	1.2	0.58
	L=2.4m					
	H=1.2+0.6-0.15-0.20-0.1-0.15=1.2m					
	Baffle walls(right side)	1	2.4	0.2	1.1	0.53
	H=1.2+0.6-0.55-0.15=1.10m					
					Total	19.80m^3

Table 26: Abstract Sheet of Septic Tank

Sr.no	Item	Quantity	Cost	Per	Amount
1	Earthwork in foundation				

	Labor				
	Male coolie	2	400	Day	800
	Female coolie	2	350	Day	700
	Sundries				50
				Total	1550
2	Cement concrete for wall foundation(1:4:8)				
	Materials				
	Cement	2	300	Bag	600
	Sand	0.22	800	M^3	176
	Aggregate	0.44	1000	M^3	440
	Sundries				50
				Total	1266
	Labor				
	Main mason	1	700	Day	700
	Male coolie	2	400	Day	800
	Female coolie	2	350	Day	700
	Bhistie	1	300	Day	300
				Total	2500
3	Brick masonry				
	Materials				
	Brick	1480			
	Add 5% wastage	74			
	Total Brick	1554	4000	1000nos	6216
	Cement	4	300	Bag	1200
	Sand	0.83	800	M^3	670
	Sundries				50
				Total	8136
	Labor				
	Main Mason	1	700	Day	700
	Mason	2	550	Day	1100
	Male coolie	3	400	Day	1200
	Female coolie	3	350	Day	1050
	Bhistie	1	300	Day	300
	Sundries				50
				Total	4400
4	Total cement concrete (1:2:4)				
	Materials				
	Cement	2	300	Bag	600
	Sand	0.23	800	M^3	184
	Aggregate	0.45	1000	M^3	450
	Sundries				50
				Total	1284
				Grand total	9734

13.1.4Socio-cultural design

- As a socio-cultural design we have decided to design post office.

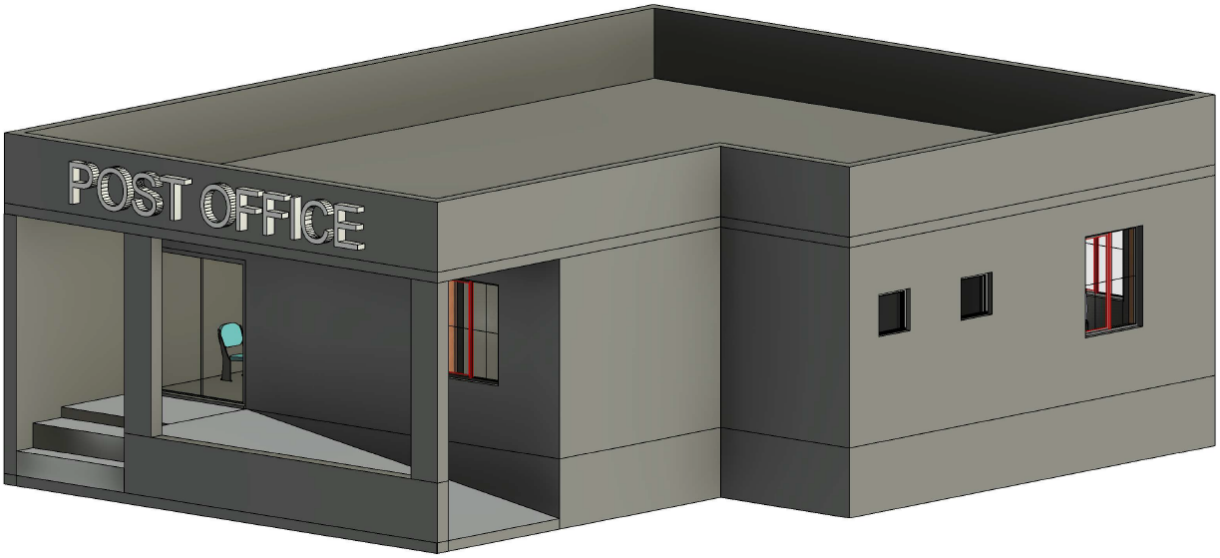


Fig no: 63 Post office

Table 27: Measurement sheet of post office

Sr.no	Item	No	L(m)	B(m)	H(m)	Quantity
1	Excavation Hor. o/o 2*11.2 = 22.4 Ver. i/i 2*9.90 = 19.8 Total = 42.2 m	1	42.2	0.9	1.2	45.8
					Total	45.58m^3
2	B.B.C.C (1:6:12) in Foundation	1	42.2	0.9	0.3	11.47
					Total	11.47m^3
3	First class brick masonry up to plinth in C.M.(1:6)					
	Step1	1	42.2	0.6	0.2	5.06
	Step2	1	42.2	0.5	0.2	4.22
	Step3	1	42.2	0.4	0.2	3.38
	Upto plinth	1	42.2	0.23	0.7	6.79
					Total	19.45m^3
4	Sand filling in plinth					
	Cashier room	1	3.4	3.6	0.6	7.34
	Store room	1	2.3	3.6	0.6	4.97
	Manager office	1	3.5	3.6	0.6	7.56
	Water room	1	2.1	1.45	0.6	1.83
	Toilet	1	2.1	1.33	0.6	1.68
	Public post	1	3.1	3.1	0.6	5.77
	Other area					21.87

					Total	51.023m^3
5	First class brick masonry in super structure in C.M. (1:6)					
	Hor. o/o 2*11.2 = 22.4 Ver. i/i 2*9.90 = 19.8 Total = 42.2 m	1	42.2	0.23	3.95	38.34
	Internal walls	1	31.68	0.23	3.95	28.78
	Deduction					
	Door	1	2.14	0.23	2.14	1.05
	Door 1	1	1	0.23	2.14	0.49
	Door 2	5	0.91	0.23	2.14	2.24
	Window	3	0.91	0.23	1.4	0.29
	Window 1	4	1.22	0.23	1.4	0.39
	Ventilator	1	0.7	0.23	1.4	0.23
					Total	62.43m^3
6	10 cm brick partition wall	1	42.66	-	0.9	38.39
					Total	38.39m^2
7	Wooden doors with oxide copper fastening &fixtures					
	Door	1	2.14	-	2.14	4.58
	Door 1	1	1	-	2.14	2.14
	Door 2	5	0.91	-	2.14	9.74
	Window	3	0.91	-	1.4	1.27
	Window 1	4	1.22	-	1.4	1.71
					Total	20.35m^2
8	Cc Jali	1	0.7		1.4	0.98
					Total	0.98m^2
9	10 cm R.C.C slab portion (1:1.5:3)	1	10.53	7.6		80.03
		1	8.09	3.43		27.75
					Total	107.78m^2
10	12 mm thick single coat cement plaster in c.m. (1:4)					
	Cashier room	2	3.74	3.6	-	13.46
		2	3.7	3.6	-	13.32
	Store room	2	2.4	3.6	-	8.64
		2	3.7	3.6	-	13.32
	Manager office	2	3.6	3.6	-	12.96
		2	3.7	3.6	-	13.32
	Water room	2	2.2	1.45	-	3.19
		2	1.15	1.45	-	1.66
	Toilet	2	2.2	1.33	-	2.92
		2	1.43	1.33	-	1.90
	Public post	2	3.2	3.1	-	9.92
		2	3.2	3.1	-	9.92

	Other area	1				10.84
					Total	241.80m^2
	Deduction:					
	Door	1	2.14	2.14	-	2.29
	Door 1	1	1	2.14	-	2.14
	Door 2	5	0.91	2.14	-	1.95
	Window	3	0.91	1.4	-	1.27
	Window 1	4	1.22	1.4	-	1.71
	Ventilator	1	0.7	1.4	-	0.98
					Total	231.46m^2
11	Double coat sand faced plaster to external walls					
	Horizontal walls	2	10.76	-	3.05	65.63
	Vertical walls	2	8.09	-	3.05	49.35
					Total	114.98m^2
	Deduction:					
	Door	1*0.5	2.14	-	2.14	2.29
	Window	3*0.5	0.91	-	1.4	0.64
	Window 1	4*0.5	1.22	-	1.4	0.9
	Ventilator	1*0.5	0.7	-	1.4	0.49
					Total	110.66m^2

Table 28: Abstract sheet of post office

Sr.no	Item	Quantity	Per	Rate	Amount
1	Excavation	45.58	M^3	220	10027.60
2	B.B.C.C (1:6:12) in Foundation	11.39	M^3	2620	29841.80
3	First class brick masonry up to plinth in C.M. (1:6)	19.45	M^3	3850	74882.50
4	Sand filling in plinth	51.023	M^3	1930	98474.20
5	First class brick masonry in super structure in C.M.(1:6)	62.43	M^3	3950	2,46,598.5
6	10 cm brick partition wall in c.m. (1:4)	38.39	M^3	465	17,851.0
7	Wooden doors with oxide copper fastening &fixtures	20.35	M^3	7400	1,50,590
8	c.c. jali	0.98	M^2	550	539
9	10 mm R.C.C slab portion (1:1.5:3)	107.78	M^2	1630	1,75,681.4
10	12 mm thick single coat cement plaster in C.M. (1:4)	241.8	M^2	185	44,733
11	Double coat sand faced plaster to external walls	110.66	M^2	400	44,264
12	Indian W.C. Pans with a pair of footrests	1	Nos	3350	335
13	Foot rests	1	Pair	450	450
14	P.V.C. flushing cistern for W.C.	1	Nos	2800	2800
15	P.V.C. automatic flushing tank for Urinals	1	Nos	2000	2000
16	Nanny traps	1	Nos	300	300
				Total	8,98,802.7
				Add 5%Contingencies	44,940.13
				Grand Total	9,43,743.00

13.1.5Smart Design

- AS a smart design we have decided to design RO plant.

❖ **OSMOSIS**

- A process by which molecules of a solvent tend to pass through a semi permeable membrane from a less concentrated solution into a more concentrated one.

❖ **REVERSE OSMOSIS**

- A Process by which solvent passes through a porous membrane in the direction opposite to that of natural osmosis when subjected to a hydrostatic pressure greater than osmotic pressure.

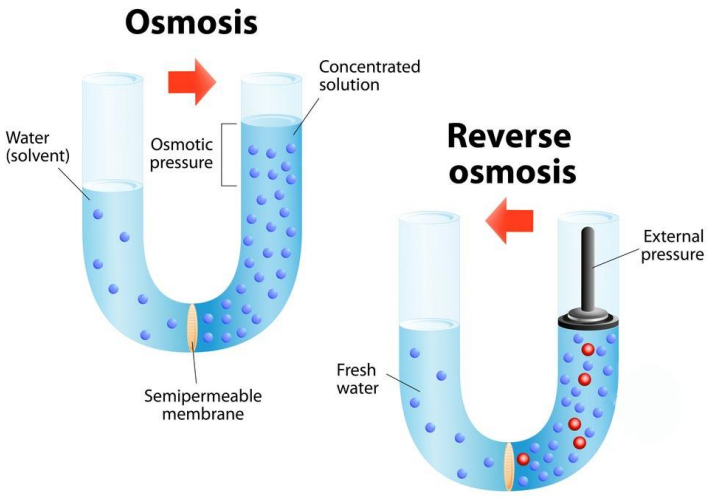


Fig no: 64 Osmosis and Reverse Osmosis Process

❖ **SEMI PERMEABLE MEMBRANE**

- It is a membrane that may or may not allow particles to pass through it.permeable is defined as membrane that can be crossed by particles,ions or water.semi permeable means that some particles,ions or water can cross the membrane.
- penetrate flow :1000 lit/hr
- membrabe type : spiral wound TFC
- polynide size : dia 4*40 long (inches)
- no.of members :5
- no.of member housing : 2

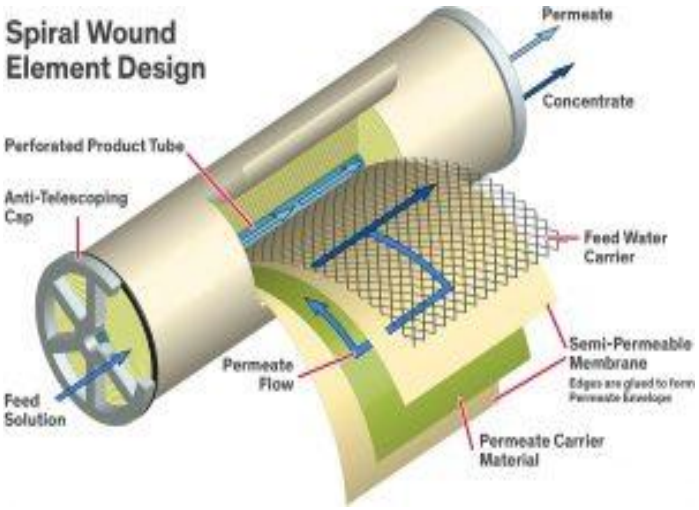


Fig no: 65 Semi permeable membrane

❖ **RO REQUIREMENTS**

- Ground water or raw water analysis
- Sand filters
- Raw water pump
- Dual media filters
- Cartridged filters
- High pressure pump

❖ DESIGN PROCEDURE OF RO PLANT

1. Ground water or Raw water analysis

- In this process the ground water is analyzed to find the Total Dissolved Solids(TDS).Membrane is selected based upon the TDS value obtained in the raw water. TDS value can be majorly calculated by using these two methods:
- Using an electrical conductivity meter
- Using filter paper and a scale

2. Sand filters

- At first ground water is collected and passed through sand filters,the filter media is supported on gravel bed that consists of multiple layers of graded quartz sand,fine sand,super fine white sand and pebbles of progressively large size.
- The filter will effectively remove up to 30 – 50 micron of the suspended solids to less than 5 ppm.

Flow rate : 1500 Lph
min.operating pressure : 1.5 kg/cm^2
media : support bed + carbon

Fig no: 66Sand filter

3. Raw water pump

- After sand filters water passed to raw water pumps from which water is passed to dual media filter.
- For 1000 litres capacity

Flow rate : 2000lit/hr
Discharge capacity : 2.5kg/cm^2(min)
Motor capacity : 1.0hp

Fig no: 67 Raw water pump

4. Dual media filters

- A sand-anthracite filter or dual media filter/multi-media filter is primarily used for the removal of turbidity and suspended solids as low as 10-20 microns. Dual media filters provide very efficient particle removal under the conditions of high filtration rate.
- Dual media filter contains two Medias one is sand and other is activated carbon.

Operating pressure : 3.5 kg/cm^2
Flow rate : 2000 lit/hr
Valve type : single multi port
Bed depth : 800mm

- Activated carbon filter:

flow rate : 2000 lit/hr
media : activated cabon+sand
min.operating pressure : 1.5 kg/cm^2

Fig no : 68Dual media

- In dual media filters inlet pressure should be 3.5kg/cm^2 and outlet pressure should be 0.5kg/cm^2.
- Now the water is passed through 0.46 micron filter candle,the silt density index obtained should be less than 3
- chemicals used:
- HCl
- Antiscalant(silica,calcium,magnesium)
- These are added according to the following formulae.

