DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
Makhiyala Village

Junagadh District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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BALAJI ENGG. COLLAGE

Mr. MAYUR S. NANDHA

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

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Year: 2020-21

Gujarat Technological University,
Chandkheda, Ahmedabad – 382424 Guja at

CERTIFICATE

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

Detail Project Report for ,

VILLAGE :- MAKHIYALA

DISTRICT :- JUNAGADH

Under

Vishwakarma Yojana: Phase-VIII

in partial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA

during the academic year 2020-21.

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

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College Name:	**BALAJI ENGINEERING COLLAGE**
College Stamp:	

ABSTRACT

- The number of village in India is anywhere between 600000 and one million, according to various government data bases, about 75% of India's population live in villages. Total area of Gujarat is 1,94,244 km^2 including 1,90,939 km^2 rural area and 5305 km^2 urban area.

Population type	**:**	**Rural**
Male Population	**:**	**1,77,99,159**
Female Population	**:**	**1,69,14,569**
Total Population	**:**	**3,47,13,729**

- "Developing Village with a rural soul but with all urban amenities that a city may have."

- Vishwakarma yojana is an approach towards ruralnisation, it has been proposed to provide the benefit of real world experience to engineering students and apply their technical knowledge in the planning, development and management of rural facilities.
- Makhiyala is a Village in Junagadh Taluka in Junagadh district of Gujarat state, India. It is located 10 km towards north from District head quarters Junagadh and 337 km from state capital Gandhinagar. Makhiyala pin code is 362011 and postal division is Junagadh.

Aim of this yojana

- Skill development in student
- Provided the facilities to village
- Provided the good infrastructure to village

ACKNOWLEDGEMENT

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

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

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

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

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

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Chapter 1: Ideal village Visit from Your District Of Gujarat State

❖ Introduction

In this chapter we will discuss about the ideal village for the basic approach and also for develop the idea for our selected village and also it includes the literature review of ideal village and some basic information.

Ideal village concept adopted by national, state and local governments of India, as an focused on holistic rural development, derived from Mahatma Gandhi's vision of Adarsh Gram (Ideal village). The 'gaon' with the green field, clean air and clear blue sky always gives a nostalgic chram to any individuals. But, it is very unfortunate that villages which have so many things to offer are still very backward. Poverty, lack of education and lack of even the basic needs are washing away the charm. of the village. But beating the odd there are some Indian village which have set a different level of milestone altogether.

1.1 Background & Study area location

- **Background**

Vishwakarma yojana is one of the best platforms for the development of the village.

Vishwakarma yojana is the project for the development of the village and try to make a better life style for them and increase their health &wealth.

Vishwakarma yojana is provide the benefits of real work experience to engineering student and simultaneously apply their technical knowledge in the development of infrastructure in rural development. Under this scheme, the villages are surveyed and this project was identified and selected for implementation.

By this project we connect directly to the villagers which are doing various occupation like farming, govt. job, business, animal husbandry labor work, house industry and many more things.

Rurbnisaton is to bring peace of mind to the villagers by providing them basic amenities required and still keeping the village soul. This project gives one new idea for Development of rural villages. Also gives procedure how they fulfill needs of the villages. As a measure to strengthen the panchayat Raj Institutions in terms of functions, powers and finance. Gram Sabha, NGOs, Self-Help Groups and PRIs have been accorded adequate role to make participatory democracy meaningful and effective. By this Vishwakarma yojana project government want technical solution of the problem of villages at the engineering point of view.

The basic need of rural development program has been alleviation of poverty and unemployment through creation of basic social and economic infrastructure provision of training to rural unemployed youth and providing employment to marginal farmers / laborers' to discourage seasonal and permanent migration to urban area.

- **Study area location**

According to census 2011 information the location code of vadal village is 514463. Vadal village is located in junagadh district in Gujarat, India. It is situated 12Km away from junagadh, which is both district & sub- district headquarters of vadal village. Vadal village is following the panchayat raj system.

LOCATION & INFORMATION	
VILLAGE	VADAL
TALUKA	JUNAGADH
DISTRICT	JUNAGADH
STATE	GUJARAT
LANGAUGE	GUJARATI, HINDI, ENGLISH
TIME ZONE	IST(UTC+50)
PIN CODE	362310

TABLE NO 1.STUDY AREA & LOCATION

1.2 Concept: Ideal Village, Normal Village

An ideal village has good system of drainage. Because filth and rubbish of the village should be regularly removed away into the compost pits. An ideal village has very good drainage system so that the dirty water of the village is properly drained away.

There should be good transportation system. Public can easily travel to all nearby villages and cities.

- **House**

The houses of an ideal village have to be very neat & clean. The owners of those houses look to the house sanitation and house-drainage. The houses have to have sufficient windows to let in air and light.

- **Agriculture**

People of an ideal village are good farmers. They grow food crops and seasonal crops etc. now they improved method of farming for production of crops. And also they are aware of new technologies for the framing.

- **Educational facilities**

There are primary schools and high school in an ideal village. Primary education is free and compulsory. To increase the literacy rate of the village by providing the primary and secondary school in village and also by improving the facilities available in school.

- **Medical facilities**

In an ideal village, there are clinical facilities for villagers and animals. Hence, there are lots of dispensaries. In emergency case, there should the ambulance facilities for travel to city.

- **Other facilities**

We can find post-office, library, playground, garden, skill development center 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 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 village 'HUB' that could attract resources for the development of other village
- To prevent distress migration from rural to urban areas, which is a common occurrence in India's villages due to lack of opportunities and facile?
- Contribution toward social empowerment
- Create and sustain a culture of co-operative living for inclusive and rapid development.

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

Based on census 2011 information the location code is 514463. Vadal village is located in junagadh tensile of junagadh district in Gujarat, India. It is situated 12Km away from junagadh.

Gram Panchayat	Vadal
Block/ teasel	Junagadh
District	Junagadh
State	Gujarat
Pin Code	362310
Area	2104.32 Hectare
Population	7165
Household	1557
Nearest Town	Junagadh

TABLE NO 2. VADAL

Fig: 1. Map of Village

1.2.3 The idea of model / smart village

The concept of smartness is popular in respect and honor of human development regardless of rural or urban area, literate or illiterate in all country and ideal is not commission to it.

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

- **What is smart village?**

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

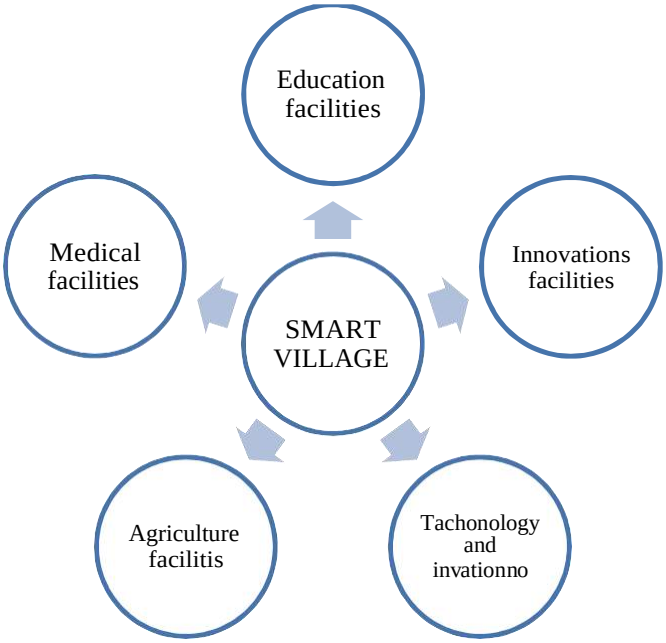


Fig: 2.The idea of model village

1.2.4 Ancient History civil concept about Indian village / foreign countries perspective and its development

It is well acknowledged that we were familiar to science just time is changed and the same thing is in front of us in new from. A book "Vimanashastam" show the procedures to make an airplane. Some other facts are:

1. The iron pillar of Delhi is famous Indian place it has 99% resistance to corrosion and almost 1600-1700 years old. A study concluded that a corrosion-resistance agent iron hydrogen phosphate was applied on it which shows advanced chemical knowledge of our ancestors.

2. Harappa and Mohenjo-Daro are best example of this architecture and mature urban civilization. In Harappa civilization the underground drainage system was from small to big sewer than to channel and then channel to river. It has also a remarkable town planning system.

3. Ancient fort and huge bath bawadiya etc. are very attractive. One of the most beautiful example of patterns in architecture it is chandbauri well in Rajasthan which is 100 feet below the earth level.

4. Mughals have done change in architecture, the use of marbles shows that we had good Knowledge of geology too.

5. Jagganath temple: the shadow of the main dome is not visible whatever be the time it shows architecture feat. Also the Sudarshan chakra on the top seems always facing you. Irrespective of wherever you stand. When you enter the temple by Singhdwara after first step you cannot here any sound of ocean but when you exit it can be clearly heard.

6. The Narayan pal vishun mandir of Chitrkut, Bastar was completely built only in a day. Its structure and arts are also built in a shorter period of time of a day.

7. The Konark sun temple is one of the UNESCO heritage site. The main attraction of the temple is its twelve pairs of wheel located at the base of the temple. These wheels are nit ordinary wheels but tell time as well the spokes of the wheels create a sundial. One can calculate the precise time of the day by just looking at the shadow cast by these spokes.

1.3 Detail study

- **Social economic**

Name of three major occupation groups in village	Farming	70%
	Jobs in Junagadh	12%

TABLE NO 3. Socio Economical Profile

- **Physical and Demographic**

❖ **Main Source of Drinking Water**	**1. 1.Tap Water** **2. Tube Well** **3. Overhead tank** **4. 4. Underground sump**
❖ **Drainage system**	Village is equipped with close drainage system.
❖ **Transportation facility**	1. Local transportation available 2. Nearest railway station (Junagadh)
❖ **Electricity facility**	24 hours electricity provided by **PGVCL**.
❖ **Road Network**	Road are well kept, clean and wide. Internal roads are C.C. road.
❖ **Sanitation facility**	Public toilet available at village. Door to door service available for waste management.
❖ **Housing**	90% people have there own house. All the houses in the village are pucca. All the houses have sanitation facilities and toilets.
❖ **Educational facility**	Primary school available in village. Kinder garden also available in village.
❖ **Banking facility**	Various branches of nationalize and domestic banks are available in village.
❖ **Medical facility**	Primary healthcare center available.

TABLE NO 4. Facility in vadal

Vadal village is located in Junagadh Tehsil of Junagadh district in Gujarat, India. Vadal is located 12 Km Away from junagadh, which is both district & sub-district headquarter of vadal village. The geographical are of village is 2104.32 hectares. Vadal has a total population of 7,165 peoples. There are about 1,557 houses in vadal village. Junagadh is nearest town to vadal which is approximately 12Km away.

Sr. No	Census	Population	Male	Female
1	2001	5672	2979	2693
2	2011	7165	3726	3439

TABLE NO 5. Population of vadal

Fig 3: Drinking facility

Fig 4: Road & Transport facility

Fig 5: Education facility

Fig 6: Medical facilities

1.4 SWOT analysis of ideal village SWOT:

strength – weakness – opportunity threat **Strength**

Drainage facility & Transportation facility (By Road & Rail)

- Proper drainage facility
- Sanitation facility

Weakness

- Improper disposal of waste
- Improper layout of village
- Lack of higher secondary education facility

Opportunity

- Improving in waste management
- Woman empowerment
- Education awareness

Threats

- Lack of awareness of villagers about cleanliness
- Lack of awareness of villagers about education
- Lack of funds and technical knowledge in agricultural field

1.5 Future Prospects of village

For future prospect, the vadal village can use more advanced technologies for agricultural prospect and other requirements also. They can make the village Wi-Fi zone and can improve the computer labs in the schools. They can provide biogas plant in the village.

1.6 Benefits of visit of ideal village

We visited vadal village, Junagadh. By visit of this village Vadal, we got an idea about an ideal village. We had seen much kind of new technologies which can be used in village that are being used in the urban area. By this visit of this village, it has improved our communication skills and we know how to interact with the people.

1.7 civil Aspect required in ideal village / smart village :

no any other

Chapter 2: Village literature review

2.1 Introduction: Urban and Rural

Urban

An urban area is human settlement with high population and infrastructure facilities of built environment. Urban area are created through urbanization and are categorized as cities, towns, or sub urban settlements are proper, planned settlements built up according to a process called urbanization. According to census 2011, there are 7,935 towns, 7,041 statutory town and 3,894 census towns.

Rural

A Rural area is a land that has population and infrastructure facility of built environment. Urban area are created through urbanization and are categorized as cities, towns, or sub urban settlement are proper , planned settlement built up according to a process called urbanization. According to census 2011, there are 7,935 towns, 4,041 statutory town and 3,894 census towns.

2.2 Importance of the rural development

Rural areas have low population density and large amount of undevelopment land .Agricultural activities are more in rural areas.

Rural areas are large and isolated areas of and open country with low population density.

United states census (2000 census) defines rural areas as comprising open country and settlement with fewer than 2500 resident 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 from bill) define rural Ares other than a city or town that has a population of greater than 50,000 swath of land that has few homes or other building and not very many people.

National geographic society define A rural area is an open swath of land that has few homes or other building and not very many people.

2.3 Ancient village / Different definition of Rural Urban Villages

A Village is a clustered human settlement or community, larger than a hamlet but smaller than a town, with a population ranging from a few hundred to a few thousand.

Urban

For the census of India 2011, the definition of urban area is as follows:

1. All places with a municipality, corporation, cantonment board or notified town area committee, etc.

2. All other places which satisfied the following criteria;

   I. A minimum population of 5,000;

   II. At least 75 per cent of the male main working population engaged in non-agricultural pursuits.

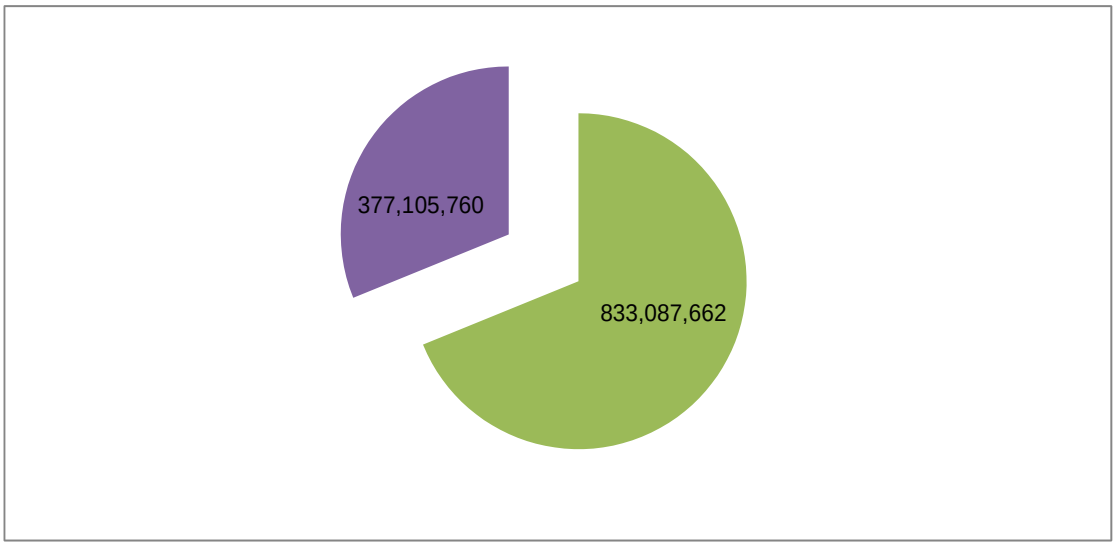
2.4 Scenario: Rural / Urban Village of India population growth

Population Growth

Total: 1,210,194,422 (100%)

Rural: 833,087,662 (68.84%)

Urban: 377,105,760 (31.16%)



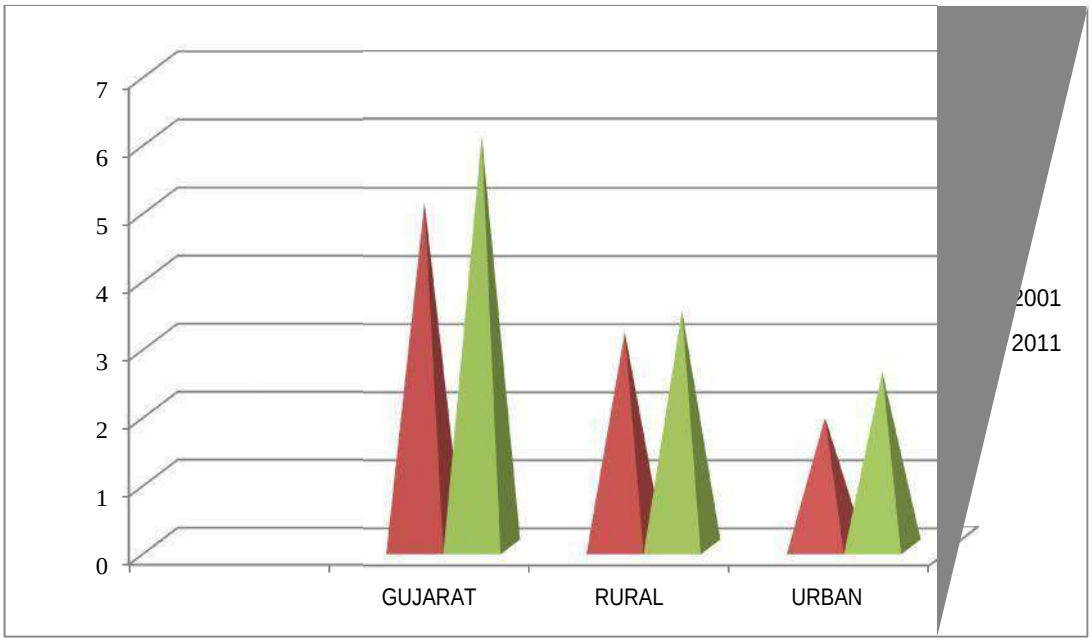
	2001	2011	Difference
India	102.9	121.0	18.1
Rural	74.3	83.3	9.0
Urban	28.6	37.7	9.1

Table No 6. Population of Rural and Urban area as per Census 2011 and latest

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

	2001	2011	Different
Gujarat	5.06	6.04	0.98
Rural	3.16	3.47	0.31
Urban	1.09	2.57	0.67

Table No 7: Gujarat Population (In Croce)



2.6 Rural Development Issues – Concerns – Measures

- Rural development issues – Concerns

The Financial, manpower and managerial resources devoted to the implementation of rural development programs are utterly inadequate.

a) People are directly or indirectly dependent on agriculture and a large number of landowners have small and medium-sized landholdings.
b) The upper caste people still hold large land while people of the lower castes own either marginal land or work as landless laborers.
c) Lack of physical facilities in rural areas.
d) Less awareness and less income opportunity.

- Various Measures for rural Development

1. To develop rural youths, children etc.
2. To develop living standard of rural mass.
3. To develop infrastructure facility in rural area.
4. To develop rural institutions like panchayat, cooperatives, post, banking and credit etc.
5. To develop agriculture, animal husbandry and other agricultural related areas.
6. To provide minimum facility to rural mass in terms of drinking water, education, transport, electricity and communication.

2.7 Various infrastructure guidelines with the Norms for Village for the provision of different Infrastructure facilities

Facilities	Planning Commission / UDPHFI Norms	Required as per Norms
	Education	
Anganwadi	Each village	2
Primary School	Each village	1
Secondary School	Per 7,500 Population	0
Higher Secondary School	Per 15,000 Population	0
Collage	Per 1,25,000 Population	0
Tech. Training Institute	Per 100,000 Population	0
Agricultural research center	Per 100,000 Population	0
	Medical facility	
Gov./Panchayat Dispensary or Sub PHP or Health center	Each Village	1
PHP or Health Center	Per 20,000 Population	0
Child welfare and maternity Home	Per 10,000 Population	0
Hospital	Per 100,000 Population	0
	Transportation	
Pucca village Approach Road	Each Village	Yes
Bus/Auto stand Provision	All Village Connected by Pt(ST Bus or Auto)	Yes
	Drinking Water	
Water facility	-	-
Over Head Tank U/G Sump	1/3 of Total Demand	1.6 Lac cap
Public Latrines	2/3 of Total Demand	3.2 Lac cap
Cremation Ground	Each Village	0
Post Office	Per 20,000 Population	0
Gram Panchayat Building	Per 10,000 Population	1
APMC	Each individual /group Panchayat	1
Fire Station	Per 100,000 Population	0
Police Station	Per 15,000 Population	0
Community	Per 10,000 Population	0

Table No: 8 Infrastructure Guideline Facilities

2.8 Ancient/Existing Electrical concept study as a literature Review for the provision of Development

2.9 Other Project / Schemes of Gujarat / Indian Government

Following are the scheme or project by Gove. Sector:

1. Mahatma Gandhi national rural employment Guarantee Act (MHNREGA)
2. Pradhan Mantri Gram Sadak Yojana (PMGCY)

3. Indira Awas Yojana (IAY)

(1) MGNREGA

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

(2) PMGSY

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

According to latest figure made available by the State Governments under a survey to identify Core Network as part of the PMGSY program, about 1.67lakh Unconnected Habitations are eligible for coverage under the program. This involves construction of about 3.71 lakh km. of road for new connectivity and 3.68 lakh km. under up gradation.

The president of India, in his address to parliament on 25th February, 2005 announced a major business plan for rebuilding rural India called Bharat Nirman. The Finance Minister, in his Budget Speech of 28th February, 2005, identified rural Roads as one of the six components of Bharat Nirman and has set a goal to provide connectivity to all habitations with a population of 1000 person and above (500 person and above in the case of hilly or tribal areas) with an all-weather road. A total of 59564 habitations are proposed to be provided new connectivity under Bharat Nirman. This would construction of 1, 46,185Kms of rural roads. In addition to new connectivity, Bharat Nirman envisages up Gradation/renewal of 1,94,130Kms of existing rural roads. This compresses 605 up gradation from Government of India and 40% renewal by the state Governments.

(3) IAY

Housing is one of the basic requirements for human survival. For a normal citizen owning a house provide significant economic security and status in society.foe 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.

Objective:

The objective of India Awaas yojana primarily to help construction of dwelling units by members of Scheduled castes/Schedule tribes, freed bonded laborers and also non –SC/ST rural poor below the poverty line by providing them with grant-in-aid.

Chepter 3: Smart Village Concept as per your Idea and Visit

3.1 Introduction: Concept, Definition and Practices

Concept

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

Definition:

The meaning of smart village is all the necessaries facilities is developed in the village and no need to moves in city for any kind of requirement**.**

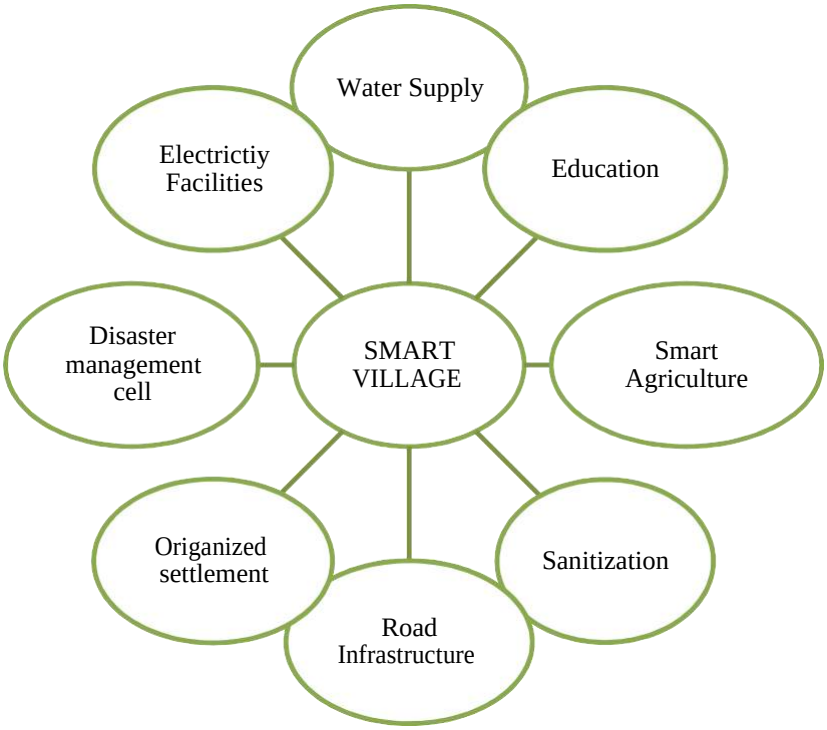


Fig: 7 Smart villages Concept

Study and Location

We have Visit a Smart Village Shapur of Junagadh for purpose of understanding the basic concept of village.

- Shaper is located in Vanthli Taluka of Junagadh dist. Of Gujarat it is 12 km away from Junagadh.

3.2 Vision-Goals, Standards and Performance Measurement Indicators:

- In order to enhance and improve the quality of "public service", a sound and clear quality management concept is needed. From the process perspective, "high quality" means that a process must deliver satisfaction- the ultimate output variable of any process. A smart city uses information and communication technologies (ICT) in order to increase the quality if its services-whish should to low should result in the high satisfaction of the inhabitants. CITY keys provide a validated, holistic performance measurement framework for monitoring and comparing the implementation of Smart City solutions, with the objective of speeding up the transition to low carbon, resource-efficient cities.
- The indicators are arranged is an extended triple bottom line sustainability framework, including the themes people, planet, prosperity, governance and propagation, and completed with specific smart city indicators. Under the main themes, subthemes conforming to major policy ambitions have been identified. All indicators have been described in detail, with an indication of expected data sources. As such the indicators are ready for use. The first use of the indicator sets was in the testing of the indicators in smart city projects or cases in the CITY keys partner cities.

3.3 Technological Options:

- Human society is developing with rapid momentum and achieved various successes for making its livelihood better. The civilization is witness for various changes related to its development through different catalysts like industrial development, green revaluation, science and technology, etc. India has more than 72% of its population living in villages. Near about seven decade had been passed since India got freedom, but the scenario in villages in our country is still unchanged. On one side India has recently selected 100 cities for Smart City project and ready to adapt all the advanced technologies for these smart cities and on other hand villages in our country are still struggling for getting basic amenities like24 x 7 electricity.
- On one hand 4G internet technology is being utilized all over the urban areas but on other hand villages in our country are still searching for genuine mobile networks. Our Governments are joining hands with developed countries like America, Indonesia, Japan to run bullet trains to connect big cities in India whereas villages in our country are still disconnected and are lacking with basic facilities like drinking water, healthy food, sanitization, toilets, transportation, education, etc. The technology that we use here can be availed to the people living in rural areas to help in improving their lifestyle. This paper summarizes such efforts which can definitely help us to introduce various technologies in these neglected parts of our country fulfilling our responsively to build up our nation. Thus new concept of smart villages can be introduced to make heaven in the heart of our India, because real Bharat is recognized by the villages in our country.

Various technologies for developing smart villages :

Following various techniques can be promoted improving the life of people in villages and for actual development of smart villages.

- Enhanced Use of Smart Phones and Optical Fiber Technology for Internet Techniques

- Online Library and E- Education
- Smart Agriculture
- Smart and Efficient Public Transport System
- Smart Sewage Management System and Sanitation
- Renewable Energy Sources and Solar Energy
- Latest and Affordable Medical Facilities

- Indian villages need to be more focused on basic things such as sanitization, health care, drinking water and education. As villages and the villagers have farming - agriculture as their primary source of income. So having villages reap the benefits of irrigation is really very important. The biggest barrier to achieve our goal of developing smart villages will be to deal with the mentality of the villagers and make them understand the real need of modernization. Also to create and develop SMART VILLAGES across the country, the authorities thought process would need a shift.
- Adopting a village or group of villages by each of MPs and MLAs for its development is good initiative taken by our governments and should be implemented up to a grass root level. Also we can promote many of self-financed firms like industries, educational institutes to adopt such villages or group of villages for developing them and can provide possible technical support.

3.4 Road map and Safe Guards:

- The smart City mission has two components; area-based development for smaller areas within the city and pan-city development where one idea is implemented all throughout. According to officials from the Ministry of Urban Development (MUD), among other things, area-based plane allow for the purches of buses and other means to augment public transportation.
- Pan city development has no provision for such capital investment on transport but requires the application of information of technology-based solution for better traffic management.
- Pan city development plans for metros such as New Delhi and Mumbai have proposed smart parking to manage the increasing volume of care while Agra has mooted the one Agra, one card for cashless transaction across public transport systems, museum and other tourist attractions.

3.5 Issue & Challenges:

- The establishment that help cities manage electricity, water, waste, traffic flows, municipal operations and city services are becoming increasingly complex and can be expensive. Although the return on investment may be attractive, complexities often make it challenging for cities to kick-start their smart City projects. Successful implementation of smart city solutions need effective horizontal and vertical coordination between various institutions between central government (MUD) state government as well as local government agencies' on various issues related to financing, sharing of best practices and sharing of service delivery processes.

- Other challenges for India include merging technology with law enforcement. There is no point in installing high tech traffic signals if its implementation cannot be enforced. India will also have to find ways of encouraging private investment for infrastructure required for a smart city.

3.6 Smart Infrastructure - Intelligent Traffic Management:

Intelligent Traffic Management System for Smart Cities:

- In present-day times, the number of vehicles has increased drastically, but in contrast, the capabilities of our roads and transportation systems still remain underdeveloped and as a result, fail to cope with this upsurge in the number of vehicles. As a consequence, traffic jamming, road accidents, increase in pollution levels are some of the common traits that can be observed in our new age cities. With the emergence of the Internet of Things and its applicability in Smart Cities, creates a perfect platform for addressing traffic-related issues, thus leading to the establishment of Intelligent Traffic Management Systems (ITMS). The work presented in this paper talks about an intelligent traffic management system that lays its foundation on Cloud computing, Internet of Things and Data Analytics.
- Our proposed system helps to resolve the numerous challenges being faced by traffic management authorities, in terms of predicting an optimum route, reducing average waiting time, traffic congestion, travel cost and the extent of air pollution. The system aims at using machine learning algorithms for predicting optimum routes based upon traffic mobilization patterns, vehicle categorization, accident occurrences and levels of precipitation. Finally, the system comes up with the concept of a green corridor, wherein emergency services are allowed to travel without facing any kinds of traffic congestion.

3.7 Cyber Security:

- Securing smart cities is a not-for-profit global initiative which aims at solving the existing and future cyber security problems of smart cities through collaboration between companies, government, media outlets and individuals across the world. Over the past few years, Technology has begun to play an important role in our daily lives. Internet enabled gadgets have changed the way in which we work or do our daily chores. Digitization has an impact on personal lives, education, health, government and national security. Due to increase in complexity of smart city systems and globally connected social, economic, political systems, etc. has increased vulnerability of security of a city. The cyber threats have amplified due to infinite supply of data. Smart surveillance technology or analytics to manage the crowd, traffic, cyber security, data privacy, building codes to manage natural/man-made disasters, etc. are some parameters that would make a city safe. Different challenges to our security and expectations of privacy have arrived due to innovations in IT. Humans are already interconnected via gadgets. Standards are evolved for all these potentially connected systems. This will lead to improve in quality in life.

- Smart Transportation will also provide an access to a web of connected data from GPS location. Integrated systems and cyber security will aid public safety. We examine two important challenges: Security and Privacy.

3.8 Retrofitting- Redevelopment – Greenfield Development District Cooling

- Air condition from Hammond services .In the Southeast, air conditioners are almost crucial pieces of equipment for home comfort. However, it can be default to find the right air condiment for your home, one that will provide enough cool air in the summer to cool your home without driving your energy costs through the roof.

- **Energy Efficient and Affordable Air conditioners:** When it comes down to selecting a new air conditioner for your home, there are a few things you should consider. First of all is efficiency. By choosing an energy efficient model, you can be sure your money is being well spent and isn't being thrown away with inefficiencies. Get the most being for your buck with and air conditioner that won't cost a fortune to run. If you're having treble choosing an air conditioner for your home, contact us today – we can help you weigh your options!

3.9 Strategic Options for Fast Development

- The strategic components of area-based development in the Smart Cities Mission are city Improvement (retrofitting), city renewal (redevelopment) and city extension (Greenfield Development) and Pan-city initiative in which Smart Solutions are applied covering larger Parts of the city.
- Retrofitting will introduce planning in an existing built-up area to achieve smart city Objectives, to make the existing area more efficient and livable. In retrofitting, an area consisting of more than 500 acres will be identified by the city in consultation with citizens. Depending on the existing level of infrastructure services in the identified area and the vision of the residents, the cities will prepare a strategy to become smart.
- Since existing structures are largely to remain intact in this model, it is expected that more intensive infrastructure Service levels and a large number of smart applications will be packed into the new smart City.

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

- Swatchh 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? The government has taken various steps to create awareness among the masses for keeping the area surrounding them neat and clean city. Government is also paying good role for cleaning of rivers, railway stations, tourist destinations and other public places.

3.11 Initiatives in village development by local self-government

- The Smart Cities Mission is an innovative and new initiative by the Government of India to drive economic growth and improve the quality of life of people by enabling local development and harnessing technology as a means to create smart outcomes for citizens.

3.12 Smart Initiatives by District Municipal Corporation:

- Talking about the smart city initiative by Junagadh district the goal of the initiative is " Smart utilization of Junagadh city's potential for enhancing quality of life for the citizens of providing equal access to best quality physical infrastructure , social infrastructure and mobility through leveraging state of the art and technology :
- Thus making Junagadh a futuristic Global city with focus on enhancing economy , protecting the ecology and preserving the identity and culture of the city".
- The initiatives taken by Junagadh Municipal Corporation are :
  - Solar roof Panels
  - Green Junagadh campaign
  - Integrated command and control center.
  - Installation of CCTV Cameras
  - Installation of smart toilets
  - Installation of public wi-fi
  - Parking encroachment drive

3.13 Any Projects Contributed Working by Government/ NGO / Other Digital Concepts

- The village is almost fulfilled with all types of facilities and it does not need any more Facility. Other than this, A Composed Pit is being constructed by government in the village.

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

- Similar to Vishwakarma Yojana, Students of engineering colleges can be given chance to visit foreign countries' smart villages and survey and study it properly as they study the smart villages of Gujarat.
- Than with the help of other government or private engineers, one can Implement other countries smart village projects in Indian villages.

Chapter4: Allocated Village Makhiyala Village Junagadh

Introduction:

4.1.1 Introduction about Makhiyala Village Details

Makhiyala village is located in Junagadh Taluka of Junagadh Dist. Sarpanch of Makhiyala village is Gopal bhai. Village is located 12 km away from Junagadh. Total population of village 3687 among them 1922are male 1765 and are female as per census 2011.Main occupation of village is farming.

Makhiyala Village Overview	
Gram Panchayat	Makhiyala
Block / Tehsil	Junagadh
District	Junagadh
State	Gujarat
Pin code	362011
Area	1371.43 Hectares
Population	3687
Households	777
Nearest Town	Junagadh

Table No 14. Makhiyala Data

4.1.2 Justification/ need of study

Almost 69% of our population lives in village and need to be provided with the best of facilities and lifestyle to take India forward as a country. Being future civil engineers it is our duty to observer even the smallest issue and work towards its improvement. Even if a small amount of migrate from village to cities the pressure on city increases, be it: overcrowding, population, traffic etc., this effects the whole nation Migration occurs mainly due to job opportunities and better facilities like hospital, education facility etc. provided in urban area. To increase liveliness of village by providing good sanitation facility, good infrastructure, basic requirements like pucca house or awaas, water supply etc. are require considering the environment and need of people.

4.1.3 Study Area (Broadly define)

- In Makhiyala village some physical and social facilities are better like CC & block roads, primary school, secondary schools, and anganvadi. In the village there is lack of some of the basic facilities like public library, public toilet, public garden, market etc.
- For the development of Makhiyala village we are trying to provide the facilities like vegetable markets a physical infrastructure, liquid waste management as sustainable Infrastructure and rain water harvesting as a smart infrastructure facility.
- Based on the survey we tried to give design of basic facilities to fulfill their needs. By providing these basic facilities to village to reduce urban city pressure and to decrease migration rate, which ultimate aim of Vishwakarma yojana.

4.1.4 Objectives of the study

- To study the existing growth, characteristics and development of the village
- To study the existing infrastructure facilities and its management issues phasing by villagers
- Economy generation is the key pillars that the concept hinges on which should be introduced to village
- To study the future growth and future scenario of the village
- To study how to improve a drainage facility of rural areas
- To provide sanitation for all

4.1.5 Scope of the Study

- Reduce migration and decrease poverty in village due to improvement given below content by using and following village development plan
    - Micro, Small and Medium Scale Industries
    - Irrigation Development, Power and Energy Utilization
    - Domestic Water Resource Development
    - Educational Programs and Services
    - Health Programs and Service
- To ensure integrated development of village, people and environment by creating sustainable design for all to optimum extent as possible
- India is agriculture country, about sixty percent of total population lives in village; they migrate to city for job and urban facility. This is useful to find the Actual requirement of village and how to overall development of village is possible in easy and practically way.
- Based on the study the requirement can be known and the further plan based on this requirements can be visualized for the compacted development of the village

4.1.6 Methodology Frame Work for development of your Village

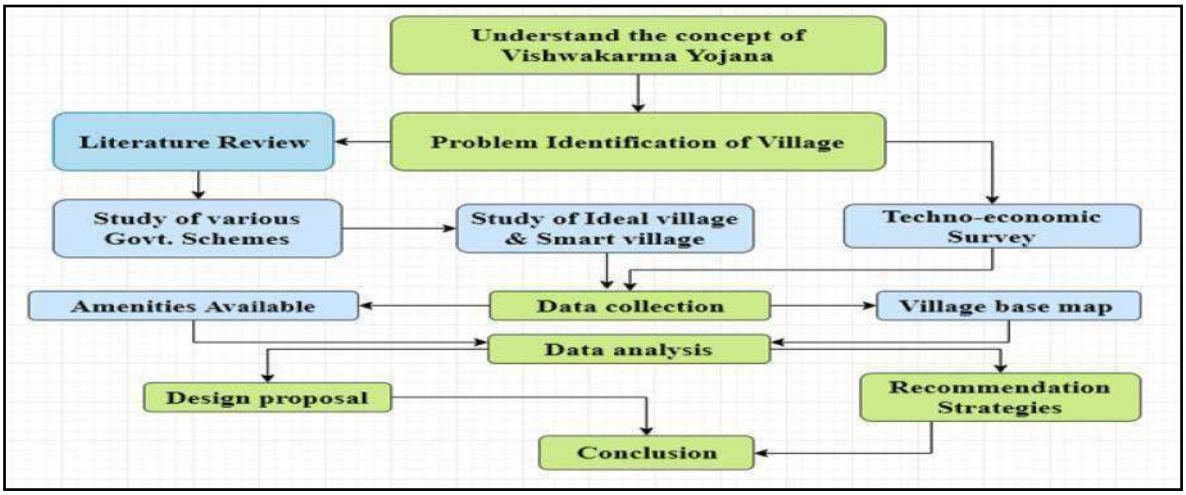


Fig: 8 Methodology Framework for village

4.1.7 Available Methodology for development of related to Civil

Objects which were available in the Makhiyala village were, cement concrete road, Anganeadi, Underground Drainage, Primary School, Protected well, Bank and ATM, Primary Health center Bus Transportation facilities etc.