  = (10000*ppm of HCl*working hours)/1000
- Anti-Scalant dosing:
- for dosing pump:

  flow rate **:** 1.5 lit/hr
  disch pressure **:** 4kg/cm^2
  make **:** E dose,hydracell or equivalent
- for dosing tank:
- **capacity** **:**100 lit
- **make** **:**sintex,wimphost or equivalent

5. Cartridged filters

- After that water is passed through catridged filter
- These filters can be surface filters or depth type filters.
- Depth type filters capture particles and contaminant through total thickness of the medium
- While in surface filters particles are blocked on the surface of filter.
- (for removing suspended particles >5microns)

  flow rate **:** 2000 lit/hr
  material **:** polypropylen
  filter rating **:** 5 micron
  length **:** 20 inches
  make **:** pratham,aquapuro or equivalent

Fig no :69 Catdriged filter

6. High pressure pump

- This pressure pump pumps the water into the membranes with high pressure,here the flow rate should be maintained at 10m^3/hr.
- Now water is passed into pressure tubes,where minerals get swiped off.

  flow rate **:** 2000 lit/hr
  disch pressure **:**13 kg/cm^2
  material **:** SS304
- We require UV system

  flow rate **:** 1000 lit/hr
  make **:** sukrut or equivalent

Fig no : 70High pressure pump

❖ **INSTRUMENTS LIST**

- Pressure gauges : 5 nos
- range :0-21
- bar dia size:4 inches
- type: bourdon
- pressure switches: 2 nos
- range: 0-450 psi(pounds per sq inch)
- conductivity meter : 1 panel mounted
- rotameter : 2
- level switch : 2
- digital TDS meter : 1

Electrical control panel

- voltameter,ammeter,MCBs : should be provided of adequate cap
- PLC & touch panel : should be provided
- Feed/product water conductivity meter : should be provided

pH correction dosing tank

capacity : 0-1.5 lph
disch pressure : 2kg pressure

Dosing tank

Capacity : 50 litres
Material : HDEP

Table 29: Replacing items/parts during RO period

Description	Present market cost	Frequency of replacement
Membrane	Rs. 22170 per candle	1 year(Normally)
Micron filter	Rs. 260 per candle	During every service time
Anti sclant chemical	Rs. 6620 per pack	1 year (Normally)

Cost of Ro and annual maintanence charges **:** (1000 litres capacity)
Supply and installation cost **:** 5, 80,000 rupees
Labour charges **:** 9,700 rupees

Consumables(annual in normal working conditions):

- membranes : 5 nos = 5*22170 = 1,10,850 rupees
- micron filter: 2 nos in each servicing = 260*6*2 = 3,120 rupees
- anti scalant chemical: 2 packets = 2*6620 = 13,240 rupees

Suppose if we assume life of an Ro sysytem as 5 years:

cost of unit : Rs.5,80,000
annual cost of 1 unit :1,16,000

Cost analysis for per litre of treated water(1000 lt capacity Ro system):

- electricity :4.25 kw = 4.25*16 =68 kw (16 hrs working daily)
- electrical charges : Rs 8.36/kw for 365 days = 365*68*8.36 = 2,07,495
- labour amc cost for year :9,700
- consumables cost :1,27,210
- Total cost involved for year : Rs.1,16,000+2,07,495+1,27,210 = Rs.4,60,405.00

13.1.6 Heritage design

- As a heritage design we have decided to design clock tower.

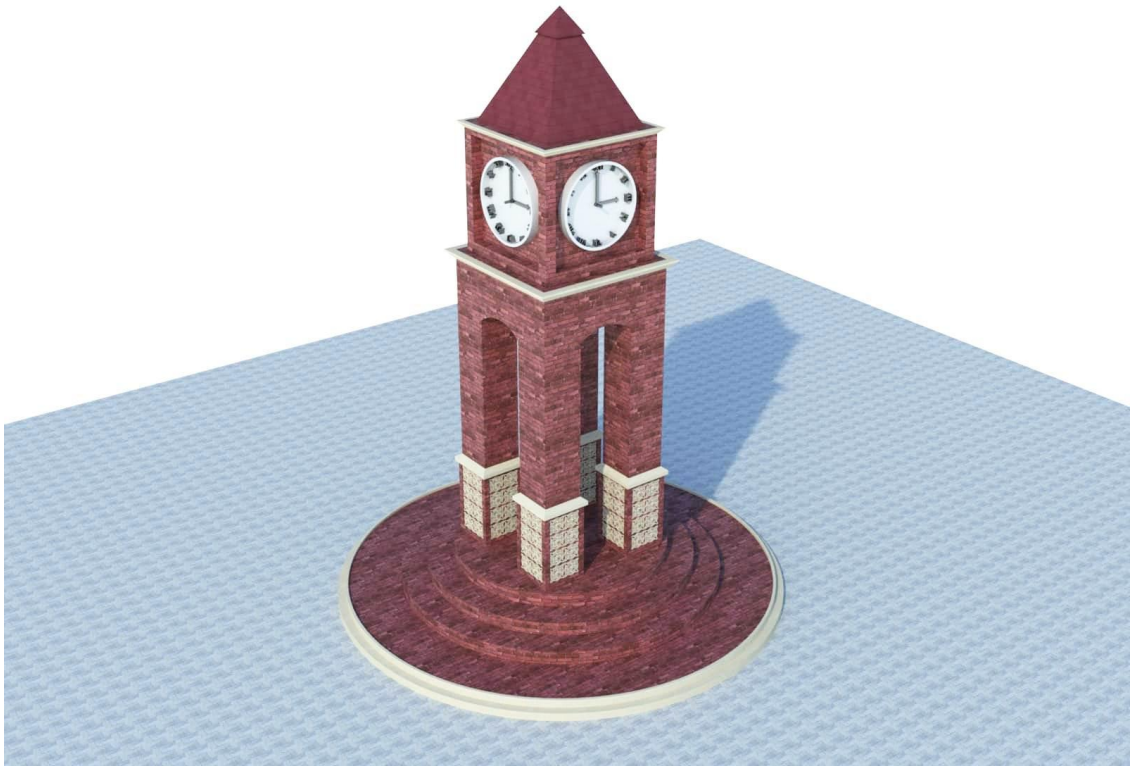


Fig no: 71 Clock tower

Table: 30 Measurement sheet of clock tower

Sr.no	Item Description	nos	L(m)	B(m)	H(m)	Quantity
1	Excavation in foundation	1	8.3	0.76	0.81	5.11m^3
2	P.C.C For Foundation	1	8.3	0.76	0.30	1.89 m^3
3	1 Step Brick Work	1	10.52	0.61	0.30	1.93 m^3
4	2 Step Brick Work	1	10.52	0.51	0.20	1.07 m^3
5	3 Step Brick Work	1	10.52	0.41	0.46	1.98 m^3
6	Column (right side)	2	5.7	0.76	1.52	13.16 m^3
7	Column (Left side)	2	5.7	0.76	1.52	13.16 m^3
8	Brick work In Wall	-	10.52	0.23	1.52	3.68 m^3
9	Plaster	1	18.04	-	1.52	27.42 m^2

Table: 31 Abstract sheet of clock tower

Sr.no	Description Of Item	Quantities	Rate	Unit	Amount
1	Excavation in foundation	5.11	90	m^3	500
2	P.C.C For Foundation	1.89	3200	m^3	6048
3	Brick Work in foundation	4.98	3500	m^3	17430
4	Brick Work in super structure	48.52	3500	m^3	169820

5	Plaster work in c.m.(1:3) for inside & outside	27.42	200	m^2	5484
6	Cement	101	400	Bag	40400
7	Sand	5.28	800	m^3	4224
8	Aggregate	10.56	1000	m^3	10560
9	Bricks	31320	4	Nos	125280
10	Steel	525	50	Kg	26250
11	Binding wire	5.25	20	Kg	105
				Total	406,101
				Add 3% of contingencies	12183
				Add 2% of water charge	8122
				Grand total	426,406

13.2Reason for Students Recommending this Design

- There is no bank in this village. If people need money then they will go nearer town which is 11 km away from this village. So we decided to design a bank as physical design.
- In this village water problem are there people of this village are not using water harvesting, water butt etc... System so we are decided to design rain water harvesting system as sustainable design.
- There is no any type of heritage like statue, gate, chabutra etc… so we can decided to design a clock tower as heritage design.
- As a social design we have decided to design septic tank.
- There is no any post office in this village so we have decided to design post office as a socio-cultural design.
- As a smart village design we have decided to design RO plant.

13.3About designs Suggestions / Benefit of the villagers

- There is no bank in this village. So we give design of bank. now people can easily withdrawal or deposit money in bank.
- In summer season water related problem are increase, so we give design of rain water harvesting system so water related problem are decrease.
- In this village there is no any clock tower. So we have decide to provide it so people can watch time and beauty of village can be increased.
- Sewer lines can occasionally leak raw sewage and contaminate groundwater. Because a septic system doesn't run through a sewer system, there's less of a risk for leakage. Plus, it uses a natural filtration system that minimizes pollution.
- A post office is a public facility that provides mail services, including accepting of letters and parcels, providing post office boxes, and selling postage stamps, packaging, and stationery. Post offices may also offer additional services.

Chapter :14 Technical options with case studies

14.1Civil Engineering

14.1.1Advanced Earthquake Resistant

- Earthquake-resistant structures are structures designed to protect buildings 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.
- Among the most important advanced techniques of earthquake resistant design and construction are:
  1. Base Isolation
  2. Energy Dissipation Devices

❖ **Base Isolation**

- The simplest form of base isolation uses flexible pads between the base of the building and the ground.
- When the ground shakes, inertia holds the building nearly stationary while the ground below oscillates in large vibrations.
- Thus, no force is transferred to the building due to the shaking of the ground. The flexible pads are called base-isolators and structures using these devices are called base-isolated buildings.

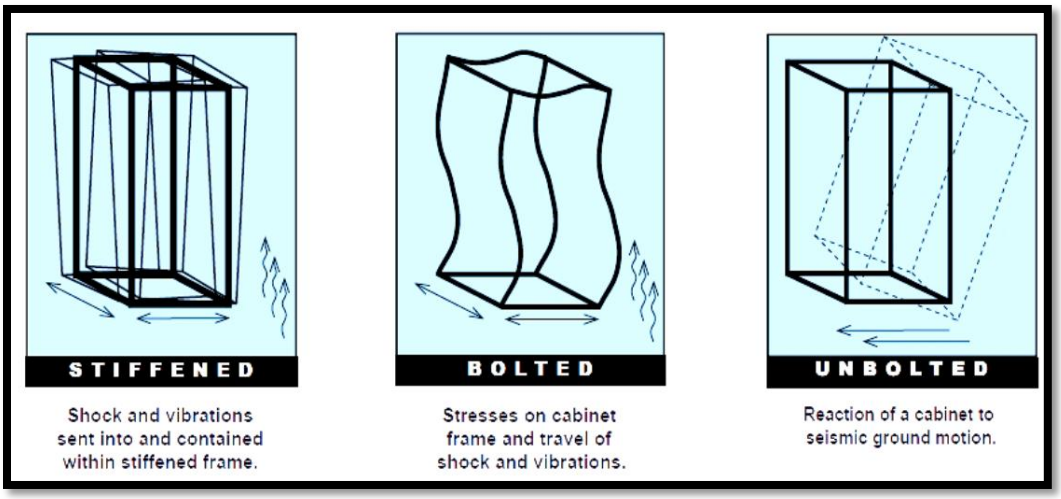


Fig no:72Base isolation method

❖ **Working Principle**

- When an earthquake vibrates a building with a fixed foundation, the ground vibration is transmitted to the building.
- The buildings displacement in the direction opposite the ground motion is actually due to inertia.

- In addition to displacing in a direction opposite to ground motion, the un-isolated building is deformed.
- If the deformation exceeds the constraints of the building design, the structure of the building will fail.
- This failure often occurs in the ground floor because most of the building's mass is above that level. Also many buildings have "soft" ground floors with many windows or unreinforced spaces for parking or lobbies.

❖ **Types of Bearings**

- Lead-rubber bearings are frequently used for base isolation. A lead rubber bearing is made from layers of rubber sandwiched together with layers of steel. The bearing is very stiff and strong in the vertical direction, but flexible in the horizontal direction.
- Spherical sliding isolation uses bearing pads that have a curved surface and low-friction materials similar to Teflon. During an earthquake the building is free to slide both horizontally and vertically on the curved surfaces and will return to its original position after the ground shaking stops. The forces needed to move the building upwards limit the horizontal or lateral forces that would otherwise cause building deformations.

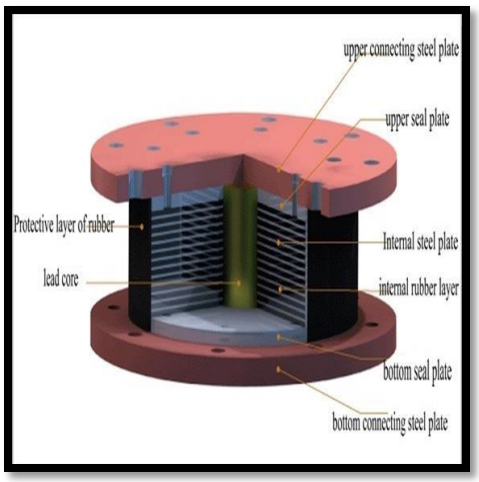


Fig no: 73 Lead rubber bearing

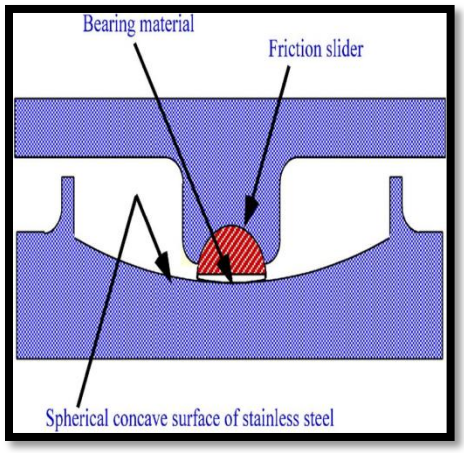


Fig no: 74 Spherical sliding bearing

❖ **Energy Dissipation Devices**

- Another approach for controlling seismic damage in buildings is to install Seismic Dampers in place of some structural elements, such as diagonal braces.
- These dampers act like the hydraulic shock absorbers in cars that absorb sudden jerks. When seismic energy is transmitted through them, dampers absorb part of the energy, thus damping the vibration of the building.
- By equipping a building with devices that have high damping capacity, the seismic energy entering the building is greatly decreased.

❖ **Commonly used Energy Dissipation Devices**

- Viscous Dampers (energy is absorbed by silicone-based fluid passing between piston cylinder arrangement).
- Friction Dampers (energy is absorbed by surfaces with friction between them rubbing against each other).

- Yielding Dampers (energy is absorbed by metallic components that yield).
- Viscoelastic dampers (energy is absorbed by utilizing the controlled shearing of solids).

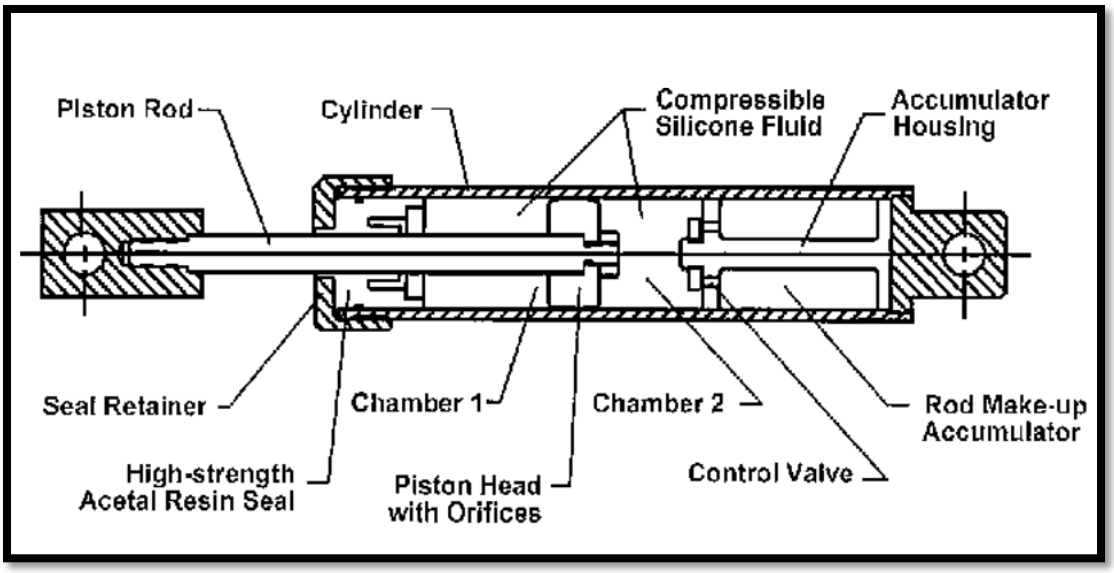


Fig no:75 Cross section of a viscous fluid damper

14.1.2Seismic Retrofitting of Buildings

❖ **Seismic Retrofitting of Buildings**

- It is the modification of existing structures to make them more resistant to seismic activity, ground motion or soil failure due to earthquake.
- The retrofit techniques are also applicable to other hazardous conditions such as tropical cyclones, tornadoes and severe winds from thunderstorms.