Census Parameter	Census Data
Total Population	3687
Total No of House	777
Female Population	47.9 % (1765)
Total Literacy rate	74.0 % (2730)
Female Literacy rate	32.0 % (1178)
Working Population	53.4 %
Child (0-6) Population 2011	313
Girl Child (0-6) Population 2011	46.6 % (146)
Scheduled Tribes Population	0.0 %
Scheduled Cast Population	9.4 % (347)

Table No 15: Population Data Makhiyala

4.2 Makhiyala Village Study Area Profile

According to Census 2011 information the location code or village code of Makhiyala Village is 51446. Makhiyala village is located in Junagadh Tehsil of Junagadh district in Gujarat, India. It is situated 12 km away from Junagadh, which is both district & sub-district headquarter of Makhiyala village. The total geographical area of village is 1371.43 hectares. Makhiyala has a total population of 3,687.

4.2.1 Study Area Location with brief History land use details

Makhiyala is a village in Junagadh Taluka in Junagadh District of Gujarat State, India. It is located 12 km towards from Junagadh, 335 km form state capita Gandhinagar.

Particulars	Total	Male	Female
Total No. of House	777	-	-
Population	3687	1922	1765
Child (0-6)	313	167	146
Schedule Cast	347	168	179
Schedule Tribe	0	0	0
Literacy	80.91%	88.43%	72.76%
Total Workers	1970	1251	719
Main Workers	1526	1243	283
Marginal Workers	444	8	436

Table No 16: Land use Details Makhiyala

4.2.2 Base Location map

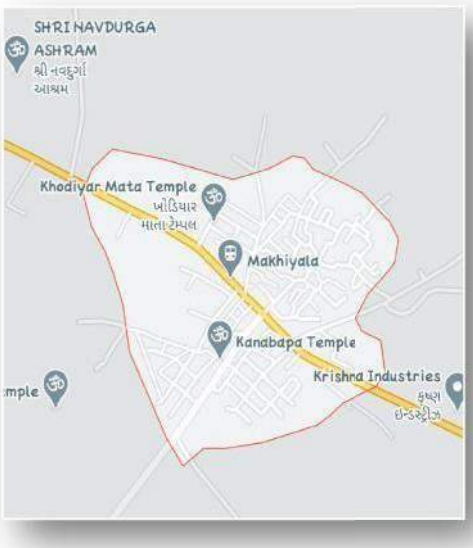


Fig 9: Makhiyala Map

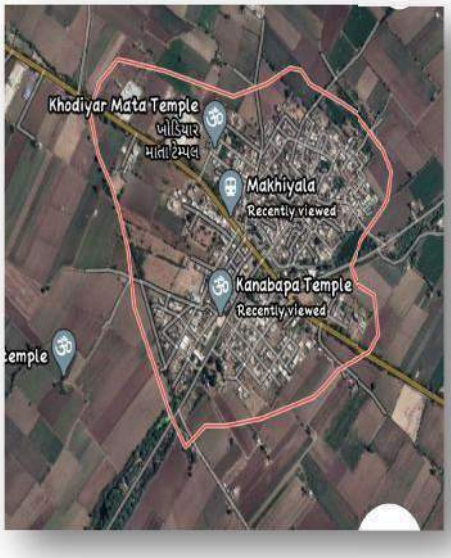


Fig 10: Makhiyala Satellite View

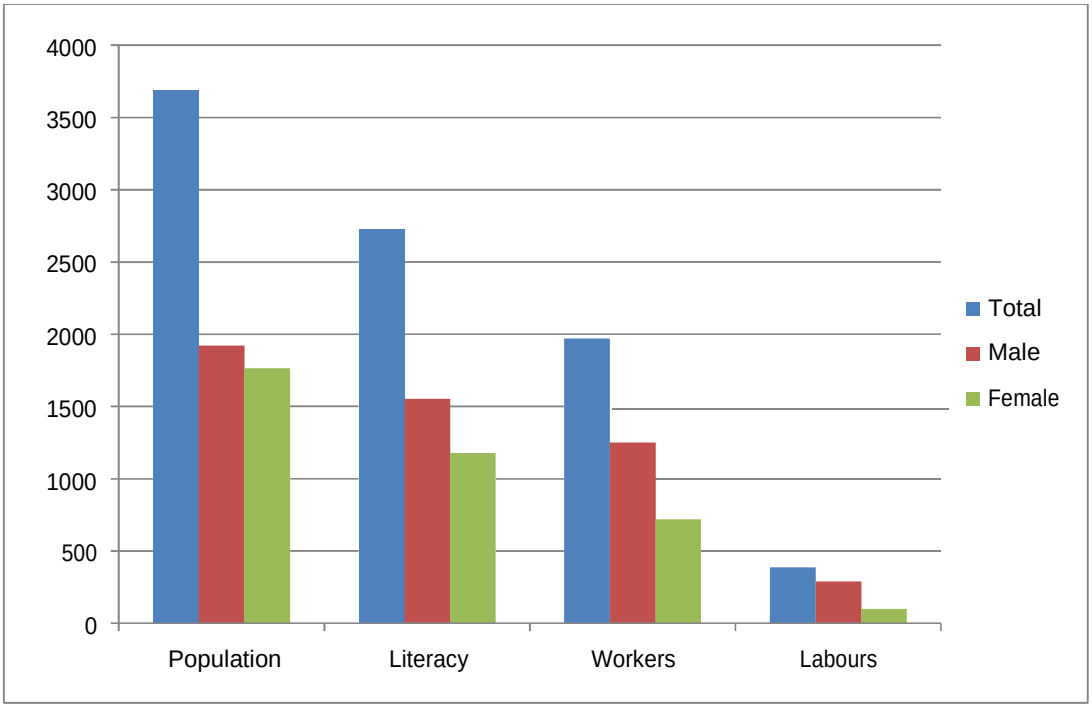
4.2.3. Physical & Demographical Growth

- **Demographical:** The village is home to 3687 people, among them 1922 (52.1%) are male and 1765 (47.9 %) are female. 9.4 % are from schedule cast and 0 % are schedule tribes. Child (aged under 6 year) population of Makhiyala village is 313, among them 167 are boys and 146 are girls. There are 777 households in the village.

- **Growth of population:** In Makhiyala village population of children with 0-6 is 313 which make up 8.49% of total population of village. Average sex ratio of Makhiyala village is 919 which are lower than Gujarat state average of 919. Child sex ratio for the Makhiyala as per census is 874, lower than Gujarat average of 890.

- **Literacy:** Makhiyala village has higher literacy rate compared to Gujarat. In 2011 literacy rate of Makhiyala village was 80.91% compared to 78.03% of Gujarat. In Makhiyala male literacy rate was 88.43 % while female literacy rate was 72.76 %.

- **Workers Profile:** Total workers in Makhiyala village are 1970 which are either main or marginal workers. Total workers in the village are 1970 out of which 1251 are male and 719 are female. Total main workers are 1526 out of which female main workers are 1243 and male main workers are 283. Total marginal workers of village are 444.



4.2.4 Economic generation profile / Banks

- The major population of Makhiyala village is engaged with agriculture activities and other some people are doing business and services.
- The main crops are grown in Makhiyala village is:
  - Peanuts, Wheat, Cotton, Juvar, Vegetables

4.2.5 Actual Problem faced by Village and smart solution

During an intersection with people of Makhiyala village we understood their problems and issues like:

- There are no street lights available in village
- Garbage disposal space are not available
- Not good road in the village

Smart Solutions

- Solid waste management
- Solar street lights
- RCC Road construct
- Community hall
- Skill development center

4.2.6 Preservation of traditions, festivals

There are no any traditions, festivals, and cuisine are occur or held in the villages.

4.2.7 Migration Reasons/Trends

- Immediate concerns faced by such migrant worker relate to food, shelter, healthcare, fear of getting, infected or spreading the infection, loss of wages, concerns about the family, anxiety and fear.
- Sometimes, they also face harassment and negative reaction of local community.

4.3 Data Collation Makhiyala village

4.3.1 Methods of Data collection

1) Individual interview
2) Physical survey of village
3) Self survey of the village
4) Publish report of central and state government and local bodies
5) Interaction with the village

4.3.2 Primary details of survey

- Makhiyala is a village located in Junagadh Taluka of Junagadh district. Sarpanch of the village is Gopal bhai. Village is located 12km away from Junagadh. Total area of village is 446 hectares.
- Total population of village is 3687 among them 1922 are male and 1765 are female as per census 2011.
- Total households in Makhiyala village are 777 as per census. Main occupation of Makhiyala village people is farming.

4.3.3 Average size of House-Geo-Tagging House

- The population of Makhiyala village is 3687 among them 1922 male and 1765 female. Total number of households is 300.
- Most of houses in Makhiyala village is residential house and some of kutchha house.
- 94% pucca house.
- 6% kutchha house.

4.3.4 No of Human being in One House

- Mainly in the one house there is 5 persons including children.

4.3.5 Material available locally in the village

- For the house, they used mainly bricks, sand and wood. As brick manufacturing is available in village bricks are economical for them.

4.3.6 Geographical Details

Area	1371.43 Hectares

Latitude	21.6186^0 N
Longitude	70.4506^0 E

Table No 17. Geographical details

4.3.7 Demographical Details

Total No. of House	**777**
Population	3687(Male: 1922 & Female: 1765)
SC & ST	347 & 00
Literacy	74.0 %
Total Workers	1970

Table No 18: Demographical details

4.3.8 Occupational Details

- In Makhiyala village most of peoples are connected with farming and labor work.

4.3.9 Agricultural Details

- Bore well and piped water is used for irrigation purpose.
- Makhiyala village people mostly depend on agriculture product like cotton, penult, wheat, vegetables, etc.

4.3.10 Physical infrastructure Facility-Manufacturing HUB

- There is no any manufacturing hub in Makhiyala. There is only cold storage is available.

4.3.11 Tourism development available

- There is no any tourism cluster in Makhiyala village.

4.4 Infrastructures Details

4.4.1 Drinking facility

Fig 11: Water Tank

In Makhiyala village there is two overhead tank of capacity 50000 liter and 100000 liter and one underground sump of capacity 1.2 lakh liter capacities are the main source of water.

4.4.2 Drainage network & sanitation facility

Figure No12 Drainage network

In village is working efficiently closed drainage System is provided with maintenance repair.
The undergoing development of the public toilet in the Makhiyala village and house to house toilet arethere in the village.

4.4.3 Transportation & Road Network

Fig 13: Bus station & Roads

- Good all-weather road is available in village. Village is connected with Junagadh - Jamnagar highway and ring road which provide good transportation facilities and internal streets road are also maintained nice.

4.4.4 Housing Condition


Fig 14: Housing condition

- The house condition in the village is very nice among this there is 94% pucca house and 6% kutchha house approx.

4.4.5 Social Infrastructure facility

❖ **Health**

- In Makhiyala village there is privet clinics and sub center for any other facility the peoples have to travel nearby area like Junagadh**.**
- There is Aayuverdik clinic is also available in Makhiyala village.

Fig 15: Clinic

❖ **Education facility**


Fig 17: Primary School

- The Village has two schools available, one primary school and one Aanganvadi. All them seem to be good condition but have issues. The primary school building is completely built and functional but has some minor issues.

❖ Other Social facilities

Fig 18: Community Hall

Fig 19: Makhiyala Mandali office

Fig 20: Gajera family samaj

Fig 21: Divyang Orphanage

Fig 22: Temple

4.4.6 Existing Condition of Public Building & Maintenance of existing Infrastructure

- Public toilet is underdevelopment.
- Primary school condition is poor.
- Water tank should be under repair& maintenance.
- Condition of all road is nice.
- Gram panchayat building should be repair.
- Condition of bus stand is very poor.

4.4.7 Technology Mobile / WI-FE / Internet Usage Details

- All most 75% people have smart phone and they use internet, but there is no Wi-Fi facility in village**.**

4.4.8 Sports Activity as Gram Panchayat

- There are no any sports activities are being done by gram panchayat.

4.4.9 Socio-Cultural Facilities

- The Makhiyala village has panchayat building and it is good condition. A small play ground outside the primary school building.

4.4.10 Other facilities

- There are no any kind of facilities like RO water plant**,** Solar system etc.

4.4.11 Any other details

- No any other details.

4.5 Electrical concept

4.6 Existing Institution like – Village Administration , Detail profile

A village is a clustered human settlement or community, larger than a hamlet but smaller than a town, with a population ranging from a few hundred to a few thousand. Though villages are often located in rural areas, the term urban village is also applied to certain urban neighborhoods. Villages are normally permanent, with fixed dwellings; however, transient villages can occur. Further, the dwelling of a village are fairly close to one another, not scattered broadly over the landscape, as a dispersed settlement.

4.6.1 Bachatmandli

There is no bachatmandli in the village makhiyala.

4.6.2 Dudhmandali

There is a group of a dairy member is take the milk from buffalo and cow holder and sell in low prize to villager.

4.6.3 Mahila forum

The concept of Mahila mandal come into existence in 1955 at the time of the first five years plan was about to be over. The women were organized into mahila mandals during the second five year plan with stress on women education, health services for the mother and child, supplementary feeding for the children and women's economic development. The sixth five year plan basically adopted their pronged strategy, which included thrust on thrust, education and employment. As per our interaction survey we did not found any active mahila mandal forum currently in makhiyala village.

4.6.4 Plantation for the air polution

Village is fully covered with trees in each and every streets and each and every place.

4.6.5 Rain water Harvesting – Waste water recycling

Some of the house of village have the system of rain water harvesting.

4.6.6 Agricultural Development

There is no special attention given to agricultural in this village . but in drought the government help farmer in agriculture.

4.6.7 Any other

no any other data.

Chapter 5: Technical Options with Case Studies (For any one Topic, Take a new concept design, prototype model with actual costing)

5.1 Introduction

- Smart city technologies are increasingly coming to the population daily living. Smart city technologies provide efficient city services, as a central instrument of receiving various services for residents (energy and water supply , urban infrastructure, transportation etc.). The purpose of research is the definition of methodological approaches of a settlements development modeling . Methods include collation of local and foreign experience in modeling the territorial development of urban and rural settlements.
- A recent report “Global Construction 2020”, estimates that India will be the third largest global construction market after china and USA. In order to improve the standard of living of population, one of the key hurdles that face today`s India is to overcome the challenge of infrastructure bottlenecks.

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying

- India's construction sector is assessed at Rs.4000 billion or $100 billion. As a result of government pending, private investments as well as foreign direct investment, has made India number one of the top ten spending nations on construction in the world. We manufacture more than 250 million tons of cement and are second only to China. A recent report "Global Construction 2020", estimates that India will be the third largest global construction market after China and USA. In order to improve the standard of living of her population, one of the key hurdles that faces today's India is to overcome the challenge of infrastructure bottlenecks. Consequently the federal government has announced our 11th five years plan which allocates 9% of the GDP to infrastructure projects. The National Planning commission - an apex federal body has estimated an allocation of $515 billion which is equivalent to Rs.23 trillion to infrastructure sectors over the next five years. This includes construction of Roads, Highways, Airports, Bridges, Ports, Railways as well as water supply and sanitation amongst few others. The 12th five years plan projects an investment of 10% of the national GDP into infrastructure which equates to a staggering $1 trillion or equivalently Rs.45 trillion.

Drivers for Sustainability:

- While India is preparing to tackle these growth plans with enthusiasm, it is imperative that the country should analysis and takes into account the price that the future

populations of the world and here will have to pay and the world in turn will have to pay, should this unprecedented growth take place without adequate thought to sustainability.

- Should we consume all our energy, materials, water resources without considering for the needs of our children and grandchildren, the future of the world and our nation is at peril. Obviously GHG emissions, climate change and sustainability are at stake. It is estimated that GHG emissions would increase from 2 billion tons to 6-7 billion tons of CO2 in 2030.
- Some of us may question why India must slow down her pace of development and pay for the sins of already developed and industrialized Western nations. Clearly, the OECD or the industrialized countries must take the lead in mitigating climate change, reducing greenhouse gas emissions, but also large developing countries such as India and China will also have to start to reduce their emissions over the next 20 to 30 years if we truly want to give our children a chance at a future.
- Developing countries with large emissions should have some responsibility, although differentiated and different from the industrialized world. While sustainable practices and products may be slightly unintuitive and perceived as counterproductive to the growth of GDP in the short-term, in the long- term, the future growth of the country depends on it. Growth that is not sustainable is not true growth.

Recommendations :

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

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

1. Planning, Design and Specifications :

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

2. Construction Practices:

- It is acknowledged that wastage in the construction industry is as high as 30%. That means at current valuation, we are talking about wastage to the tune of Rs.1200 billion or $27 billion in India. This is in itself a large, yet relatively simple and straight forward challenge to tackle. These wastages are activities that absorb resources, man hours and materials but create no value. Most developed countries have different forums / institutes

/ researchers / academic institutions for seeking solutions to mitigate these wastages and lean construction practices that emerged have yielded encouraging. Lean construction is a "way to design production systems to minimize waste of materials, time and efforts in order to generate the maximum possible value". While some novel initiatives are being taken in some parts of India to adopt leaner construction practices, India does not have a fully focused lean construction forum. Creation of an industry consortium or lean construction forum may be a good beginning.

3. Material Conservation and Selection :

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

4. Demolition and Recycling :

In India, the use of recycled aggregates has not been adequately explored. Reportedly, the construction and demolition waste has substantially increased as new super structures are being built on land after tearing down the smaller structures that previously existed. It is estimated that the construction industry in India generates about 10-12 million tons of waste annually. Projections for building materials requirement of the housing sector indicate a shortage of aggregates of about 55,000 million cu. m. An additional750 million cu.m. of aggregates would be required for achieving the targets of the road sector. Recycling of aggregate material from construction and demolition waste may reduce the demand-supply gap in both these sectors. There is also an increasing-acute shortage of dumping grounds and landfills particularly in metropolitan cities. SERC, Ghaziabad had taken up a pilot R&D project on Recycling and Reuse of Demolition and Construction Wastes in Concrete for Low Rise and Low Cost Buildings in mid-nineties with the aim of developing techniques/methodologies for use of recycled aggregate concrete in construction. The experimental investigations were carried out in Mat Science laboratory and Institutes around Delhi/GZB to evaluate the mechanical properties and durability parameters of recycled aggregate concrete made with recycled coarse aggregate collected from different sources. Also, the suitability in construction of buildings has been studied.

5. Energy Conservation :

- Since sources of good quality, aggregates are fast depleting, the concrete industry in India needs to prepare itself to use locally available 'marginal' aggregates. The use of local materials helps reduce the carbon footprint associated with transport. Thus, from sustainability angle, the emphasis should be placed on using locally-available aggregates, even if there are small deficiencies in their quality. It has been amply demonstrated that desired properties of concrete can be obtained by intelligent blending of available aggregates with crushed sand, inert fillers, supplementary cementitious materials and chemical admixtures. Another important issue is that river sand and other construction materials are usually transported by road. India has a well-developed and efficient rail and water transport system that need to be leveraged by the construction industry. This is not only more sustainable option but also most cost effective.

Conclusion :

- India is an astoundingly growing economy and hence the pressure on the use of natural resources is very heavy.
- There is an awakening about the words durability and then sustainability.
- Though the durability is understood to a point the real meaning and importance of sustainability is not fully comprehended by engineering fraternity as well as planners.
- Some sporadic efforts are carried out in the form of very repetitive academic experimentation; however, these efforts are in extreme primitive conditions.
- Industry has not opened to this "Sustainability aspect" proactively as they are busy joining the band wagon of growth machine.
- Federal authorities also are not well informed and hence not equipped to adopt 'Sustainability initiative'.
- Also use of renewable energy and resources is not much sought after option and not given due importance as the initial costs are high.
- At the same time, there is definite internal feeling in all that something is definitely needed to be done for next generation. Typically not to leave them with depleted resources.
- At the behest of ACI international – India Chapter of ACI has organized couple of international conferences on sustainability along with the help of other organizations and Institutions.
- But this effort to create and spread awareness should be all pervasive. The proactive participation of all the institutions, professional bodies, academicians, industry as well as firm patronage and participation of government is extremely essential.
- 'Lean Concrete' and 'Reduce Wastage' initiatives in the industry are very necessary

5.1.2 Soil Liquefaction:

- The effects of soil liquefaction on the built environment can be extremely damaging. Buildings whose foundations bear directly on sand which liquefies will experience a sudden loss of support, which will result in drastic and irregular settlement of the building causing structural damage, including cracking of foundations and damage to the building structure, or leaving the structure unserviceable, even without structural damage. Where a thin crust of non-liquefied soil exists between building foundation and liquefied soil, a 'punching shear' type foundation failure may occur. Irregular settlement may break underground utility lines. The upward pressure applied by the movement of liquefied soil through the crust layer can crack weak foundation slabs and enter buildings through service ducts, and may allow water to damage building contents and electrical services.
- Bridges and large buildings constructed on pile foundations may lose support from the adjacent soil and buckle, or come to rest at a tilt.
- Sloping ground and ground next to rivers and lakes may slide on a liquefied soil layer opening large ground fissures, and can cause significant damage to buildings, bridges, roads and services such as water, natural gas, sewerage, power and telecommunications installed in the affected ground.

Figure No 23 Soil Liquefaction

Buried tanks and manholes may float in the liquefied soil due to buoyancy. Earth embankments such as flood levees and earth dams may lose stability or collapse if the material comprising the embankment or its foundation liquefies.

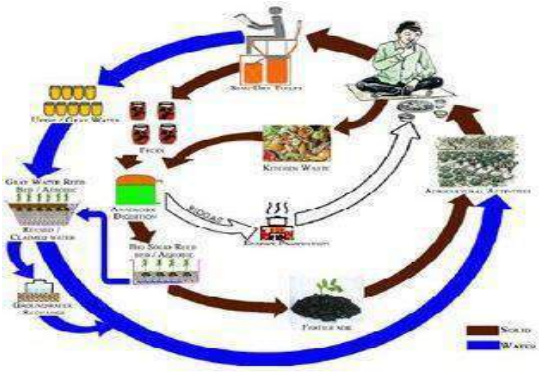
Over geological time, liquefaction of soil material due to earthquakes could provide a dense parent material in which the frangipane may develop through pathogenesis.

5.1.3 Sustainable Sanitation:

- Sustainable sanitation recognizes that in order tube sustainable, a sanitation approach must be socially acceptable and economically viable.
- In this way, sustainable sanitation is a loop-based approach that differs fundamentally from the current near concepts of waste water management and that does not only recognize technology, but also social, environmental and economic aspects.
- Sustainable sanitation is an approach that considers sanitation holistically and it recognizes that Human excreta and wastewater are not waste product, but a valuable resource.

- This view is based on the fact that wastewater and excreta contain significant amount of energy, plant nutrients and also water that can be recycled and reused, thus protecting natural resources.

  Figure No 24 Suansatable sanitation system



Water and Sanitation is one of the primary drivers of public health, this means that once we can secure access to clean water and to adequate sanitation facilities for all people, irrespective of the difference in their living conditions, a huge battle against all kinds of diseases will be won. These words, lent sanitation and health.

This implies the following criteria

- Environmental and Natural Resources
- Technology and Operation
- Financial and economic issues

The view of general system of sustainable sanitation system is a simplified and idealized technique for use of the treated water and nutrients present in the treated effluent sludge.

It improves the yield of crop as well as revenue generation and the system focuses on the treated wastewater, the waste is not a waste, it's an important biological resources.

Health and hygiene: The sanitation system must put an effective barrier between its user and the environment, and must prevent exposure that could affect public health at all points of the sanitation system: From the toilet, via the collection and treatment system, to the point of reuse or disposal and downstream populations hence it also includes hygiene behavior (see also health and hygiene issues).

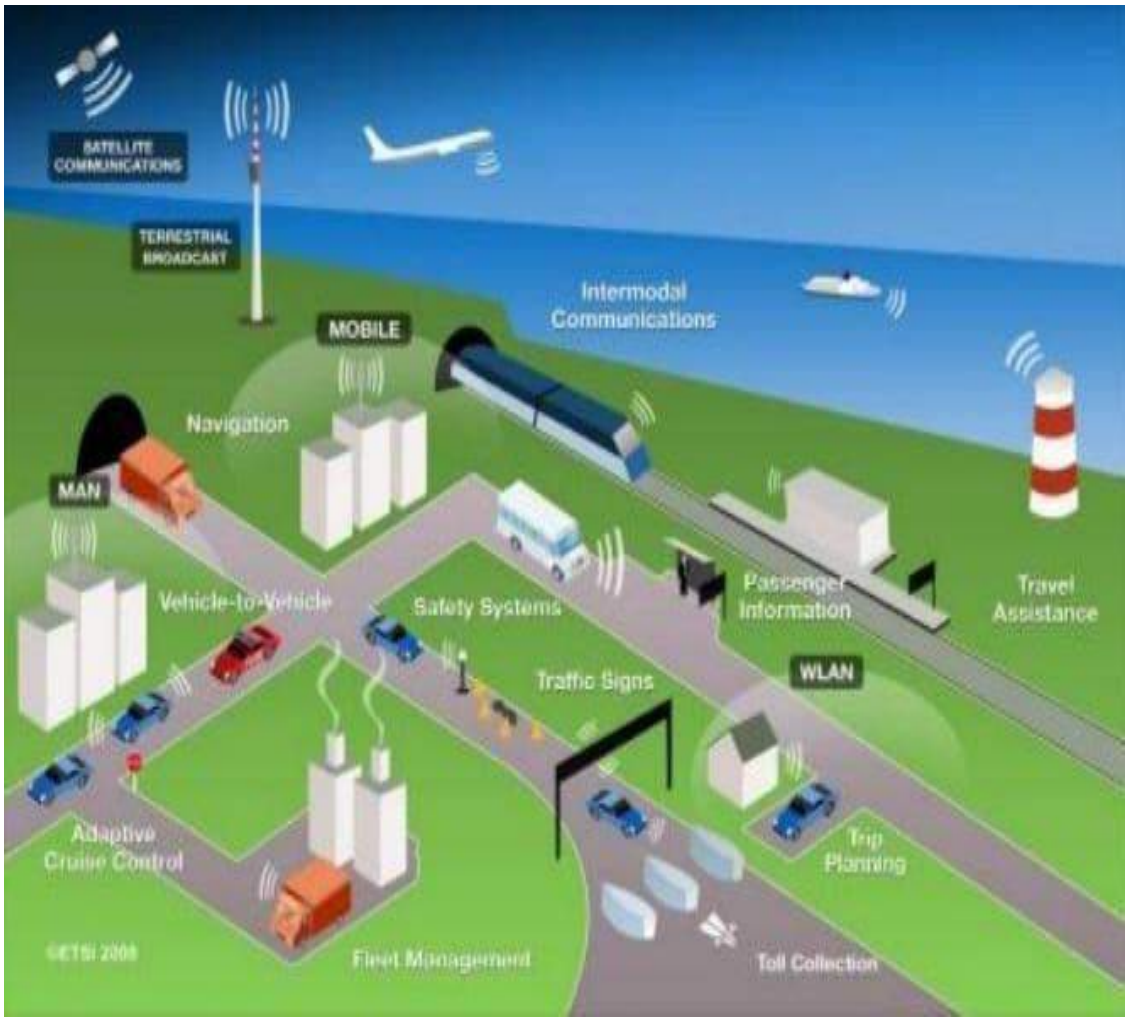
5.1.4 Transport Infrastructure / system:

- Transport infrastructure consists of the fixed installations necessary for transport and includes roads, railways, airways, waterways, and terminals.
- Transport is vital to the well-functioning of economic activities and a key to ensuring social well-being and cohesion of populations. Transport ensures everyday mobility of people and is crucial to the production and distribution of goods. Adequate infrastructure is a fundamental precondition for transport systems.
- In their endeavour to facilitate transport, however, decision-makers in governments and international organizations face difficult challenges. These include the existence of physical barriers or hindrances, such as insufficient or inadequate transport

infrastructures, bottlenecks an missing links, as well as lack of funds to remove them. Solving these problems is not an easy task.

- It requires action on the part of the governments concerned, actions that are coordinated with other governments at international level.

Figure No 25 transport infrastructure



5.1.5 Vertical farming:

What Is 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.

Figure No 26 Vertical Framing

- 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.

How Vertical Farming Works

There are four critical areas in understanding how vertical farming works

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

- Firstly, the primary goal of vertical farming is producing more foods per square meter. To accomplish this goal, crops are cultivated in stacked layers in a tower life structure. Secondly, a perfect combination of natural and artificial lights is used to maintain the

perfect light level in the room. Technologies such as rotating beds are used to improve lighting efficiency.

- Thirdly, instead of soil, aeroponic, Aquaponics or hydroponic growing mediums are used. Peat moss or coconut husks and similar non-soil mediums are very common in vertical farming. Finally, the vertical farming method uses various sustainability features to offset the energy cost of farming. In fact, vertical farming uses 95% less water 3.

Advantages and Disadvantages of Vertical Farming

Advantages

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

Disadvantages

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

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

Mechanism:

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

Prevention :

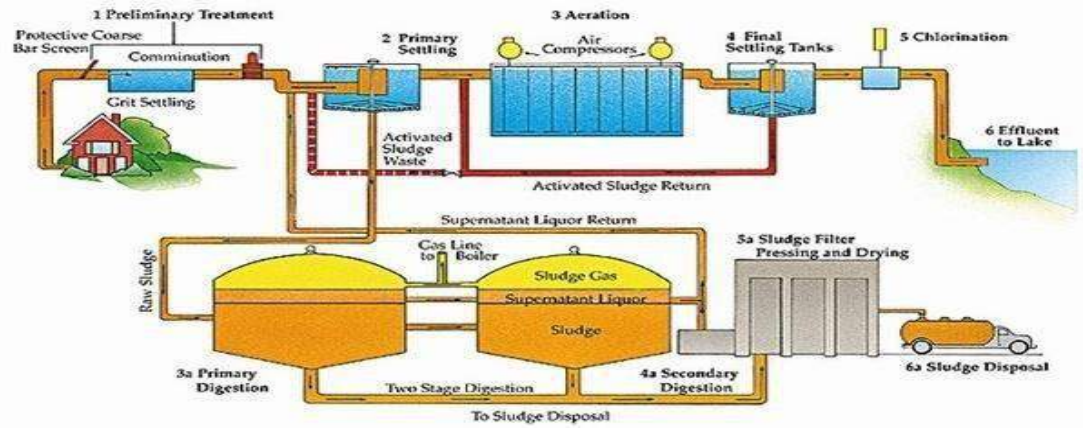
- Corrosion of steel in reinforced concrete structures can be divided into four different categories, based on how they provide protection:

1. Alternative reinforcement and slab design method includes materials that electrically isolate the steel from the concrete and create a barrier for chloride ions, materials that protect steel galvanic-ally, and materials that have significantly higher corrosion thresholds than conventional reinforcing steel. Concrete slabs have been designed without any internal reinforcement.
2. Barrier methods protect reinforced concrete from corrosion damage by preventing water, oxygen, and chloride ions from reaching the reinforcement and initiating corrosion.
3. Electrochemical methods use current and an external anode to protect the reinforcement, even when the chloride ion concentration is above the corrosion threshold.
4. Corrosion inhibitors offer protection by raising the threshold chloride concentration level, by reducing the permeability of the concrete, or by doing both.

5.1.7 Sewage treatment plant:

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

Figure No 27 Sewage treatment plant



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

5.1.8 Technical case study:

Utilization of waste plastic in manufacturing of brick:-

Introduction

- Plastic is one of the daily increasing useful as well as a hazardous material. At the time of need, plastic is found to be very useful but after its use, it is simply thrown away, creating all kinds of hazards. Plastic is non-biodegradable that remains as a hazardous material for more than centuries. The quantity of plastic waste in Municipal Solid Waste (MSW) is expanding rapidly.
- They are non-biodegradable and also researchers have found that the plastic materials can remain on earth for 4500 years without degradation In India approximately 40 million tons of the municipal solid waste is generated annually, with evaluated increasing at a rate of 1.5 to 2% every year. Hence, these waste plastics are to be effectively utilized. Waste in its various forms is increasing in landfills. Due to disastrous effects plastic has on human life, environmentalists are persistently working to get a solution to the problem of plastic disposal. They are focusing on day to day human practices which can help to reduce the disposal problem.
- One of the techniques employed is the 5 R's which is considered to be a base of waste management and should be strictly followed in order to promote ecological balance through conscious human behavior and choices. Incineration, in fact, may not be possible due to the production of noxious or toxic fumes. Plastic can remain under the ground for 500 years, which leads to the contamination of soil and thus pollutes the environment. According to the report of Central Pollution Control Board (CPCB), it is seen that the packaging and polyvinyl chloride (PVC) pipe industry grows at 16-18% per year. Table provides the total plastics waste consumption in India during last decade.

Table no19 Plastic waste consumption in India

Sr. No	Years	Consumptions(Tones)
1	1996	61,000
2	2000	3,00,000
3	2001	4,00,000
4	2007	8,500,000
5	2020	17,550,000

Figure No 28 Waste Plastic

Aim of The Case Study:-

- The aim of the Case Study is to the plastic waste management strategies and provides an effective way to minimize it and use it for a beneficial purpose.

Further adding to this, the main project work also relates the following:-

- Compilation of data on plastic waste from rural and urban areas.
- Analysis and study of plastic waste to understand its utilization or disposal.
- To measure the willingness of help and co-operation provided by people for plastic waste management.
- To review the methods for waste collection, transportation and disposal as available for municipal solid waste.
- To provide an effective way of using plastic waste into a very beneficial way and giving a plastic brick as a final product by using plastic waste.
- The need of developing such a brick was to minimize the plastic waste by using it in the best possible way and replacing these bricks with raw mud as a constructing material for houses so that the major issue of houses getting washed away during floods and damaging during earthquakes can be minimized.
- To prevent the people health from harmful diseases.

Design of brick:-

The Prototype:-

- A prototype of the block mode from plastic waste has been made.
- This will give a basic idea of how the block can be used in real life.
- The block will be used as a kind of fundament for the houses, covered with clay, so they maintain the look as from today.
- After completion of the monsoon seasons, the house will still be existing with the roof on so there‘s no need to build up the house again from the scars as they need to do it today.

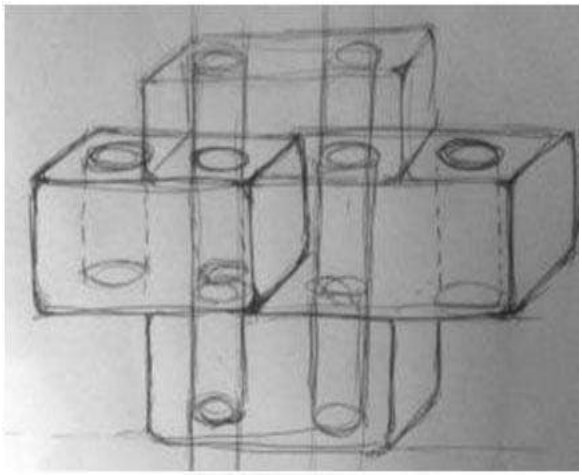


Figure No 29 Sketchmetic dia. of brick

Figure No 30 Plastic Brick Arrangement

Required Materials:-

- Plastic waste such as crisp bogs, polythene bags.
- Standard brick mould for preparing bricks of dimension 19*9*9 cms.
- A solar grill oven or an electric oven of heating capacity 100 to 500º C.
- A metal cover plate and a compressing/tamping rod.
- A water jet sprinkler.

Preparation Methodology:-

- At initial stage, waste soft plastic (polythene bags, crisp bags) of (approximate 4 to 5 kgs) is filled up in a brick mould of dimensions 19*9*9cms and then it is made air tight so as to prevent the leakage of viscous plastic.
- After filling the mould with plastic bags, it is compressed with a tamping rod until fully filled and then it is closed with a metal plate.
- The brick mould is now placed in a heating oven and heated at 175 to 200ºC for one and a half to two hours.
- Further the mould is taken out from the oven with accurate precautive measures and for sudden cool down, a jet of water is sprayed on the mould.

- Finally with the help of mechanical means, the final product a plastic brick is obtained.

Analysis of brick from plastic scrap:-

A. Compression Test

- This test is done to known the compressive strength of brick. It is also called crushing strength of brick. Four specimens of brick were taken to laboratory for testing and tested one by one. In this test, a brick specimen is put on crushing machine and applied pressure till it breaks. And the reading is noted. The ultimate pressure at which brick is crushed is taken into account. All four brick specimens are tested one by one and the load at crushing was noted.

B. Water Absorption Test

- In this test, bricks are weighed in dry condition and let them immersed in fresh water for 24 hours. After 24 hours of immersion, those are taken out from water and wipe out with cloth. Then, brick is weighed in wet condition. The difference between weights is the water absorbed by brick. The percentage of water absorption is then calculated. The less water absorbed by brick the greater its quality. Good quality brick doesn't absorb more than 20% water of its own weight.