❖ **When seismic retrofitting is needed?**

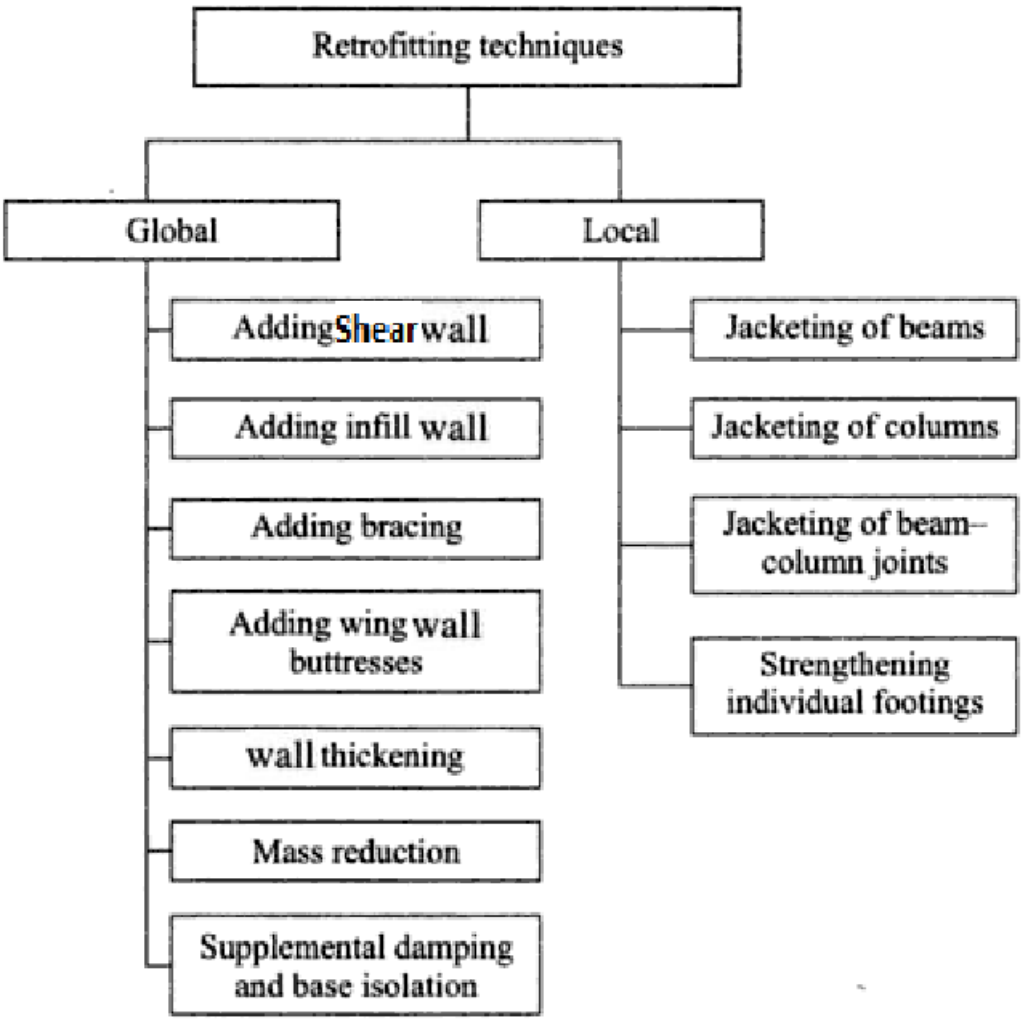
- Earthquake damaged buildings
- Earthquake-vulnerable buildings(with no exposure to severe earthquakes)

❖ **Retrofit Performance Objectives**

- Public safety only: The goal is to protect human life, ensuring that the structure will not collapse upon its occupants or passersby, and that the structure can be safely exited. Under severe seismic conditions the structure may be a total economic write-off, requiring tear-down and replacement**.**
- Structure survivability: The goal is that the structure, while remaining safe for exit, may require extensive repair (but not replacement) before it is generally useful or considered safe for occupation. This is typically the lowest level of retrofit applied to bridges.
- Structure functionality: Primary structure undamaged and the structure is undiminished in utility for its primary application.
- Structure unaffected: This level of retrofit is preferred for historic structures of high cultural significance.

❖ **Retrofitting techniques**

Table 32: Retrofitting techniques



❖ **Adding new shear wall**

- Frequently used for retrofitting of non ductile RC frame buildings.
- The added elements can be either cast in place or pre cast concrete elements.
- New elements preferably be placed at the exterior of the buildings.
- Not preferred in the interior of the structure to avoid interior mouldings.

❖ **Adding steel bracing**

- An effective solution when large openings are required.
- Potential advantages for the following reasons:
- higher strength and stiffness
- opening for natural light
- amount of work is less since foundation cost may be minimized
- adds much less weight to the existing structure

Fig no: 76Additional shear wall

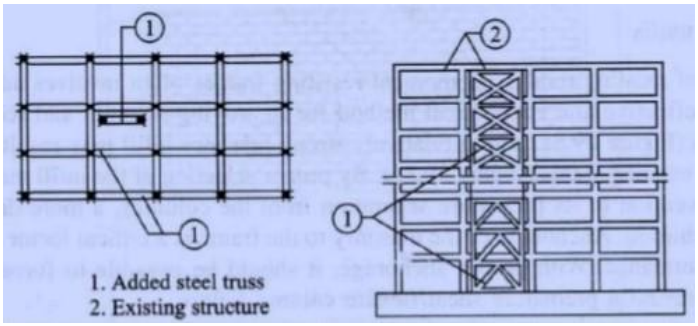


Fig no: 77 Additional steel bracing

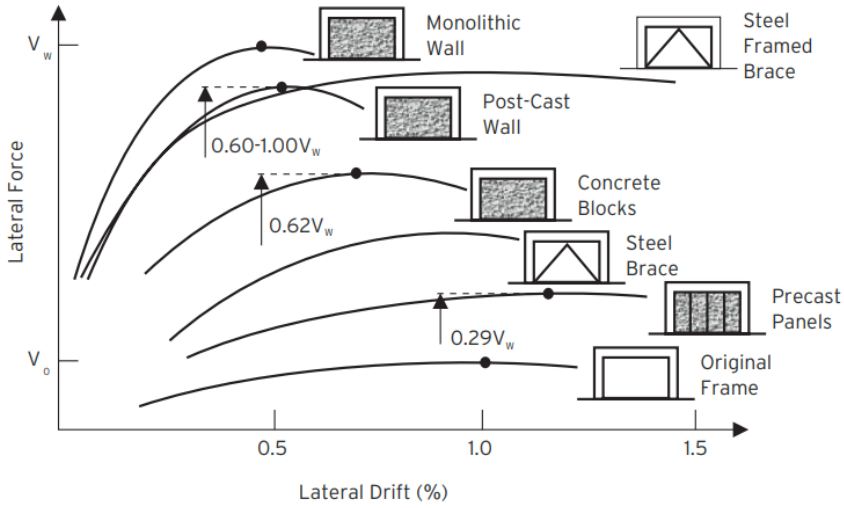


Fig no: 78 Effect of adding shear wall and bracing

❖ Jacketing

- Most popular method for strengthening of building columns
- 1. Steel jacket,
- 2. Reinforced Concrete jacket,
- 3. Fiber Reinforced Polymer Composite(FRPC) jacket
- Purpose for jacketing:
- To increase concrete confinement
- To increase shear strength
- To increase flexural strength

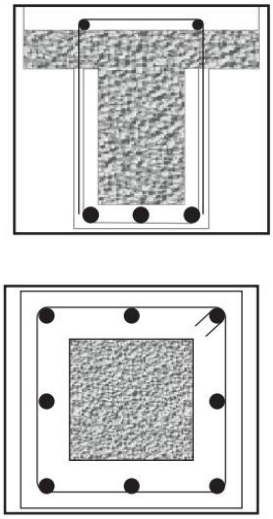


Fig no: 79 beam and column jacketing

❖ **Retrofit of Structures using Innovative Materials**

- Current research on advanced materials has mainly concentrated on FRP composites.
- Studies have shown that externally bonded FRP composites can be applied to various structural members including columns, beams, slabs, and walls to improve their structural performance such as stiffness, load carrying capacity, and ductility.

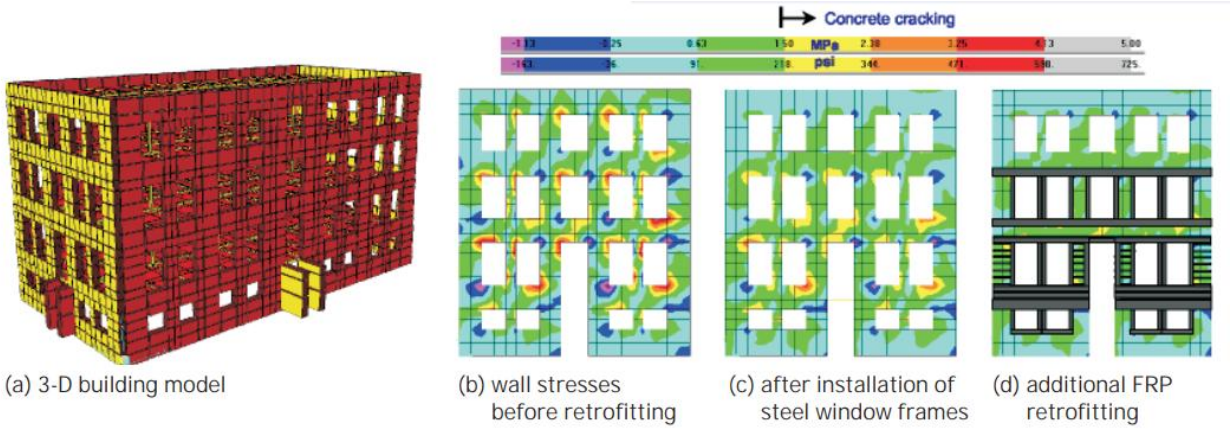


Fig no:80 A Retrofit Application combining Conventional and Composites Retrofitting

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

❖ **Modern construction materials**

1. Prefabricated Laminated Timber

- Considered the wood of the future, this type of wood is more resistant to water and is stronger than conventional timber from trees. The prefabricated wood is used to support skyscrapers, and help reduce carbon emissions with every story raised.
- Many of the top construction companies in the world are using this and other prefabrication methods to increase sustainability and reduce costs

Fig no: 81Prefabricated laminated Timber

2. Self-Healing Concrete

- Self-healing concrete is saving contractors a lot of time and labor. The concrete is engineered with water-activated bacteria which heal cracks by producing calcite. By using this type of concrete, you reduce infrastructure maintenance, and you reduce the production of greenhouse gases. Simply put, you can build faster, and the structures will last for about 200 years.

Fig no: 82Self healing concrete

3. 3D Graphene

- 3D graphene is coming to replace steel. Steel is not only heavy but also expensive to buy. 3D graphene is only 5 percent of the weight of steel but offers up to 200 times the strength of steel. With the added strength, contractors can build skyscrapers more than 98k feet high. Again, the material can be used in the manufacture of lighter and more fuel-efficient vehicles.

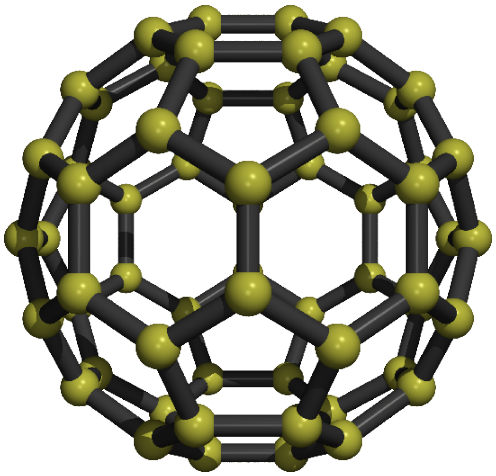


Fig no: 83 3D grapheme

4. Transparent Aluminum

- One of the new building materials for homes is a ceramic alloy that is almost 2x harder than sapphire. The material does not corrode and is resistant to radiation and oxidation. You can use it in the creation of stronger windows for homes, and domes for space and undersea vehicles.

Fig no: 84 transparent aluminum

5. Bioreactors

- As the world moves towards renewable sources of energy, new building materials for houses are all geared towards sustainability. These bioreactors are algae-infused wall panels that undergo synthesis to create energy. The new sustainable building materials are ideal when you need to create buildings with great thermal regulation and which are more self-reliant.

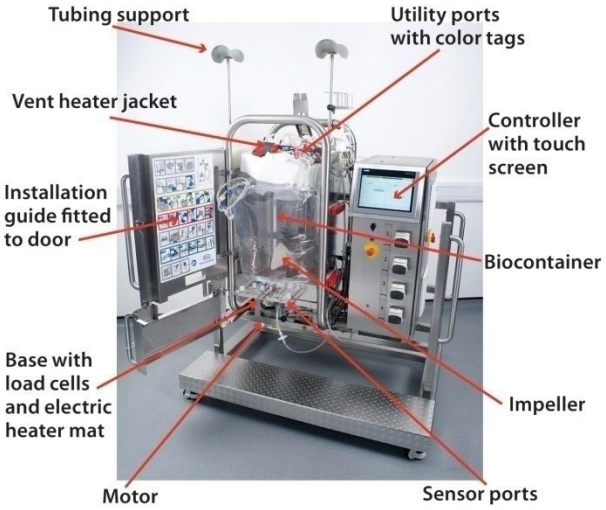


Fig no: 85 Bio-reactor

6. Invisible Solar Cells

- You can generate energy at home without having huge solar panels. Invisible solar cells produce power by pushing wavelengths of light to cells at the edges. You can use these new home building materials to generate energy from any component of a building, including doors and windows. It is one of the new building materials in architecture that will save you money on electricity bills.

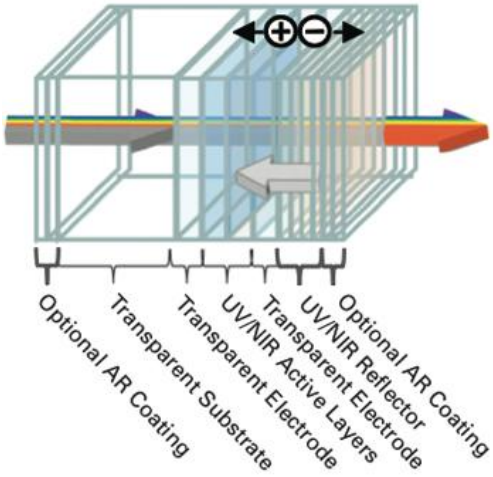


Fig no: 86Invisible solar cells

7. Synthetic Spider Silk

- The synthetic spider silk is up to 340x longer lasting compared to steel. Again, it contains resonance properties making it ideal for use in most buildings. Variants of this material can be used in acoustic building tiles and laboratories.

Fig no: 87Synthetic spider silk

8.Aluminum Foam

- This is one of the new sustainable building materials that are 100 percent recyclable. The material is developed when air is injected with molten metal to create a porous material. The aluminum foam is strong and lightweight and can be used to create durable building cladding and decorative features on buildings.

Fig no: 88 Aluminum foam

9. Nanocrystal

- Nanocrystal comes to make smart windows even smarter. The new home building materials are made with crystalline nanoparticles, which allow in natural light while blocking heat. The materials are ideal when you need to have more light into your home but reduce HVAC costs.

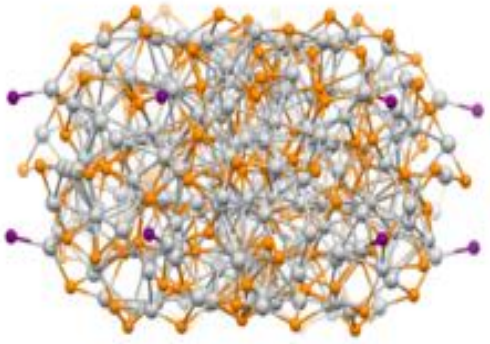


Fig no: 89 Nano crystal

10. Translucent Wood

- This wood can also be termed as the "future of wood" as it will be used for different applications. When used on structures, it offers better insulation, it is stronger than conventional wood, and it is biodegradable.
- You can use the wood in solar panels, on windows as replacements for glass, for natural indoor lighting, and contemporary structures. The wood is 90 percent transparent.