Figure No31 Testing of brick in ct (UTM)

Figure No32 Compression test result of Brick

Figure No 33 Brick Absorption test

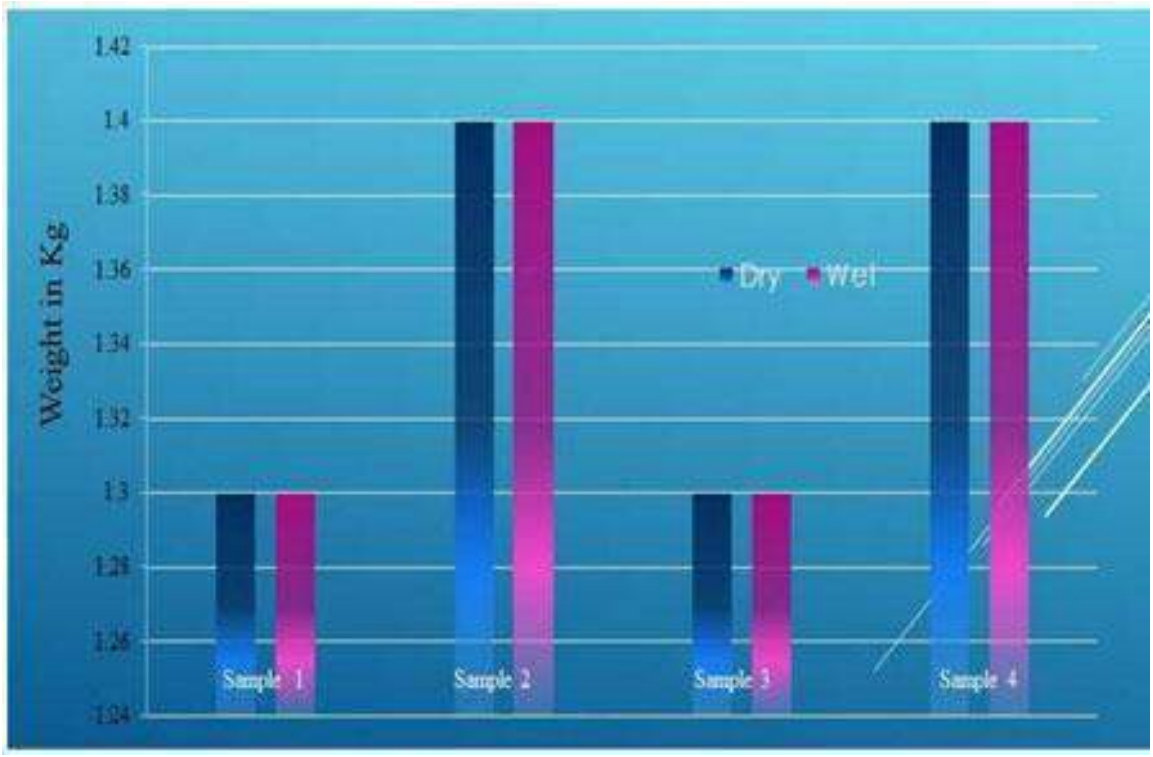


Figure No 34 Absorption test result of brick

Future Scopes:-

- The plastic bricks used for further in construction projects due to its light weight and economic purpose. The plastic use in the many form in the construction like bricks, tiles, road pavements etc. When plastic used for these construction the structures will be more economics and it have enough strength, durability.
- Establishing the industries.
- Protection of environment
- Increasing they strength by adding other martial
- Recycling the plastic and using as a construction material.

Advantages of plastic brick:-

- Allow recycling of waste plastic.
- If made with hollow cells, they can be filled with compacted dirt, increasing their potential utility for projects lasting several years.
- They can be used for insulation; in this application they may b left as such with hollow cells and these cells may be filled with husk. This seems to be a most practical application, suitable for moderately cool regions.
- If brick covered with aluminum foil, perhaps glued with epoxy, they would withstand UV much better.
- They should be sufficiently economical, with potential to easy recycling. Under submerged condition they should last much longer.
- Exotic shapes are possible for decorative purposes.

Disadvantages of plastic brick:-

- Mortar would not stick, unless they are designed with specialized rough surface. Even then, mortar is not expected to stick reliably.
- Plastic may appear strong, but it would deform under pressure. It would limit its utility in any typical weight bearing application.
- It would have limited lifespan due to degradation of UV. Hot climate or direct exposure to sun could make them soft.
- Plastic is flammable. It would need to pay any application construction codes.

CONCLUSIONS:-

- The Plastic sand bricks possess more advantages which include Cost efficiency, Removal of waste products thus abolishing the land requirement problem for dumping plastic, Reduction in the emission of greenhouse gases by the conversion of flue gases into synthetic oil etc.

Chapter 6: Swachh Bharat Abhiyan (Clean India)

6.1 Which type of swatchhta need in your village, explaining existing situation with photograph

- **Swatchh bharat abhiyan or clean India mission** was a nation-wide campaign from 2014 to 2019 to clean up the streets, roads and infrastructure of cities towns, and rural areas.

- Its objectives include eliminating open defecation through the construction of household-owned and community-owned toilet and establish an account table mechanism of monitoring toilet use.

Fig 35: Makhiyala village needs of Garbage cleaning

- There is no facility in the village for waste-disposal.

- As we observed, Makhiyala has implemented Waste Collection System operated under RUDA. However, it is not sufficient or villagers do not use it. Instead, villagers prefer to dump village in open plots or street sides of the as shown in the pictures below:

- We recommend providing dustbins on major places of the village to reduce waste collection. For the further facility, we can provide dustbins with separate waste collection facility for different types of waste. These dustbins can be made in different colors for its identification. Moreover, there are insufficient waste collectors for cleaning roads. They should be recruited.

6.2 Swatchhta needed in Makhiyala village –existing with photograph

- We have done one survey on existing condition of village regarding swachhta. The people are maintaining cleanliness of the village but in some streets there is no swachhta because there are animal and their waste, mud etc. the village pond has to

need a proper maintenance. Other than these there are clean streets, main road and approach road.

Fig 36: Makhiyala village Swachhta

6.3 Activities Done by Student for allocated village with Photograph

- If there was any dirt in the sub centre, it was cleaned and a pledge of cleanliness was taken from its staff.
- The drug was sprayed to prevent further spread of mosquito infestations, so that diseases' like dengue do not spread
- While traveling doesn't throw any paper or any waste on road. Keep it in your beg or pocket (as it is a dry waste you can them in your beg/pocket).
- Keep paper begs with yourself to store wet and throw them in dustbin only.
- Spitting on road (as it can be the reason of viral disease).
- Avoid use of plastic bag.
- Follow government's rules and regulations.
- If someone is breaking the rules then make them aware of it.
- Stop your friends if they are making such mistakes.
- Spread awareness to keep our village clean.

Figure No 37 Spred mediseen

Chapter 7: Impact of COVID-19

7.1 Existing condition and taken step in allocated village

- The village is so deprived from the city & urban life that the village has seen no corona case. The precaution is always better than the cure but the villagers are taking no precaution regarding corona. No one is wearing mask or maintaining any social distance.

Fig 38: No precaution in Covid-19

Fig 39: Corona condition in village

- In some street the lockdown is got very well. People are not got to outside to home with not reason.

7.2 Activities Done by Students for allocated village with Photograph

Volumeter of student they have took initiator like they are want to make social distance of customer their frequently visited at shop. They made circle and advised shopkeeper and consumer they have stood in this circle and regular maintain it.

Fig 40: Visit of Makhiyala village

Figure No 41.social distance A

Figure No 42. Social Distance B

- We tried to convince the villagers to wear the mask and maintain the social distancing. We wore a mask and take sanitazer every time we visit the village.

7.3 Any other steps taken by the student / Villagers

After the corona virus outbreak in India, there were reports of mask shortages, and even that unscrupulous traders were taking advantage of the people's desperation and selling them for as high as Rs 150-200. Indian government distributes masks to the people in our locality then in our allocated village and nearby villages. And that too free of cost. It's a small effort to safeguard the people in our village from this corona virus pandemic.

Figure No 43. Mask and food packaging distrubution

Chapter 8: Sustainable Desige Planning Proposal

(Prototype Design) – Part-1

8.1 Design Proposal

- In the Vishwakarma Yojana Phase-VII Part – I we have given total six design according to the village need and useful for the villagers.
- The design proposals are
  - Public Garden
  - Medical Shop
  - Public Library
  - Solar Water Purifier
  - Internet Café
  - Chabutro

❖ **Recommendation of the design**

- In village there is no library for book reading and student have to travel outward for this purpose. We have design library for physical comfort.
- There is no medical store in the village by undertaking the requirement of the villagers we have design medical store for their health purposes.
- For online facility we have design internet cafes for village peoples.
- For spending the time each other we design a public garden.

❖ **Benefit of the village**

- In village, there is no library for book reading and students have to travel outward for this purpose we have design library for physical comfort.
- For online facility we have design internet cafes for village peoples.
- In village there is bus stand but it is in maintenance there is no buses are coming for that we have planning to design one of the most attractive bus stand for villagers to made easy travel experience in nearby cities.
- There is no place when people meet each other and got to good communication. We have planning to design a public garden when people meet.

8.1.1 Public Garden

A public garden is an institution that maintains collections of plants for the purposes of public education and enjoyment, in addition to research, conservation, and higher learning. It must be open to the public and the garden's resources and accommodations must be made to all visitors.

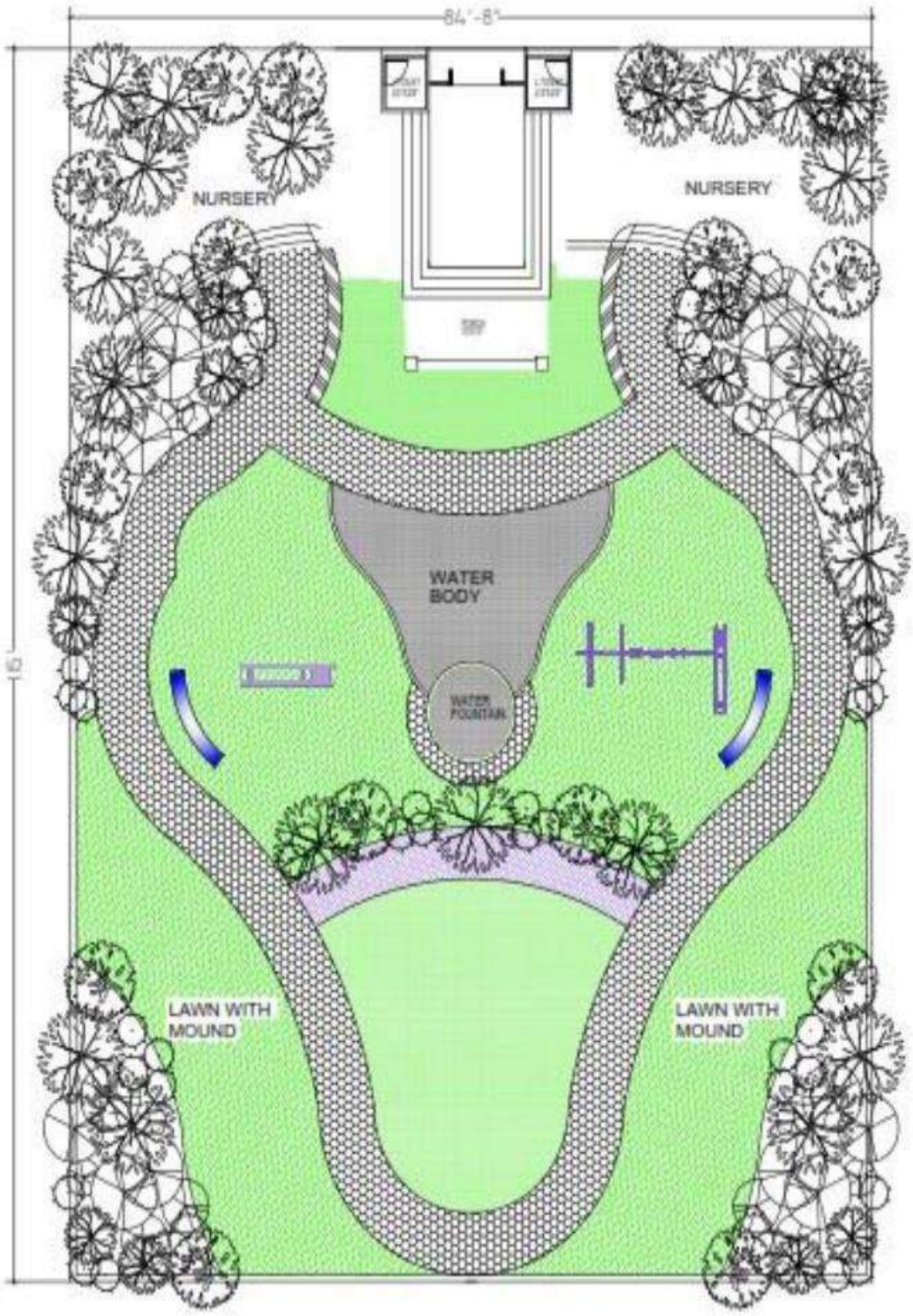


Figure No 44.public garden

Measurement sheet for Public Garden:-

Table No 20 Measurement sheet for garden

Sr. No.	Item Description	No.	Length	Breadth	Height	Quantity
1	Excavation	1	97.5	1	0.9	87.75 m^3
2	BBCC	1	97.5	1	0.2	19.5 m^3
3	Masonry	1	97.5	0.23	1.5	33.65 m^3
4	Tile Flooring	1	136.2 m^2			136.2 m^2
5	Grass	1	7331 m^2			7331 m^2
6	Water Body	1	48.2 m^2		0.8	38.56 m^3
7	Staging	1	4.57	16.76	0.3	22.98 m^3

Abstract sheet for a Garden:

Table No 21 Abstract sheet for a Garden

Sr. No.	Item Description	Required Qty.	Cost/ Unit	Total Cost
1	Excavation	87.75 m^3	85 Rs	7,458 Rs
2	BBCC	19.5 m^3	3200 Rs	62,400 Rs
3	Masonry	33.65 m^3	3500 Rs	1,17,775 Rs
4	Tile Flooring	136.2 m^2	750 Rs	1,02,150 Rs
5	Grass	7331 m^2	45 Rs	3,29,895 Rs
6	Water Body	38.56 m^3	800 Rs	30,848 Rs
7	Staging	22.98 m^3	3500 Rs	80,430 Rs
8	Fountain	1	48,000 Rs	48,000 Rs

8.1.2 Medical shop

A pharmacy (also called "drugstore" in American English or "community pharmacy" or "chemist" in Commonwealth English) is a retail shop which provides pharmaceutical drugs, among other products. At the pharmacy, a pharmacist oversees the fulfillment of medical prescriptions and is available to counsel patients about prescription and over-the-counter drugs or about general health issues. A typical pharmacy would be in the commercial area of a community.

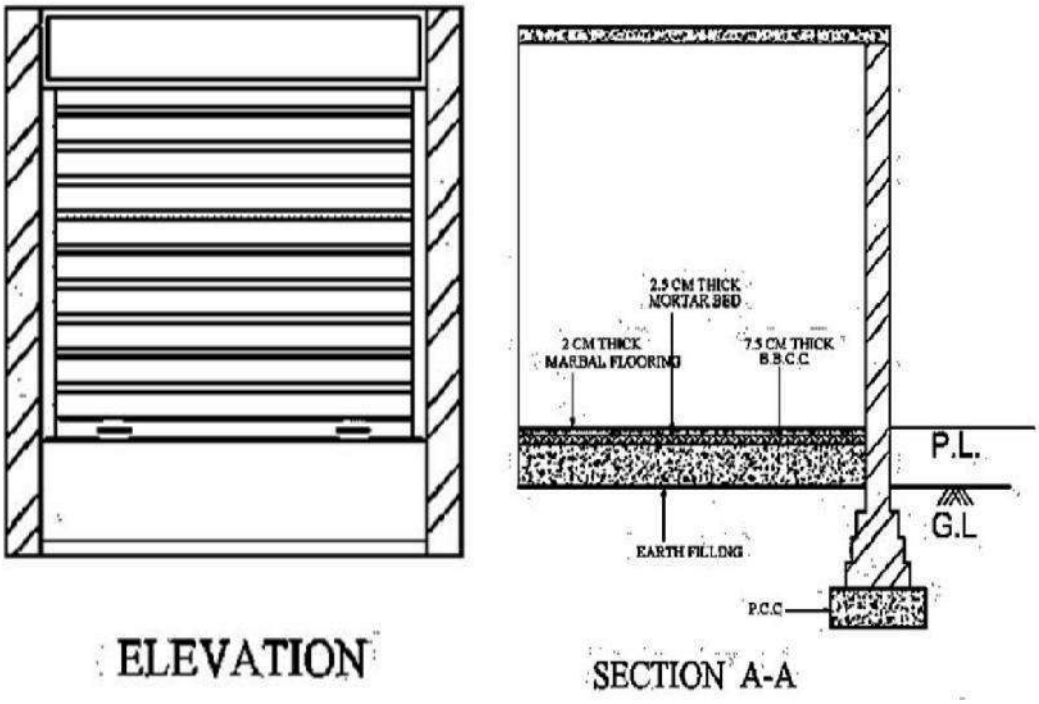


Figure No 45 Medical shop

Measurement sheet For Medical shop

Table No 22 Medical Shop

SR NO	ITEM DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	
1	Excavation in foundation						
	Long wall=3.51m	1	3.51	0.9	1.5	4.7385	
	Short wall=2.59m	2	2.59	0.9	1.5	6.993	
				Total quantity =		11.7315 Cu.m	
2	Plain cement concrete						
	in foundation(1:2:4)						
	Long wall=3.51m	1	3.51	0.9	0.3	0.9477	
	Short wall=2.59m	2	2.59	0.9	0.3	1.3986	
				Total quantity =		2.3463 Cu.m	
3	Brickwork in foundation						
	and plinth in C.M(1:6)						
	Long wall:						
STEP: 1	3.51+0.6 =4.11m	1	4.11	0.6	0.2	0.4932	
STEP: 2	3.51+0.5 =4.01m	1	4.01	0.5	0.2	0.401	
STEP: 3	3.51+0.4 =3.91m	1	3.91	0.4	0.2	0.3128	
STEP: 4	3.51+0.3 =3.81m	1	3.81	0.3	0.6	0.6858	
						1.8928	
	Shortwall						
STEP: 1	2.59-0.6 =1.99m	2	1.99	0.6	0.2	0.4776	
STEP: 2	2.59-0.5 =2.09m	2	2.09	0.5	0.2	0.418	
STEP: 3	2.59-0.4 =2.19m	2	2.19	0.4	0.2	0.3504	
STEP: 4	2.59-0.3 =2.29m	2	2.29	0.3	0.6	0.8244	
				Total quantity =		5.856 Cu.m	
4	Brickwork in						
	super structure						
	Long wall=3.51	1	3.51	0.3	3	3.159	
	Short wall=2.59	2	2.59	0.3	3	4.662	
				Total quantity =		7.821 Cu.m	
5	R.C.C slab,chajja,and lintel						
	R.C.C slab:						
	Breadth=2.59m	1	3.51	2.59	0.12	1.09091	
	Length=3.51m						

6	**2 Cm marble flooring**						
	Room	1	3.05	2.59		7.8995 m.sq	
7	**Earth fillingin plinth**	1	3.05	2.59	0.48	3.79176 Cu.m	
8	**Smooth plaster inside**						
	the room in c.m.(1:3)						
	ROOM	1	3.05		3	9.15	
		2	2.59		3	15.54	
				Total quantity =		**24.69 Sq.m**	
9	**Smooth plaster outside**						
	the room in c.m (1:3)						
	ROOM	1	3.51		3	10.53	
		2	2.59		3	15.54	
				Total quantity =		**26.07 Sq.m**	
10	**Painting in inside**						
	ROOM	1	3.05		3	9.15	
		2	2.59		3	15.54	
				Total quantity =		**24.69 Sq.m**	
11	**Painting in outside**						
	ROOM	1	3.51		3	10.53	
		2	2.59		3	15.54	
				Total quantity =		**26.07 Sq.m**	
12	**Rolling Shutter**	1	2.59		2.6	**6.734**	Sq.m

Abstract sheet for Medical shop

Table no 23. Abstract sheet for medical shop

SR NO	PATICULARS OF ITEM	QUANTITY	PER	RATE	AMOUNT Rs.
1	**Excavation in foundation**	11.73	Cu.m	180	2111.4
2	**plain cement concrete in**	2.346	Cu. m	4300	10087.8
	Foundation				
3	**Brick work in foundation**	5.846	Cu. m	3500	20461
4	**brick work in super structure**	7.821	Cu. m	3800	29719.8
	R.C.C work in slab, chajja. and lintel	1.09	Cu. m	6300	6867
6	**2 cm marble flooring**	7.899	Sq.m	700	5529.3
7	**earth filling**	3.791	Cu. m	50	189.55
8	**Smooth plaster inside th room in**	24.69	Sq.m	260	6419.4
	c.m(1:3)				
9	**Smmoth plaster outside the room**	26.07	Sq.m	350	9124.5
	in c.m(1:3)				
10	**Painting in inside**	24.69	Sq.m	230	5678.7
11	**Painting in outside**	26.07	Sq.m	320	8342.4
12	**Rolling Shutter**	6.734	Sq.m	1210	8148.14
13	**Switchboard and Wiring of Electricity**	2	nos.	450	900
14	**CCTV Camera**	1	nos.	7999	7999
				Rs.	**121577.99**
		ADD 5% contingencies Rs.			**61505**
			Total Rs.		**183082.99**
			Total Rs. Say =		**18310**

8.1.3 Public Library

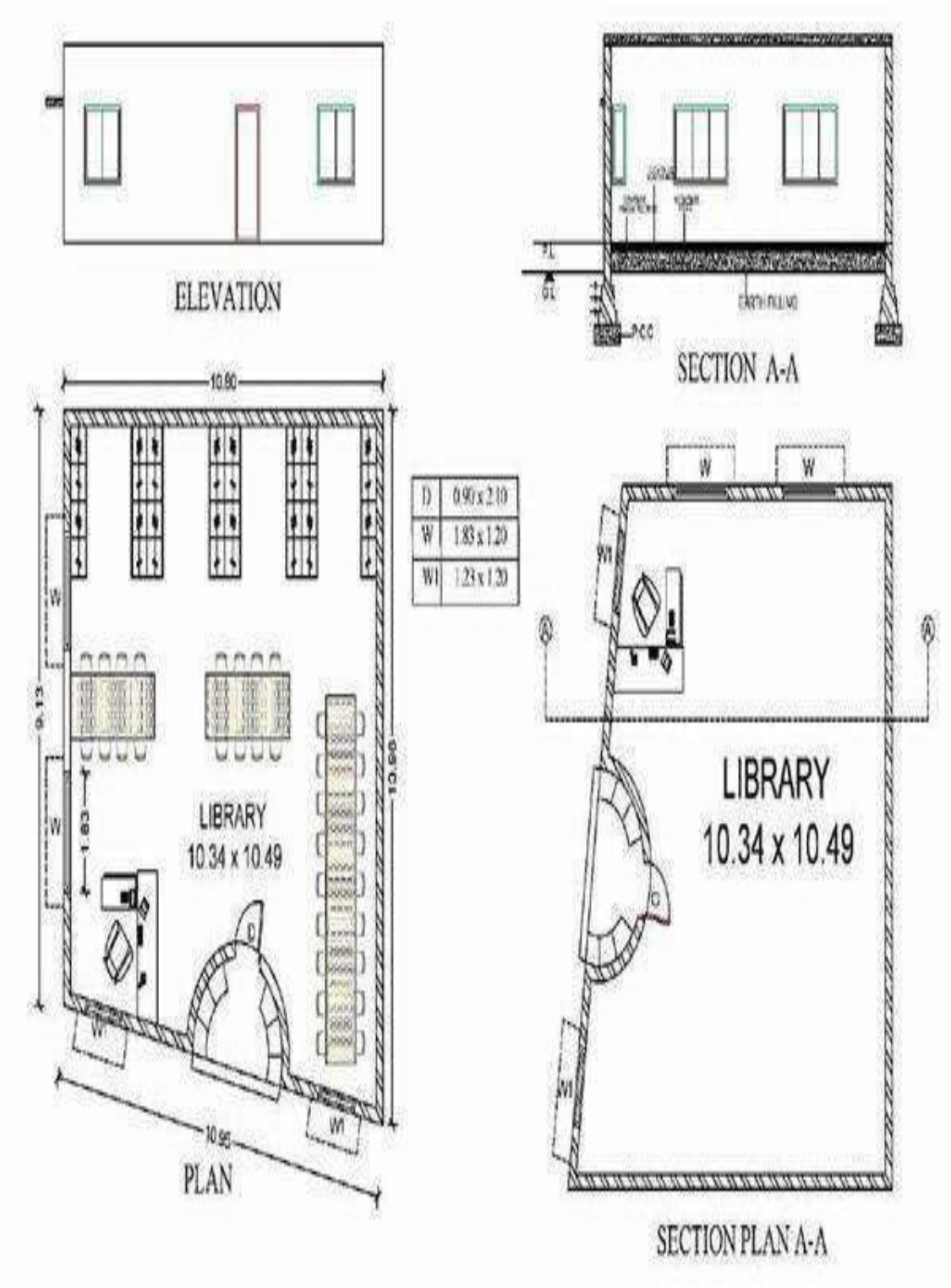


Figure No 46. Public Library

Measurement sheet for Public Library

Figure No 24 Public Library

SR NO	ITEM DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	
1	**Excavation in foundation**						
	Long wall(1)=10.8m	1	10.8	0.9	1.5	14.58	
	Long wall(2)=10.95m	1	10.95	0.9	1.5	14.7825	
	Short wall(1)=9.13m	1	9.13	0.9	1.5	12.3255	
	Short wall(2)=10.96m	1	10.96	0.9	1.5	14.796	
				Total quantity =		**56.484 Cu.m**	
2	**Plain cement concrete**						
	in foundation(1:2:4)						
	Long wall(1)=10.8m	1	10.8	0.9	0.3	2.916	
	Long wall(2)=10.95m	1	10.95	0.9	0.3	2.9565	
	Short wall(1)=9.13m	1	9.13	0.9	0.3	2.4651	
	Short wall(2)=10.96m	1	10.96	0.9	0.3	2.9592	
				Total quantity =		**11.2968 Cu.m**	
3	**Brickwork in foundation**						
	and plinth in C.M(1:6)						
	Long wall(1):						
STEP: 1	**10.8+0.6 =11.4m**	1	11.4	0.6	0.2	1.368	
STEP: 2	**10.8+0.5 =11.3m**	1	11.3	0.5	0.2	1.13	
STEP: 3	**10.8+0.4 =11.2m**	1	11.2	0.4	0.2	0.896	
STEP: 4	**10.8+0.3 =11.1m**	1	11.1	0.3	0.6	1.998	
						5.392	
	Long wall(2):						
STEP: 1	**10.95+0.6 =11.55m**	1	11.55	0.6	0.2	1.386	
STEP: 2	**10.95+0.5 =11.45m**	1	11.45	0.5	0.2	1.145	
STEP: 3	**10.95+0.4 =11.35m**	1	11.35	0.4	0.2	0.908	
STEP: 4	**10.95+0.3 =11.25m**	1	11.25	0.3	0.6	2.025	
						5.464	
	Shortwall(1)						
STEP: 1	**9.13-0.6 =8.53m**	1	8.53	0.6	0.2	1.0236	
STEP: 2	**9.13-0.5 =8.63m**	1	8.63	0.5	0.2	0.863	
STEP: 3	**9.13-0.4 =8.73m**	1	8.73	0.4	0.2	0.6984	
STEP:	**9.13-0.3 =8.83m**	1	8.83	0.3	0.6	1.5894	

4							
	Shortwall(2)						
STEP: 1	**10.96-0.6 =10.36m**	1	10.36	0.6	0.2	1.2432	
STEP: 2	**10.96-0.5 =10.46m**	1	10.46	0.5	0.2	1.046	
STEP: 3	**10.96-0.4 =10.56m**	1	10.56	0.4	0.2	0.8448	
STEP: 4	**10.96-0.3 =10.66m**	1	10.66	0.3	0.6	1.9188	
				Total quantity =		**30.9392 Cu.m**	
4	**Brickwork in**						
	super structure						
	Long wall(1)=10.80	1	10.8	0.3	3	9.72	
	Long wall(2)=10.95m	1	10.95	0.3	3	9.855	
	Short wall(1)=9.13m	1	9.13	0.3	3	8.217	
	Short wall(2)=10.96m	1	10.96	0.3	3	9.864	
				Total quantity =		**37.656 Cu.m**	
	Deduction for door/window						
	DOOR	1	0.9	0.3	2.1	0.567	
	WINDOW	2	1.83	0.3	1.2	1.3176	
	WINDOW1	2	1.23	0.3	1.2	0.8856	
						2.7702 Cu.m	
	Deduction for lintel						
	DOOR	1	0.9	0.3	2.1	0.567	
	WINDOW	2	1.83	0.3	1.2	1.3176	
	WINDOW1	2	1.23	0.3	1.2	0.8856	
						2.7702 Cu.m	
				Total Deduction=		5.5404 Cu.m	
				Total Quantity =		**32.1156 Cu.m**	
5	**R.C.C slab,chajja,and lintel**						
	R.C.C slab:						
	Breadth=10.96m	1	10.96	10.95	0.12	14.4014	
	Length=10.95m						
	R.C.C chajja:						
	Window	2	1.83	0.6	0.1	0.2196	
	Window1	2	1.23	0.6	0.1	0.1476	
	R.C.C.lintel:					2.7702	
				Total Quantity =		**17.5388 Cu.m**	

6	**2 Cm marble flooring**						
	Room	1	10.34	10.49		**108.467 m.sq**	
7	**Earth filling in plinth**	1	10.34	10.49	0.48	**52.064 Cu.m**	
8	**Smooth plaster inside**						
	the room in c.m.(1:3)						
	ROOM	1	10.2		3	30.6	
		1	10.34		3	31.02	
		1	8.53		3	25.59	
		1	10.49		3	31.47	
						118.68 Sq.m	
	Deduction for door						
	and window						
	DOOR	0.5	0.9		2.1	0.945	
	WINDOW	0.5	1.83		1.2	1.098	
	WINDOW1	0.5	1.23		1.2	0.738	
						2.781 Sq.m	
				Total quantity =		**115.899 Sq.m**	
9	**Smooth plaster outside**						
	the room in c.m (1:3)						
	ROOM	1	10.8		3	32.4	
		1	10.95		3	32.85	
		1	9.13		3	27.39	
		1	10.96		3	32.88	
						125.52 Sq.m	
	Deduction for door						
	and window						
	DOOR	0.5	0.9		2.1	0.945	
	WINDOW	0.5	1.83		1.2	1.098	
	WINDOW1	0.5	1.23		1.2	0.738	
						2.781 Sq.m	
				Total quantity =		**122.739 Sq/m**	
10	**Painting inside**						
	the room						
	ROOM	1	10.2		3	30.6	
		1	10.34		3	31.02	
		1	8.53		3	25.59	
		1	10.49		3	31.47	
						118.68 Sq.m	
	Deduction for door						
	and window						
	DOOR	0.5	0.9		2.1	0.945	

	WINDOW	0.5	1.83		1.2	1.098	
	WINDOW1	0.5	1.23		1.2	0.738	
						2.781 Sq.m	
				Total quantity =		**115.899 Sq.m**	
11	Painting outside						
	the room						
	ROOM	1	10.8		3	32.4	
		1	10.95		3	32.85	
		1	9.13		3	27.39	
		1	10.96		3	32.88	
						125.52 Sq.m	
	Deduction for door						
	and window						
	DOOR	0.5	0.9		2.1	0.945	
	WINDOW	0.5	1.83		1.2	1.098	
	WINDOW1	0.5	1.23		1.2	0.738	
						2.781 Sq.m	
				Total quantity =		122.739 Sq.m	
13	WINDOWS	2	1.83		1.2	4.392	Sq.m
		2	1.23		1.2	2.952	Sq.m
				Total quantity	=	7.344	Sq.m

Abstract sheet for Public Library

Table no 25 Abstract sheet Public library

SR NO	PATICULARS OF ITEM	QUANTITY	PER	RATE	AMOUNT Rs.
1	**Excavation in foundation**	56.484	Cu.m	180	10167.12
2	**plain cement concrete in**	11.296	Cu.m	4300	48572.8
	Foundation				
3	**Brick work in foundation**	30.94	Cu.m	3500	108290
4	**brick work in super structure**	32.12	Cu.m	3800	122056
5	**R.C.C work in slab,chajja.and lintel**	17.54	Cu.m	6300	110502
6	**2 cm marble flooring**	108.47	Sq.m	700	75929
7	**earth filling**	52.064	Cu.m	50	2603.2
8	**Smooth plaster inside th room in**	115.899	Sq.m	260	30133.74
	c.m(1:3)				
9	**Smmoth plaster outside the room**	122.739	Sq.m	350	42958.65
	in c.m(1:3)				
10	**Painting in inside**	115.899	Sq.m	230	26656.77
11	**Painting in outside**	122.739	Sq.m	320	39276.48
12	**Switchboard and Wiring of Electricity**	4	nos.	450	1800
13	**CCTV Camera**	2	nos.	7999	15998
14	**Door**	1	nos.	4200	4200

15	**Windows**	7.344	Sq.m	320	2350.08
				Rs.	**641493.84**
		ADD 5% contingencies		**Rs.**	**32074**
			Total Rs.		**673567.84**
			Total Rs. Say =		**673600**

8.1.4 Solar Water Purification

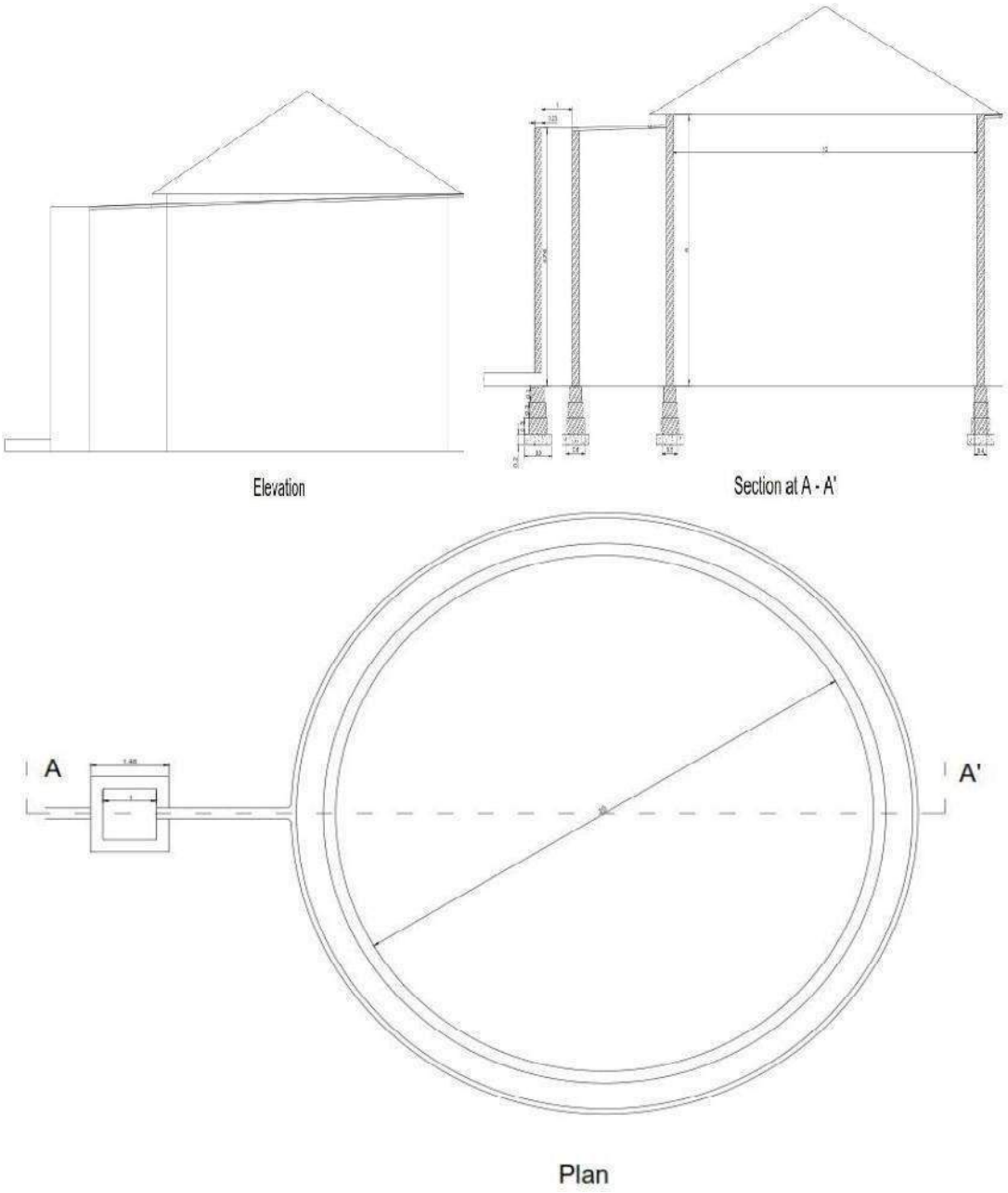


Figure No 47 solar water purification

Measurement sheet for solar water purification

Table No 26 measurement sheet solar water purification

Sr No	Item Description	No	Length	Breadth	Height	Quantity	Total Quantity
1	**Excavation in foundation**						
	L = 31.42m H = 5m	1	31.42	0.9	1.1	31.058	
	L = 1.23 x 4 = 4.92 H = 4.76m	1	4.92	0.9	1.1	4.87	
							35.93 cu.M
2	**Plain Cement Concrete**						
	L=31.42m	1	31.42	0.9	0.2	5.656	
	L=4.92m	1	4.92	0.9	0.2	0.8856	
							6.542 cu.M
3	**Brick Masonry up to Plinth**						
	For 1st step (500 mm) L = 31.42m L = 4.92m	1 1	31.42 4.92	0.6 0.6	0.3 0.3	5.656 0.886	
	For 2nd step (400 mm) L = 31.42m L = 4.92m	1 1	31.42 4.92	0.5 0.5	0.3 0.3	4.713 0.738	
	For 3rd step (500mm) L = 31.42m L = 4.92m	1 1	31.42 4.92	0.4 0.4	0.3 0.3	3.77 0.59	
							16.353 cu.M
4	**D.P.C**						

	L = 31.42m L = 4.92m	1 1	31.42 4.92	0.4 0.4		12.57 1.968	
							14.54 sq.M
5	**Superstructure Masonry**						
	L = 31.42m L = 4.92m	1 1	31.42 4.92	0.23 0.23	5 4.76	36.13 5.38	
							41.51cu. M
6	**Smooth Plaster for Inner Walls**					0	
	L = 31.41m L = 1m	1 4	31.41 1		5 4.76	157.05 19.04	
							157.05 sq.M

Abstract sheet for solar water purification

Table No 27 Abstracts sheet solar water purification

Sr. No.	Quantity Name	Total Quantity	Unit	Rs/unit	Total Cost in Rupees
1	Excavation	35.93	Cu.M	85	3054.05
2	PCC	6.542	Cu.M	3200	20934.4
3	Brick Masonry Up to PL	16.35	Cu.M	3200	52320
4	Brick Masonry in Super structure	41.51	Cu.M	3500	145285
5	Plastering	157.05	m^2	150	23557.5

Total Construction Cost including Labour Cost = 221617 Rupees.
Contractor's Profit = 33242.55 Rupees (15%).
Total Cost without considering wastage: 221617 + 33242.5 = 254859
Therefore, the cost is said to be 3,50,000 Rupees including other costs i.e. waterproof base & walls made of rubber, glass roof etc.