Fig no: 90 Translucent wood

11. Illuminating Concrete

- When used on buildings, illuminating concrete will glow at night, making your building look aesthetically pleasing. The non-flammable concrete is engineered with minuscule glass balls that glow when they reflect light. You can use the concrete to create signage systems, lighting underground spaces, marking dangerous areas, and on artistic buildings.

Fig no: 91 Illuminating concrete

12. Wool Brick

- Instead of using conventional earth bricks, you can use wool bricks, which are 37x stronger but lighter. The bricks are a fusion of wool and seaweed polymer. When used in buildings, the bricks reduce the emission of greenhouse gases as they do not need firing as is required with traditional bricks.

Fig no: 92 Wool bricks

❖ Advanced construction Equipments

1. Excavators

- Excavators are important and widely used equipment in construction industry. Their general purpose is to excavation but other than that they are also used for many purposes like heavy lifting, demolition, river dredging, cutting of trees etc.
- Excavators contains a long arm and a cabinet. At the end of long arm digging bucket is provided and cabinet is the place provided for machine operator. This whole cabin arrangement can be rotatable up to 360^{o} which eases the operation. Excavators are available in both wheeled and tracked forms of vehicles.

Fig no: 93 Excavators

2. Backhoe

- Backhoe is another widely used equipment which is suitable for multiple purposes. The name itself telling that the hoe arrangement is provided on the back side of vehicle while loading bucket is provided in the front.
- This is well useful for excavating trenches below the machine level and using front bucket loading, unloading and lifting of materials can be done.

Fig no: 94Back hoe

3. Dragline Excavator

- Dragline excavator is another heavy equipment used in construction which is generally used for larger depth excavations. It consists a long length boom and digging bucket is suspended from the top of the boom using cable.
- For the construction of ports, for excavations under water, sediment removal in water bodies etc. can be done by dragline excavator.

Fig no: 95 Dragline Excavator

4. Bulldozers

- Bulldozers are another type of soil excavating equipment which are used to remove the topsoil layer up to particular depth. The removal of soil is done by the sharp edged wide metal plate provided at its front. This plate can be lowered and raised using hydraulic pistons.

Fig no: 96 Bulldozers

5. Graders

- Graders also called as motor graders are another type of equipment used in construction especially for the construction of roads. It is mainly used to level the soil surface. It contains a horizontal blade in between front and rear wheels and this blade is lowered in to the ground while working. Operating cabin is provided on the top of rear axle arrangement.

Fig no: 97Graders

6. Wheel Tractor Scrapers

- Wheel Tractor Scrapers are earth moving equipment used to provide flatten soil surface through scrapping. Front part contains wheeled tractor vehicle and rear part contain a scrapping arrangement such as horizontal front blade, conveyor belt and soil collecting hopper.
- When the front blade is lowered onto the ground and vehicle is moved, the blade starts digging the soil above the blade level and the soil excavated is collected in hopper through conveyor belt.

Fig no: 98 Wheel Tractor scraper

7. Trenchers

- Trenchers or Trenching machines are used to excavate trenches in soil. These trenches are generally used for pipeline laying, cable laying, drainage purposes etc. Trenching machines are available in two types namely chain trenchers and wheeled trenchers.
- Chain trenchers contains a fixed long arm around which digging chain is provided. Wheeled trenchers contains a metal wheel with digging tooth around it.

Fig no: 99 Trenchers

❖ Advance construction Methods

1. Precast Flat Panel System

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

Fig no: 100 Precast Flat Panel System

2. 3D Volumetric Construction

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

Fig no: 101 3D Volumetric Construction

3. Flat Slab Construction

- The flat slabs are structural elements that are highly versatile in nature. This is this versatility that it is used widely in construction. The flat slab provides minimum depth and faster construction. The system also provides column grids that are flexible.
- Wherever it is necessary to seal the partitions to the slab soffit as a reason of acoustic and fire concerns, the flat slabs are a desirable solution. When compared with other forms of construction, the flat slabs are faster and more economic in nature.

Fig no: 102Flat Slab Constructions

4. 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.

Fig no: 103 Pre cast Concrete Foundation

5. Twin Wall Technology

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

Fig no: 104 Twin wall technology

6. 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.

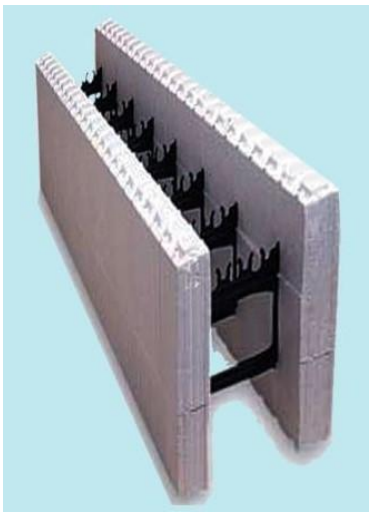


Fig no: 105 Insulating Concrete Formwork

14.1.4 Engineering Aspects of Soil mechanics - Environmental Impact Assessment

❖ **Engineering aspects of Soil Mechanics**

- Soil mechanics is a branch of soil physics and applied mechanics that describes the behavior of soils.
- It differs from fluid mechanics and solid mechanics in the sense that soils consist of a heterogeneous mixture of fluids (usually air and water) and particles (usually clay, silt, sand, and gravel) but soil may also contain organic solids and other matter.
- Along with rock mechanics, soil mechanics provides the theoretical basis for analysis in geotechnical engineering, a sub discipline of civil engineering, and engineering geology, a sub discipline of geology.
- Soil mechanics is used to analyze the deformations of and flow of fluids within natural and man-made structures that are supported on or made of soil, or structures that are buried in soils. Example applications are building and bridge foundations, retaining walls, dams, and buried pipeline systems.

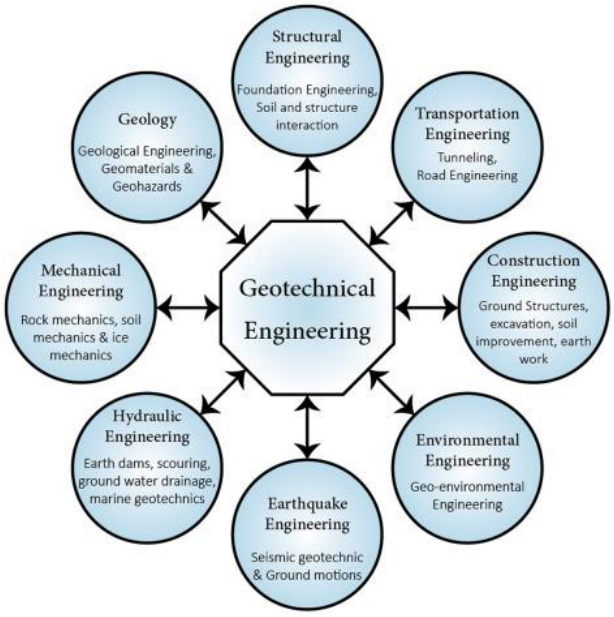


Fig no: 106 Engineering aspects of soil

- Principles of soil mechanics are also used in related disciplines such as geophysical engineering, coastal engineering, agricultural engineering, hydrology and soil physics.
- This article describes the genesis and composition of soil, the distinction between pore water pressure and inter-granular effective stress, capillary action of fluids in the soil pore spaces, soil classification, seepage and permeability, time dependent change of volume due to squeezing water out of tiny pore spaces, also known as consolidation, shear strength and stiffness of soils.
- The shear strength of soils is primarily derived from friction between the particles and interlocking, which are very sensitive to the effective stress.
- The article concludes with some examples of applications of the principles of soil mechanics such as slope stability, lateral earth pressure on retaining walls, and bearing capacity of foundations.

❖ Environmental Impact Assessment

1. Introduction

- Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.
- UNEP defines Environmental Impact Assessment (EIA) as a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers.
- Environment Impact Assessment in India is statutorily backed by the Environment Protection Act, 1986 which contains various provisions on EIA methodology and process.

2. History of EIA in India

- The Indian experience with Environmental Impact Assessment began over 20 years back. It started in 1976-77 when the Planning Commission asked the Department of Science and Technology to examine the river-valley projects from an environmental angle.
- Till 1994, environmental clearance from the Central Government was an administrative decision and lacked legislative support.
- On 27 January 1994, the then Union Ministry of Environment and Forests, under the Environmental (Protection) Act 1986, promulgated an EIA notification making Environmental Clearance (EC) mandatory for expansion or modernisation of any activity or for setting up new projects listed in Schedule 1 of the notification.
- The Ministry of Environment, Forests and Climate Change (MoEFCC) notified new EIA legislation in September 2006.
- The notification makes it mandatory for various projects such as mining, thermal power plants, river valley, infrastructure (road, highway, ports, harbours and airports) and industries including very small electroplating or foundry units to get environment clearance.
- However, unlike the EIA Notification of 1994, the new legislation has put the onus of clearing projects on the state government depending on the size/capacity of the project.

3. The EIA Process

- EIA involves the steps mentioned below. However, the EIA process is cyclical with interaction between the various steps.
- Screening: The project plan is screened for scale of investment, location and type of development and if the project needs statutory clearance.
- Scoping: The project's potential impacts, zone of impacts, mitigation possibilities and need for monitoring.
- Collection of baseline data: Baseline data is the environmental status of study area.
- Impact prediction: Positive and negative, reversible and irreversible and temporary and permanent impacts need to be predicted which presupposes a good understanding of the project by the assessment agency.
- Mitigation measures and EIA report: The EIA report should include the actions and steps for preventing, minimizing or by passing the impacts or else the level of compensation for probable environmental damage or loss.

- Public hearing: On completion of the EIA report, public and environmental groups living close to project site may be informed and consulted.
- Decision making: Impact Assessment Authority along with the experts consult the project-in-charge along with consultant to take the final decision, keeping in mind EIA and EMP (Environment Management Plan).
- Monitoring and implementation of environmental management plan: The various phases of implementation of the project are monitored.
- Assessment of Alternatives, Delineation of Mitigation Measures and Environmental Impact Assessment Report: For every project, possible alternatives should be identified, and environmental attributes compared. Alternatives should cover both project location and process technologies.
- Once alternatives have been reviewed, a mitigation plan should be drawn up for the selected option and is supplemented with an Environmental Management Plan (EMP) to guide the proponent towards environmental improvements.
- Risk assessment: Inventory analysis and hazard probability and index also form part of EIA procedures.

4. Stakeholders in the EIA Process

- Those who propose the project
- The environmental consultant who prepare EIA on behalf of project proponent
- Pollution Control Board (State or National)
- Public has the right to express their opinion
- The Impact Assessment Agency
- Regional centre of the MoEFCC

5. Importance of EIA

- EIA links environment with development for environmentally safe and sustainable development.
- EIA provides a cost effective method to eliminate or minimize the adverse impact of developmental projects.
- EIA enables the decision makers to analyze the effect of developmental activities on the environment well before the developmental project is implemented.
- EIA encourages the adaptation of mitigation strategies in the developmental plan.
- EIA makes sure that the developmental plan is environmentally sound and within the limits of the capacity of assimilation and regeneration of the ecosystem.

6. Salient Features of 2006 Amendments to EIA Notification

- Environment Impact Assessment Notification of 2006 has decentralized the environmental clearance projects by categorizing the developmental projects in two categories, i.e., Category A (national level appraisal) and Category B (state level appraisal).
- Category A projects are appraised at national level by Impact Assessment Agency (IAA) and the Expert Appraisal Committee (EAC) and Category B projects are apprised at state level.
- State Level Environment Impact Assessment Authority (SEIAA) and State Level Expert Appraisal Committee (SEAC) are constituted to provide clearance to Category B process.
- After 2006 Amendment the EIA cycle comprises of four stages:
- Screening
- Scoping

- Public hearing
- Appraisal
- Category A projects requires mandatory environmental clearance and thus they do not undergo the screening process.
- Category B projects undergoes screening process and they are classified into two types.
- Category B1 projects (Mandatorily requires EIA).
- Category B2 projects (Do not require EIA).
- Thus, Category A projects and Category B, projects undergo the complete EIA process whereas Category B2 projects are excluded from complete EIA process.

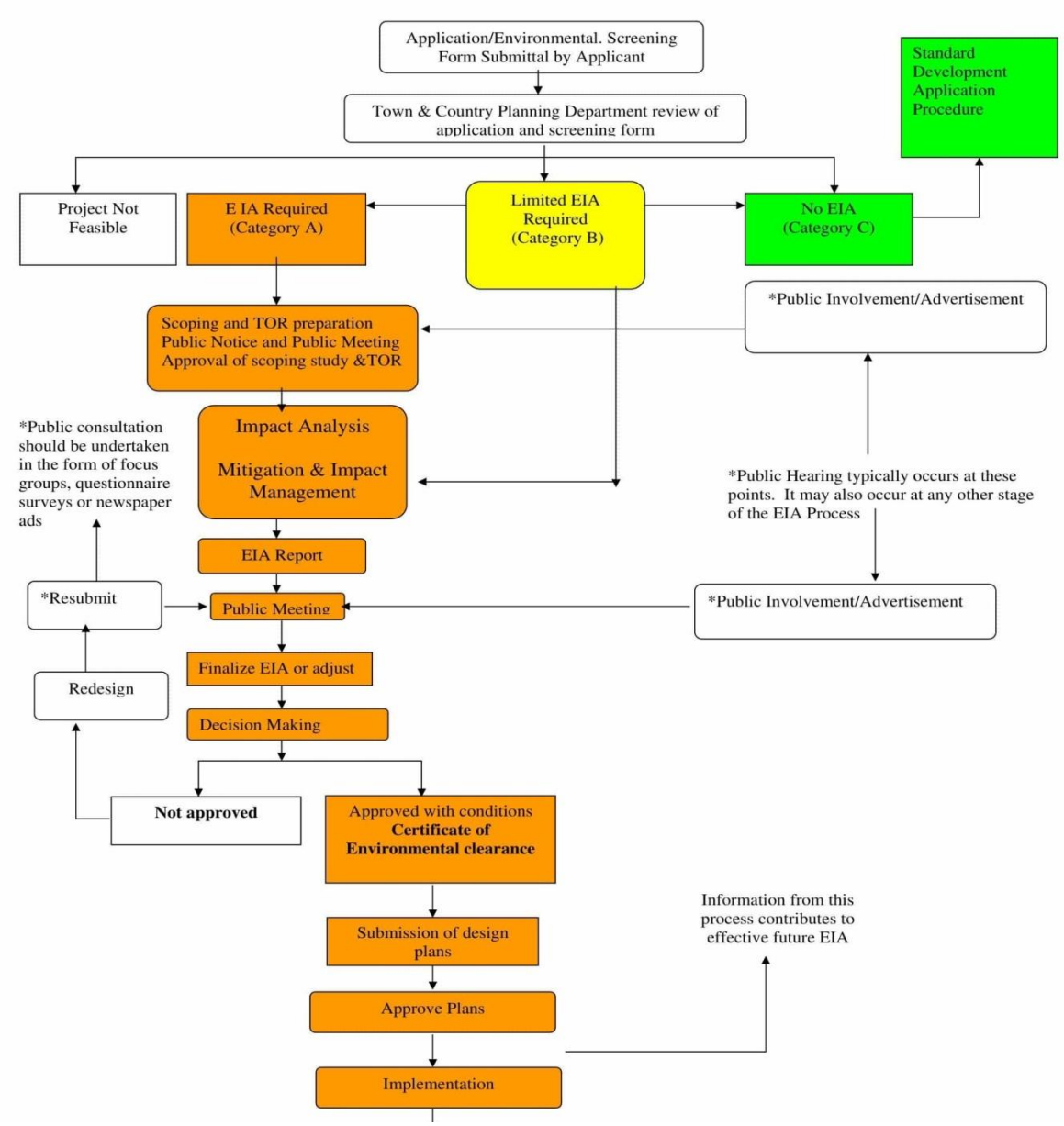


Fig no: 107 Flow chart of EIA

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

1. Water supply system

- It is an infrastructure for the collection, transmission, treatment, storage, and distribution of water for homes, commercial establishments, industry, and irrigation, as well as for such public needs as firefighting and street flushing.
- Of all municipal services, provision of potable water is perhaps the most vital. People depend on water for drinking, cooking, washing, carrying away wastes, and other domestic needs. Water supply systems must also meet requirements for public, commercial, and industrial activities.
- In all cases, the water must fulfill both quality and quantity requirements.

❖ **Surface water and groundwater**

- Surface water and groundwater are both important sources for community water supply needs.
- Groundwater is a common source for single homes and small towns, and rivers and lakes are the usual sources for large cities.
- Although approximately 98 percent of liquid fresh water exists as groundwater, much of it occurs very deep.
- This makes pumping very expensive, preventing the full development and use of all groundwater resources.

❖ **Water Requirements**

- Municipal water supply systems include facilities for storage, transmission, treatment, and distribution. The design of these facilities depends on the quality of the water, on the particular needs of the user or consumer, and on the quantities of water that must be processed.

❖ **Water Treatment**

- Water in rivers or lakes is rarely clean enough for human consumption if it is not first treated or purified. Groundwater, too, often needs some level of treatment to render it potable.

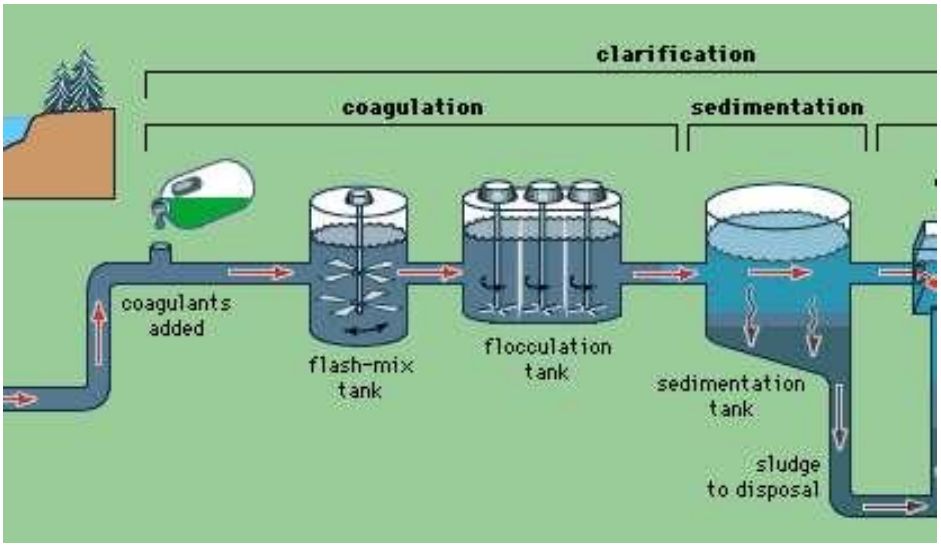


Fig no: 108 Water treatment

- The primary objective of water treatment is to protect the health of the community. Potable water must, of course, be free of harmful microorganisms and chemicals, but public supplies should also be aesthetically desirable so that consumers will not be tempted to use water from another, more attractive but unprotected source.
- The water should be crystal clear, with almost no turbidity, and it should be free of objectionable color, odor, and taste.
- For domestic supplies, water should not be corrosive, nor should it deposit troublesome amounts of scale and stains on plumbing fixtures.
- Industrial requirements may be even more stringent; many industries provide special treatment on their own premises.

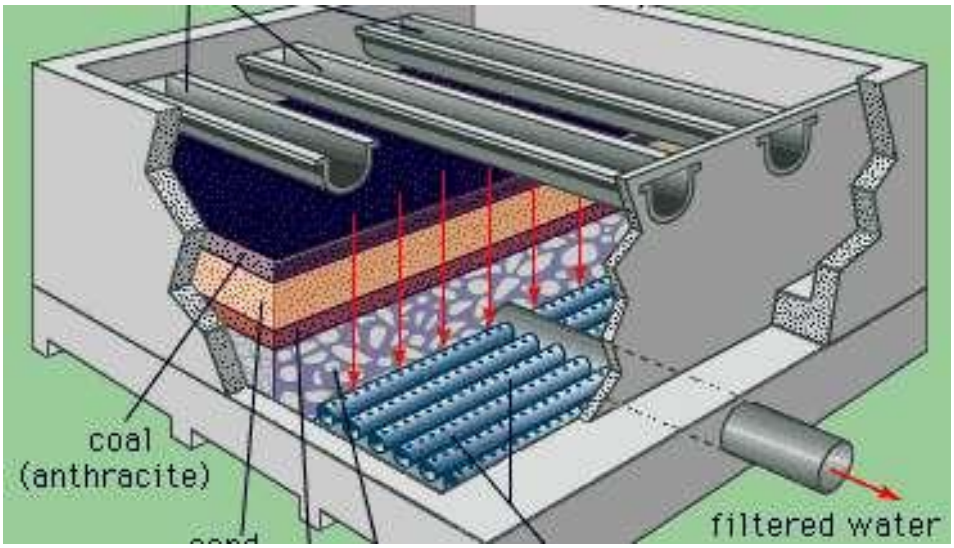


Fig no: 109 Schematic diagram of a rapid-filter water treatment facility.

- The type and extent of treatment required to obtain potable water depends on the quality of the source. The better the quality, the less treatment is needed.
- Surface water usually needs more extensive treatment than does groundwater, because most streams, rivers, and lakes are polluted to some extent.
- Even in areas remote from human populations, surface water contains suspended silt, organic material, decaying vegetation, and microbes from animal wastes.
- Groundwater, on the other hand, is usually free of microbes and suspended solids because of natural filtration as the water moves through soil, though it often contains relatively high concentrations of dissolved minerals from its direct contact with soil and rock.

2. Sewerage system

- Sewerage system**,** network of pipes, pumps, and force mains for the collection of wastewater, or sewage, from a community.
- Modern sewerage systems fall under two categories: domestic and industrial sewers and storm sewers.
- Sometimes a combined system provides only one network of pipes, mains, and outfall sewers for all types of sewage and runoff.

❖ **Types of sewerage system**

1. Combined Sewerage System

- A combined sewer system is a sewer that accepts storm water, sanitary water/sewage, then the sewage is treated in STP (sewerage treatment plant). This system is mainly used in the towns where streets are narrow and rain fall is less than the moderate.

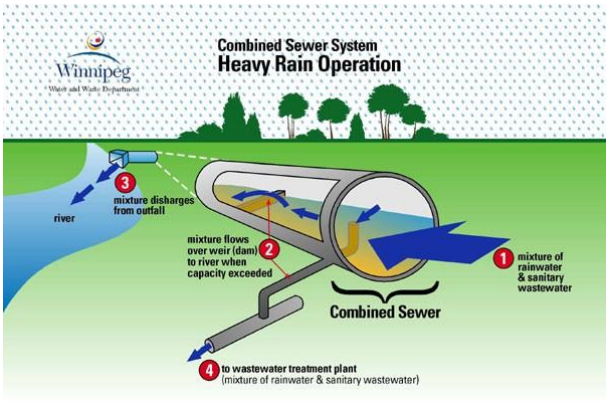


Fig no: 110 combined sewerage system

Advantages
a)Less construction cost
b)There will be No chocking problem
c)Strength of the toxic water will be reduced.
Disadvantages
(a)Due to sewage the toxicity of storm water will increase.
(b)Initial cost of piping will be high.
(c)Problem in handling.

2. Separate sewerage system

- In this system the sanitary sewage and storm water are carried separately in two sets of sewers. The sewage is conveyed to waste water treatment plant (WWTP) and the storm water is discharges into rivers without treatment.

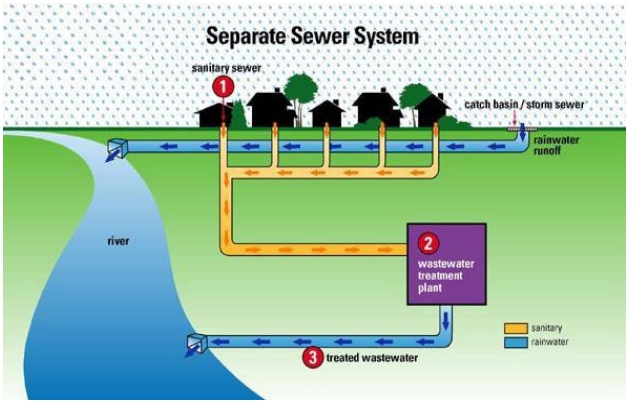


Fig no: 111 Separate sewerage system

Advantages
a) The rain water will not become toxic.
b) More efficient than combined system.
Disadvantages
a) Problem of chocking.
b) Flushing system will be required for cleaning purpose.

3. Partially combined or partially separate system

- A partially separate system is a combination of a combined sewerage system and separate sewerage systems. This type of sewerage system helps decrease the load from a combined sewerage system because only the water from initial rain falls(water from acid rain) is added to sewage water and after than this system work as separate system.

Advantages
a) The sizes of sewers are not very large as some portion of storm water is carried through open drains.
b) Combines the advantages of both the previous systems. Silting problem is completely eliminated.
c) Storm water will be less toxic as compare to previous two systems.
Disadvantages
a) The storm water is unnecessary put load on to the treatment plants to extend.
b) The toxicity of sewage water will increase.

3. Waste Water-Sustainable development techniques

1. Sustainable Treatment types

1. Lagoons/wetlands
2. Anaerobic digestion
3. Soil aquifer treatment

❖ **Lagoons/ wetlands**

- In wetland treatment, natural forces (chemical, physical and solar) act together to purify the wastewater, thereby achieving wastewater treatment.
- A series of shallow ponds act as stabilization lagoons, while water hyacinth or duckweed acts to accumulate heavy metals.
- Multiple forms of bacteria, plankton and algae act to further purify the water.

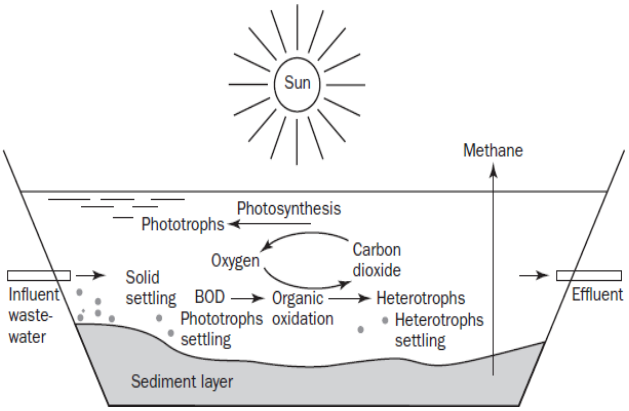


Fig no: 112 Lagoon process

Advantages of wetland treatment.

- It is mechanized treatment systems.
- Allows for total resource recovery.
- Considered as a low-cost technology if sufficient, non-arable land is available.

Disadvantages of wetland treatment

- Affected by the climate.
- Some locations may make it unsustainable.
- Mechanical problems may include clogging with sprinkler and drip irrigation systems.
- High demand for large area of arable, flat land. Existing significant odor problems.

❖ **Anaerobic digestion**

- Anaerobic Digestion Anaerobic bacteria degrade organic materials in the absence of oxygen and produce methane and carbon dioxide.
- The methane can be reused as an alternative energy source (biogas).

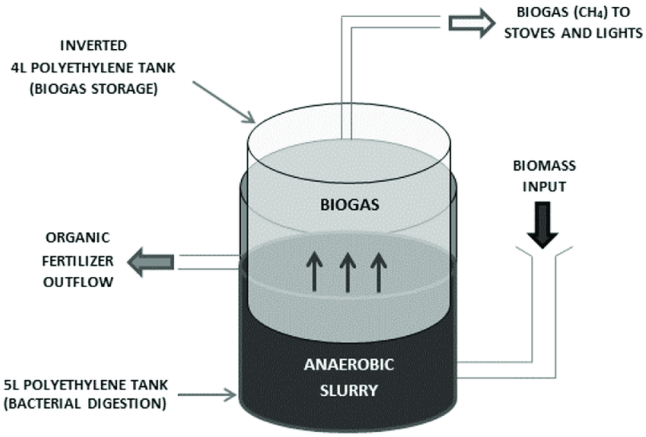


Fig no : 113 Anaerobic digestion

Advantages of Anaerobic Digestion

- No, or very low energy demand.
- Production of valuable energy in the form of methane.
- Low investment costs and low space requirement.
- Applicable at small as well as large scale.

Disadvantages Advantages of Anaerobic Digestion

- Low production of excess sludge.
- Low nitrogen and phosphorus requirements.
- High treatment efficiencies.
- Effluents contain valuable fertilizers (ammonium salts).

❖ **Soil aquifer treatment**

- Soil Aquifer Treatment SAT (soil aquifer treatment) is a geo purification system where partially treated sewage effluent artificially recharges the aquifers and then withdrawn for future use.
- By recharging through unsaturated soil layers, the effluent achieves additional purification before it is mixed with the natural groundwater.

Advantages of Soil Aquifer Treatment

- Cost is lower.
- Remove pathogen efficiently.
- Operation is not highly technical Breaks the pipe-to-pipe connection of directly reusing treated wastewater from a treatment plant.

Disadvantages of Soil Aquifer Treatment

- Can change the soil and groundwater hydrological properties.
- Requires a big area for the infiltration basin.

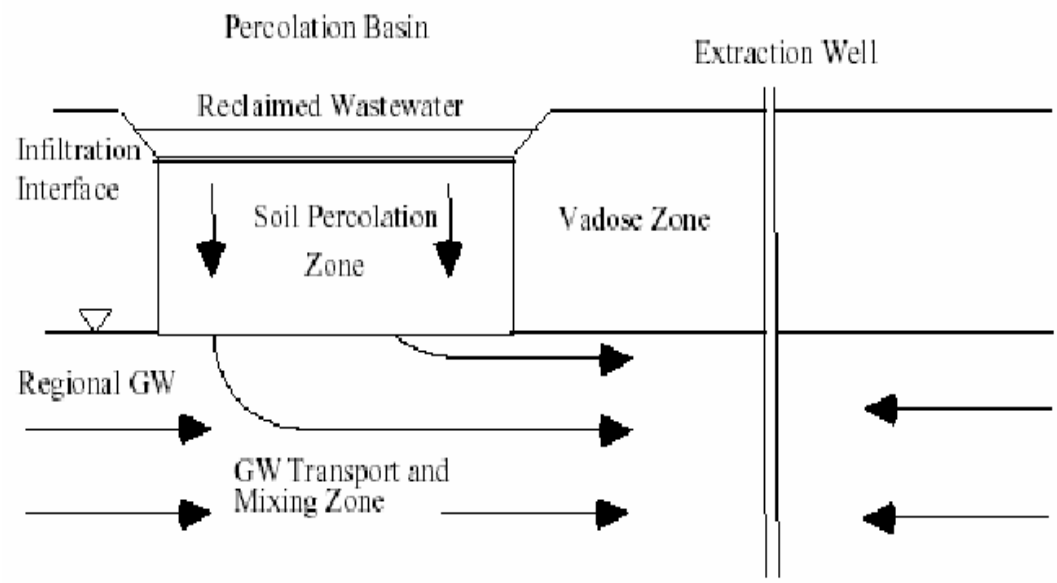


Fig no: 114 soil aquifer

Chapter: 15 Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society. with doing small changes, Period, Amount Expenditure and Benefit

Table 33:.Design Implementation details

Sr.no	Description	Period to implement	Amount
1	**Physical design**		
	Bank	Long term(3-5 year)	1142850
	RCC tank	Immediately	59035
2	**Sustainable design**		
	Rain water harvesting system	Within 1 year	39120
	Green house	Within 1 year	20125
3	**Social design**		
	Septic tank	Within 1 year	25850
	Bore well	Immediately	75000
4	**Socio-cultural design**		
	Post office	Within 1 year	943743
	Renovation of gram panchayat	Immediately	32150
5	**Heritage design**		
	Clock tower	Long term(3-5 year)	426406
	Community hall	Long term(3-5 year)	7043685
6	**Smart design**		
	RO plant	Long term(3-5 year)	460405
	Reverse vending machine	Within 1 year	225000/piece

Chapter: 16 Survey By Interviewing With Talati And/or Sarpanch

Vishwakarma Yojana: Phase VIII
VAGUDAD VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Table 34: Survey By Interviewing With Talati And/or Sarpanch

Sr no	Question	Yes/No	Remarks
1	What are the sources of income in village?	Yes	Agriculture
2	What are the chances of employment in village?	No	-
3	What are the special technical facilities in village?	No	-
4	Is any debt on village dwellers?	No	-
5	Are village people getting agricultural help?	No	-
6	Is women health awareness Program organized in village?	No	-
7	Are women having opportunity to work and income?	No	-
8	Child girl education is appreciated in village?	Yes	There is a one primary school in village and all girls are going there.
9	Facility of vaccination to child is available in village?	Yes	-
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	People of village are aware about vaccination.
11	Women help line number information is provided to village people?	Yes	-
12	Is water scarcity in village? How many days per year?	No	-
13	Is village under any debt?	No	-
14	Is any serious issue due to debt from bank or any person happened in village?	No	-
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	No	-
16	Is any death of patient occurred due to unavailability of medical facility in village?	No	-
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	No	-
18	Is village improvement is observed in comparative scenario from past to present?	Yes	-
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	No	-
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	-

Chapter: 17 Irrigation / Agriculture Activities And Agro Industry, Alternate Technique

17.1 Introduction

❖ **A history of agricultural irrigation**

- Humans have relied on agriculture to feed their communities for thousands of years and they have needed irrigation to water their crops for almost as long.
- Irrigation involves artificially supplying water to the land to enhance the growth of crops.
- The earliest form of irrigation dates back at least 8,000 years, and the technique remains an important part of successful agricultural practices across the world. Here is a brief history of irrigation from the earliest days until modern times.