- **Working of Solar Water Purifier:-**

Solar water purifier will work on basic water evaporation principle. The roof of the water tank is supposed to be made of glass to make it work. Inner sides and bottom of the tank shall be made from waterproof black material to produce

maximum heat in the tank. The glass used in roof shall be capable of resisting high temperatures. It is suggested to clean drain under the roof every morning to get its maximum efficiency.

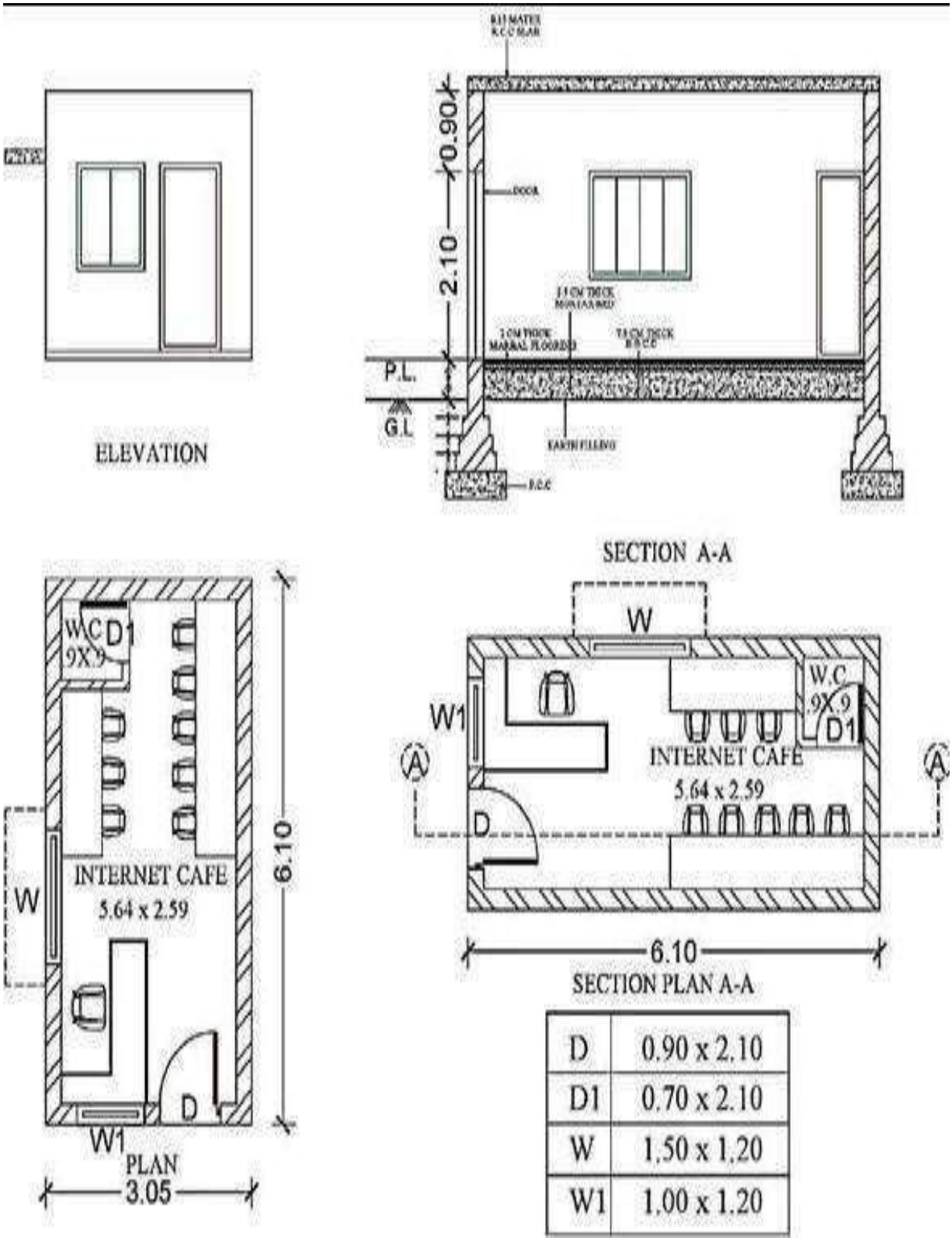
- **The capacity of Solar Water Purifier:-**

The maximum water holding capacity of solar water purifier is more then 3,90,000litres.

The water purifier can purify water up to 100 litres of water per hour at a highest temperature in summer.

8.1.5 Internet Café

- All the dimensions are in meter.
- The area of Internet cafe is 3.05 x 6.10 m.
- Total numbers of bricks are 6,350 nos. use in this Internet café. 2 cm thick marble flooring is used in Internet cafe.
- 2.5 cm mortar bed is used.
- 7.5 cm BBCC is used above earth filling. Earth filling thickness is about 0.6 m.
- The step footing below the ground level is about 0.9 m. Internet Facilities is use to a villager.
- Eight to Nine Computers are capable in the internet café.
- Internet cafés offer the use of computers with high bandwidth internet access on the payment of a fee.
- Usage is generally charged by the minute or part of hour.
- An internet cafe will generally also offer refreshments or other services such as phone repair.



D	0.90 x 2.10
D1	0.70 x 2.10
W	1.50 x 1.20
W1	1.00 x 1.20

Figure No 48 Internet Café

Measurement sheet for internet café

Table No 28 internet cafe

SR NO	ITEM DESCRIPTION	NO	LENGTH	BREADTH	HEIGHT	QUANTITY	
1	**Excavation in foundation**						
	Long wall=6.70m	2	6.7	0.9	1.5	18.09	
	Short wall=3.65m	2	3.65	0.9	1.5	9.855	
				Total quantity =		**27.945 Cu.m**	
2	**Plain cement concrete**						
	in foundation(1:2:4)						
	Long wall=6.70m	2	6.7	0.9	0.3	3.618	
	Short wall=2.45m	2	2.45	0.9	0.3	1.323	
				Total quantity =		**4.941 Cu.m**	
3	**Brickwork in foundation**						
	and plinth in C.M(1:6)						
	Long wall:						
STEP: 1	**6.10+0.6 =6.70m**	2	6.7	0.6	0.2	1.608	
STEP: 2	**6.10+0.5 =6.60m**	2	6.6	0.5	0.2	1.32	
STEP: 3	**6.10+0.4 =6.50m**	2	6.5	0.4	0.2	1.04	
STEP: 4	**6.10+0.3 =6.40m**	2	6.4	0.3	0.6	2.304	
						6.272	
	Shortwall						
STEP: 1	**3.05-0.6 =2.45m**	2	2.45	0.6	0.2	0.588	
STEP: 2	**3.05-0.5 =2.55m**	2	2.55	0.5	0.2	0.51	
STEP: 3	**3.05-0.4 =2.65m**	2	2.65	0.4	0.2	0.424	
STEP: 4	**3.05-0.3 =2.75m**	2	2.75	0.3	0.6	0.99	
				Total quantity =		**15.056 Cu.m**	
4	**Brickwork in**						
	super structure						
	Long wall=6.70	2	6.7	0.3	3	12.06	
	Short wall=2.45	2	2.45	0.3	3	4.41	
				Total quantity =		**16.47 Cu.m**	
	Deduction for door/window						
	DOOR	1	0.9	0.3	2.1	0.567	
	DOOR1	1	0.7	0.3	2.1	0.441	

	WINDOW	1	1.5	0.3	1.2	0.54	
	WINDOW1	1	1	0.3	1.2	0.36	
						1.908 Cu.m	
	Deduction for lintel						
	DOOR	1	0.9	0.3	2.1	0.567	
	DOOR1	1	0.7	0.3	2.1	0.441	
	WINDOW	1	1.5	0.3	1.2	0.54	
	WINDOW1	1	1	0.3	1.2	0.36	
						1.908 Cu.m	
				Total Deduction=		3.816 Cu.m	
				Total Quantity =		**12.654 Cu.m**	
5	**R.C.C slab,chajja,and lintel**						
	R.C.C slab:						
	Breadth=2.45m	1	6.7	2.45	0.12	**1.9698**	
	Length=6.70m						
	R.C.C chajja:						
	Window	1	1.8	0.6	0.1	**0.108**	
	Window1	1	1.3	0.6	0.1	**0.078**	
	R.C.C.lintel:					**1.908**	
						4.0638 Cu.m	
6	**2 Cm marble flooring**						
	Room	1	5.64	2.6		**14.664 m.sq**	
7	**Earth fillingin plinth**	1	5.64	2.6	0.48	**7.03872 Cu.m**	
8	**Smooth plaster inside**						
	the room in c.m.(1:3)						
	ROOM	2	5.64		3	33.84	
		2	2.6		3	15.6	
						49.44 Sq.m	
	Deduction for door						
	and window						
	DOOR	0.5	0.9		2.1	0.945	
	DOOR1	0.5	0.7		2.1	0.735	
	WINDOW	0.5	1.5		1.2	0.9	
	WINDOW1	0.5	1		1.2	0.6	
						3.18 Sq.m	
				Total quantity =		**46.26 Sq.m**	
9	**Smooth plaster outside**						
	the room in c.m (1:3)						
	ROOM	2	6.7		3	40.2	
		2	2.45		3	14.7	

						54.9	**Sq.m**
	Deduction for door						
	and window						
	DOOR	0.5	0.9		2.1	0.945	
	DOOR1	0.5	0.7		2.1	0.735	
	WINDOW	0.5	1.5		1.2	0.9	
	WINDOW1	0.5	1		1.2	0.6	
						3.18	Sq.m
				Total quantity =		**51.72**	**Sq.m**
10	**Painting inside the room**						
	ROOM	2	5.64		3	33.84	
		2	2.6		3	15.6	
						49.44	**Sq.m**
	Deduction for door						
	and window						
	DOOR	0.5	0.9		2.1	0.945	
	DOOR1	0.5	0.7		2.1	0.735	
	WINDOW	0.5	1.5		1.2	0.9	
	WINDOW1	0.5	1		1.2	0.6	
						3.18	Sq.m
				Total quantity =		**46.26**	**Sq.m**
11	**Painting outside the room**						
	ROOM	2	6.7		3	40.2	
		2	2.45		3	14.7	
						54.9	**Sq.m**
	Deduction for door						
	and window						
	DOOR	0.5	0.9		2.1	0.945	
	DOOR1	0.5	0.7		2.1	0.735	
	WINDOW	0.5	1.5		1.2	0.9	
	WINDOW1	0.5	1		1.2	0.6	
						3.18	Sq.m
				Total quantity =		**51.72**	**Sq.m**
13	**WINDOWS**	1	1.5		1.2	1.8	Sq.m
		1	1		1.2	1.2	Sq.m
				Total quantity =		**3**	**Sq.m**

Abstract sheet for Internet café

Table No 29 abstract sheet internet café

SR NO	PATICULARS OF ITEM	QUANTITY	PER	RATE	AMOUNT Rs.
1	Excavation in foundation	27.945	Cu. m	180	5030.1
2	plain cement concrete in	4.941	Cu. m	4300	21246.3
	Foundation				
3	Brick work in foundation	15.056	Cu. m	3500	52696
4	brick work in super structure	12.654	Cu. m	3800	48085.2
5	R.C.C work in slab,chajja.and lintel	4.063	Cu. m	6300	25596.9
6	2 cm marble flooring	14.664	Sq.m	700	10264.8
7	Earth filling in plinth	7.038	Cu. m	50	351.9
8	Smooth plaster inside th room in	46.26	Sq.m	260	12027.6
	c.m(1:3)				
9	Smmoth plaster outside the room	51.72	Sq.m	350	18102
	in c.m(1:3)				
10	Painting in inside	46.26	Sq.m	230	10639.8
11	Painting in outside	51.72	Sq.m	320	16550.4
12	Switchboard and Wiring of Electricity	4	nos.	450	1800
13	CCTV Camera	1	nos.	7999	7999
14	Door	1	nos.	3800	3800
15	Windows	3	Sq.m	320	960
				Rs.	**235150**
		ADD 5% contingencies		**R**	**11757**
		s.			
			Total Rs.		**246907**
			Total Rs. Say =		**247000**

8.1.6 Chabutro:-

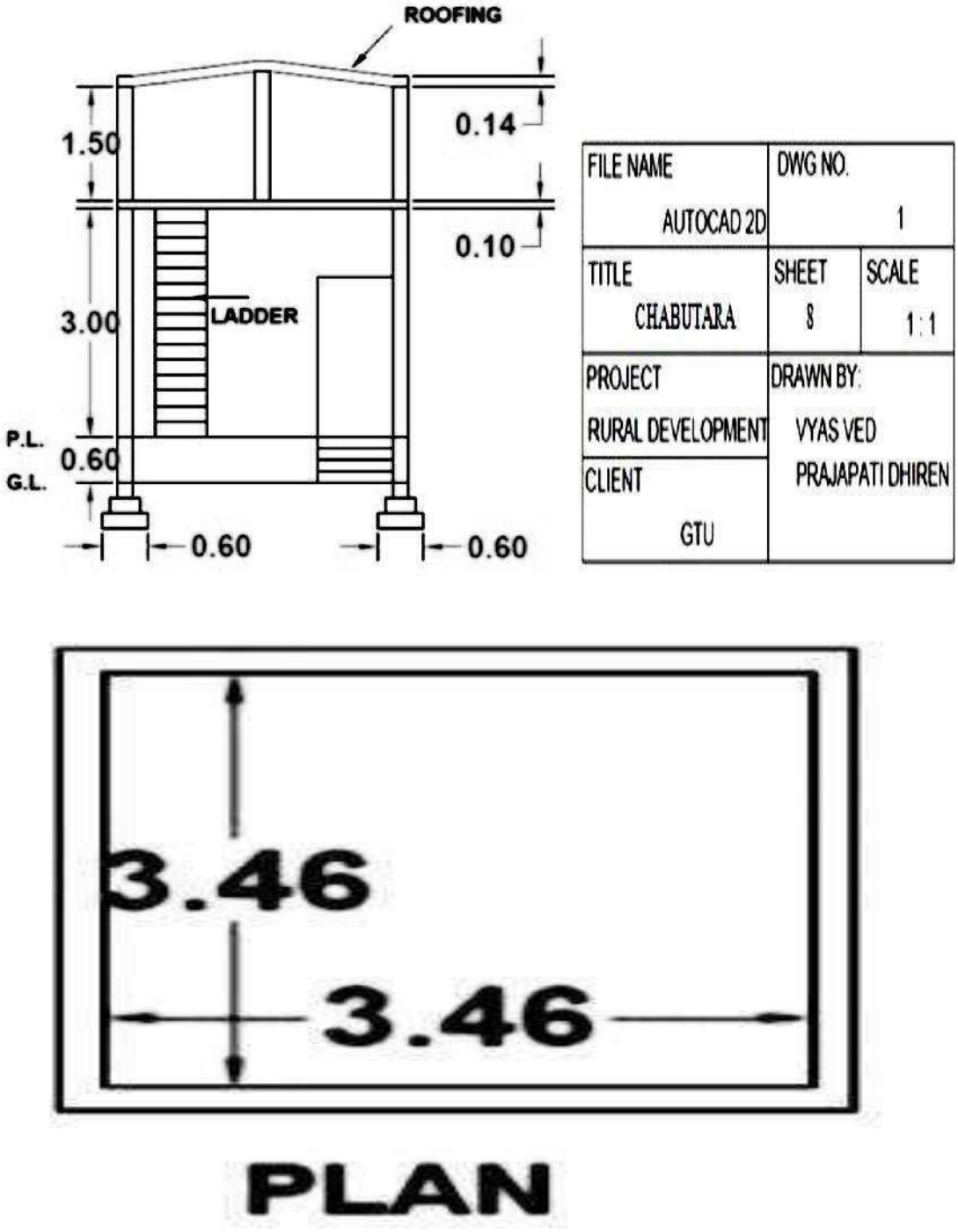


Figure no 49 Chabutro

Measurement sheet for Chabutro

Figure No 30 Measurement sheet Chabutro

Sr no	Item Description	Length(m)	Width(m)	Height(m)	Quantity (cu. m)	Total Quantity
1	Excavation for foundation in Soft ordinary soil. Total length =13.2 m	13.2	0.9	1.1		13.068
2	Providing and laying Foundation concrete (P.C.C.) (1:4:8) at Foundation.	13.2	0.9	0.3		3.564
3	Providing and laying Brick masonry at foundation up to G.L.					
3.1	1st footing Total length=13.2 m	13.2	0.6	0.3	2.367	7.911 cu.m.
3.2	2nd footing Total length=1.2 m	13.2	0.5	0.2	1.32	
3.3	3rd footing (up to G.L.)Total length= 13.2 m	13.2	0.4	0.3	1.584	
3.4	Brick masonry up to P.L.	13.2	0.4	0.5	2.64	
4	Providing refilling of the ordinary soil	Refilling = Total Excavation – (P.C.C. + Brick masonry of 1st – 3rd footing + Brick masonry upto G.L.)				
	in foundation trenches.	= 4.237 cu. m.				
5	Providing and refilling of the Yellow soil up to the Plinth level.	Refilling = 4.5 cu. m.				

	the Plinth level.						
6	Providing and laying Brick masonry up to bottom of the Slab. Total length = 13.2 m	1	13.2	0.3	3	11.88	11.88
	Deduction Door	1	0.8	0.3	2.1	0.504	0.504
	Brick masonary 1st slab to 2nd slab	5	0.3	0.3	1.5	0.675	0.675
						Total brickwork = 12.042 cu. m.	
7	Providing and Laying R.C.C. (1:2:4) work for 1st slab	1	3	3	0.15	1.35	1.35
	Providing and Laying R.C.C. (1:2:4) work for 2nd slab	1	3.48	3.482	0.15	1.81	1.81
	R.C.C. Chajja (1:2:4) D	1	0.95	0.6	0.15	0.086	0.086
	Total R.C.C. (1:2:4) Work = 3.246 cu. m.						
9	Plaster						
9.1	inside plaster Total length =	5	3	3	-	45	45 Sq. m.
	Deduction D	1	0.8	-	2.1	0.252	0.252sq. m.
						Total outside plaster = 45.252 sq. m.	
9.2	outside plaster up to 1st slab	4	3.65	-	3	43.8	43.8sq. m.
	Plaster for brick masonary column up to 1st to 2d slab	5	0.3		1.5	2.25	2.25sq. m.
	Deduction D	1	0.8	-	2.1	0.252	0.252Sq. m.
						Total inside plaster = 45.79 sq. m.	
10	Flooring		3	3	-	9	9 sq.m.

ABSTRACT SHEET (CHABUTARA)

Table No 31 Abstract sheet chabutro

Sr. No.	Particulars	Total Qty.	Rate	Per	Amount
1	Excavation for foundation in soft ordinary soil.	13.068	90	M^3	1123.84
2	Providing and laying Foundation concrete (P.C.C.) (1:4:8) at foundation.	3.564	3000	M^3	10692
3	Providing and laying Brick masonry at foundation and plinth.	7.911	900	M^3	7119.9
4	Providing refilling of the ordinary soil in foundation trenches.	4.23	110	M_3	452.31
5	Providing and refilling of the Yellow soil at Plinth level.	4.5	212	M^3	953.01
6	Providing and laying Brick masonry upto bottom of the slab	12.051	3600	M^3	42540
7	Providing and Laying R.C.C. (1:2:4) work	3.24	9000	M^3	28512
8	Providing 12 mm thick cement plaster in C.M. (1:4)	91.042	150	M^2	11835
9	Providing and fixing tile flooring	9	700	M^2	5400
			Total cost in Rupees = 108628.06		

Contractor profit 10 % + Contingency charges

= 108628+13034= 121663 Rs

Total Cost = 121663 Rs

8.2 Reason for student recommending this Design:-

- In this village not have pure water for domestic purpose of people so we are decide to design the solar water purification plant as sustainable design.
- Also a public library is design for village , so students can study easy.
- Also a public garden should be maintain in proper manner with cleanliness so we are decide to design a public garden.
- There are not a good medical shop in village. If people need medicine than they will go nearer town which is 12km away from village, we decide to design a medical shop.
- There are not a internet café where people use high speed internet service. Sometime any useful online application fill up should good internet speed than internet café is use.
- There is no any type of heritage like statue, gate and chabutra etc. so we are decide to design a chabutra.

8.3 About design suggestion / Benefit of the villagers

- People have not a good quality water. So we give design of solar water purification plant so that people can used a pure water.
- People got bore so we give the design of public garden. There people get relax.
- People have problem in online proceed, so we design the internet café.
- For student they should go to city library for reading book , so we design the public library.
- In village , for some medicine people should go to city , so we give the design of medical shop.
- In this village, chabutra is not available. So, we give design of chabutra as heritage design. As heritage point of view village make beautiful and birds have a safe space.

Chapter 9: Proposing designs for Future Development of the Village for the PART-2 Design

- After completion of visit & data collection of Makhiyala village, we have given some designs which were to be provided under this project.
- Future scope would be study over other different urban amenities that would be sustained in rural areas of Saurashtra.
- For future development of the Makhiyal village, we are proposing for PART 2 design, in which following points should be considered,
  1. Sustainable design: Animal shelter
  2. Physical design: party plot
  3. Social design: Hospital
  4. Smart village design: super market
  5. Heritage village design: statue of peace

- These are the proposed designs for the future development of Makhiyala village for Vishwakarma Yojana phase VIII, PART 2 design.
- The study is aimed to know the basic scenario of village through techno economic survey and gap analysis done.
- Through our study we will try to make a master development plan of the village. Our development plan might be including provisions of all the facilities suggest by us, and then we focus on the improvement in the existing facilities.

Chapter 10: Conclusion of the Entire village Activities of the project

From the above study and the visits conducted in the villages it is concluded that the villages needs advancement and up gradation like smart village with all the basic and advanced facilities.

In this process of ideal village the attempt has been made by giving design proposals of the Chabutro, Solar water purification, public garden, public library, medical shop, internet café.

All the civil engineering concept are effectively used and described in the above study. to complete the design process properly the data collection is also important part which was done by considering census-2011 reports and journals and magazines, techno economic survey, self-survey of the village, interaction with villagers.

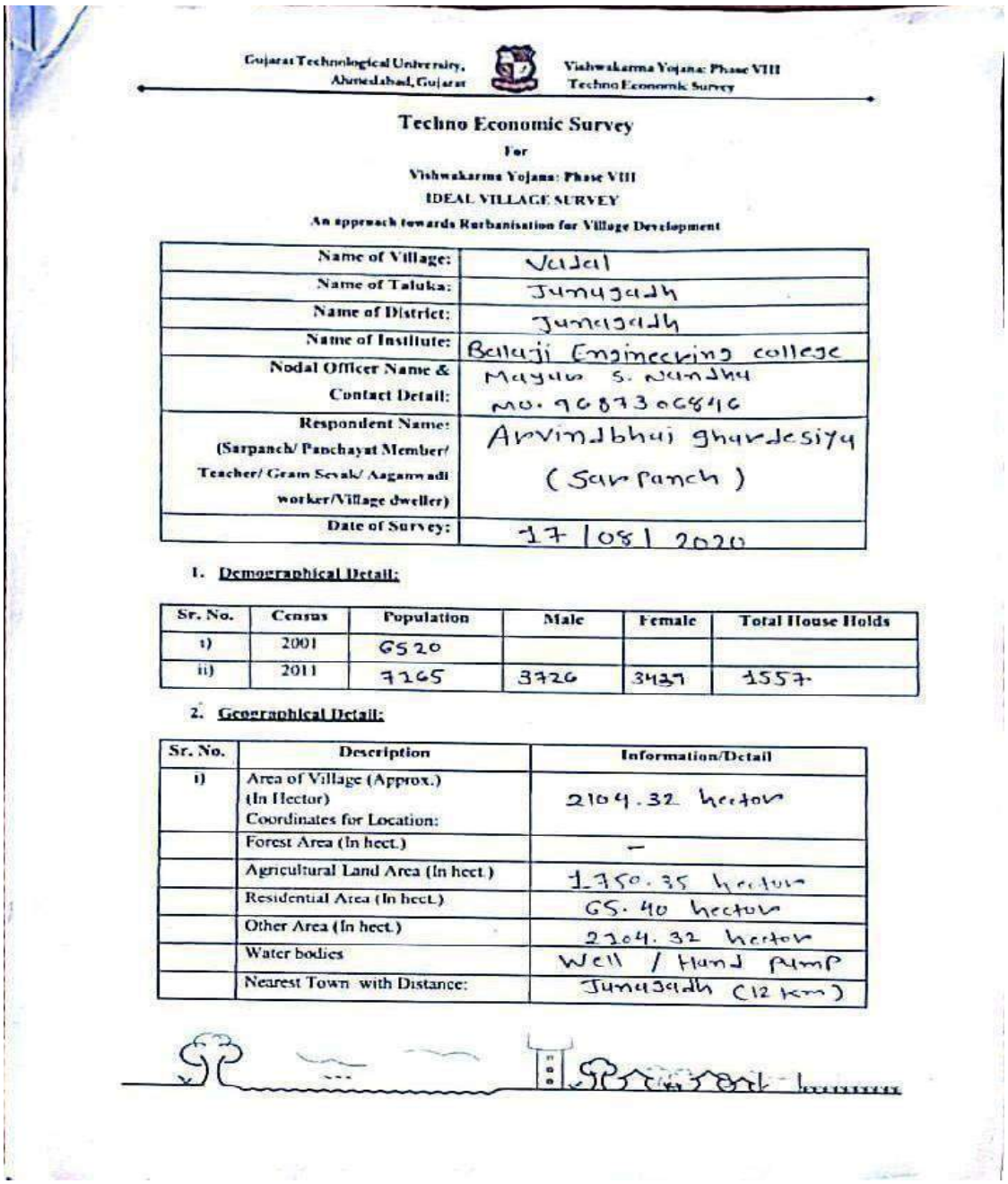
All the design prototypes and measurement sheets are included in the report for the better understanding of the design concepts..

Chapter 11: References

- S.O.R. of Junagadh 2019-20
- Census of India
- GPCB(Gujarat pollution control board)
- B.N Dutta – Estimation and costing in civil Engineering Theory
- JUDA(Junagadh urban development authority)
- Google maps
- IS 456: 2000 (Reinforced concrete structure)
- IS 875:1987 (Load calculation for slab)
- SP 16 (design of steel as per IS 456)
- IS 962:1989 (Code of Practice for Architectural and Building Drawings)
- National institute of urban affairs(WWW.niug.org)
- www.censusindia.gov.in
- www.rural.nic.in
- www.mdws.nic.in (ministry of drinking water and sanitation government of India)
- www.gujaratgov.in
- www.vyojana.gtu.ac.in
- www.wikipedia.com
- www.villageinfo.in
- www.researchgate.net

Chapter 12: Annexure attachment

12.1 survey form of ideal village scanned copy attachment in the report for Part



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

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	Vejdi
Name of Taluka:	Junagadh
Name of District:	Junagadh
Name of Institute:	Balaji Engineering college
Nodal Officer Name & Contact Detail:	Mayur S. Nandhu M0. 9687306816
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aagamwadi worker/Village dweller)	Arvindbhai ghardesiya (Sarpanch)
Date of Survey:	17/08/2020

1. Demographical Detail:

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	6520			
ii)	2011	7265	3726	3439	1557

2. Geographical Detail:

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	2104.32 hector
	Forest Area (In hect.)	-
	Agricultural Land Area (In hect.)	1750.35 hector
	Residential Area (In hect.)	65.40 hector
	Other Area (In hect.)	2104.32 hector
	Water bodies	Well / Hand pump
	Nearest Town with Distance:	Junagadh (12 km)

1

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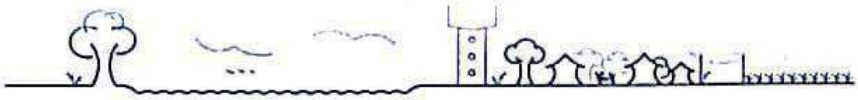
3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1.	Farming
	2.	Industrial
	3.	Education

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	yes	✓		
	• RO Water	NO			
	• Well (Covered/ Uncovered)	yes (Uncovered)	✓		
	• Hand pumps	yes	✓		
	• Tube well/ Borehole	yes	✓		
	• River/ Canal/ Spring/ Lake/ Pond	spring	✓		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	✓		1,00,000 lit
	Underground Sump	Capacity:	✓		2,00,000 lit
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	yes	✓		
Suggestions if any					
D.	**Type of Drainage**				
	Closed/ Open	Both	✓		
	If Open than Pucca / Kutchcha	Pucca	✓		
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	waters bodies	✓		
Suggestions if any:					



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E.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	Yes	✓		RCC & Block
	Main road	Yes	✓		RCC
	Internal streets	Yes	✓		Block
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH.	✓		
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Yes	✓		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes (Good)	✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Yes	✓		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs / More Than 6 hrs)	Yes	✓		Pvt. L (24 hr.)
	Power supply for Domestic Use	Yes	✓		24 hr. (Single)
	Power supply for Agricultural Use	Yes	✓		8 hr.
	Power supply for Commercial Use	Yes	✓		24 hr.
	Road/ Street Lights	Yes	✓		

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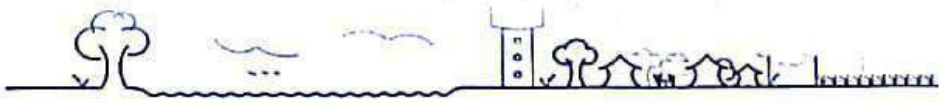
	Electrification in Government Building/ Schools/ Hospitals	Yes	✓		24 hr.
	Renewable Energy Source Facilities (Y/ N)	No		X	
	LED Facilities	Yes	✓		
Suggestions if any:					
II.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes	✓		
	Location Condition	centre Good			
	Community Toilet (With bath/ without bath facilities)	Yes (without bath)	✓		
	Solid & liquid waste Disposal system available	No			
	Any facility for Waste collection from road	No			
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	Yes (Tube well)	✓		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Both	✓		80% Pucca 20% Kutchha

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks



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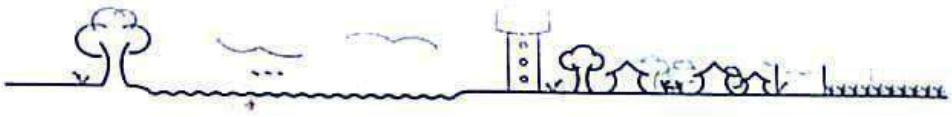
K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	Yes (PHC) Good	✓		
	Private Clinic/Private Hospital/ Nursing Home	Yes	✓		
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
L.	**Education Facilities:**				
	Aaganwadi/ Play group	Yes	✓		
	Primary School	Yes	✓		
	Secondary school	Yes	✓		
	Higher sec. School	Yes	✓		
	ITI college/ vocational Training Center	NO			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	NO			
	If any of the above Facility is not available in village than approx. distance from village: ...31..kms.(Junagadh)				
Suggestions if any:					
M.	**Socio- Culture Facilities**				
	Community Hall (With or without TV) Location:	Yes (without TV)	✓		



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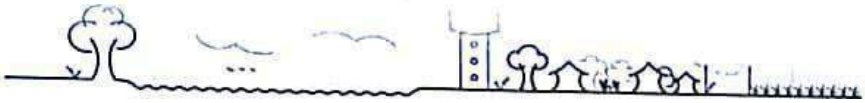
	Condition:	well			
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	No			
	Public Garden Location: Condition:	No			
	Village Pond Location: Condition:	No			
	Recreation Center Location: Condition:	No			
	Cinema/ Video Hall Location: Condition:	No			
	Assembly Polling Station Location: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



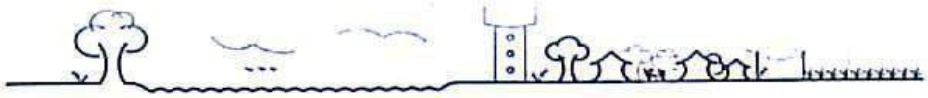
	General Market	NO			
	Shops (Public Distribution System)	Yes	✓		
	Panchayat Building	Yes	✓		
	Pharmacy/Medical Shop	Yes	✓		
	Bank & ATM Facility	Yes	✓		
	Agriculture Co-operative Society	NO			
	Milk Co-operative Soc.	Yes	✓		
	Small Scale Industries	Yes	✓		
	Internet Cafes/ Common Service Center/Wi Fi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

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	Yes Hard copy



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Vishwakarma Yojana: Phase VI Techno Economic Survey

Recent Projects going on for Development of Village	Yes
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)	No	
2.	Additional Information/ Requirement Road		
	Drainage		
	water		

9. Smart Village Proposal Design

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Wifi / Treatment plant/ Library		

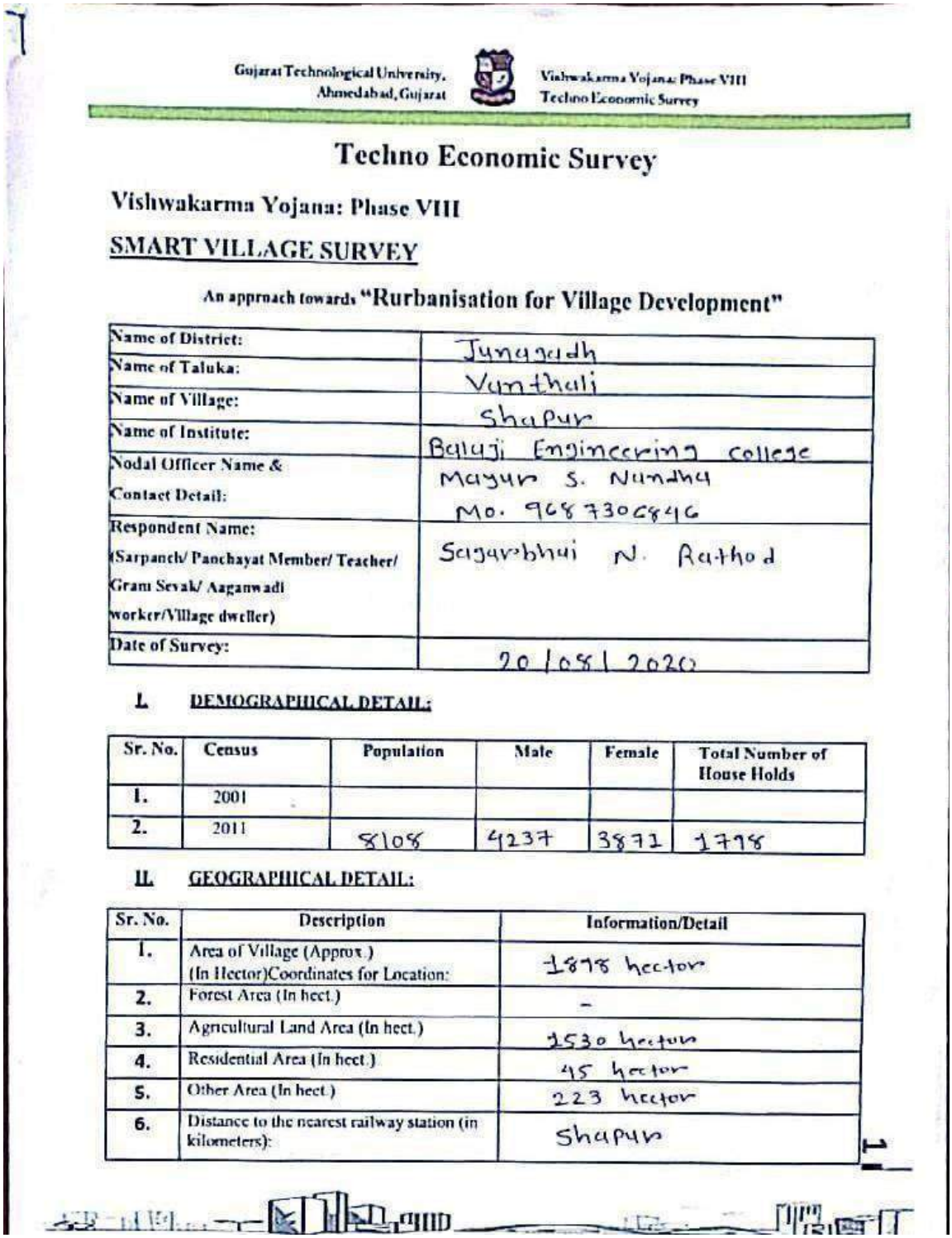
Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

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

તલાટી-મંત્રી
ગ્રામ પંચાયત-મખીયાળા

A Ghodasara
સરપંચ
ગ્રામ પંચાયત મખીયાળા

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



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

Name of District:	Junagadh
Name of Taluka:	Vanthali
Name of Village:	Shapur
Name of Institute:	Balaji Engineering College
Nodal Officer Name & Contact Detail:	Mayur S. Nundha Mo. 9687306846
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sagarbhai N. Rathod
Date of Survey:	20/08/2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	8108	4237	3871	1798

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1878 hector
2.	Forest Area (In hect.)	-
3.	Agricultural Land Area (In hect.)	1530 hector
4.	Residential Area (In hect.)	45 hector
5.	Other Area (In hect.)	223 hector
6.	Distance to the nearest railway station (in kilometers):	Shapur

7.	Name of Nearest Town with Distance:	Junagadh (13km.)
8.	Distance to the nearest bus station (in kilometers):	Junagadh (13km.)
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Farming
	2.	Industrial
	3.	Private Bussiness

Major crops grown in the village:	1.	Bajayati
	2.	Pinuts
	3.	cotton

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	✓		Tube well & Bore well
2.	**DUG WELL**				
	Protected Well	Yes	✓		
	Un Protected Well				
3.	**WATER FROM SPRING**				
	Protected Spring	Yes	✓		
	Unprotected Spring				
	Rainwater	Yes	✓		
	Tanker Truck				
	Cart With Small Tank				
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/**				
	Irrigation Channel				
	Bottled Water				
	Hand Pump	Yes	✓		Hand Pump
	Other(Specify)**Lake/ Pond**				

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	Yes		5,00,000 lit.
	Underground Sump	Capacity:	Yes		4,00,000 lit
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	Yes Yes	✓ ✓		
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Yes	✓		
	Main road	No		X	
	Internal streets	Yes	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	Yes	✓		
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Yes	✓		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes	✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Yes	✓		
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs / More Than 6 hrs)	Govt. (Yes)	✓		more than 6 hrs.