❖ **Egypt and Mesopotamia**

- The earliest known systems of irrigation began in 6000 BC in Egypt and Mesopotamia. In Egypt, the Nile flooded for a few months each year, and the waters were diverted to the fields to allow farmers to grow crops where otherwise they would be unable to do so. In 3100 BC, a large irrigation project was built, which involved the construction of dams and canals up to 20 kilometres in size.
- However, the flooding was uncertain, and high flows could wash away dikes and flood entire villages, whereas low flows would not provide the crops with enough water.
- In Mesopotamia, the Tigris and Euphrates floodwaters were used in the same way. The Sumerians dug canals in what are considered the first ever works of engineering. It is thought that canals could be used for up to 1,000 years before being replaced.

❖ **Terrace irrigation**

- Terrace irrigation is an ancient technique that was used all over the world, including in China and India, but it was used especially in the Americas. The Zana Valley in Peru provides an example of this technique, and remains of irrigation canals have been found here that date back to 4,000 BC, which are the earliest systems in the Americas that we know of. However, the technique could have been used even earlier than this.

❖ **Shri lankan irrigation**

- Irrigation in Sri Lanka dates back to about 300 BC during the reign of King Pandukabhaya. A very complex system of underground canals was used, and this is the first place where artificial reservoirs for storing water were built in an incredible feat of engineering. In fact, they were so well designed that they still exist to this day.

❖ **North American irrigation**

- Two systems of irrigation were used in North America, which are known as the Chaco and Hohokam systems. The Hohokam system was used by the Hohokam people in Arizona, and the Chaco system was used by the Anasazi in New Mexico.
- The Hohokam people built canals in the early centuries of the first millennium, whereas the Chaco system dates to about 900 AD. This also used canals to divert water into fields and reservoirs in the San Juan basin.

17.2 Irrigation and its types

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

1. Surface Irrigation

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

Fig no: 115 surface irrigation

2. 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.

Fig no: 116localized irrigation

3. 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.
- Reduce the impact of drought and climate change on food production
- Avoid contamination of groundwater and rivers caused by fertilizer leaching
- Support rural communities, reduce poverty and reduce migration to cities

Fig no: 117 drip irrigation

4. 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.

Fig no: 118 center pivot irrigation

5. Manual Irrigation

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

Fig no: 119 manual irrigation

❖ **Methods of Irrigation**

Irrigation can be carried out by two different methods:

1. Traditional Methods
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. Drip system
  2. Sprinkler 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.

17.3 Importance of irrigation

1. Insufficient and uncertain rainfall adversely affects agriculture. Droughts and famines are caused due to low rainfall. Irrigation helps to increase productivity even in low rainfall.
2. The productivity on irrigated land is higher as compared to the un-irrigated land.
3. Multiple cropping is not possible in India because the rainy season is specific in most of the regions. However, the climate supports cultivation throughout the year. Irrigation facilities make it possible to grow more than one crop in most of the areas of the country.
4. Irrigation has helped to bring most of the fallow land under cultivation.
5. Irrigation has stabilized the output and yield levels.
6. Irrigation increases the availability of water supply, which in turn increases the income of the farmers.

17.4 Agriculture in Vagudad village

- The main occupation of the Vagudad villagers is agricultural activity.
- They grow various crops such as cotton, Peanut and wheat.
- They are also aware about various irrigation systems.

Table35: Agriculture Input

use of chemical fertilizers	Yes
use of chemical insecticides	Yes
Use of chemical weedicide	Yes
soil health card	No
Irrigation: canal /tank/bore well/other	Other
Drip of sprinkler irrigation : drip/sprinkler/none	Drip

- They have to go outside from the village to sell their agricultural products.

Chapter: 18. Social Activities – Any Activities Planned By Students

- Social awareness to children of village about health and cleanliness around them.
- We have visited the primary school and clean the school with children.
- Cleaning activity done at school ground at the village with students.

Fig no120: cleaning activity

- Awareness talk in the classroom of school by students about Covid-19 and its precautions.
- Also a talk on awareness and importance of education especially for a girl child.
- They also give us information about their education system and subjects which they are study.

Fig no121: Awareness talk

- Games played with children for friendly environment.
- Also they give us information about public distribution system and agriculture activity of village.
- We really enjoy with them.

Fig no 122: games with children

Chapter: 19.Vagadad SAGY Questionnaire Survey form with the Sarpanch Signature

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Vagudad Gram Panchayat: Vagudad Ward No. —

Block: Lodhika District: Rajkot

State: Gujarat LS Constituency: Rajkot LS. Constituency

1. Family Identity and Size

Name of Head of Household	Vishal kalubhai Jaly.							Male/ Female	M
SECC Survey ID:		Family Size	10	Over 18	8	6 to 18	2	Under 6	2

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	OBC	Life Insurance	1. All Adults 2. Some Adults 3. None	AABY	1. Yes 2. No	Kisan Credit Card Yes / No	Yes
Poverty Status Year[2]:	1. BPL 2. APL	Health Insurance	1. All Adults 2. Some Adults 3. None	RSBY	1. Yes 2. No	MGNREGS Job Card Number	—
PDS (If NFSA is not implemented)		Annapurna	Antyodaya	BPL	APL	Is any woman in the family member of an SHG? Yes / No	
PDS (If NFSA is implemented)		Annapurna	Antyodaya	Priority	Other		

2. Adults (above 18 years)

Name	Age	Sex M/F/O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/N)	Bank A/C (Y/N)	Social Security Pension[5]
Kalubhai Deviraj Bhai	44	M	—	2	4	Y	N	—
Vimalbhai kalubhai Jaly	21	M	—	2	8	Y	N	—
Vishal kalubhai Jaly	25	M	—	2	5	Y	N	—
Manjuben kalubhai Jaly	39	F	—	2	2	Y	N	—

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
Shraddha								

4. Children below 6 years

Name	Age	Sex M/F/O	Disability Yes/No	Going to School (Y/N)	Going to AWC Y/N	De-worming Done	Fully Immunised Y/N	Mother's Age at the time of Child's Birth
Shraddha Vishalbhai Jaly	2	F	—	N	N	—	Y	23
Jayraj Vishalbhai Jaly	2	M	—	N	N	—	Y	25

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4

[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011)

[3] Marital Status: Not Married – 1, Married – 2, Widowed – 3, Divorced/Separated – 4

[4] Level of Education: Not Literate – 01, Literate – 02, Completed Class 5 - 03, Class 8th – 04, Class 10th-05, Class 12th-06, ITI Diploma-07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)

[5] No Pension – 0, Old Age Pension – 1, Widow Pension – 2, Disability Pension – 3, Other Pension – 4 (mention)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

	Always		Sometimes		Never
After use of Toilet	Soap	Other	Soap	Other	
Before Eating	Soap	Other	Soap	Other	

6. Use of Mosquito Net
Children: Yes / No Adults: Yes / No

7. Do members take Regular Physical Exercise

	Yoga	Games	Other Exercises
Adults	Yes / No	Yes / No	Yes / No
Children	Yes / No	Yes / No	Yes / No

8. Consumption of Tobacco

	Smoking	Chewing
Adults		
Children	X	X

9. House & Homestead Data

Own House: Yes / No	No. of Rooms:
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	498.94	2. Cultivable Area	429.78
3. Irrigated Area	—	4. Uncultivable Area	69.16

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	✓
Sharecropping /Farming Leased Land	✓
Animal Husbandry	
Pisciculture	
Fishing	
Skilled Wage Worker	
Unskilled Wage Worker	
Salaried Employment in Government	
Salaried Employment - Private Sector	
Weaving	
Other Artisan(mention)	
Other Trade & Business (mention)	

14. Migration Status
Does any member of the household migrate for Work: Yes / No. If Yes Entire Year / Seasonal
Does anyone below 18 years migrate for work: Y/N

15. Agriculture Inputs

Do you use Chemical Fertilisers	Yes/No
Do you use Chemical Insecticides	Yes/No
Do you use Chemical Weedicide	Yes/No
Do you have Soil Health Card	Yes/No
Irrigation: None/ Canal/ Tank/ Borewell/Other	
Drip or Sprinkler Irrigation: Drip /Sprinkler / None	

16. Agricultural Produce in a normal year (Top 3)

Name	Unit	Quantity
Wheat		
cotton.		
Peanut		

17. Livestock Numbers

Cows: 346	Bullocks 425	Calves: —
Female Buffalo: 4	Male Buffalo: —	Buffalo Calves: —
Goats/ Sheep: 556	Poultry/ Ducks: —	Pigs: —
Any other: Type —		No. —
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): —		

18. What games do Children Play
Nap goal

19. Do children play musical instrument (mention)
NO

Schedule Filled By: Solanki Subhi
Principal Respondent: Vishal Kalubhai Jalu
Date of Survey: 8/3/21

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: Vagudad

b. Block: Lodhika

c. District: Rajkot

d. State: Gujarat

e. Lok Sabha Constituency: Rajkot parliamentary constituency

f. Number of Wards in the Gram Panchayat: –

g. Number of Villages in the Gram Panchayat: –

h. Names of Villages: Vagudad

Demographic Information

Number of Households 142 Total Population 797 Male 416 Female 381

SC HHs 0.81 ST HHs 0.1 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	
b.	Nearest Primary Health Centre (PHC)	N	18 km
c.	Nearest Community Health Centre (CHC)	N	18 km
d.	Nearest Post Office	N	18 km
e.	Nearest Bank Branch (Any)	N	18 km
f.	Nearest Bank with CBS Facility	N	18 km
g.	Nearest ATM	N	18 km
h.	Nearest Primary School	Y	
i.	Nearest Middle School	N	18 km
j.	Nearest Secondary School	N	18 km
k.	Nearest Higher Secondary School / +2 College	N	18 km
l.	Nearest Graduate College	N	18 km
m	Nearest ITI / Polytechnic Centre	N	18 km
n	Kisan Seva Kendra	N	18 km.

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	18 km
p	Nearest Agro Service Centre	N	18 km
p	MSP based Government Procurement Centre	N	18 km
q	Milk Cooperative /Collection Centre	N	18 km
r	Veterinary Care Centre	N	18 km
s	Ayurveda Centre	N	18 km
t	E – Seva Kendra	N	18 km
u	Bus Stop	Y	
v	Railway Station	N	18 km
w	Library	N	18 km
x	Common Service Centre	N	18 km

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total N Public – Private –

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 1

b. Number of villages without Angan Wadi Centres –

Names of such villages: –

c. Schools (Number)

Primary Private: 0 Primary Govt.: 1

Middle Private: 0 Middle Govt.: 0

Secondary Private: 0 Secondary Govt.: 0

Higher Secondary Private: 0 Higher Secondary Govt: 0

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)	–	–	–	–	–	–	3 km
b.	Kerosene	–	–	–	–	–	–	3 km
c.	Other (mention)	–	–	–	–	–	–	3 km

2

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

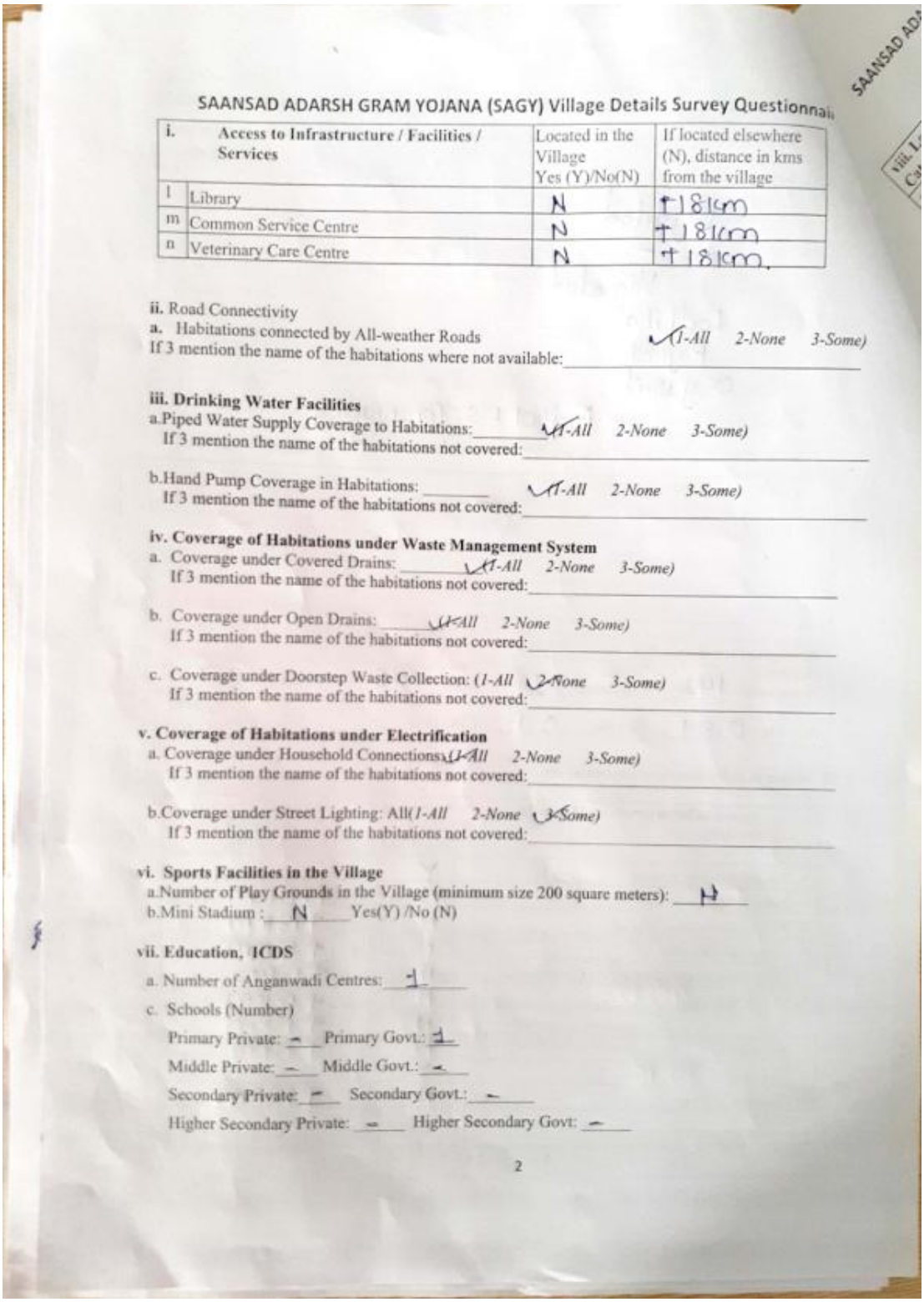
		Number
a)	Number of eligible Households for pension (old age, widow, disability)	4
b)	Number of Households receiving pension (old age, widow, disability)	4
c)	Number of eligible Households who are not receiving pension	—
d)	Number of Households eligible for Ration Card	—
e)	Number of eligible HHs having ration cards	—
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	—
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	—
h)	Number of active Job Card holders under MGNREGA	—
i)	Number of Job Card holders who completed 100 days of work during 2013-14	—
j)	Number of shops selling alcohol	—
k)	Number of BPL families	38
l)	Number of landless households	—
m)	Number of IAY beneficiaries	—
n)	Number of FRA[2] beneficiaries	—
o)	Number of Community Sanitary Complexes	—
p)	Number of Households headed by single women	—
q)	Number of Households headed by physically handicapped persons	—
r)	Total number of Persons with Disability in the village	—
s)	Number of SHGs	—
t)	Number of active SHGs	—
u)	Number of SHG Federations	—
v)	Number of Youth Clubs	—
w)	Number of Bharat Nirman Volunteers	—

Name and Signature of Surveyor and Respondent'

Solanki Subhi Vatsal Suchak Surveyor	પી. જી. વિરપરા સરપંચ વાગુદડ ગ્રામ પંચાયત PRI Respondent (Preferably Gram Panchayat Chairperson)	ગ્રા.સે.ગા. રતા. ઉપ સરપંચ, વાગુદડ .... પંચાયત Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	02/03/'21 Date of Survey

[2] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

4



SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnai

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	18km
m	Common Service Centre	N	18km
n	Veterinary Care Centre	N	18km.

ii. Road Connectivity

a. Habitations connected by All-weather Roads (1-All 2-None 3-Some)

If 3 mention the name of the habitations where not available: _____

iii. Drinking Water Facilities

a.Piped Water Supply Coverage to Habitations: _____ (1-All 2-None 3-Some)

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

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

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

iv. Coverage of Habitations under Waste Management System

a. Coverage under Covered Drains: _____ (1-All 2-None 3-Some)

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

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

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

c. Coverage under Doorstep Waste Collection: (1-All 2-None 3-Some)

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

v. Coverage of Habitations under Electrification

a. Coverage under Household Connections (1-All 2-None 3-Some)

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

b.Coverage under Street Lighting: All(1-All 2-None 3-Some)

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

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): N

b.Mini Stadium : N Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 1

c. Schools (Number)

Primary Private: - Primary Govt.: 1

Middle Private: - Middle Govt.: -

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	429.78	d.	Pasture / Grazing Land	—	g.	Check Dam	X
b.	Irrigated Land	—	e.	Forests/ Plnatations	3.15ha	h.	Wells/Bore Wells	✓
c.	Un-irrigated Land	69.16	f.	Other Common Land	—	I	Tanks /Ponds	X

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

Name and Signature of Surveyor and Respondent'

Siddhi Solanki Sushbhi Vatsal Suthar.	વી. જી. વિરડા સરપંચ વાગુદડ ગ્રામ પંચાયત	ગ્રા.સે.ગ.૧ ૨૮૧ ઉપ ...ચ, વાગુદડ ...ત પંચાયત	02/03/'21
Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

3

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: Vagudad
b. Ward Number: –
c. Gram Panchayat: Vagudad
d. Block: Lodhika
e. District: Rajkot
f. State: Gujarat
g. Lok Sabha Constituency: Rajkot L.S. Constituency
h. Number of Habitations / Hamlets in the Gram Panchayat: –
i. Names of Habitations / Hamlets: –

Demographic Information

Number of Households 142 Total Population 797 Male 416 Female 381

SC HHs 0.81 ST HHs 0.1 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	N	18 km
c.	Nearest Secondary School	N	18 km
d.	Kisan Seva Kendra	N	18 km
e.	Milk Cooperative /Collection Centre	N	18 km
g.	Health Sub Centre	N	18 km
h.	Bank	N	18 km
i.	ATM	N	18 km
j.	Bus Stop	Y	
k.	Railway Station	N	18 km

[1] While filling this the surveyor must collect the information from the Ward Member/s and relevant government officials

1

Saansad Adarsh Gram Yojana (SAGY) 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	Vagudad	–
b.	Hand Pump Coverage in Villages:	Covered ✓ / Not Covered	Vagudad	–
c.	Coverage under Covered Drains:	Covered ✓ / Not Covered	Vagudad	–
d.	Coverage under Open Drains:	Covered – / Not Covered	–	–
e.	Villages with Household Electricity Connection (Numbers)	Connected ✓ / Not Connected	Vagudad.	–

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	429.78	d.	Pasture / Grazing Land	–	g.	Check Dam	X
b.	Irrigated Land	–	e.	Forests/ Plantations	3.15 (ha)	h.	Wells/Bore Wells	✓
c.	Un-irrigated Land	69.16	f.	Other Common Land	–	i	Tanks /Ponds	X

[1] Mention the number of Villages Covered and Not Covered

3

Chapter: 20 TDO-DDO-Collector emails sending Soft copy attachment in the report

Chapter: 21 Comprehensive report for the entire village

We have visited Vagudad village and interact with various authorities of village like sarpanch, Talati mantri as well as people of village. We explain them what is Vishwakarma Yojana and main aim of vishwakarma project. We conduct techno-economic survey of village to identify various existing facilities.

We have also visited various places like gram-panchyat, bus stands, temples, Primary school and other amenities. Existing condition of various amenities as well as various infrastructures was examined by us like. road condition, housing condition, drainage system, etc.

We explain various design of our project under different infrastructure such as Rain water Harvesting system (sustainable design), public bank (physical design), septic tank (social design), Post office (socio cultural design) , RO plant (smart village design) and clock tower(Heritage design).

We discuss with Raj Samadhiyala, Lodhika and Vagudad Village authorities and dwellers of village and filled different types of survey form and analyze it. Using Techno-economic survey we get existing condition of village like demographical details, geographical details, occupational detail, physical infrastructure details, social infrastructure details, socio-cultural facilities, sustainable infrastructure facilities, and other facilities.

By use of Gap Analysis we compare all the available facilities and required facilities in Lodhika village. We observe available amenities in village like, road network, drinking water facility, educational facility, health facility, sanitation facility, transportation facility, and renewable source facility. We also observe which facilities are required for batter growth of village by interaction with different authorities of ideal village and smart village.

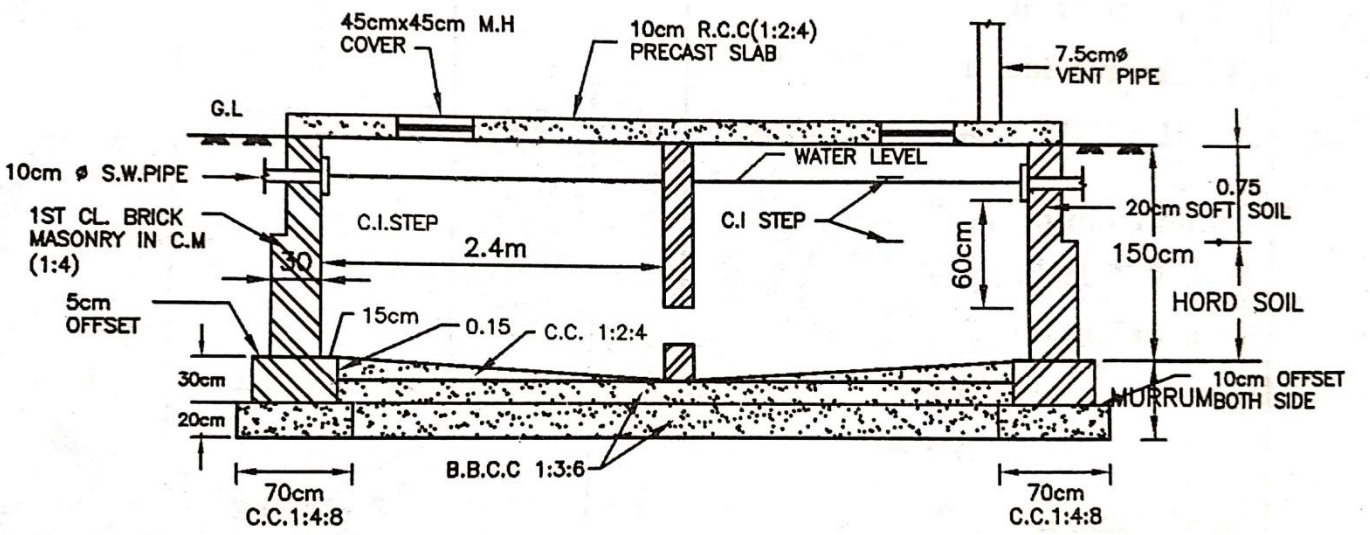
- Clock tower (Heritage design)
- Rain water harvesting system (Sustainable Design)
- Bank (Physical Design)
- Septic tank (Social Design)
- Post office (Socio Cultural Design)
- RO plant (Smart Village Design)

By providing this required facility to village, development and growth of village can be possible. So ultimately migration rate and urban city pressure can be reduce and livelihood of village dweller will increase.

And lastly this project is helped us to understand our skills and make it even batter. We got deep knowledge about development of village and various infrastructure facility design of village. Lastly we enjoyed the informational as well as practical journey of civil work.