3

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
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	Power supply for Domestic Use	24 hr.	✓		
	Power supply for Agricultural Use	8 hr.	✓		
	Power supply for Commercial Use	24 hr.	✓		
	Road/ Street Lights	Yes	✓		
	Electrification in Government Buildings/ Schools/ Hospitals	Yes	✓		
	Renewable Energy Source Facilities (Y/ N)	Yes	✓		
	LED Facilities	Yes	✓		
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes	✓		
	Location Condition	Good			
	Community Toilet (With bath/ without bath facilities)	Yes (without bath)	✓		
	Solid & liquid waste Disposal system available	No		X	
	Any facility for Waste collection from road	No		X	
Suggestions if any:					
II.	**Main Source of Irrigation Facility:**				
	TANK/POND	Yes	✓		
	STREAM/RIVER	No		X	
	CANAL	No		X	
	WELL	Yes	✓		
	TUBE WELL	Yes	✓		
	OTHER (SPECIFY)	-	-	-	
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	90% Pucca 10% Kutcha	✓		

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	Yes	✓		
	Sub-Centre	No		×	
	PHC	Yes	✓		
	BLOCK PHC	No		×	
	CHC/RH	No		×	
	District/ Govt. Hospital	Yes	✓		
	Govt. Dispensary	Yes	✓		
	Private Clinic	No			
	Private Hospital/	Yes	✓		
	Nursing Home	No		×	
	AYUSH Health Facility	No		×	
	Sonography /ultrasound facility	No		×	
	If any of the above Facility is not available in village than approx. distance from Vamthali village: ...5....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	Yes	✓		
	Primary School	Yes	✓		
	Secondary school	Yes	✓		
	Higher sec. School	Yes	✓		
	ITI college/ vocational Training Center	No			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	No			
	If any of the above Facility is not available in village than approx. distance from Vamthali village: ...5....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	Centre	Yes	
	Public Library (With daily newspaper supply: Y/N)				No
	Public Garden				No
	Village Pond				No
	Recreation Center				No
	Cinema/ Video Hall				No
	Assembly Polling Station	Good	School	Yes	
	Birth & Death Registration	Good	Panchyat building	Yes	

If any of the above Facility is not available in village than approx. distance from village: ....5....kms. Vumbhali

Suggestions if any:

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

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

Suggestions if any:

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

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Renewable energy	Yes		
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	Yes Yes 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	Under ground drainage			
3.	Any NGO working for village development	Yes	✓		
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)	No			

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	૧૫૦	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING .....૩૦..... FOGGING.....૩૨..... Drive was undertaken in the village?		

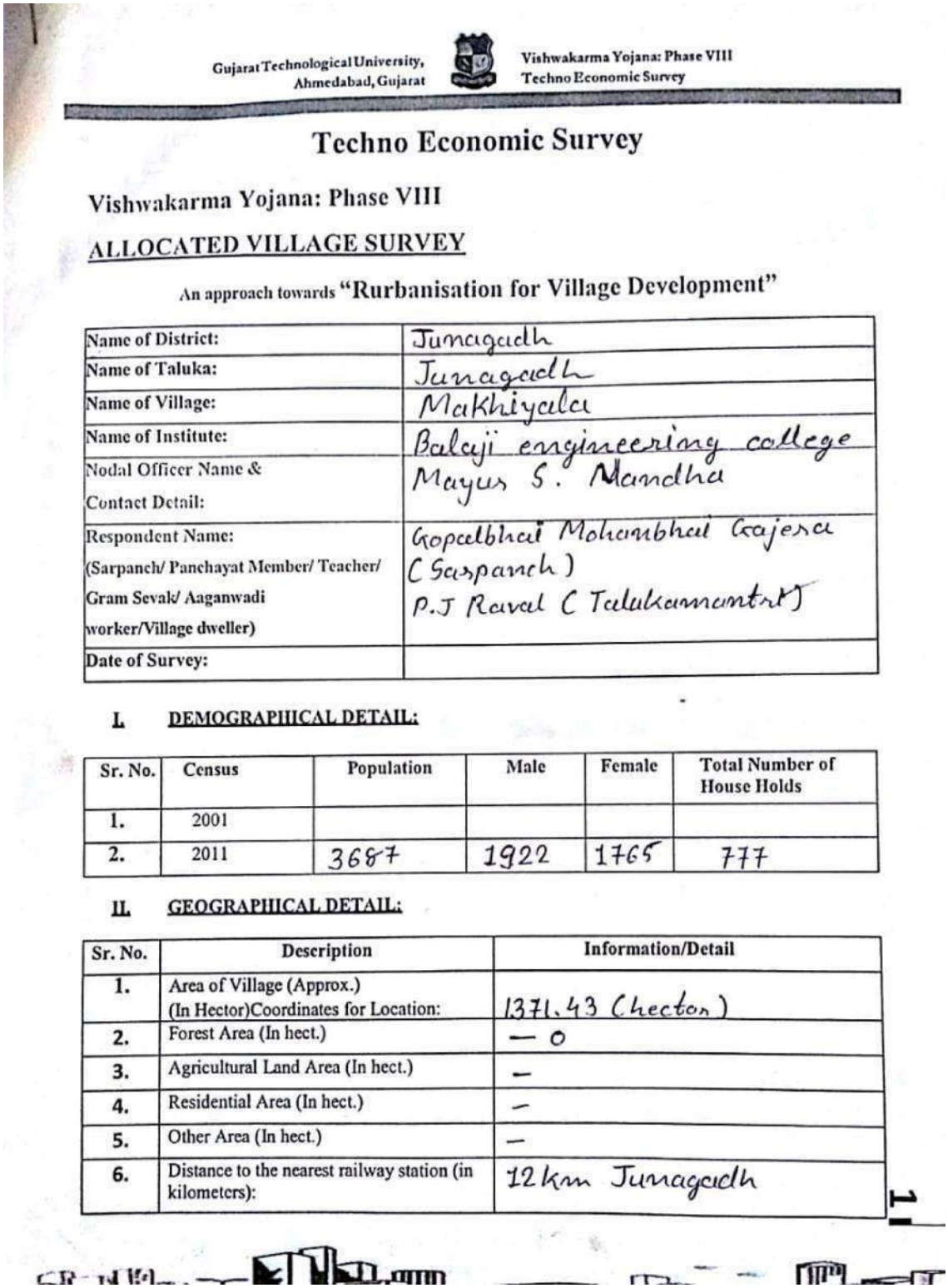
IX. Smart Village / Heritage Details

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

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

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

12.3 Survey from of Allocated Village Scanned copy attachment in the report for Pert-I



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Techno Economic Survey

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Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

Name of District:	Junagadh
Name of Taluka:	Junagadh
Name of Village:	Makhiyala
Name of Institute:	Balaji engineering college
Nodal Officer Name & Contact Detail:	Mayur S. Mandha
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Gopalbhai Mohanbhai Gajera (Sarpanch) P.J Raval (Talukamantri)
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	3687	1922	1765	777

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1371.43 (Hector)
2.	Forest Area (In hect.)	— 0
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):	12 km Junagadh

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7.	Name of Nearest Town with Distance:	Vadal (5km)
8.	Distance to the nearest bus station (in kilometers):	In Village
9.	Whether village is connected to all road for the any facility or town or City?	yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. farming 2. labour Work 3. Buisness

Major crops grown in the village:	1. Peanut 2. Cotton 3. Tuwear

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	✓		Tube well Bore well
2.	**DUG WELL** Protected Well Un Protected Well	yes	✓		
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring	yes	✓		
	Rainwater Tanker Truck Cart With Small Tank				
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump	yes	✓		hand pump

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	Other(Specify)Lake/ Pond	—			
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	2		
	Underground Sump	Capacity:	1		
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	Yes			
	Main road	Junagadh - Jamnagar Road			
	Internal streets	Yes			
	Nearest NH/SH/MDR/ODR Dist. in kms.	yes			
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Junagadh (12 km)			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	In Village (Good)			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Good			
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Majevadi			

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	Power supply for Domestic Use	yes			
	Power supply for Agricultural Use	yes			
	Power supply for Commercial Use	yes			
	Road/ Street Lights	yes			
	Electrification in Government Buildings/ Schools/ Hospitals	yes			
	Renewable Energy Source Facilities (Y/ N)	no			
	LED Facilities	yes			
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	yes			
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL OTHER (SPECIFY)	Tank & Tubewell			
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	94 % (Pucca)		6 % (Kutchha)	

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	✓			
	Sub-Centre	X			
	PHC	X			
	BLOCK PHC	X			
	CHC/RH	X			
	District/ Govt. Hospital	X			
	Govt. Dispensary	X			
	Private Clinic	✓			
	Private Hospital/	X			
	Nursing Home	X			
	AYUSH Health Facility	X			
	sonography /ultrasound facility	X			
	If any of the above Facility is not available in village than approx. distance from village: .12....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	4			
	Primary School	2			
	Secondary school	1			
	Higher sec. School	1			
	ITI college/ vocational Training Center	1			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	1			

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

Suggestions if any:

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

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	Yes			
	Telecommunication Network/ STD booth	Yes			
	General Market	Yes			
	Shops (Public Distribution System)	Yes			
	Panchayat Building	Yes			
	Pharmacy/Medical Shop	—			
	Bank & ATM Facility	Yes			
	Agriculture Co-operative Society	Yes			
	Milk Co-operative Soc.	Yes			
	Small Scale Industries	Yes			
	Internet Cafes/ Common Service Center/Wi Fi	—			
	Youth Club	—			
	Mahila Mandal	—			

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	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Districlt Bank			
	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 ✓	well		✓	
	4. Kishori Shakti Yojana ✓	well		✓	
	5. Balika Samriddhi Yojana ✓	well		✓	✗
	6. Mid-day Meal Programme ✗				✗
	7. Intergrated Child Development Scheme (ICDS) ✗				✗
	8. Mahila Mandal Protsahan Yojana (MMPY) ✗				
	9. National Food for work Programme (NFFWP) ✓	well		✓	
	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 ✓	well		✓	
	16. Employee Guarantee Scheme (EGS) ✓	well		✓	
	17. Prime Minister Rojgar Yojana (PMRY) ✓	well		✓	✗
	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) ✓	Sardar Awas Yojana			

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

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VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities,	—	
	School Building ✓	yes	
	Health Center ✓	yes	
	Panchayat Building ✓	yes	
	Public Toilets & any other ✗	No	
2.	Additional Information/ Requirement	—	
3.	During the last six months how many times CLEANING ....Yes.(15 days)..... FOGGING.....Yes.(15 days)..... Drive was undertaken in the village?	✓ ✓	

IX. Smart Village / Heritage Details

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

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

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

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12.4 Gap Analysis of the Allocated Village

VILLAGE GAP Analysis

Village Facilities	Planning Commission/UDPFI Norms	Village Name:	MAKHIYALA		
		Population:			3687
		Existing	Required as per Norms	Smart Vilage / Cities / Heritage Future Projection Design	Gap
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	1	2	1	-1
Primary School	Each Per 2500 population	2	2	0	0
Secondary School	Per 7,500 population	1	1	0	0
Higher Secondary School	Per 15,000 Population	1	1	0	0
College	Per 125,000 Population	1	1	1	1
Tech. Training Institute	Per 100000 Population	0	0	0	0
Agriculture Research Centre	Per 100000 Population	0	0	0	0
Skill Development Center	Per 100000 Population	0	0	0	0
Health Facility					
Govt/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	0	0	0	0
Primary Health & Child Health Center	Per 20,000 population	1	1	0	1
Child Welfare and Maternity Home	Per 10,000 population	0		0	0
Multispeciality Hospital	Per 100000 Population	0	0	0	0
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	1	0	-1
Physical Infrastructure Facilities					
Transportation		Adequate / Inadequate			
Pucca Village Approach Road	Each village	Adequate			Adequate
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	Adequate			Adequate
Drinking Water (Minimum 70 lpcd)		Adequate / Inadequate			
Over Head Tank	1/3 of Total Demand	Adequate			Adequate
U/G Sump	2/3 of Total Demand	Adequate			Adequate
Drainage Network – Open		Adequate			20%
Drainage Network – Cover		Adequate			80%
Waste Management System		Adequate			Adequate
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	1	1	0	0
community hall and Public Library	Per 15000 Population	0	1	1	0
Cremation Ground	Per 20,000 population	1	1	0	0
Post Office	Per 10,000 population	0	1	0	-1
Gram Panchayat Building	Each individual/group panchayat	1	1	0	0
APMC	Per 100000 Population	0	1	0	-1
Fire Station	Per 100000 Population	0	0	0	0
Public Garden	Per village	0	1	1	-1
Police post	Per 40,000Population	0	0	0	0
Shopping Mall		-			
Electrical Design					
Electricity Network		Adequate / Inadequate			
Govt. ele.	Each Village	Adequate			Adequate(24Hr.)
Any Smart Village Facility					
Technology					
CCTV Camera	-	Adequate			Adequate
WIFI	-	Adequate			Adequate

		ESR cap	**0**		
		Sump cap	**0**		
		Lat	**0**		

Table No: 32 Gap Analyses

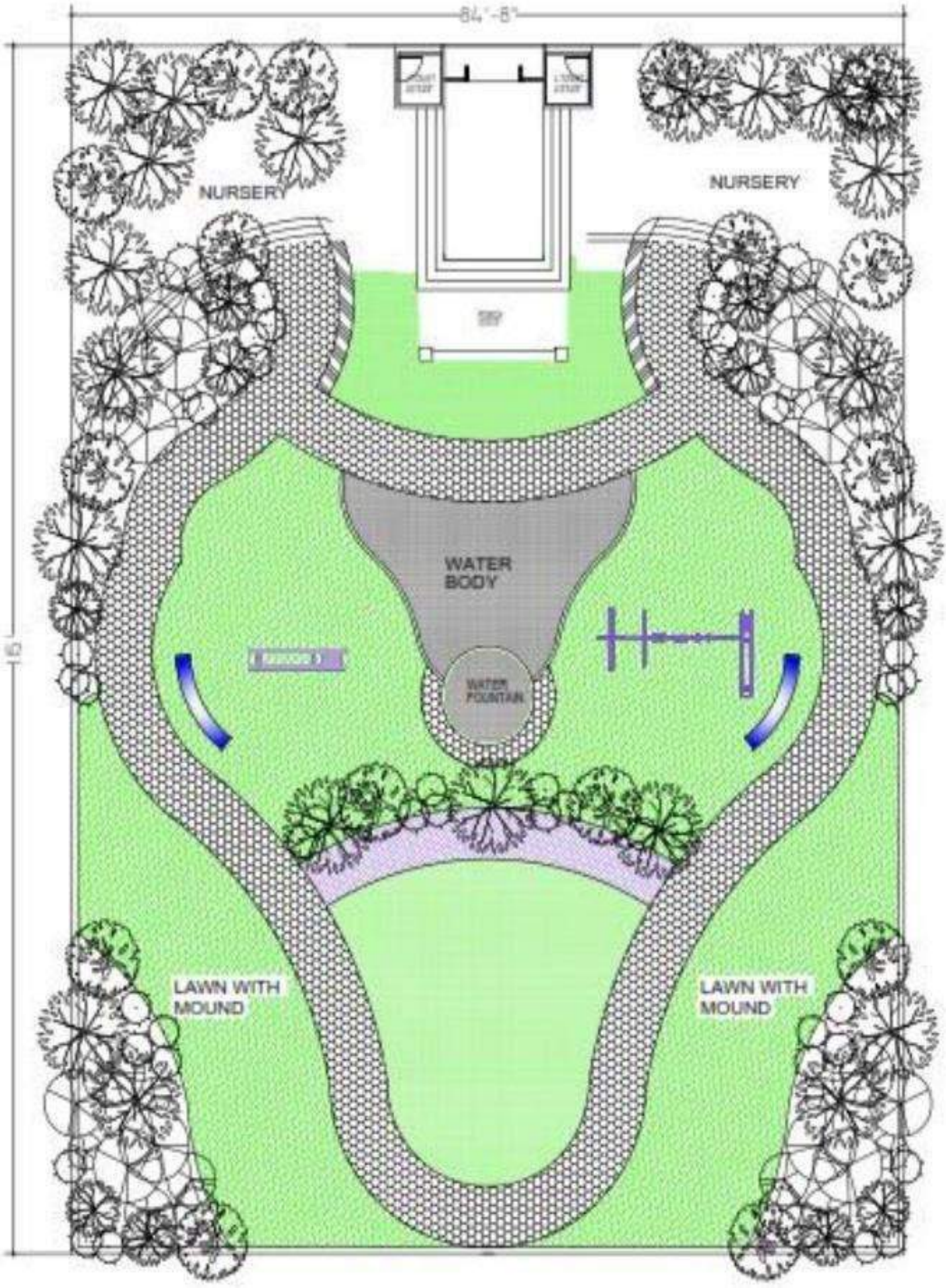
12.5 Summary Details of the Villages Designs in Table from as Part-1 and part-2

Sr. No	Village Name	Discipline	Part – 1	Part – 2
1	Makhiyala	Civil	Public Garden	Super Market
			Medical Shop	Community Hall
			Public Library	Party plot
			Solar water Purifier	Clinic Center
			Internet café	Knowledge center
			Chabutro	
2	Jalanshar	Civil	Bio Gas Plant	Aanganwadi
			Public Toilet	R. O. Water
			Bus station	Play Ground
			Community hall	Library
			Bank	Skill development Center
			Gate	
3	Shukhpur	Civil	Solid Waste Management	Post Office
			Cemetery	Bio Gas plant
			PHC	Stationary Shop
			Krushi Seva Kendra	Dispensary Shop
			Water Treatment	ATM
			Waste Water	

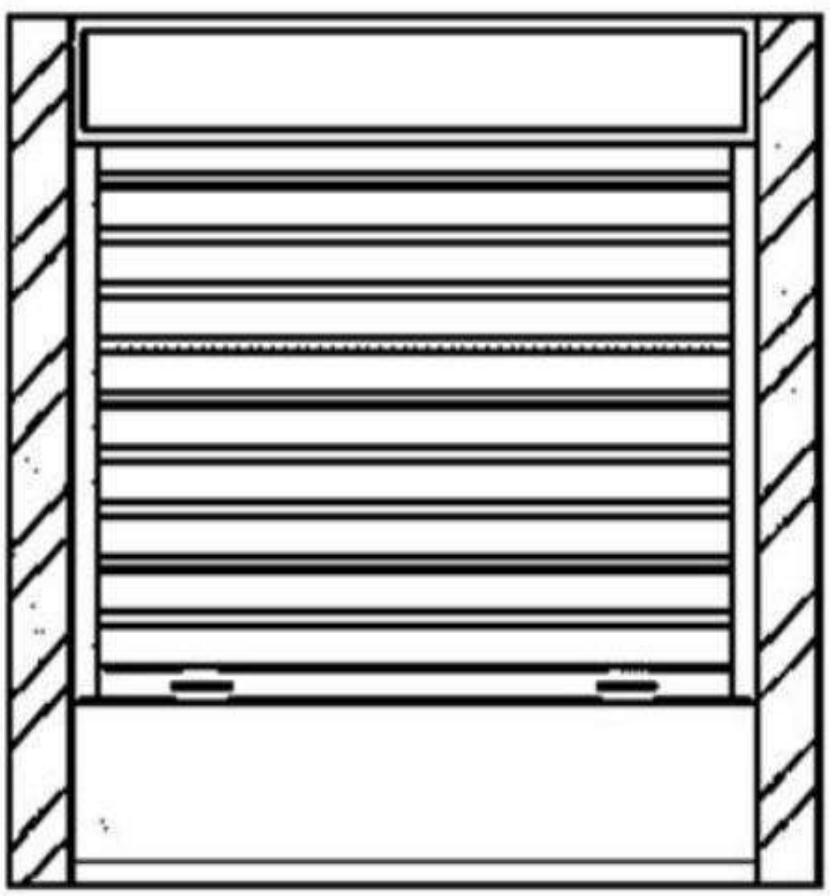
Table No: 33Summary Details

12.6 Drawing

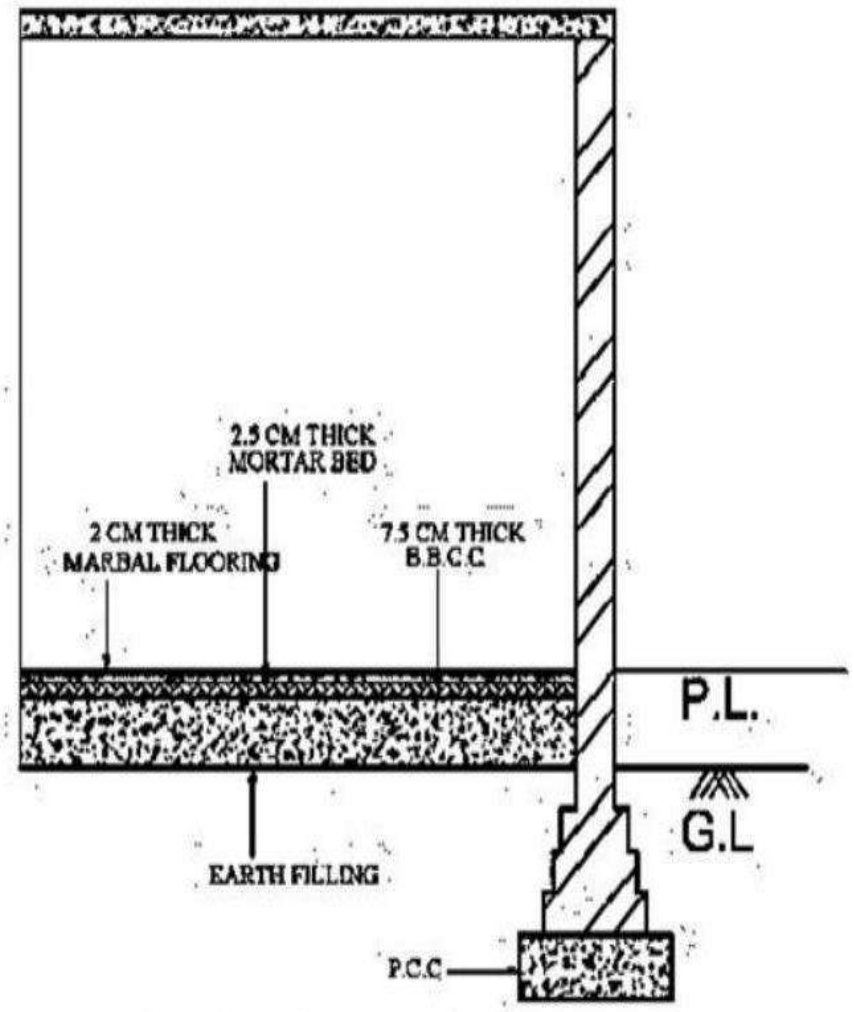
Public Garden



Medical Shop

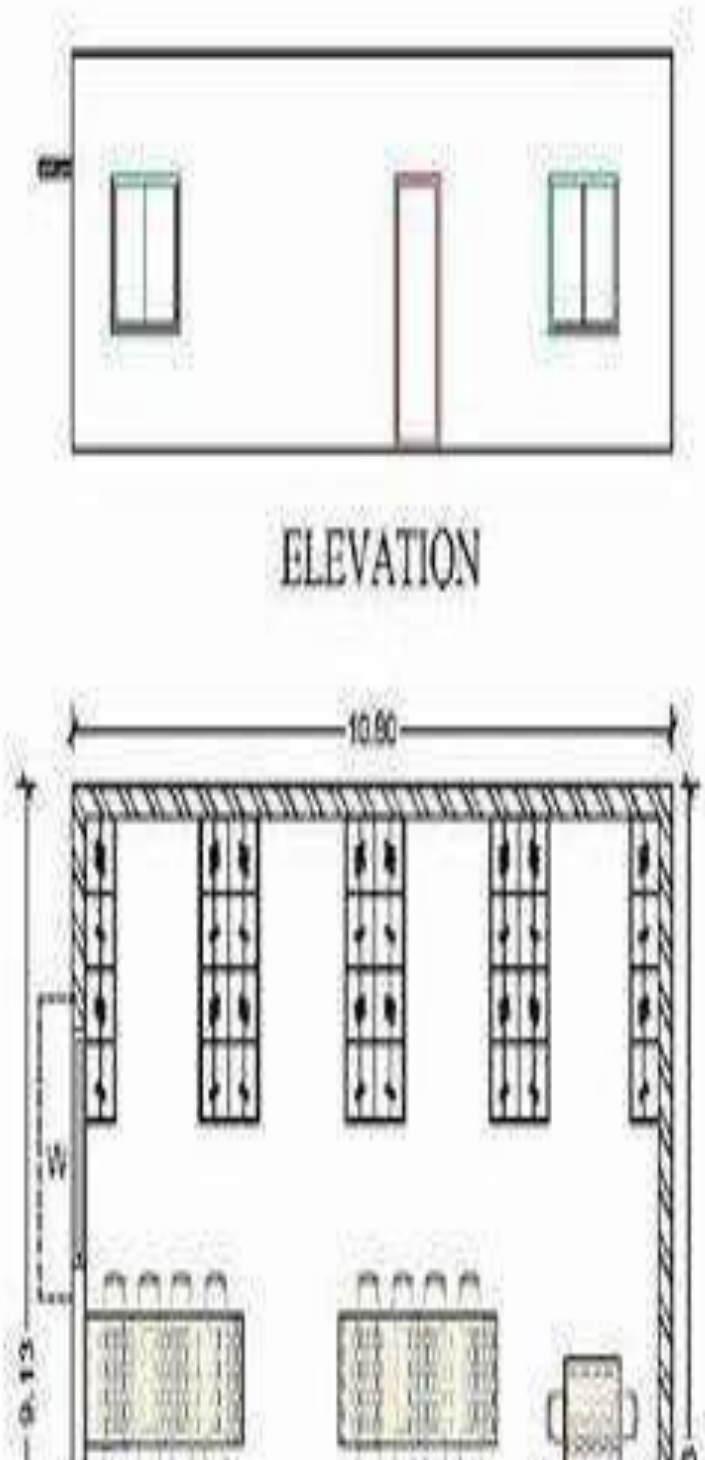


ELEVATION



SECTION A-A

Public Library



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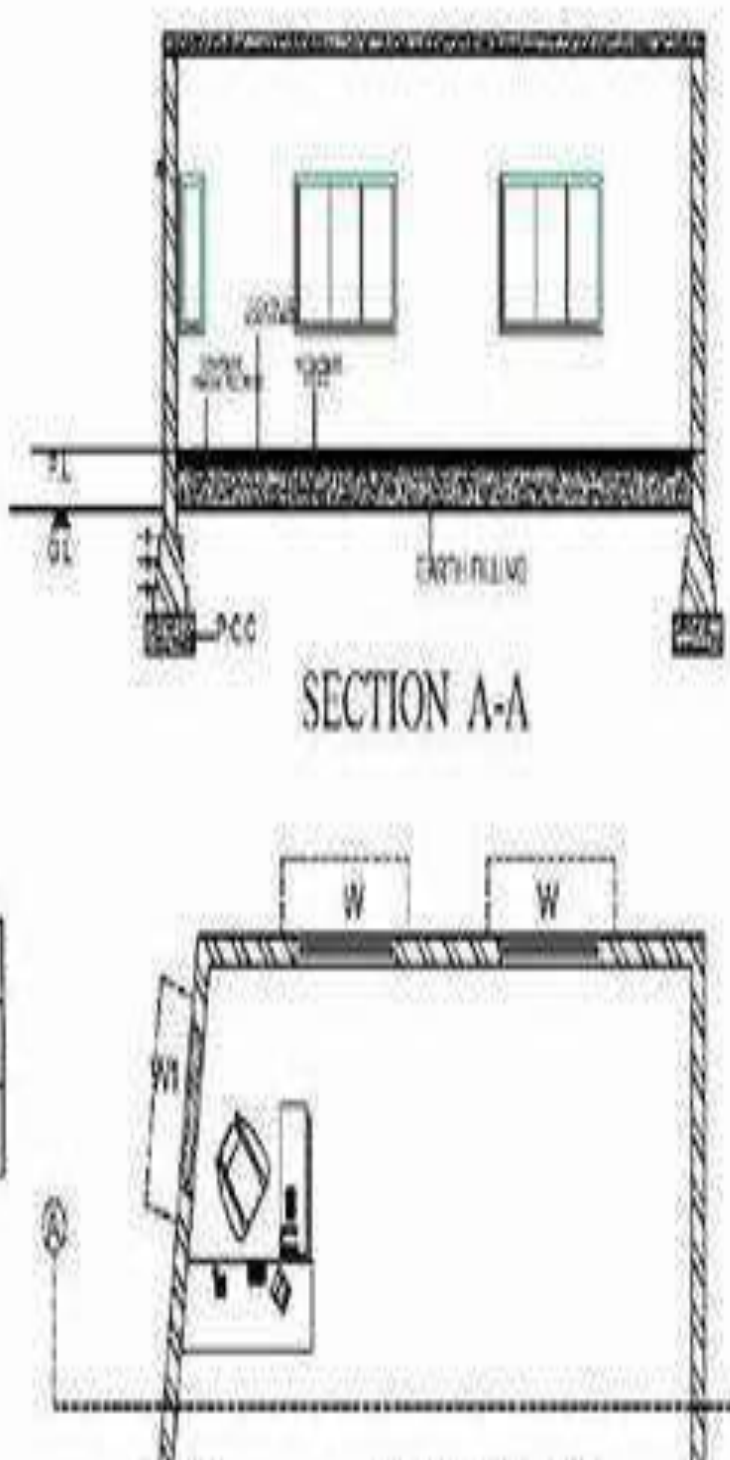
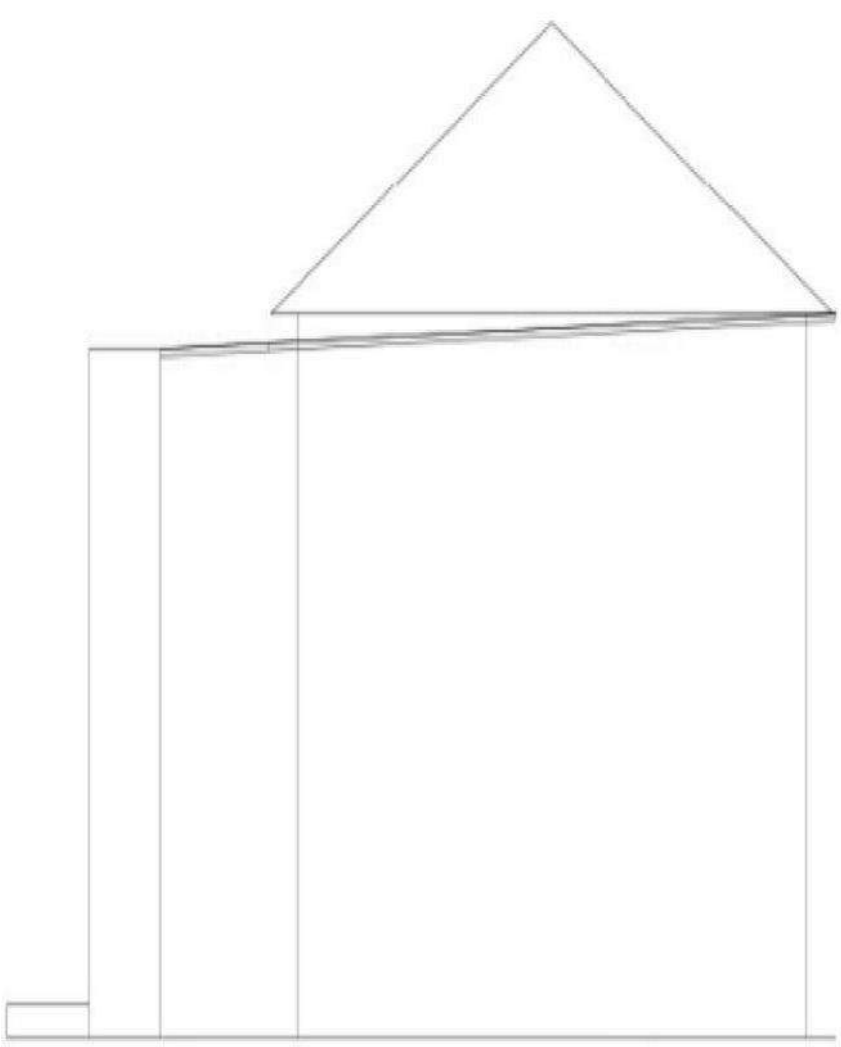
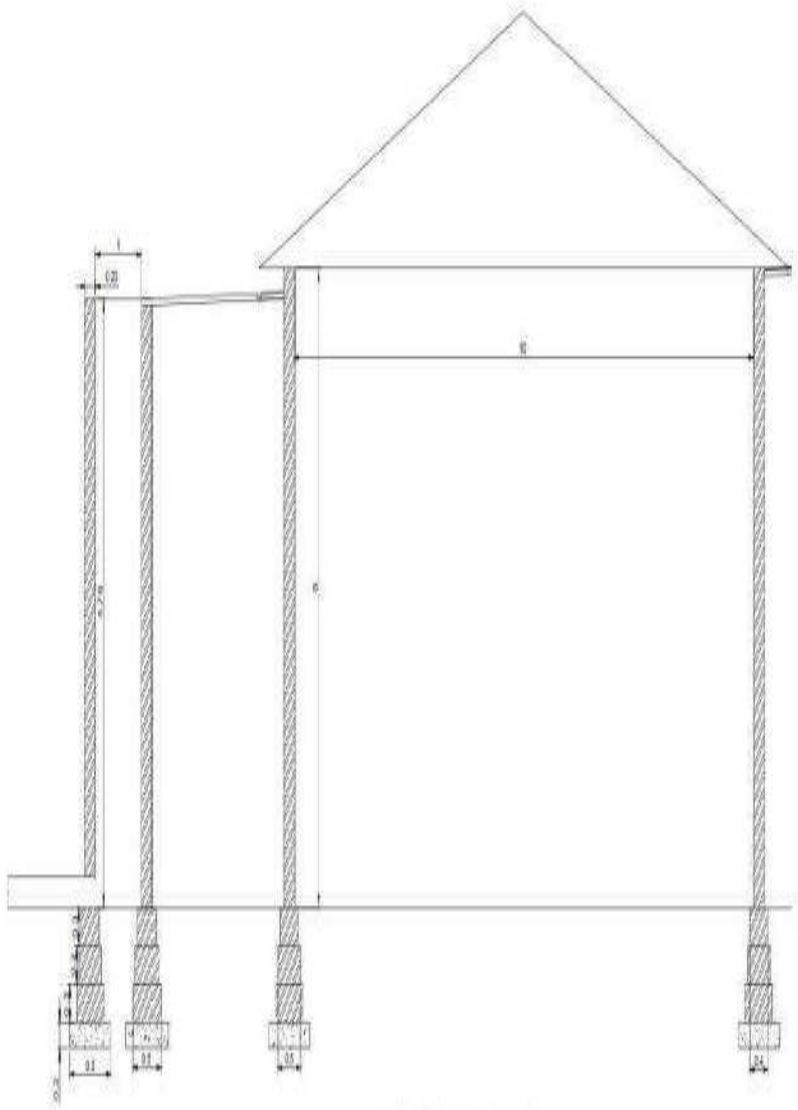
W	1.83 x 1.20
W1	1.23 x 1.20