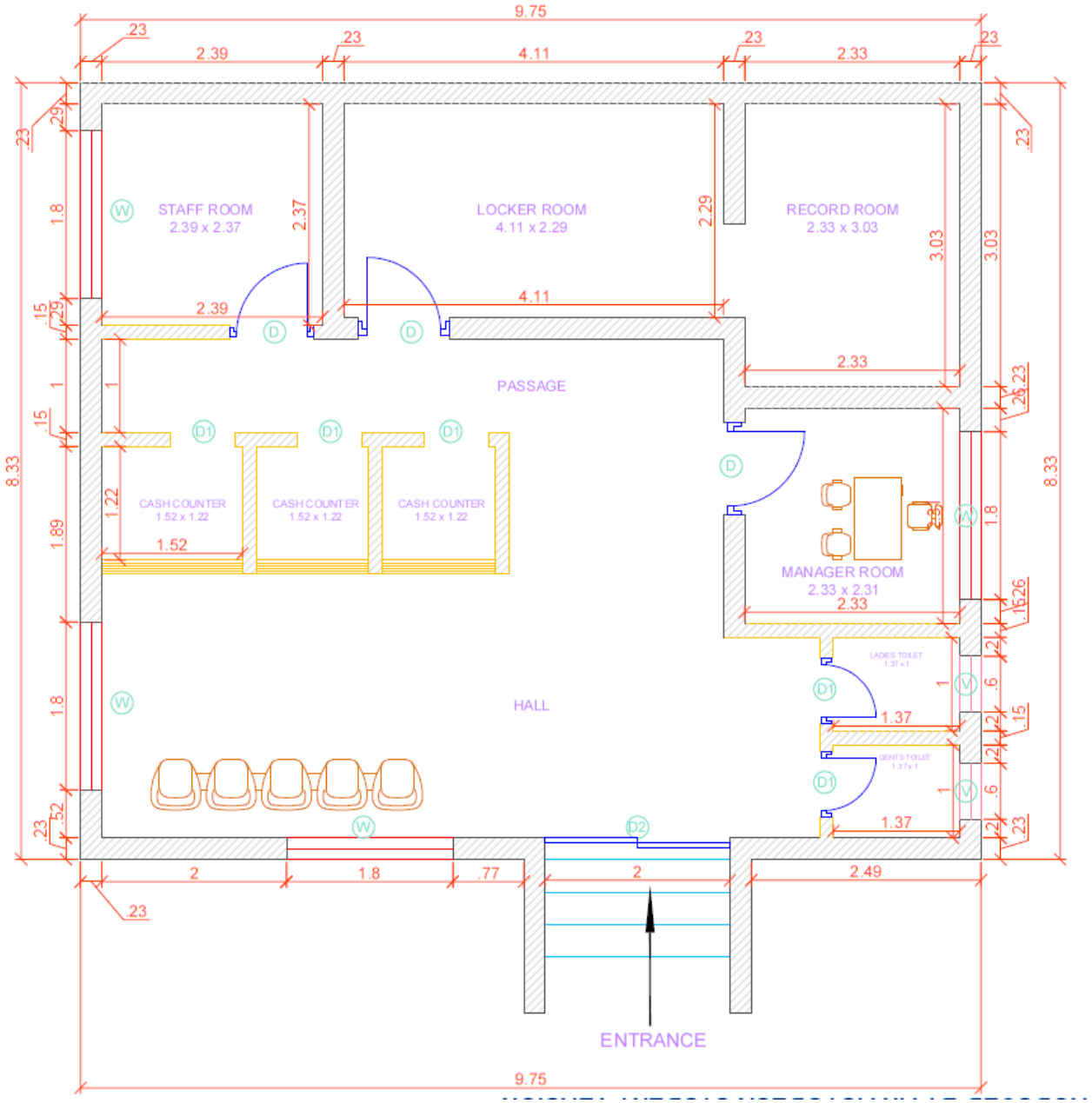
❖ **Detail drawings**

- **section of septic tank**

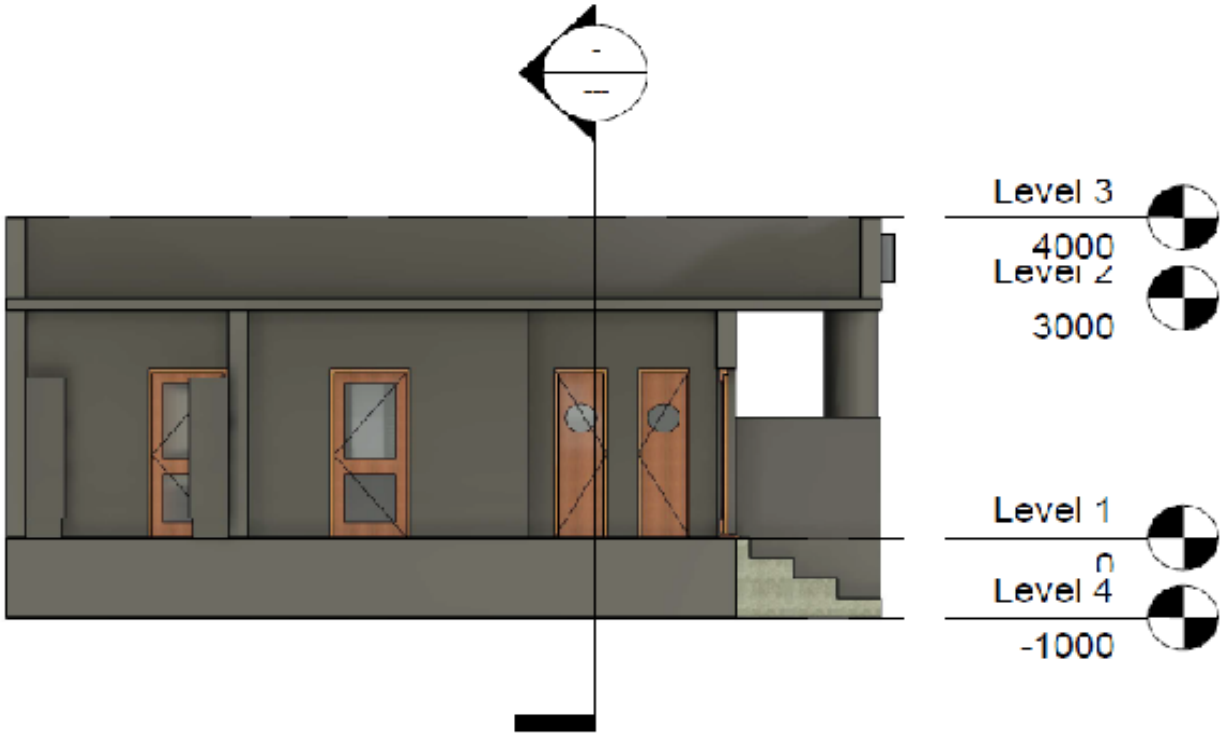


Section AB

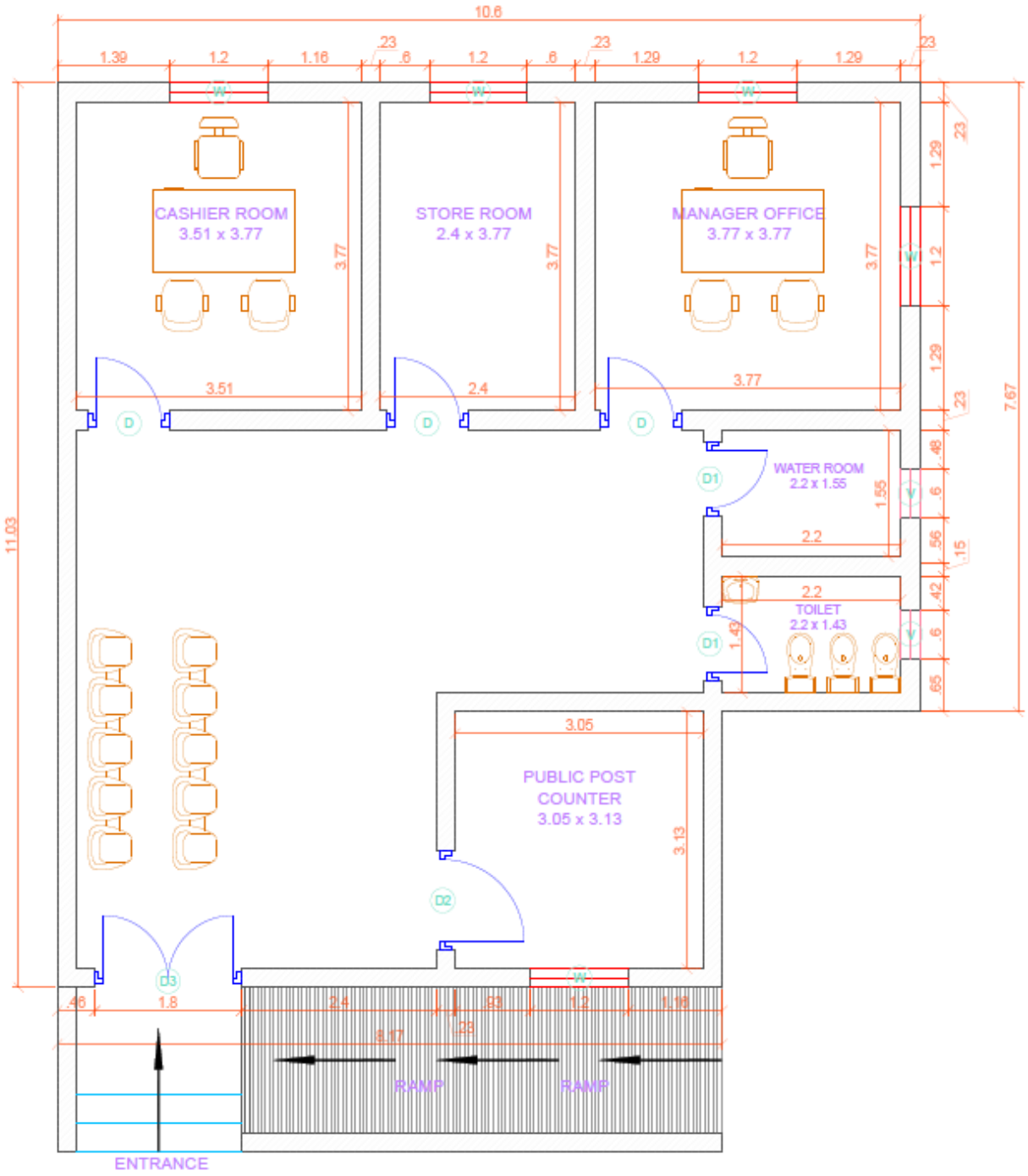
- **Plan and section of bank**



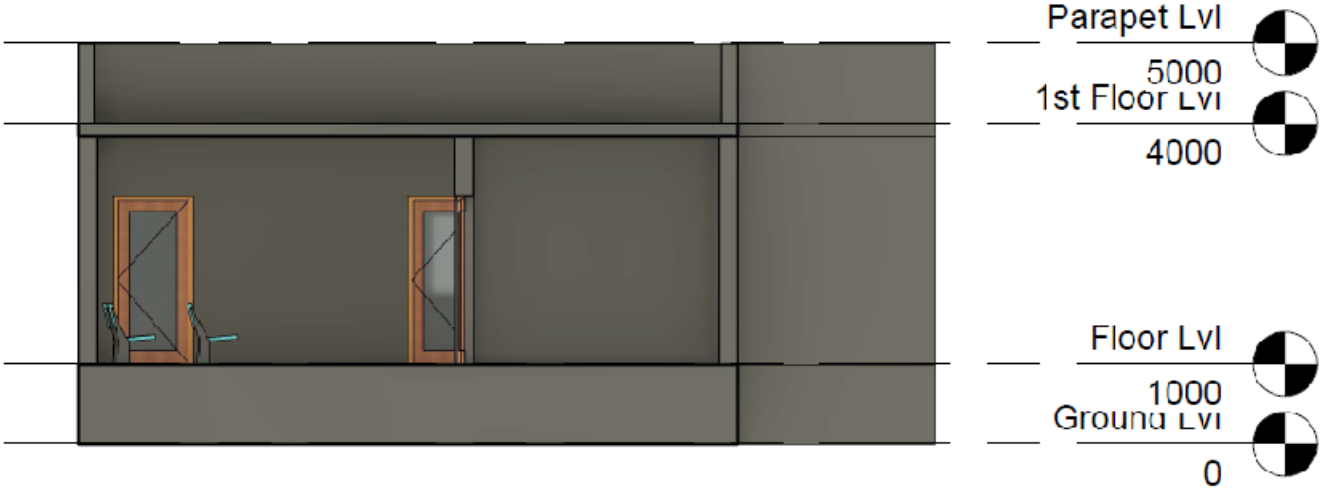

Level 3
4000
Level 2
3000
Level 1
0
Level 4
-1000

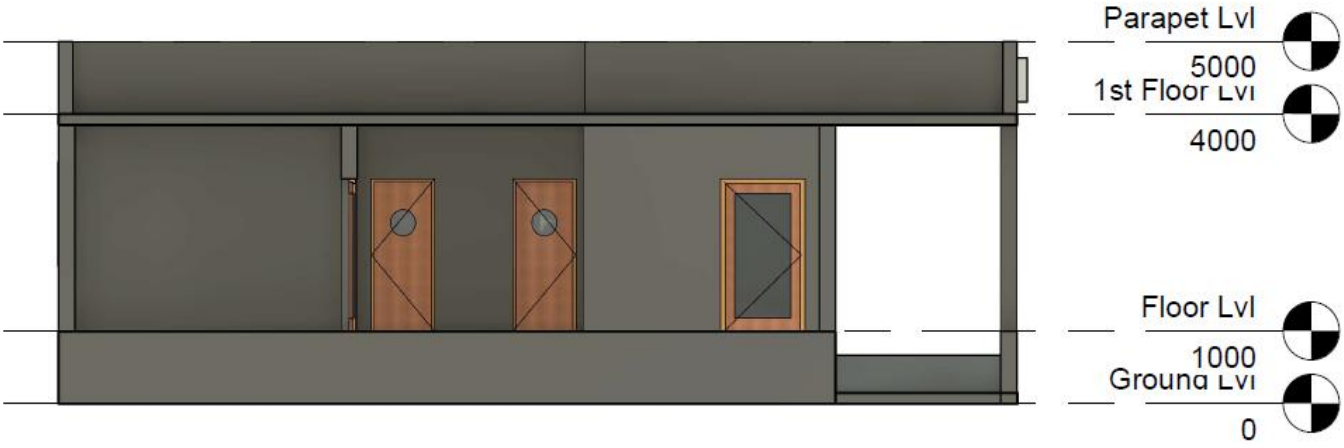

Level 3
4000
Level 2
3000
Level 1
0
Level 4
-1000

- **Plan and section of post office**

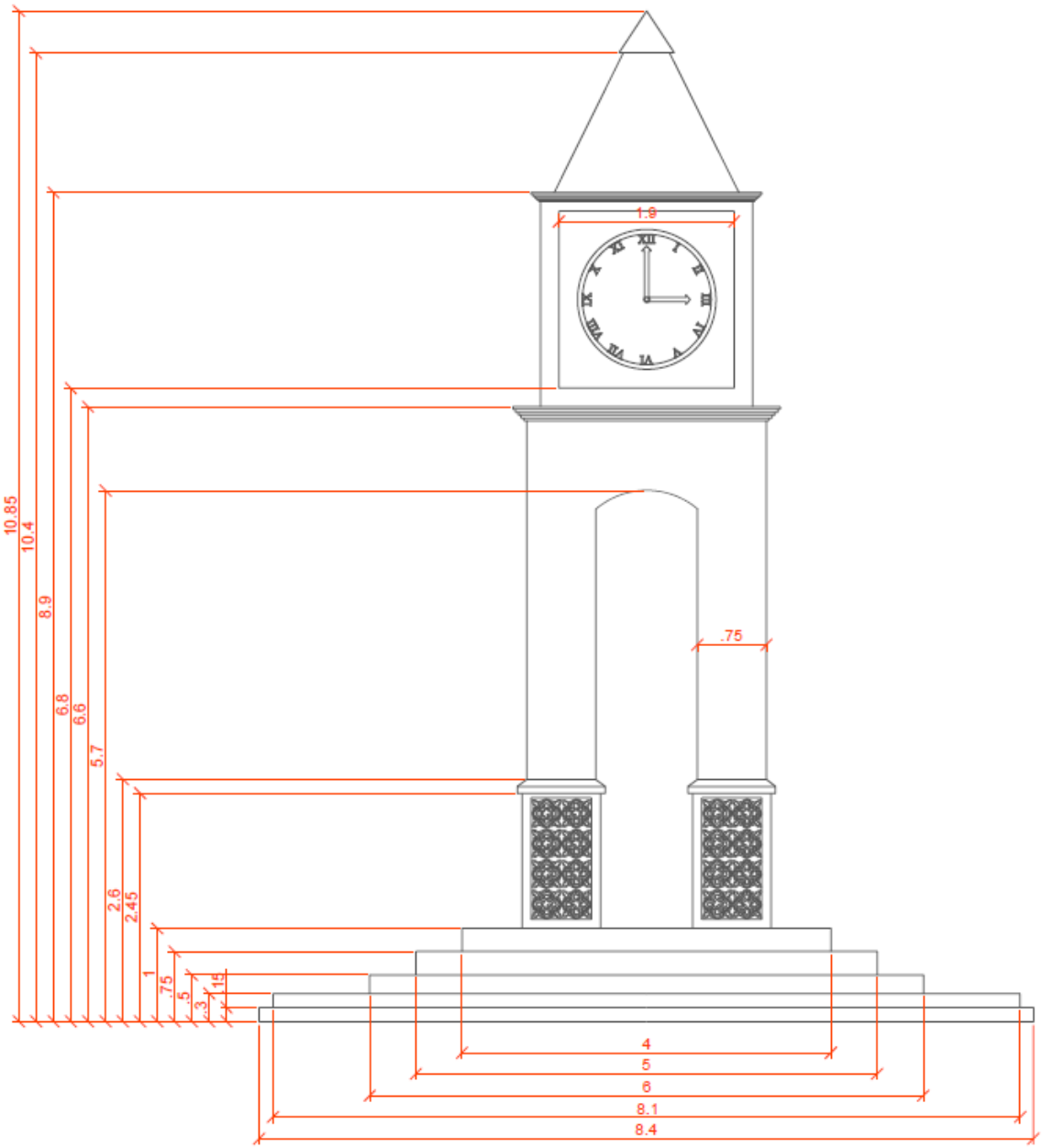


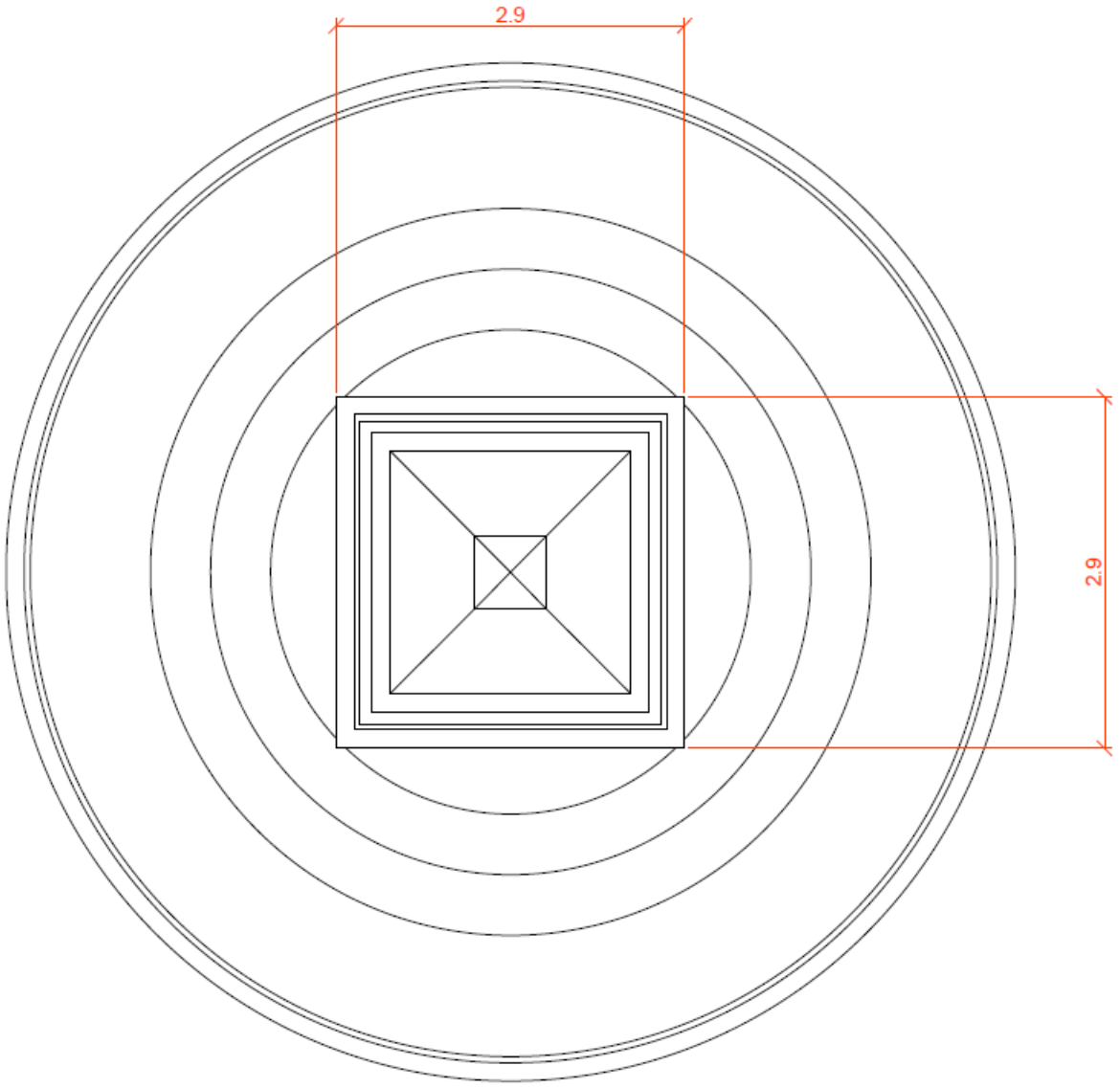

POST OFFICE
Parapet Lvl
5000
1st Floor Lvl
4000
Floor Lvl
1000
Ground Lvl
0


Parapet Lvl
5000
1st Floor Lvl
4000
Floor Lvl
1000
Ground Lvl
0


Parapet Lvl
5000
1st Floor Lvl
4000
Floor Lvl
1000
Ground Lvl
0

- **Elevation and plan of clock tower**




2.9
2.9