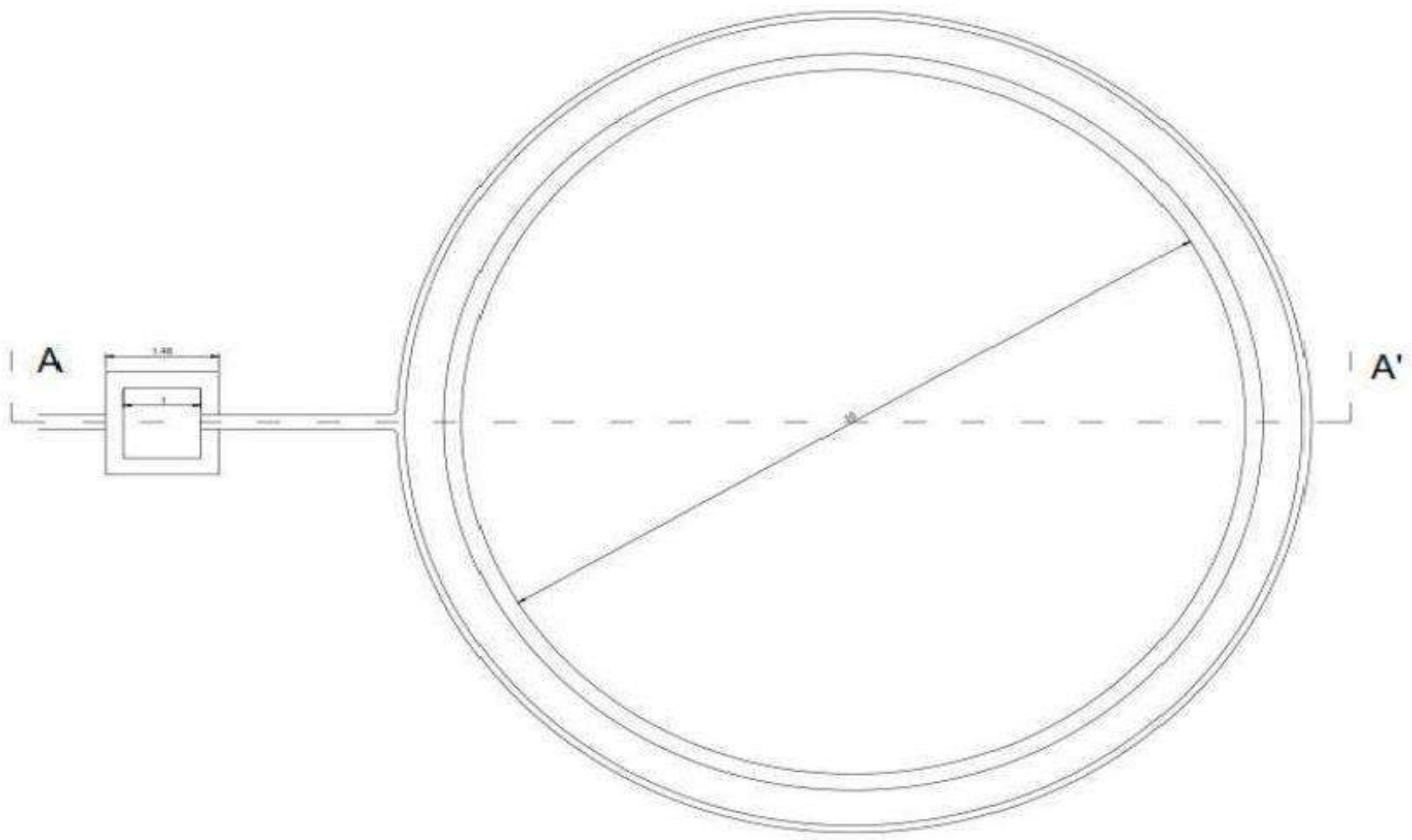
Solar water purification



Elevation

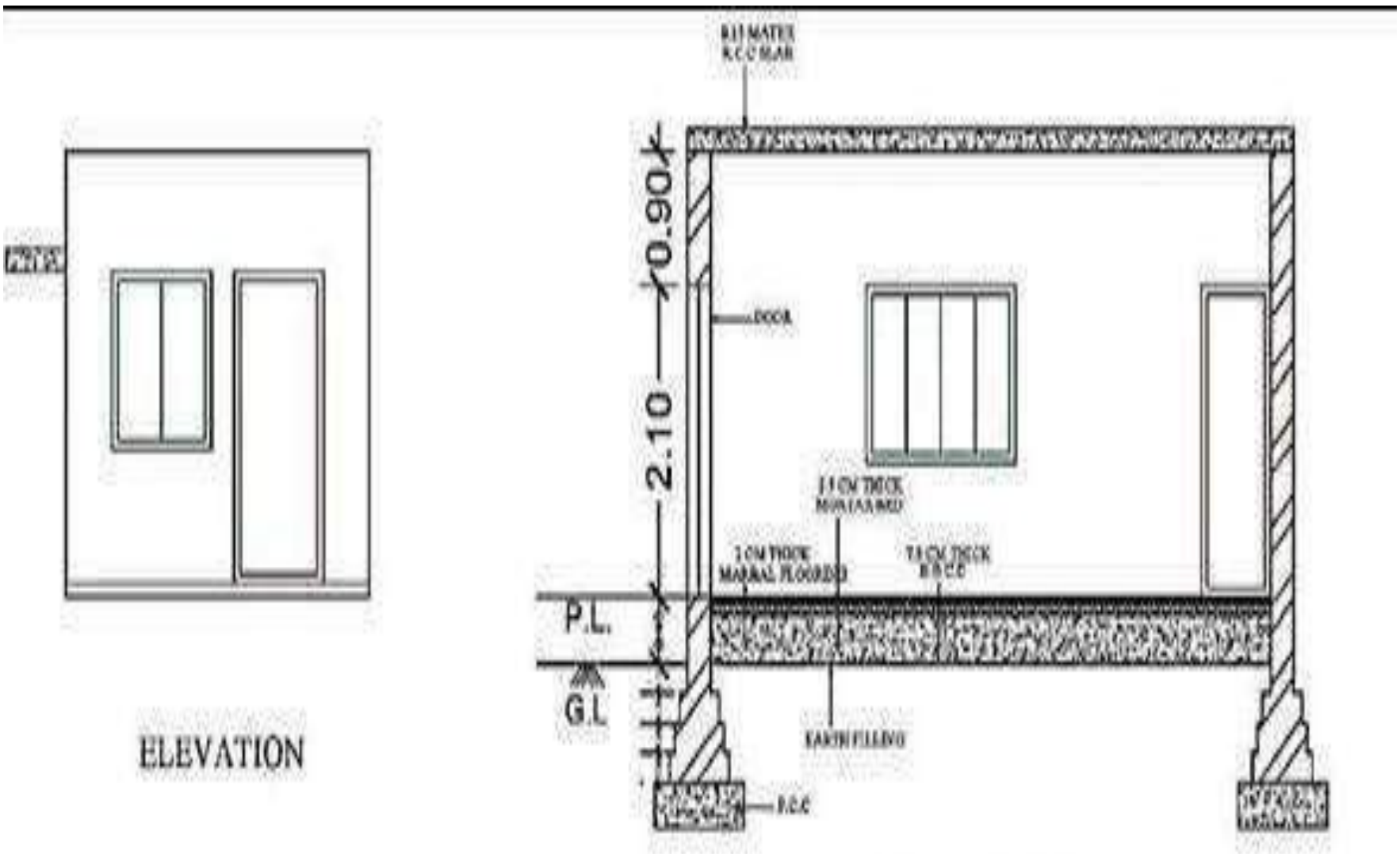


Section at A - A'



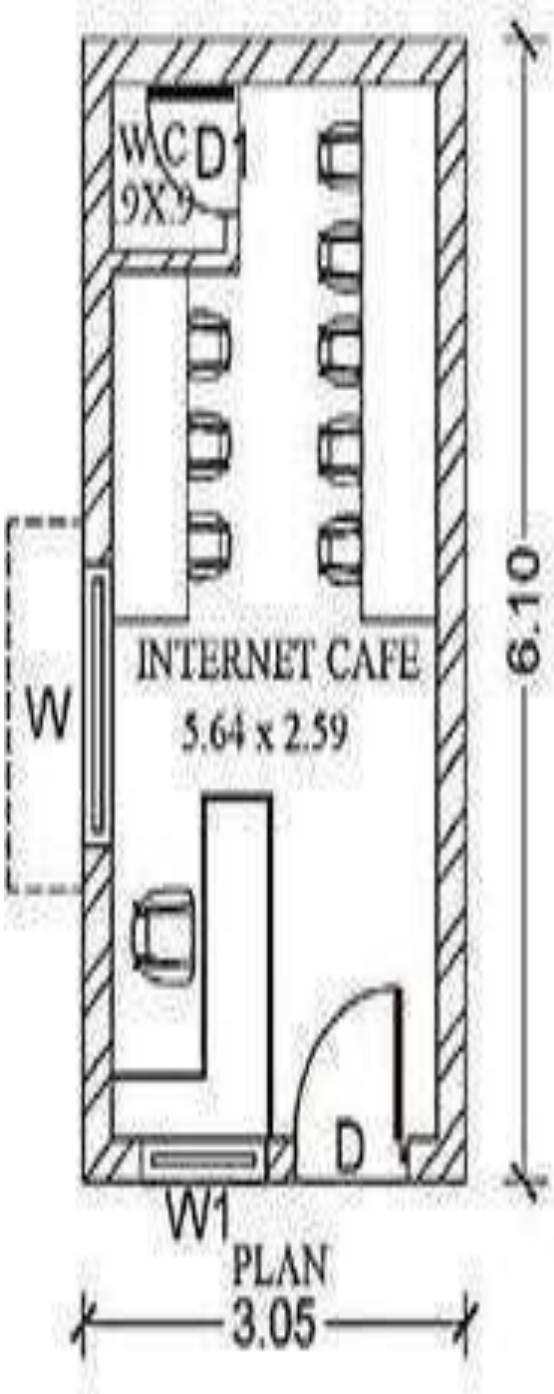
Plan

Internet cafe

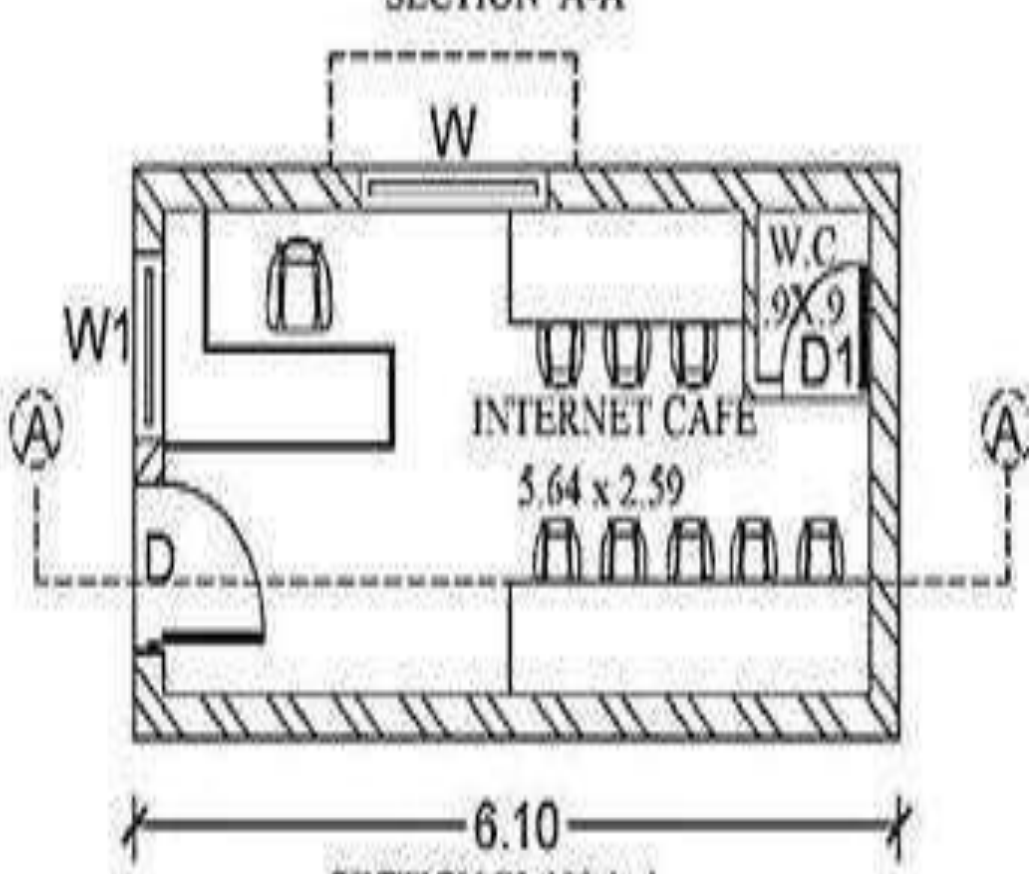


ELEVATION

SECTION A-A



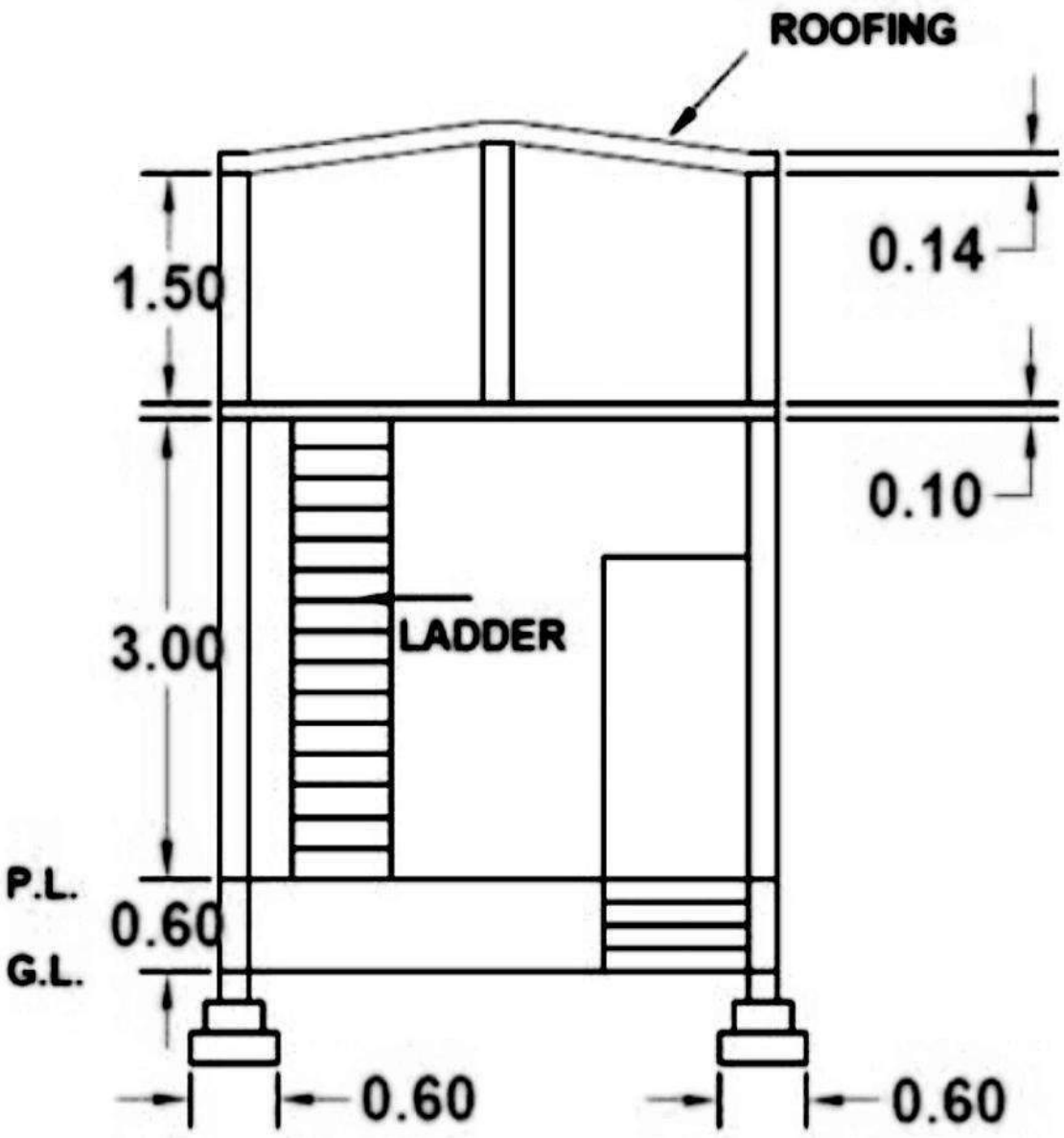
PLAN



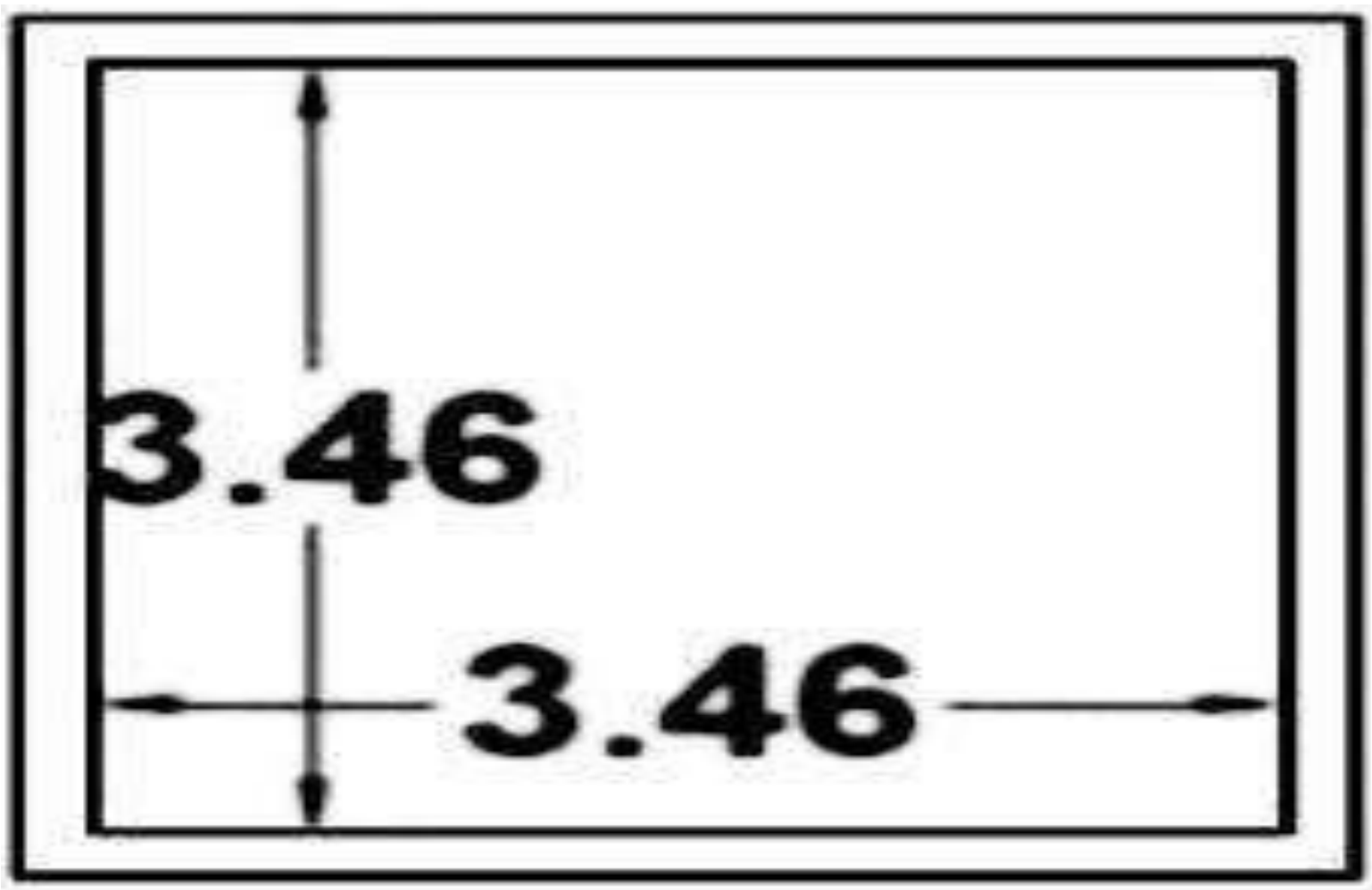
SECTION PLAN A-A

D	0.90 x 2.10
D1	0.70 x 2.10
W	1.50 x 1.20
W1	1.00 x 1.20

Chabutro



FILE NAME AUTOCAD 2D	DWG NO. 1	
TITLE CHABUTARA	SHEET 8	SCALE 1:1
PROJECT RURAL DEVELOPMENT	DRAWN BY: VYAS VED PRAJAPATI DHIREN	
CLIENT GTU		



PLAN

12.7 Summary of good photographs in table format

Figure No 50 Ideal village Photos

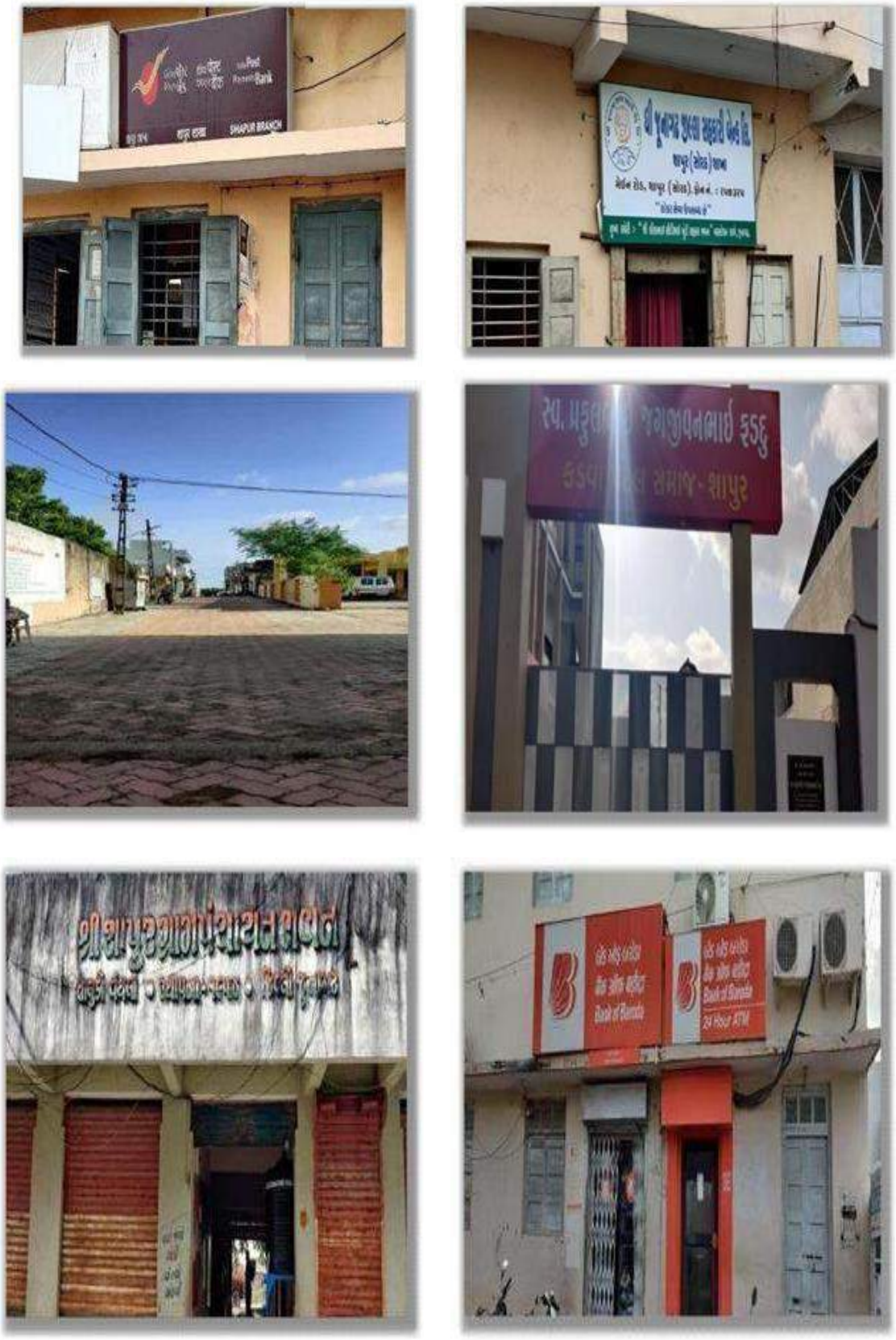


Figure No 51 Smart Village Photos

Figure No 52 Allocated Village Photos

12.8 Village Interaction with sarpanch Report with photograph

- We was visit Makhiyala village and interact with various authorities of village like sarpanch, talati mantri as well as people of village. We were explaining 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-panchayat, bus stand, temples, primary school, aaganwadi 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 design of our project under different infrastructure such as public library, public garden, internet café, medical store, solar water purifier and gate.

Fig No: 53 Visit of Makhiyala village

12.9 Sarpanch letter giving information about the village development

BALAJI ENGINEERING COLLEGE - JUNAGADH

At. Makhiyala, Junagadh-Dhoraji Highway, Junagadh - 362014 Ph. : 0285-2687238 Fax : +91-285-2687338

Ref. No. : BECT/BEC/ADMIN/21132 Date : 17/08/2020

માનનીય
સરપંચ શ્રી
માખીયાળા

વિષય: ગામ ની મુલાકાત લેવા બાબત.

નમસ્કાર,

સવિનય સાથ જણાવવાનું કે "બાલાજી એન્જીનીયરીંગ કોલેજ", જુનાગઢ માં અભ્યાસ કરતા વિદ્યાર્થીઓ છેલ્લા વર્ષના પ્રોજેક્ટ બાબતે આપના ગામની મુલાકાત લેવાની હોવાથી આપશ્રીને નમ્ર વિનંતી કે અમારા વિદ્યાર્થીઓને તમારા ગામની મુલાકાત માટેની પરવાનગી આપવા વિનંતી.

ગામની મુલાકાત દરમ્યાન ગામના વિકાસલક્ષી કાર્યનું અવલોકન કરી ગામ ના એક અહેવાલ તૈયાર કરવામાં આવશે. તો આ કાર્યમાં આપશ્રી અને ગામવાસીઓનો સહકાર મળશે. તો આપને વિનંતી કે ગામની મુલાકાત દરમ્યાન સહકાર આપશો એવી અમારી અપેક્ષા છે. વિદ્યાર્થીઓના નામ ની યાદી નીચે દર્શાવેલ છે.

i). સાવલીયા હેમીન પરસોત્તમભાઈ - 171070106006
ii). કરંગીયા યશ કિશોરભાઈ - 171070106003

આભાર સહ
આપનો વિશ્વાસુ

Principal
Balaji Engineering College
Makhiyala - Junagadh.

સરપંચ
ગ્રામ પંચાયત-માખીયાળા

E-mail : becjunagadh@gmail.com Web site : www.bietjunagadh.org

12.10 Comprehensive report preparation as per format

- Makhiyala is a village in junagadh Taluka in Junagadh District of Gujarat, State India. It is located 14Km from Junagadh Makhiyala village population is 3687.
- Sarpanch, Talati, panchayat member and village dweller remained fresant to know how the development of Makhiyala village is possible and to give their feedback.
- Sarpanch and village dweller shared various problem faced by them while designing such a facility give various approach and also presented management techniques of such facility with proposed design.
- We explained all the farameters of various design such as sustainable, physical, social, socio-culture, smart and heritage village design.
- The garden and public toilet are required for repair & manitence.
- Our team of VY thanked all the member of the village for their support during this work period and made than understand that the implantation of such facilities can build implantation of such facilities can build a better village and hence lead to build a strongation.
- The presentation was very much interactive and helpful to understand various amenities to be designed at village level for me overall development of the Jhalansar village as Rurbnisaton.

Chapter 13: Sustainable Design Planning Proposal

(Prototype Design) – Part-II

13.1 Design Proposal

- In the Vishwakarma Yojana Phase-VII Part – II we have given total Five design according to the village need and useful for the villagers.
- The design proposals are
  - Community hall
  - Clinic center
  - Knowledge center
  - Party plot
  - Vegetables Market

❖ **Recommendation of the design**

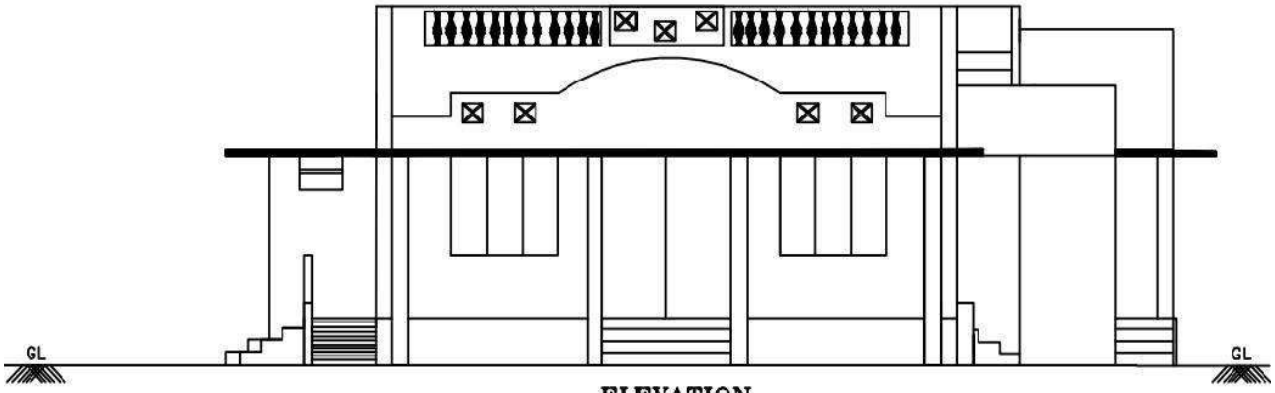
- In village there is no Party plot for any functions and celebration have to this purpose. We have design Party plot for physical comfort.
- There is no clinic center in the village by undertaking the requirement of the villagers we have design clinic center for their health purposes.
- For vegetable shopping we have design vegetable market for village peoples.
- For general meetings and other small function we design a community hall.

❖ **Benefit of the village**

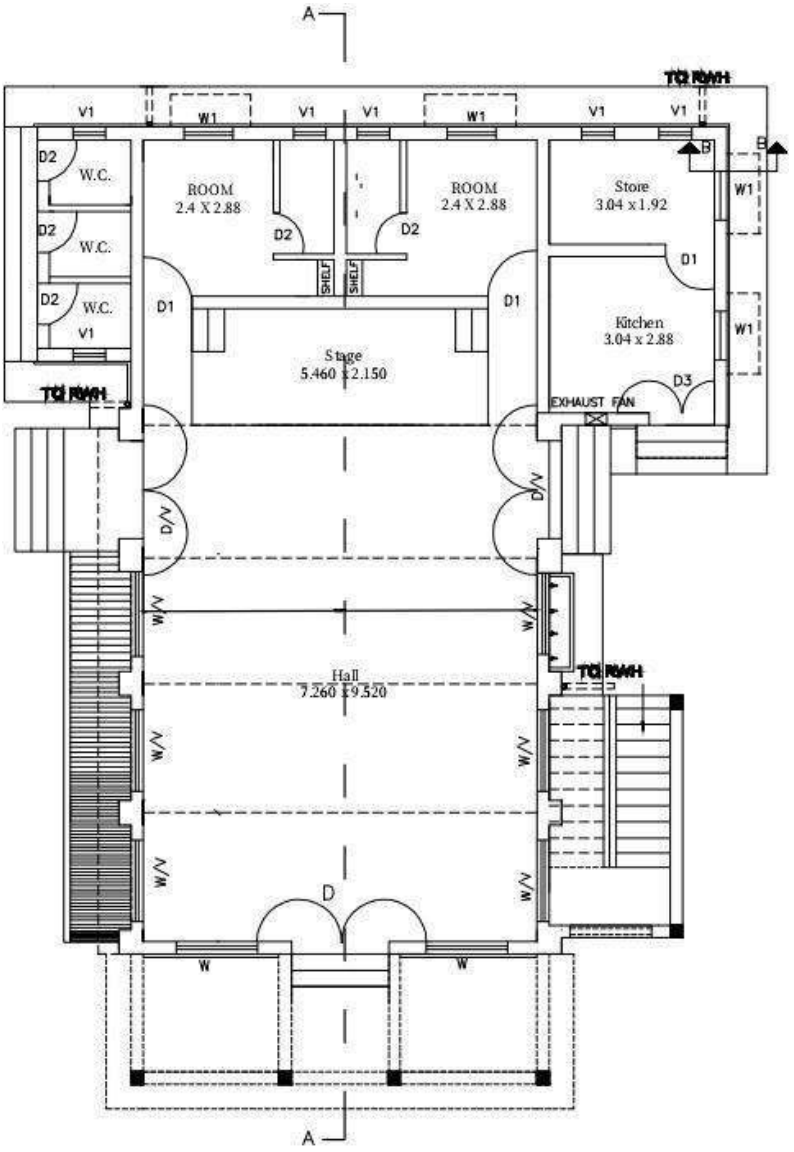
- In village, there is no party plot for any functions and celebration for this purpose we have party plot for physical comfort.
- There is no clinic center in the village by undertaking the requirement of the villagers we have design clinic center for their health purposes.
- For vegetable shopping we have design vegetable market for village peoples.
- For general meetings and other small function we design a community hall.

13.1.1 Community hall

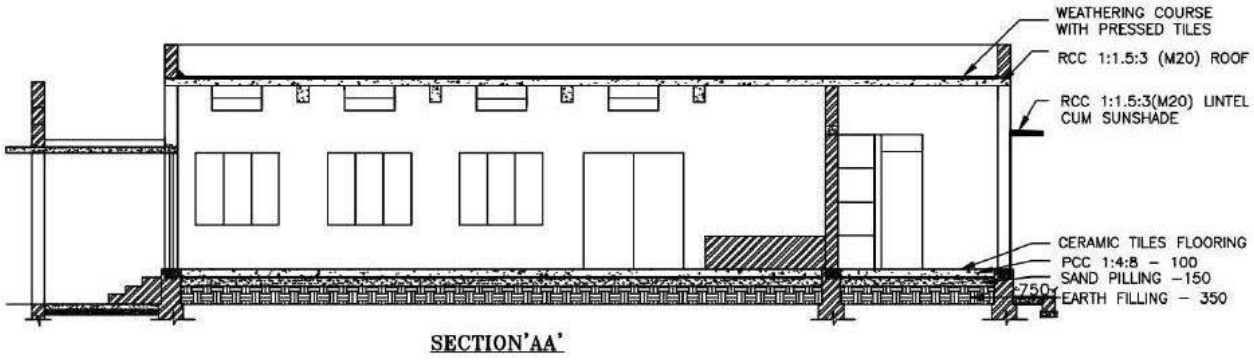
Village and community halls are the smallest buildings that can accommodate a sports programmed alongside the customary social and arts pursuits. There are a wide variety of types and sizes, all with the following in common – a main activity and assembly space together with ancillary accommodation that might include additional small halls.



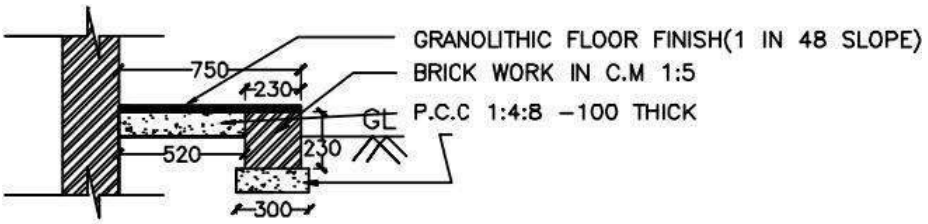
ELEVATION



PLAN



SECTION'AA'



SECTION'BB'(PLINTH PROTECTION PLATFORM)

- **Measurement sheet**

Sr. No.	Item Description	Nos	Length	Breadth	Height	Quantity	Total Quantity
1	Excavation	1	75	1	1.2	90m^3	90m^3
2	BBCC	1	75	1	0.2	15 m^3	15 m^3
3	Under Plinth Masonry: Step 1: Step 2: Step 3:	 1 1 1	 75 75 75	 0.8 0.6 0.4	 0.3 0.3 0.3	 18m^3 13.5m^3 9m^3	40.5m^3
4	Masonry Above Plinth	1	75	0.23	5.5	94.87m^3	94.87m^3
5	Plastering Work: Long Walls: Short Walls:	 2 2 4 4	 8.6 19.4 5 6.5		 5 5 3 5	 86 m^2 194 m^2 60 m^2 130 m^2	470m^2

6	RCC Slab	1	20	10	0.15	$30m^2$	$30m^2$

TABLE NO: 34

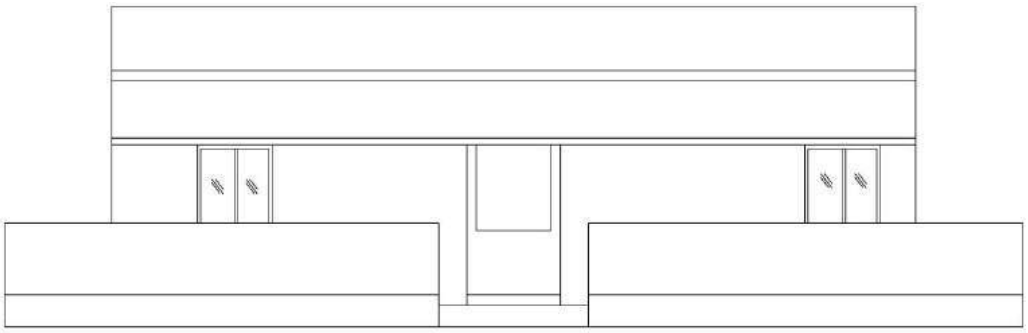
- **Abstract sheet**

Sr. No.	Item Description	Required Qty.	Cost/ Unit	Total Cost
1	Excavation	90 m^3	85 Rs	7,650 Rs
2	BBCC	15 m^3	3200 Rs	48,000 Rs
3	Masonry	135.37 m^3	3500 Rs	4,73,795 Rs
4	Plastering	470 m^2	750 Rs	3,52,500 Rs
5	Slab	30 m^3	4500 Rs	1,35,000 Rs

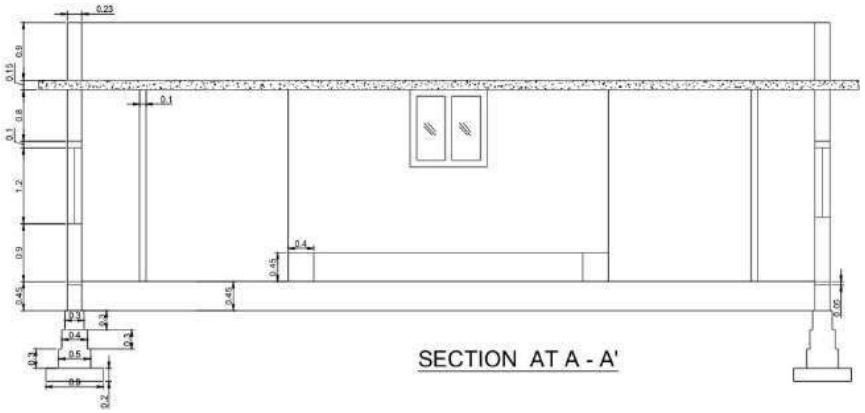
TABLE NO: 35

13.1.2 Clinic center

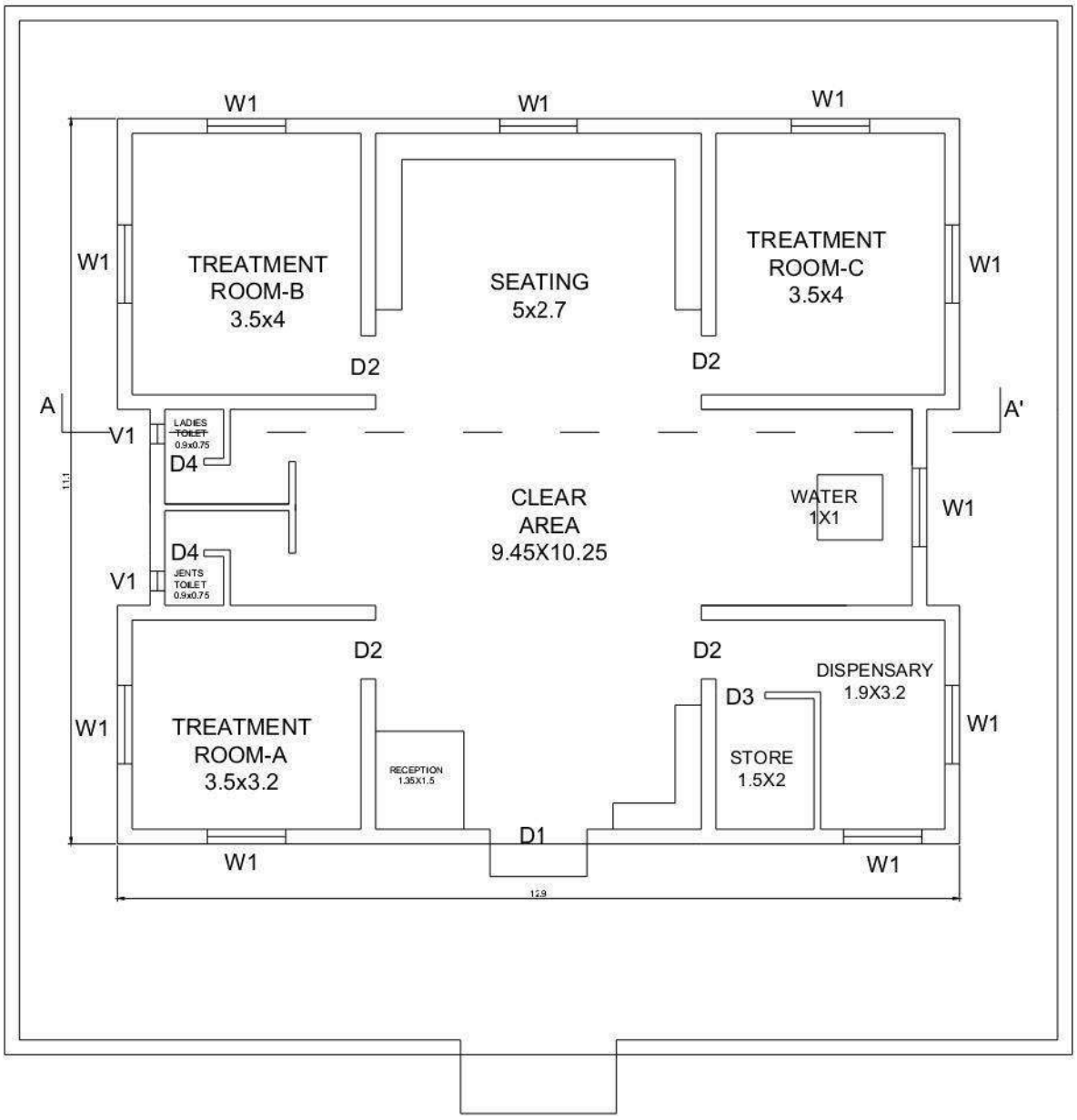
Village Hospital most of important, India is a country where a significant section of the nation's population lives in the village. The progress and development of our country depend on the improved living conditions in rural areas where all the meaningful life supportive facilities, including healthcare facilities, will be adequately available for one and all.



ELEVATION



SECTION AT A - A'



PLAN

- **Measurement sheet**

Sr. No.	Item Description	No	Length	Breadth	Height	Quantity	Unit	Total Quantity	Unit
1	Excavation in foundation								
	L = 82.5 - (1/2 X 0.9 X 8) L = 78.9m H = 1.1m	1	78.9	0.9	1.1	78.11	Cu.M		
2	Plain cement concrete								

	L=78.9	1	78.9	0.9	0.2	14.2	Cu.M		
3	Brick masonry up to plinth								
	for 1st step (500 mm) L = 82.5 - (1/2 X 0.5 X 8) L = 80.5	1	80.5	0.5	0.3	12.1	Cu.M		
	for 2nd step (400 mm) L = 82.5 - (1/2 X 0.4 X 8) L = 80.9	1	80.9	0.4	0.3	9.7	Cu.M		
	for 3rd step (300mm) L = 82.5- (1/2 X 0.3 X 8) L = 81.3	1	81.36	0.3	0.9	21.96	Cu.M		
	Net quantity of brick masonry							43.8	Cu. M
4	Earth filling								
	Room 1	1	3.5	4	0.45	6.3	Cu.M		
	Seating area	1	5	4	0.45	9	Cu.M		
	Room 2	1	3.5	4	0.45	6.3	Cu.M		
	Clear area	1	11.45	3	0.45	15.6	Cu.M		
	Room 3	1	3.5	3.2	0.45	5.04	Cu.M		
	Entering area	1	5	3.2	0.45	7.2	Cu.M		
	Dispensary & store	1	3.5	3.2	0.45	5.04	Cu.M		
								54.5	Cu. M
5	Brick masonry in superstructure								
	L = 82.5 - (1/2 X 0.23 X8) L =81.7m	1	81.7	0.23	3	56.4	Cu.M		
								56.4	Cu. M
	Deduction of door and window								
	D1	1	1.5	0.23	2.1	0.724	Cu.M		

	D2	4	0.9	0.23	2.1	1.749	Cu.M		
	W1	10	1.2	0.23	0.9	2.57	Cu.M		
	V1	2	0.3	0.23	0.3	0.041	Cu.M		
								5.1	Cu. M
	Periphery Lintel Quantity								
	L=81.7m	1	81.7	0.23	0.15	2.83	Cu.M		
								2.83	Cu. M
	Net quantity of brick masonry							48.47	Cu. M
	For partition wall								
	W/C L1	2	0.95		3	5.7	sq.M		
	L2	2	0.8		3	4.8	sq.M		
	L3	1	1.85		3	5.55	sq.M		
	L4	2	0.7		3	4.2	sq.M		
	Store Room L1	1	1.55		3	4.65	sq.M		
	L2	1	2.05		3	6.15	sq.M		
								31.05	sq.M
	Door window deduction for partition wall								
	D3	1	0.75		2.1	1.89	sq.M		
	D4	2	0.6		2.1	2.52	sq.M		
								4.41	sq.M
	Net quantity of partition							26.96	sq.M
6	Smooth plaster								

	Room 1	2	3.5		3	21	sq.M		
		2	4		3	24	sq.M		
	Room 2	2	3.5		3	21	sq.M		
		2	4		3	24	sq.M		
	seating	2	5		3	30	sq.M		
		1	4		3	12	sq.M		
	clear	4	3.23		3	38.76	sq.M		
		2	3		3	18	sq.M		
	Room 3	2	3.5		3	21	sq.M		
		2	3.2		3	19.2	sq.M		
	Room 4	2	3.5		3	21	sq.M		
		2	3.2		3	19.2	sq.M		
	Store	1	1.5		3	4.5	sq.M		
		1	2		3	6	sq.M		
	W.C.	2	0.9		3	5.4	sq.M		
		2	0.75		3	4.5	sq.M		
		1	1.8		3	5.4	sq.M		
		2	0.6		3	3.6	sq.M		
		1	0.7		3	2.1	sq.M		
		2	5		3	30	sq.M		
		1	4		3	12	sq.M		
	Ceiling Plaster								
	Room 1	1	3.5	4		14	sq.M		
	Room 2	1	3.5	4		14	sq.M		
	Seating	1	5	4		20	sq.M		
	Clear	2	3.5	3		9.75	sq.M		

	Room 3	1	3.5	3.2		11.2	sq.M		
	Room 4	1	3.5	3.2		11.2	sq.M		
	Store	1	1.5	2		3	sq.M		
	W.C.	2	0.9	0.7		1.26	sq.M		
	Entrance	1	5	4		20	sq.M		
								447.07	sq.M
	Deduction door and window								
	D1	2/2	1.5		2.1	3.15	sq.M		
	D2	6/2	0.9		2.1	5.67	sq.M		
	D3	2/2	0.75		2.1	1.57	sq.M		
	D4	4/2	0.6		2.1	2.52	sq.M		
	W1	10/2	1.2		0.9	5.4	sq.M		
								18.31	sq.M
	Total Plastering work							428.76	sq.M
7	slab quantity								
	Slab	1	12.9	12.1	0.15	23.41	Cu.M		
	Chajja quantity	10	1.2	0.9	0.1	1.08	Cu.M		
	Total slab quantity							24.49	Cu. M

TABLE NO: 36

- **Abstract sheet**

Sr. No.	Quantity Name	Total Quantity	Unit	Rs/unit	Total Cost in Rupees
1	Excavation	78.11	Cu.M	85	6639.35
2	PCC	14.20	Cu.M	3200	45,440
3	Brick Masonry Up to PL	43.80	Cu.M	3200	1,40,160
4	Brick Masonry in Super structure	48.47	Cu.M	3500	1,69,645
5	Partition wall super structure	26.96	Cu.M	440	11,862.4
6	Plastering	428.76	Sq.m	150	64,314
7	Earth Filling	54.50	Cu.M	50	2725

8	Slab (1:1.5:3)	24.49	Cu.M	8800	2,15,512

TABLE NO: 37

Total Construction Cost including Labor Cost = 6, 56,297.75 Rupees.

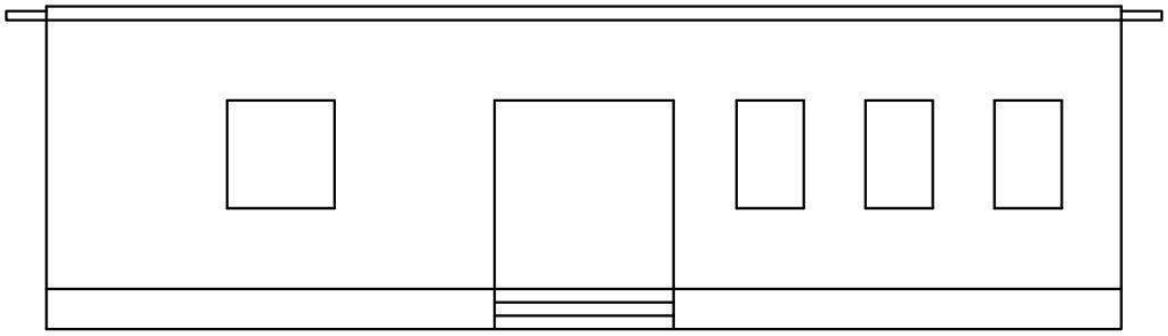
Contractor's Profit = 98444.66 Rupees (15%).

Total Cost without considering wastage: 65627.75 + 98444.66 = 7, 54,742.41

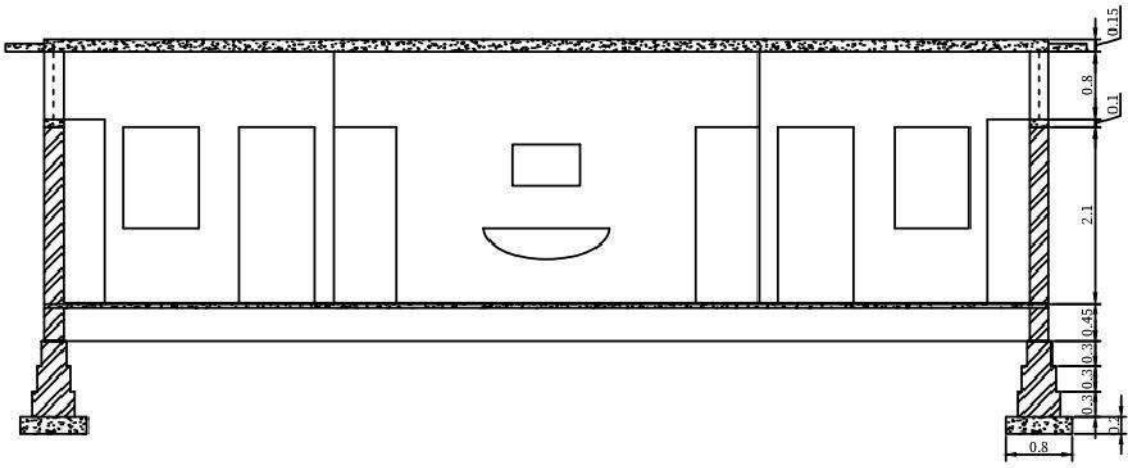
Therefore, the cost is said to be **755000 Rupees.**

13.1.3 Knowledge center

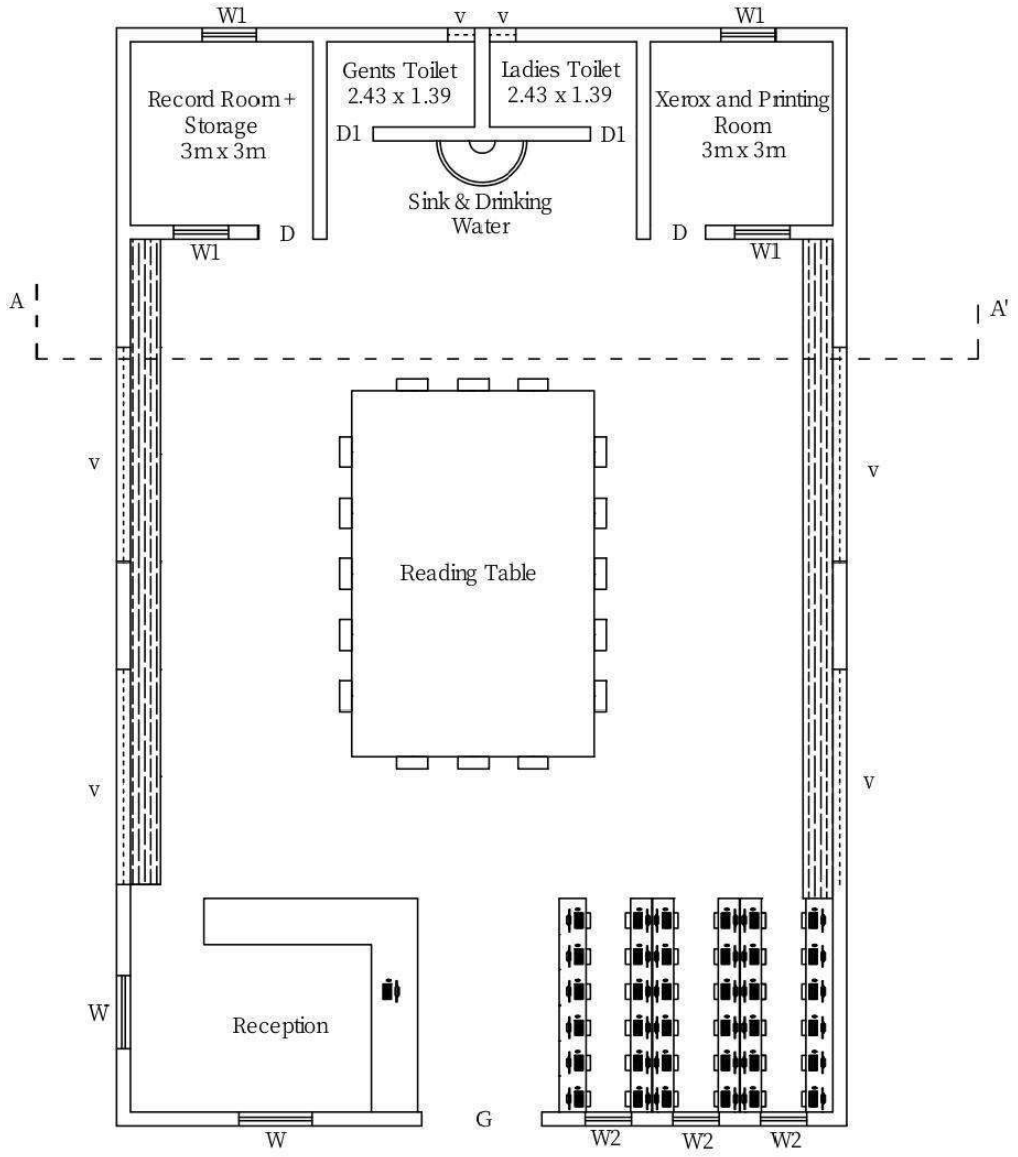
Village Knowledge Center serve as information dissemination centre providing instant access to farmers to latest information/ knowledge available in the field of agriculture, starting from crop production to marketing. Every Knowledge center is manned by a "Knowledge center In-charge" that looks after the operations of the Knowledge center.



Elevation



Section at A-A'



Plan

- **Measurement sheet**

Sr. No.	Item Description	Nos	Length	Breadth	Height	Quantity	Total Quantity
1	Excavation	1	64	1	1.2	76.8 m^3	76.8 m^3
2	BBCC	1	64	1	0.2	12.8 m^3	12.8 m^3
3	Under Plinth Masonry:						34.56 m^3
	Step 1:	1	64	0.8	0.3	15.36 m^3	
	Step 2:	1	64	0.6	0.3	11.52 m^3	
	Step 3:	1	64	0.4	0.3	7.68 m^3	

4	Masonry Above Plinth	1	64	0.23	3	44.16 m^3	44.16 m^3
5	Plastering Work: Long Walls: Short Walls:	 2 2	 20 12		 3 3	 72 m^2 120 m^2	192 m^2
6	RCC Slab	1	20	12	0.15	36 m^2	36 m^2

TABLE NO: 38

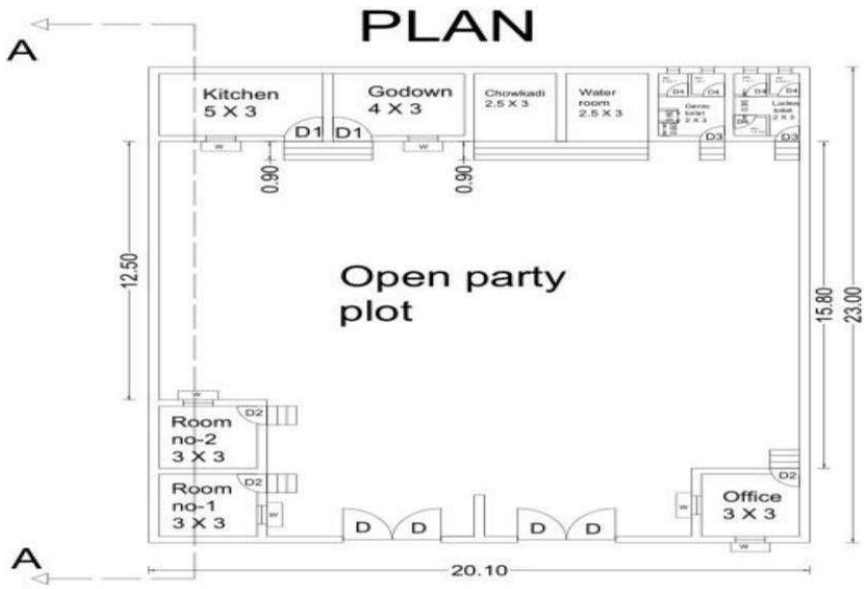
- **Abstract sheet**

Sr. No.	Item Description	Required Qty.	Cost/ Unit	Total Cost
1	Excavation	76.8 m^3	85 Rs	6,528 Rs
2	BBCC	12.8 m^3	3200 Rs	40,960 Rs
3	Masonry	78.72 m^3	3500 Rs	2,75,520 Rs
4	Plastering	192 m^2	750 Rs	1,44,000 Rs
5	Slab	36 m^3	4500 Rs	1,62,000 Rs

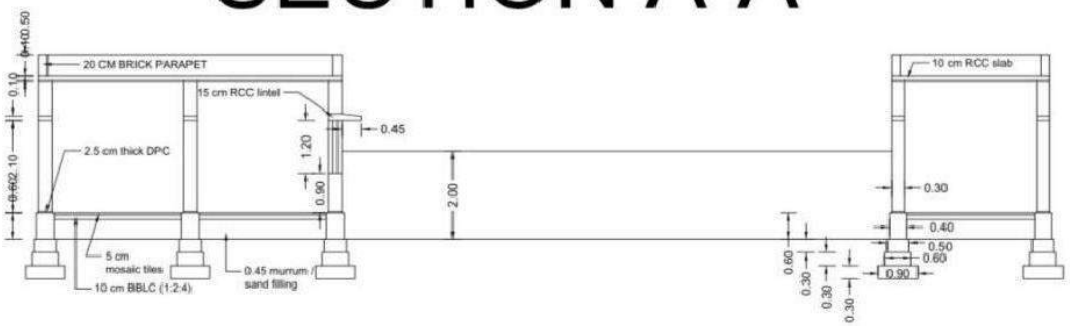
TABLE NO: 39

The total Estimated cost of Knowledge Centre is said to be **7, 00,000 Rs.**

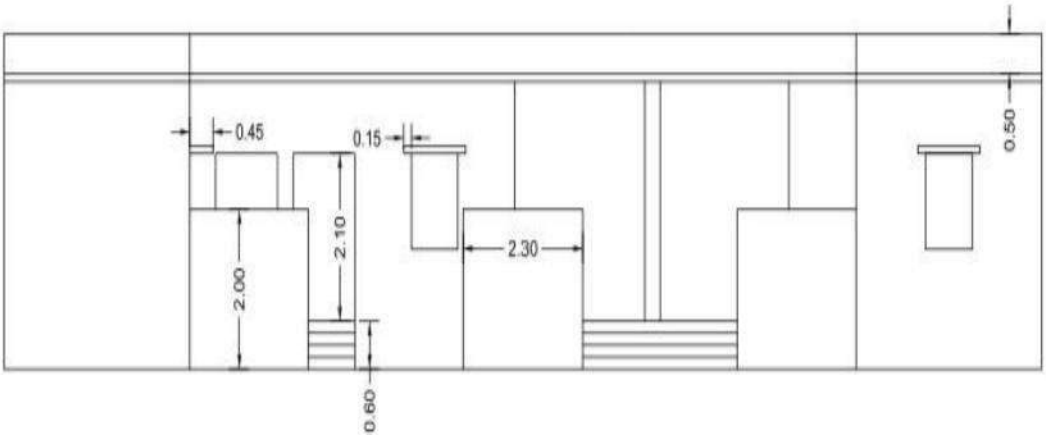
13.1.4 Party plot



SECTION A-A



ELEVATION



SCHEDULE FOR OPENINGS

NO.	DETAILS	SYMBOL	SIZE
1	DOOR	D	1.5 X 2.1
2	DOOR	D1	0.9 X 2.1
3	DOOR	D2	0.75 X 2.1
4	DOOR	D3	0.65 X 2.1
5	WINDOW	W	0.9 X 1.2
6	VENTILATION	V	0.5 X 0.5

- **Measurement sheet**

SR. NO	DESCRIPTION	NO	L	B	H	QUANTIY
	Total Centre line= 22.7x2+19.8x3+3.3x4+6.6+3.3x5=141.1m No. Of T-junction= 9					
1	Excavation for foundation up to 1.5 depth					
	Length =141.1-(9×0.9÷2)= 137.45	1	137.45	0.9	0.9	111.33m3
	For steps:-					
	At door D_2					
	L= 0.9+0.15+0.15=1.2M	3	1.2	0.6	0.15	0.324
	At door D_1, L= 1.5M	2	1.5	0.6	0.15	0.27
	At chowkadi , water room					
	L= 6+0.3+2x0.15=6.6m	1	6.6	0.6	0.15	0.594
	At toilet, L= 0.75+2x0.15= 1.05m	2	1.05	0.6	0.15	0.189
					Total	112.70m3
2	Providing and laying PCC(1:4:8) for foundation	1	137.45	0.9	0.3	37.11m^3
	Steps :					
	D_2	3	1.2	0.9	0.15	0.486
	D_1	2	1.5	0.9	0.15	0.405
	At chowakadi,water room	1	6.6	0.9	0.15	0.891
	D_3	2	1.05	0.9	0.15	0.283
					Total	39.17m3
3	First class brick masonry C:M(1:6) for foundation					
	Step:-1(60cm) L=138.4m	1	138.4	0.6	0.3	24.91m^3
	Step:-2(50cm)					
	L=138.85m	1	138.85	0.5	0.3	20.82m^3
					Total:-	45.73m^3
4	Back filling in foundation					
	=111.33-39.17=72.16m^3				Total:	72.16m^3
5	First class brick masonary G.L to P.L					
	L= 139.3m	1	139.3	0.4	0.575	32.0.4m^3
	At D1					
	Step1.	2	0.9	0.3	0.15	0.081
	Step2.	2	0.9	0.3	0.30	0.162
	Step3.	2	0.9	0.3	0.45	0.243
	At D2					
	Step 1	3	1.2	0.3	0.15	0.162
	Step 2	3	1.2	0.3	0.30	0.324
	Step 3	3	1.2	0.3	0.45	0.486
	At chowkadi ,water room					
	Step 1	1	6.3	0.3	0.15	0.283
	Step 2	1	6.3	0.3	0.30	0.567
	Step 3	1	6.3	0.3	0.45	0.850

	At Toilet,					
	Step 1	2	0.75	0.3	0.15	0.0675
	Step 2	2	0.75	0.3	0.30	0.135
	Step 3	2	0.75	0.3	0.45	0.202
					Total	35.26m^3
6	DPC(2.5cmthick)	1	139.3	0.4		55.72m^2
	Deduction:-					
	D1	2	1.2	0.4		0.96
	D2	3	0.9	0.4		1.08
	D3	2	0.75	0.4		0.6
	D	2	1.5	0.4		1.2
					Net total	51.88m^2
7	First class brick masonary for superstructure					
	LW = 20.10m	2	20.10	0.3	3	36.18
	SW = 3m	7	3	0.3	3	18.9
	For room 1,2					
	LW = 3m	3	3	0.3	3	8.1
	SW = 6.9m	2	6.9	0.3	3	12.42
	For office,					
	LW =3m	2	3	0.3	3	5.4
	SW = 3.6m	2	3.6	0.3	3	6.48
	For boundary,					
	SW1= 15.80m	1	15.80	0.3	2	9.48
	SW2 = 12.5m	1	12.50	0.3	2	7.5
	LW = 9.9m	1	9.9	0.3	2	5.94
	Deduction					
	At chowkadi, water room					
	L = 3.3	1	3.3	0.3	3	2.97
	D	2	1.5	0.3	2	1.8
	D1	2	1.2	0.3	2.1	1.512
	D2	3	0.9	0.3	2.1	1.70
	D3	2	0.75	0.3	2.1	0.94
	W	5	0.9	0.3	1.2	1.62
	V	12	0.4	0.3	0.4	0.576
					Total	11.11
					Net total	99.28
8	Half brick partition wall in C:M (1:6)					
	LW =0.9m	5	0.9		3	13.5
	SW= 1.1m	3	1.1		3	9.9
	Deduction					
	D4	5	0.65		2.1	6.825
					Net total	16.575m^2
8a	Brick work for parapet, 0.2m					
	LW1=20.10m	1	20.10	0.2	0.5	2.01
	LW2 = 13.8m	1	13.8	0.2	0.5	1.38

	SW = 3m	2	3	0.2	0.5	0.6
	For room 1,2					
	LW = 3m	2	3	0.2	0.5	0.6
	SW = 6.9m	2	6.9	0.2	0.5	1.38
					Total	$5.97m^3$
9	Providing RCC slab, lintel, chhajja					
	Lintel					
	LW= 20.10	2	20.10	0.3	0.15	1.809
	SW = 3	7	3	0.3	0.15	0.945
	For room 1,2					
	LW = 3m	3	3	0.3	0.15	0.405
	SW = 6.9m	2	6.9	0.3	0.15	0.621
	For office, LW =3m	2	3	0.3	0.15	0.27
	SW = 3.6m	2	3.6	0.3	0.15	0.324
	Chhajja					
	W	5	1.1	0.45	0.1	0.247
	RCC slab					
	For last portion	1	20.10	3	0.1	6.03
	For room 1,2	1	6.9	3	0.1	2.07
	For office	1	3.6	3.6	0.1	1.296
					Total	$14m^3$
10	Providing mild steel reinforcement in RCC work					
	Quantity=1%ofvolumeofconcrete					
	=14×78.54=1099.56kg					
					Total:-	1099.56kg
11	12cmthickplaster					
	(A)Internal plaster					
	(1)ceiling					
	Kitchen	1	5	3		15
	Godown	1	4	3		12
	Toilet M	1	2	3		6
	Toilet F	1	2	3		6
	Room 1,2 and office	3	3	3		27
	Wall					
	Kitchen	2	5		3	30
		2	3		3	18
	Godown	2	4		3	24
		2	3		3	18
	Toilet M	4	2		3	24
		4	2		3	24
	Room 1,2 and office	6	3		3	54
		6	3		3	18
					Total	$276m^2$
11a	External plaster up to parapet					
	LW =20.10m	1	20.10		4.35	87.43
	SW = 15.1m	1	15.1		4.35	65.68
	Room 1,2 LW = 6.9m	2	6.9		4.35	60.03

	SW = 3m	2	3		4.35	26.1
	Office LW = 3.6m	2	3.6		4.35	31.32
	SW =3.3m	2	3.3		4.35	28.71
	Boundary wall					
	SW1= 12.5m	2	12.5		2	50
	SW2=15.8m	2	15.8		2	63.2
	LW=12.9m	2	12.9		2	51.6
	Chhajja Face	5	1.2		0.1	0.6
	Side	10	0.45		0.1	0.45
	Top	5	0.45		0.1	0.225
	Bottom	5	0.45		0.1	0.225
					Total	465.0.7m^2
	Deduction D	2	1.5		2.1	6.3
	D1	2	1.2		2.1	5.04
	D2	3	0.9		2.1	5.67
	D3	2	0.75		2.1	3.15
	W	5	0.9		1.2	5.4
	V	12	0.4		0.4	1.92
					Total	27.48m2
					Net total	712.59m,^{2}
12	5cmthickmosictilesflooring					
	Kitchen	1	5	3		15
	Godown	1	4	3		12
	Toilet	2	3	3		18
	Room 1,2 and office	3	3	3		27
	Chowkadi,water room	2	2.5	3		15
					Total	87m2
13	10cmBBLC(1:2:4)					
	Kitchen	1	4.9	2.9	0.1	1.421
	Godown	1	3.9	2.9	0.1	1.131
	Toilet	2	1.9	2.9	0.1	1.102
	Room 1,2 and office	2	2.9	2.9	0.1	1.682
	Chowkadi,water room	2	2.4	2.9	0.1	1.392
					Total	6.73m^3
14	Sand filling/murum					
	Kitchen	1	4.9	2.9	0.45	6.39
	Godown	1	3.9	2.9	0.45	5.08
	Toilet	2	1.9	2.9	0.45	4.959
	Room 1,2 and office	2	2.9	2.9	0.45	7.57
	Chowkadi,water room	2	2.4	2.9	0.45	6.26
					Total	30.25m^3

TABLE NO: 40

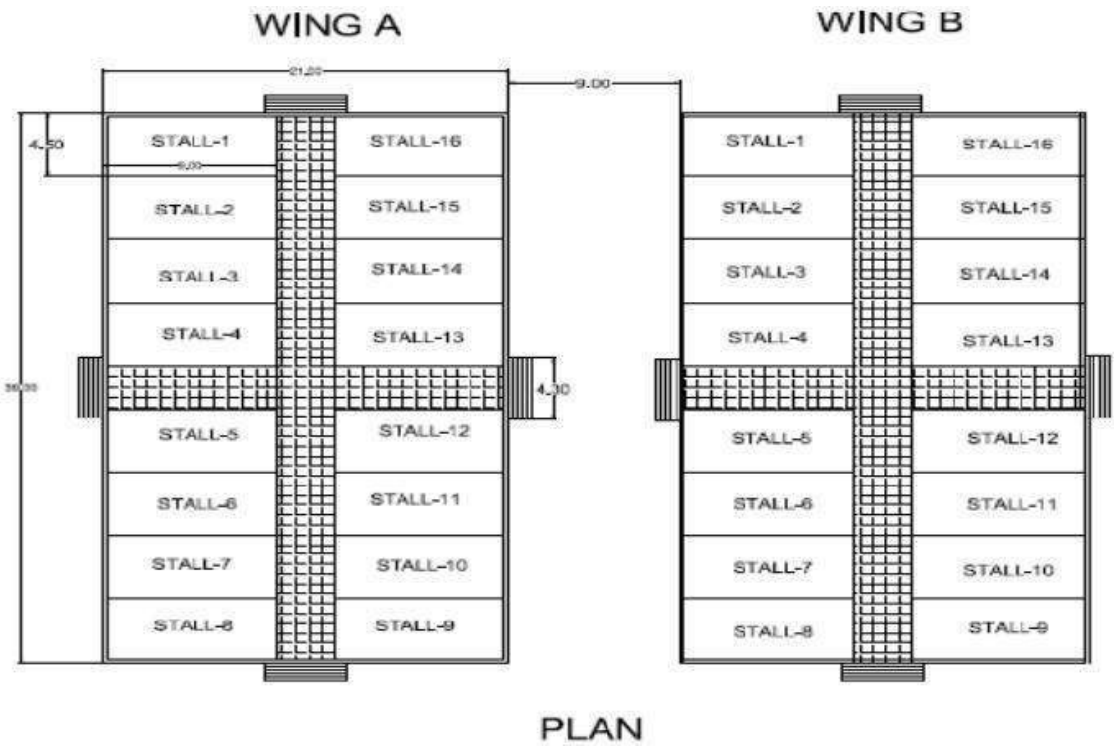
➢ **Abstract sheet**

SR. NO	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT(RS)
1	Excavation for foundation up to 1.5 m depth	112.70 m^3	100	m^3	11270
2	Providing and laying PCC (1:4:8) for foundation	39.17 m^3	1500	m^3	58755
3	First class brick masonry CM (1:6) for foundation	45.73 m^3	1600	m^3	73168
4	Back filling in foundation	72.16 m^3	70	m^3	50512
5	First class brick masonry GL to PL	35.26m^3	1600	m^3	56416
6	DPC (2.5 cm thick)	51.88 m^2	200	m^2	10376
7	First class brick masonry for super structure	105.25 m^3	1500	m^3	157875
	Half brick wall	16.575	1500	M^2	24862.5
9	Providing and laying RCC (1:2:4)	14m^3	2500	m^3	35000
10	Providing mild steel reinforcement for RCC work including binding and bending and placing in position	1099.56 kg	45	Kg	49480.2
11	12 mm thick plaster	712.59 m^2	150	m^2	106888.5
12	5 cm thick mosaic tiles flooring	87 m^2	200	m^2	17400
13	10 cm BBLC (1:2:4)	6.73 m^3	1000	m^3	6730
14	Sand filling / murrum	30.25m^3	60	m^3	1815
		TOTAL :-			660548.2
		3 % CONTIGENCY :-			19816.45
		2 % WORKCHARGE ESTABLISHMENT :-			13210.96
		TOTAL :-			693575.61
		10 % CONTRACTOR PROFIT :-			69357.56
		GRAND TOTAL :-			762933

TABLE NO: 41

13.1.5 Vegetables Market

Vegetables are vital to the general good health of human beings, providing essential vitamins and minerals, dietary fiber, and photochemical and reducing risk from dangerous diseases and other medical conditions. Most of the vegetables are marketed fresh with only a small portion processed.



- **Measurement sheet**

Sr. No.	DESCRIPTION	No.	LENGTH IN Mt.	WIDTH IN Mt.	DEPTH IN Mt.	QTY.	TOTAL QTY.	UNIT
	FOR WING A							
1	**EARTHWORK IN EXCAVATION**							
	SIDE LONGWALL	2.00	39.730	0.500	1.500	59.595	**154.380**	**C.M T.**
	SIDE SHORTWALL	2.00	20.730	0.500	1.500	31.095		
	MIDDLE LONGWALL	2.00	39.730	0.500	1.500	59.595		
	MIDDLE SHORTWALL	2.00	2.730	0.500	1.500	4.10		
2	**P.C.C(1:4:8) IN FOUNDTION**							
	SIDE LONGWALL	2.00	39.730	0.500	0.300	11.919	**30.876**	**C.M T.**
	SIDE SHORTWALL	2.00	20.730	0.500	0.300	6.219		
	MIDDLE LONGWALL	2.00	39.730	0.500	0.300	11.919		

	MIDDLE SHORTWALL	2.00	2.730	0.500	0.300	0.819		
3	**BRICK MASONRY UPTO PLINTH**							
	SIDE LONGWALL						**108.066**	**C.MT.**
	1ST STEP	2.00	39.330	0.500	0.300	11.799		
	2ND STEP	2.00	39.230	0.400	0.300	9.415		
	3RD STEP	2.00	39.130	0.300	0.850	19.956		
	SIDE SHORTWALL							
	1ST STEP	2.00	21.130	0.500	0.300	6.339		
	2ND STEP	2.00	21.230	0.400	0.300	5.095		
	3RD STEP	2.00	21.330	0.300	0.850	10.878		
	MIDDLE LONGWALL							
	1ST STEP	2.00	39.330	0.500	0.300	11.799		
	2ND STEP	2.00	39.230	0.400	0.300	9.415		
	3RD STEP	2.00	39.130	0.300	0.850	19.956		
	MIDDLE SHORTWALL							
	1ST STEP	2.00	3.130	0.500	0.300	0.939		
	2ND STEP	2.00	3.230	0.400	0.300	0.775		
	3RD STEP	2.00	3.330	0.300	0.850	1.698		
4	**SOIL FILLING**							
	SIDE LONGWALL	2.00	39.730	0.500	1.000	39.730	**102.920**	**C.MT.**
	SIDE SHORTWALL	2.00	20.730	0.500	1.000	20.730		
	MIDDLE LONGWALL	2.00	39.730	0.500	1.000	39.730		
	MIDDLE SHORTWALL	2.00	2.730	0.500	1.000	2.730		
5	**PLINTH FLOORING**							
	PLINTH FLOOR AREA	819.00					819.00	S.MT.

6	**OUT SIDE PLASTERING**							
	SIDE LONGWALL	2.00	39.730	1.000		79.460	120.920	S.M.T
	SIDE SHORTWALL	2.00	20.730	1.000		41.460		
7	**SHED WITH MATERIALS**							
	SHAD AREA	819.00					819.00	S.M.T
8	**STAIRCASE PER RUNNING METER**							
		4.00	21.500			86.0	86.00	S.M.T

TABLE NO: 42

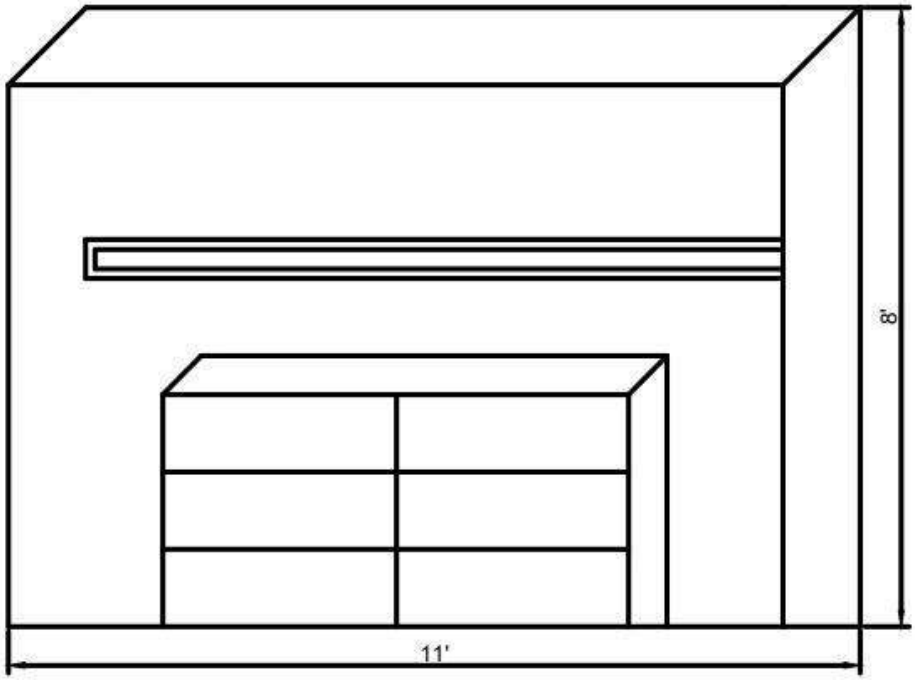
- **Abstract sheet**

SR.NO	PARTICULAR	QUNATITY	RATE	UNIT	AMOUNT
1	EARTHWORK IN EXCAVATION	154.38	276.45	Cu. Mt	42,678.35
2	P.C.C (1:4:8) IN FOUNDATION	30.88	700.00	Sq. Mt	21,613.20
3	BRICKWORK	108.07	3,200.00	Sq. Mt	345,811.20
4	SOIL FILLANG	102.92	750.00	Cu. Mt	77,190.00
5	PLINTH FLOORING	819.00	500.00	Sq. Mt	409,500.00
6	OUT SIDE PLASTERING	120.92	444.32	Sq. Mt	53,727.17
7	SHED WITH MATERIALS	819.00	3,500.00	Cu. Mt	2,866,500.00
8	STAIRCASE RUNNING METER	86.00	1,248.00	R. Mt	107,328.00
	TOTAL				RS. 40,01,537
	ADD 1.5% WATER CHARGES				RS. 60,023
	ADD 10% CONTRACTOR PROFIT				RS. 4,06,156
	GRAND TOTAL				RS. 44,67,717

TABLE NO: 43

13.1.6 Bhalay ni dival (Helping Wall):-

The helping wall is wall, where a rich people are take over their clothes , food, shoes etc. it's help the poor people who need this.



- **Measurement sheet**

Sr No.	Description	No	Length in mt.	Width in mt.	Depth in mt.	Qty.	Total Qty.	Unit
1	**Earthwork in excavation**							
	Wall	1	3.350	0.500	1.500	2.510	2.510	m^3
2	**p.c.c(1:4:8) in foundation**							
	wall	1	3.350	0.500	0.300	0.502	0.502	M^3
3	**Brick masonry**							
	wall	1	3.350	0.500	2.438	4.083	4.083	M^3
4	**plastering**							
	inside	1	3.350	1	2.438	8.167	16.334	M^2
	outside	1	3.350	1	2.438	8.167		

TABLE NO. 44

- Abstract sheet

Sr no.	Particular	Quantity	Rate	Unit	Amount
1	Earthwork in excavation	2.510	276.45	Cu.mt	694
2	p.c.c in foundation	0.502	700.00	Cu.m	352
3	Brick work	4.083	3200.00	Sq.m	13065
4	Plastering	16.334	444.32	Sq.m	7258
	TOTAL				RS. 21,369
	ADD 1.5% WATER CHARGES				RS. 32O
	ADD 10% CONTRACTOR PROFIT				RS.2137
	GRAND TOTAL				RS. 23,826

TABLE NO. 45

13.2 Reason for Student Recommending this Design

- There is no Super market in this village. Peoples are to selling and buying of vegetables not easily.
- There is no Clinic center in this village. Highlight for Peoples health issues in this village.
- There is no any knowledge center in Makhiyala village. For the better development of students and village other peoples there should be one knowledge center in the village.
- There are no any functions or other celebration space. Hence provided to party plot in Makhiyala village.
- There is no any place for group activity and other activity celebrating hence community hall is provided in this village.

13.3 About designs Suggestions/Benefit of the village

- The peoples are vegetables selling and buying easily and villagers are easy process of vegetables selling. Hence provided to vegetable market design provided to Makhiyala village.
- The villagers and nearest other peoples easily and speedily health issues solving. "Fashions come and go, but good health is a treasure it keep". Hence provided to clinic center in Makhiyala village.
- The peoples of the village can be knowledgeable. It can be developed the grasping power of students and peoples. Hence provided the Knowledge center in Makhiyala village.
- The peoples are celebrating of engagement, reception, birthday parties, wedding, social meetings. Hence provided the design of party plot in Makhiyala village.
- Community hall is public locations where members of community tend to gather for group activities, social support, public information, and other purpose. Hence provided to the community hall in Makhiyala village.

Chapter 14: Technical Option with Case Studies

14.1 Civil Engineering

14.1.1 Advanced Earthquake Resistant

- Earthquake resistant design of building depends upon providing the building with strength, stiffness and inelastic deformation capacity which are great enough to withstand a given level of earthquake-generated force.
- This is generally accomplished through the selection of an appropriate structural configuration and the careful detailing of structural members, such as beams and columns and the connection between them.
- But more advanced techniques for earthquake resistance is not to strengthen the building, but to reduce the earthquake-generated forces acting upon it.

❖ **Earthquake resistant design techniques for buildings and structures**

- Among the most important advanced techniques of earthquake resistant design and construction are:
  1. Base isolation
  2. Energy dissipation devices

❖ **Base isolation method**

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

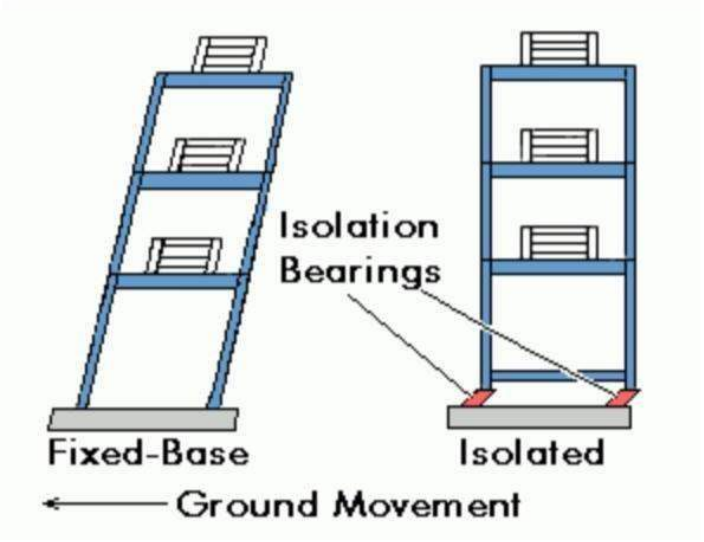
Figure No: 54 Base-isolation and fixed-based buildings

❖ **Earthquake generated forces**

- To get a basic idea of how base isolation works, examine figure 2. This shows an earthquake acting on both a base isolated building and a conventional, fixed-base building. As a result of an earthquake, the ground beneath each building begins to move. In Figure 2, it is shown moving to the left.
- Each building responds with movement which tends toward the right .the building undergoes displacement towards the right. The building's displacement in the direction opposite the ground motion is actually due to inertia. The inertial forces acting on a building are the most important of all those generated during an earthquake.
- It is important to know that the inertial forces which the building undergoes are proportional to the building's acceleration during ground motion.
- It is also important to realize that building don't actually shift in only one direction. Because of the complex nature of earthquake ground motion, the building actually tends to vibrate back and forth in varying directions.

❖ **Response of base isolated building**

- By contrast, even though it too is displacing, the base-isolated building retains its original, rectangular shape. It is the lead-rubber bearings supporting the building that are deformed.



- The base-isolated building itself escapes the deformation and damage, which implies that the inertial forces acting on the base-isolated building have been reduced.
- Experiments and observations of base-isolated buildings in earthquakes have been shown to reduce building accelerations to as ¼ of the acceleration of comparable fixed-base buildings, which each building undergoes as a percentage of gravity.
- As we noted above, inertial forces increase, and decrease, proportionally as acceleration increases or decreases.
- Acceleration is decreased because the base isolation system lengthens a building's period of vibration, the time it takes for the building to rock back and forth and then back again. And in general, structures with longer periods of vibration tend to reduce acceleration, while those with shorter periods tend to increase or amplify acceleration.
- Finally, since they are highly elastic, the rubber isolation bearing don't suffer any damage. But the lead plug in the middle of our example bearing experiences the same deformation as the rubber. However, it generates heat.
- In other words, the lead plug reduces, or dissipates, the energy of motion, i.e., kinetic energy- by converting that energy into heat. And by reducing the energy entering the

building, it helps to slow and eventually stop the building's vibrations sooner than would otherwise be the case, in other words, it damps the building's vibrations.

❖ **Energy dissipation devices**

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

1. Friction dampers: these utilize frictional forces to dissipate energy
2. Metallic dampers: utilize the deformation of metal elements within the damper
3. Viscoelastic dampers: utilize the controlled shearing of solids
4. Viscous dampers: utilized the forced movement of fluids within the damper

❖ **Fluid viscous dampers**

- General Principals of damping devices are illustrated through fluid viscous damper. Following section, describes the basic characteristics of fluid viscous damper, the process of developing and testing them, and the installation of fluid viscous dampers in an actual building to make it more earthquake resistant.

❖ **Damping devices and bracing systems**

- Damping devices are usually installed as part of bracing systems. Figure 3 shows one type of damper-brace arrangement, with one end attached to a column and one end attached to a floor beam. Primarily, this arrangement provides the column with additional support.
- Most earthquake ground motion is in a horizontal direction; so, it is a building's columns which normally undergo the most displacement relative to the motion of the ground. Figure 3 also shows the damping device installed as part of the bracing system and gives some idea of its action.

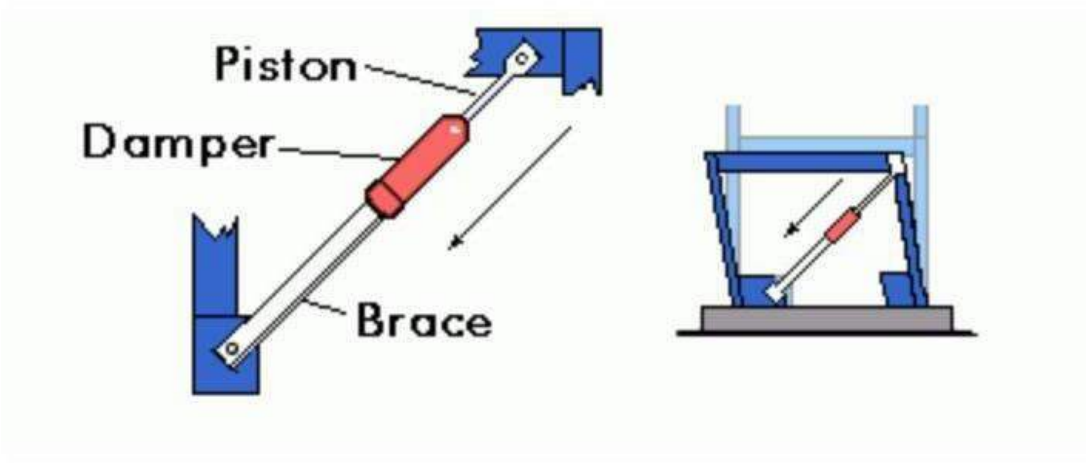


Figure No: 55 damping device installed with brace

14.1.2 Seismic retrofitting of building

- Seismic retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. With better understanding of seismic demand on structures and with our recent experience with large earthquakes near urban centers, the need of seismic retrofitting is well acknowledged.

- Seismic retrofitting techniques are required for concrete construction which are vulnerable to damage and failures by seismic forces. In the past thirty years, moderate to severe earthquakes occurs around the world every year. Such events lead to damage to the concrete structures as well as failures.

- Thus the aim is to focus on a few specific procedures which may improve the practice for the evaluation of seismic vulnerability of existing reinforced concrete buildings of more importance and for their seismic retrofitting by means of various innovative techniques such as base isolation and mass reduction.

- So, seismic retrofitting is a collection of mitigation technique for earthquake engineering. It is of utmost importance for historic monuments, areas prone to severe earthquakes and tall or expensive structures.

❖ **Need for seismic retrofitting**

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

❖ **Basic concept of retrofitting**

- Up gradation of lateral strength of the structure
- Increase in the ductility of the structure
- Increase in strength and ductility

❖ **Classification of retrofitting techniques**

1. Global
2. Local

1. Global techniques

- Adding shear wall
- Adding infill wall
- Adding bracing
- Adding wing wall
- Wall thickening
- Mass reduction
- Base isolation
- Mass dampers

2. Local techniques

- Jacketing of beams
- Jacketing of columns
- Jacketing of beam-columns joints
- Strengthening of individual footings

❖ **Adding new shear walls**

- Frequently used for retrofitting of non ductile reinforced concrete frame building.
- The added elements can be either cast in place or precast concrete elements.
- New element preferably be placed at the exterior of the building.
- Not preferred in the interior of the structure to avoid interior moldings.

Figure No: 56additional shear wall

❖ **Adding steel bracings**

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

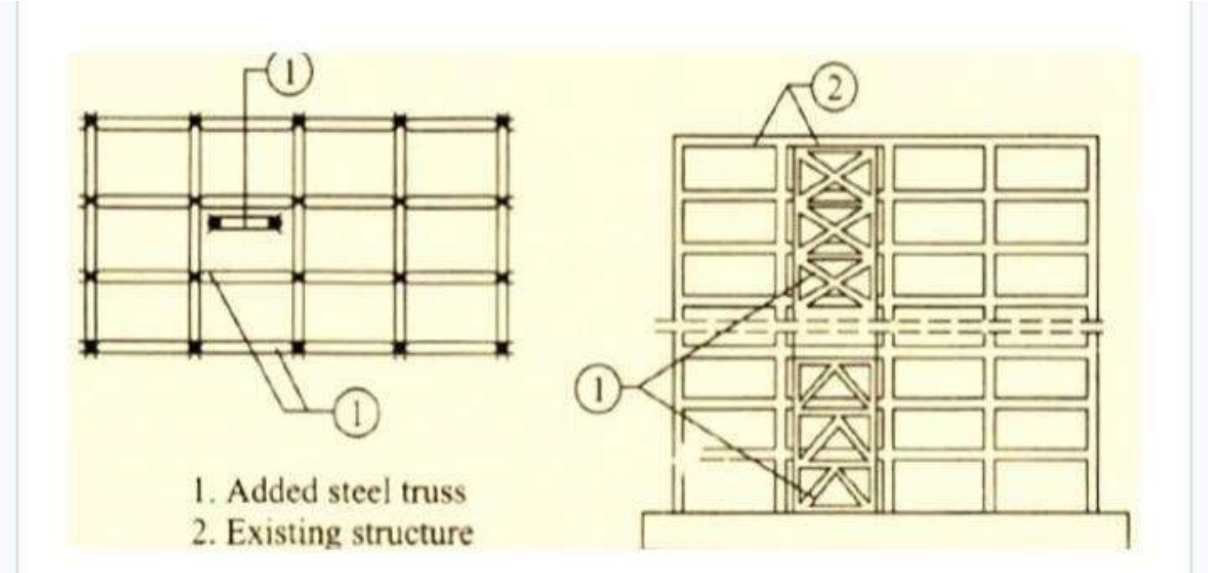


Figure No: 57 RC Building retrofitted by steel bracing

❖ **Jacketing (local retrofitting technique)**

This is the most popular method for strengthening of building columns.

- **Types of jacketing**
  1. Steel jacket
  2. Reinforced concrete jacket
  3. Fiber reinforced polymer composite(FRPC) jacket
- **Purpose for jacketing**
  1. To increase concrete confinement
  2. To increase shear strength
  3. To increase flexural strength

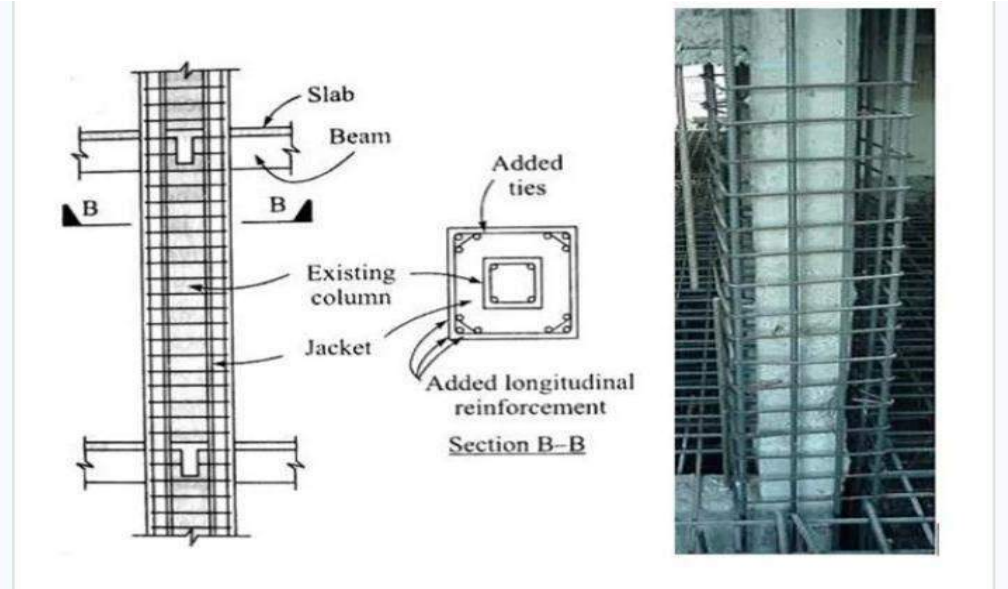


Figure No: 58 column jacketing

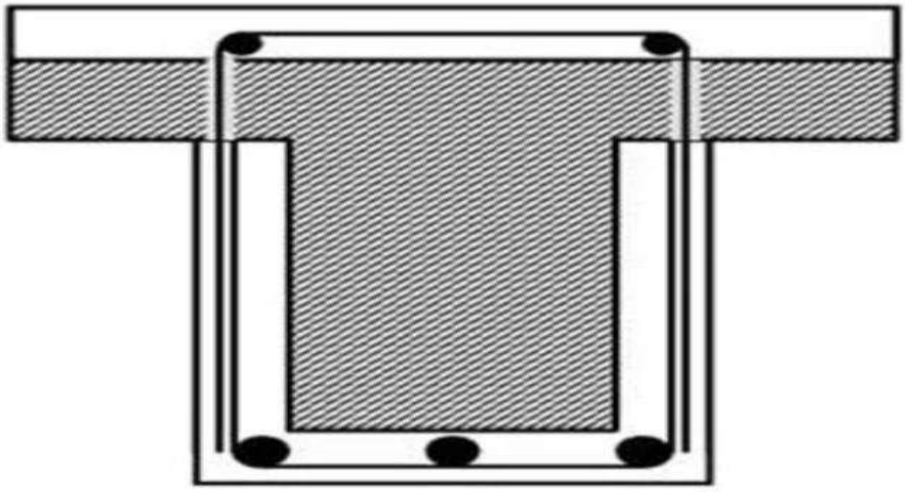


Figure No: 59 beam jacketing

❖ **Base isolation (or seismic isolation)**

➢ Isolation of superstructure from the foundation is known as base isolation. It is the most powerful tool for passive structural vibration control technique.

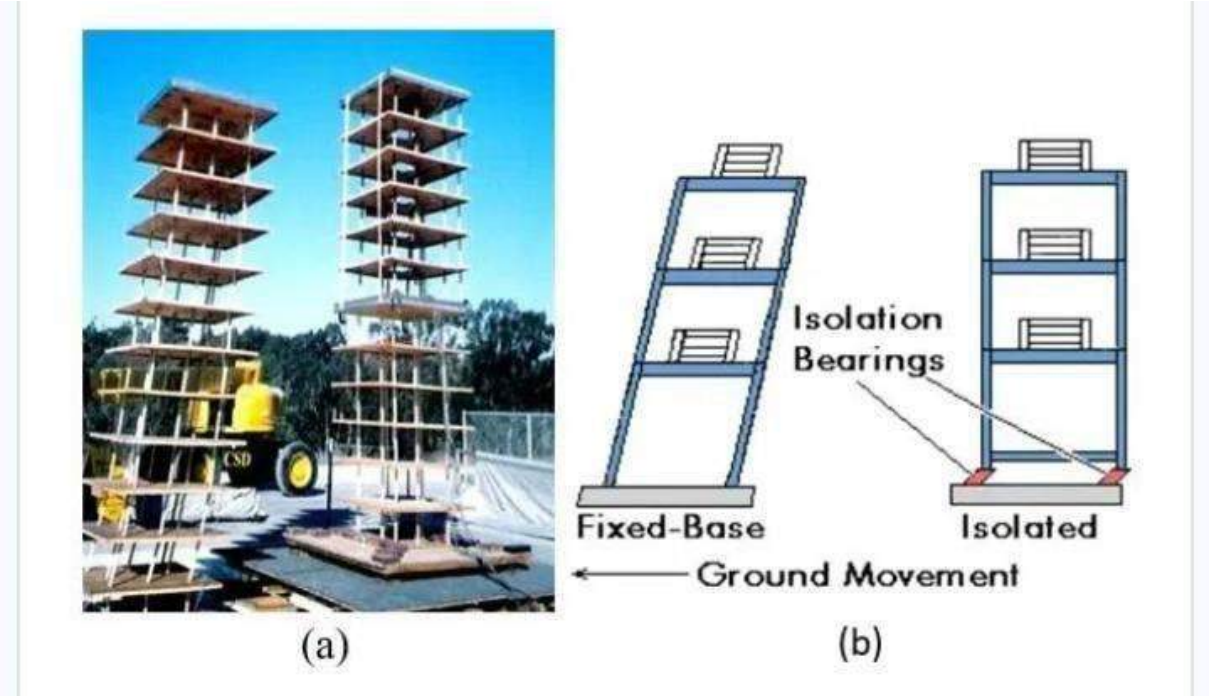


Figure No: 60 base isolated structure (a) model under test, (b) diagrammatical representation

❖ **Mass reduction technique of retrofitting**

➢ This may be achieved, for instance, by removal of one or more storey's as shown in figure 6. In this case it is evident that the removal of the mass will lead to a decrease in the period, which will lead to an increase in the required strength.

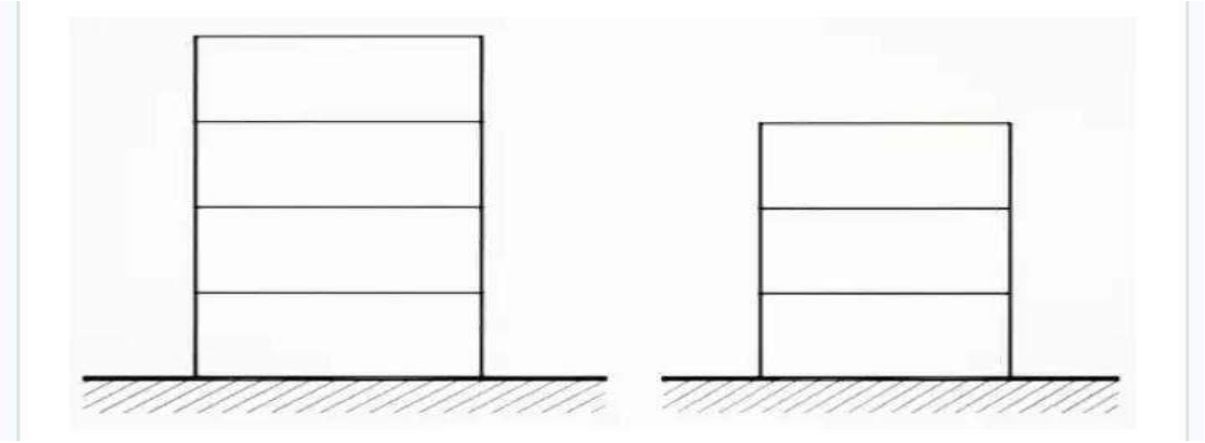


Figure 61 seismic retrofitting by mass reduction (removal of storey)

❖ **Wall thickness technique of retrofitting**

➢ The existing walls of a building are added certain thickness by adding bricks, concrete and steel aligned at certain places as reinforcement, such that the weight of wall increase and it can bear more vertical and horizontal loads, and also its designed under special conditions that the transverse loads does not cause sudden failure of the wall.

❖ **Conclusion – seismic retrofitting techniques for concrete structures**

- Seismic retrofitting is a suitable technology for protection of a variety of structures.
- It has matured in the recent years to a highly reliable technology.
- But, the expertise needed is not available in the basic level.
- The main challenge is to achieve a desired performance level at a minimum cost, which can be achieved through a detailed nonlinear analysis.
- Optimization techniques are needed to know the most efficient retrofit for a particular structure.
- Proper design codes are needed to be published as code of practice for professionals related to this field.

14.1.3 Advanced practice in construction field in modern materials, techniques and equipment's

- India is witnessing construction of very interesting project in all sectors of infrastructure. High rise structure, under construction, include residential/ commercial blocks up to a height of 320m and RC chimneys for thermal power stations expending upwards up to 275m. majority of the structures are in structural concrete. The functional demands of such high rise structure include the use of durable materials. High strength concrete, self-compacting concrete are gaining widespread acceptance. Apart from the basic structural materials, modern project require a variety of secondary materials, modern projects require a variety of secondary materials for a variety of purposes such as construction chemicals, waterproofing materials, durability aids etc. the paper highlights some of the recent developments.

❖ **High performance concrete**

- In the United States, in response to widespread cracking of concrete bridge decks, the construction process moved towards the use of high performance Concrete (HPC) mixes. Four types of HPC were developed:

- Very high early strength concrete – 17.5 mPa in 6 hours
- High early strength concrete – 42.5 mPa in 24 hours
- A very high strength – 86 mPa in 28days
- High early strength with fiber reinforcement

High performance concrete was introduce in India initially for the reconstruction of the pre-stressed concrete dome of the kaiga atomic power project, followed for parts of the reactors at tarapur and Rajasthan. Subsequently, a number of bridges and flyovers have introduced HPC up to M75 grade in different parts of India.

❖ **Air cleaning bricks**

- Indoor air quality (IAQ) is becoming a more important concern for commercial real estate as we gain a better understanding of how built environment affects the health of those who live and work in them. There is no shortage of ways to improve IAQ, but

most of them require active energy use to filter the air. That approach emits more carbon and other pollutants into the air over the long term.

- Carmen Trudell, assistant professor at cal poly san luis obispo's school of architecture, has invented a passive system that makes use of the bricks on the outside of the building to filter out the heavier particles in the air as it enters the space. The concrete bricks funnel air into an internal cyclone filtration section that separates heavy elements and drops them down into a hopper at the base of the wall. Clean air is then pulled into the building, either mechanically or passively, and maintenance can simply remove and empty the hopper on a periodic basis.
- In tests, the system removed about a third of fine particulate matter and 100 percent of coarse particles. Better still, trudell's system is inexpensive relative to alternative options, and she envisions using them in developing countries.

❖ **High volume fly ash concrete (HVFA)**

- The high volume fly ash concrete represents an emerging technology for highly durable and resource efficient concrete structures. Laboratory and field experience have shown that fly ash from modern coal-fired thermal power plants, when used in large volume (typically 50-60% by mass of the total cementations materials content), is able to impart excellent workability in fresh concrete at a water content that is 15-20% less than without fly ash. To obtain adequate strength at early age, further reductions in the mixing water content can be achieved with better aggregate grading and use of super-plasticizers.
- HVFA concrete has now been successfully used in a few sporadic in India. All SCC in India use HVFA, to the extent of 50% cement replacement. Some concrete roads being built by NHAI have also used HVFA concrete, including the four-lining of satara-kolhapur national highway.

❖ **Condensed silica fume(CSF)**

- Product of Ferro-silicon industry and present an imported product, easily available in the Indian market. The particle size is very small, about 100 times smaller than that of cement. It can occupy the voids in between cement particles in a concrete mix, reduce the water demand and thus contribute to a very dense concrete of high durability. Normally, 5-10% of cement can be replaced by CSF in order to produce durable concrete. The product is expensive and is used in developed countries only for very high strength concrete (above 75 mPa). Indiscriminate use of CSF for lower grades, barring exceptions, only increases the project cost without corresponding technical benefits. Even when used, the percentage replacement should be based on trial mixes in each case, which may vary from one to 10%. CSF may also be used for high performance concrete of lower grades.

❖ **Passive cooling ceramics**

- Air conditioning is an energy-intensive process that accounts for an outsized portion of global carbon emissions. Passive cooling methods have been used for centuries, but most

are ineffective when it's very hot outside and many conflict with, rathe than support, artificial cooling. Recently, however, students at the institute for advanced architecture of Catalonia's digital matter intelligent constructions studio have come up with a façade made of a clay composite and hydro gel that cools building the same way our skin cools our bodies.

- Our bodies sweat to cool us down. When our skin is wet, heat transfers into the water, and the hottest water particles evaporate, taking the heat away with them. This material functions in the same way. Water collect in the hydro gel droplets that are embedded in the clay composite. As the building heats up, heat is transferred to the water and then lost to evaporation. This effect happens much faster when it is hotter, meaning the system is also responsive to temperature conditions.
- The students responsible for the project found that it could produce up to a 6.4 degree centigrade reduction in temperature over the course of 20 minutes. In ideal conditions, this could lead to a reduction in air conditioning use of 28 percent, which would result in significant savings and reduction in carbon emissions.

- **Modern building construction techniques**
  - Building construction methods have experienced significant facelift in recent times with innovative technologies being harnessed optimally for improving the qualitative index of buildings.
  - This has spelled considerable advantages for end users like us who can remain immune from recurrent expenses on repairs and other incidental building-related jobs. Construction lead time has also been reduced and building costs have been rationalized.
  - This post takes you through 8 techniques that have given the much needed fillip to the most primitive human pursuit that still exists i.e. construction.

❖ **D Volumetric Construction**

- Using this modular construction technology, 3D units are produced in controlled factory settings using needful construction and building materials.
- Finished units are transported to site in various modules, basic structural blocks or final touched up units with all amenities installed, for assembly. Blocks can be erected rapidly

Figure No: 62 D Volumetric construction

1. Precast flat panel modules

- These are primarily wall and floor modules which are manufactured away from the actual site and then transported to site for erection. Load bearing components like decorative cladding and insulation panels can also be produced.
- Also called cross-wall construction, the technology has gained momentum due to seamless adherence to specifications and ease as well as swiftness of construction.

Figure No: 63 Precast flat panel modules

2. Tunnel formwork system

- With this tunnel technique, construction is paced up for cellular structures of repetitive patterns through the building of monolithic walls or units in a single operation per day.
- Expeditious work is achieved by deploying formwork and readily mixed concrete with the convenience and agility of factory conditions. formwork in tunnel form are stacked and used at the site with cranes.

Figure No: 64Tunnel formwork

3. Flat slabbing technology

- This technique utilizes the simplicity of contemporary formwork for quickly building flat slabs to facilitate easy and swift placing of horizontal amenities and for partitioning.
- Maximum of pre-fabricated services occurs as services can be carried out in an uninterrupted manner in zones underneath the floor slabs.

- Every top-notch building construction company is using the same as internal layouts can be conveniently modified for accommodating alterations at a later data. Further, reinforcement needed is lesser which cuts down labour costs significantly.

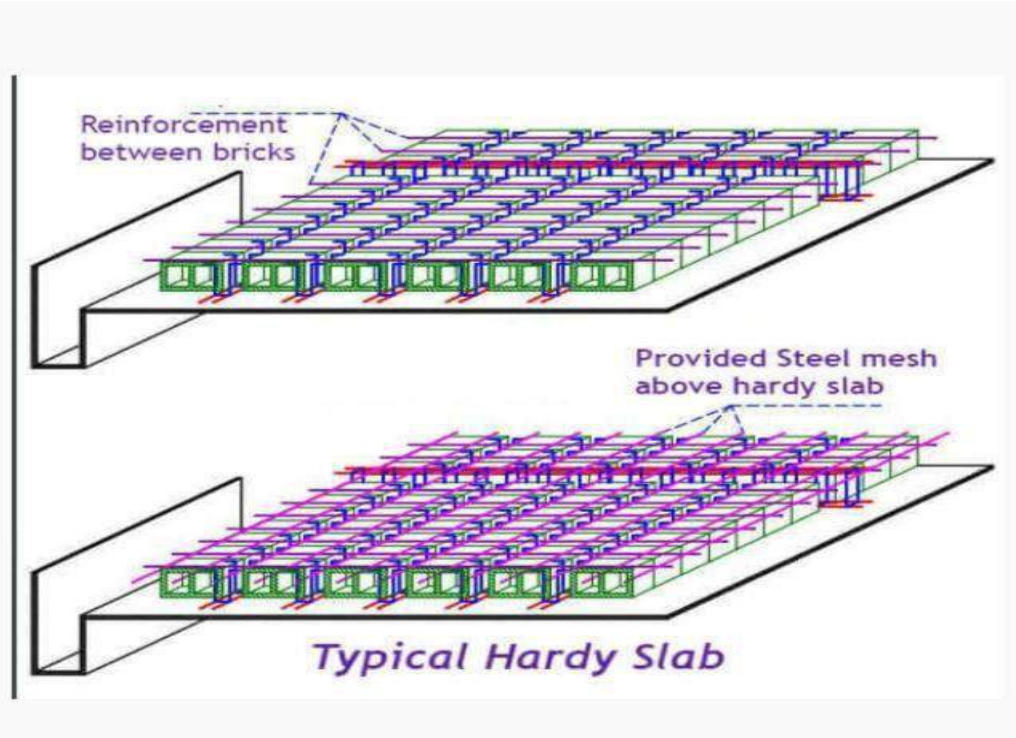


Figure No: 65 Flat slab techniques

4. Pre-cast foundation technique

- Foundation can be built swiftly with precast concrete units which are produced in a factory and are high on quality quotient. Strength is imparted to foundation related building construction materials through interconnected concrete piles.
- This technique allows construction work to progress even in inclement weather and minimized excavation activity.

Figure No: 66 Pre-cast Foundation

5. Hybrid concrete building technique

- This technique expedites construction turnaround time by blending the advantages of concrete pre-casting with the in-situ building. Quality improves, whereas the cost of construction plummets.
- Hybrid concrete structures are easy to build, competitive in nature and perform consistently.

Figure No: 67 Hybrid building technique

❖ **Modern construction equipment**

- Modern construction equipment play a vital role in the construction industry where business objectives are strictly time and margin driven. The modern construction equipment is very swift and reliable with high-quality control measures embedded into them as they have evolved over the years.
- Proper utilization of these equipment helps in the economy, quality, safety, speed and timely completion of the project. It optimizes the usage of material, manpower, finance and the shortage of skilled and efficient labor and at the same time keeps a direct check over the quality measures that are being used.
- The following machinery list helps any construction industry

1. Hydraulic mobile stone crusher
2. Self loading concrete mixer
3. Mini dumper
4. Concrete pipe truck
5. Excavators
6. Backhoe loaders
7. Bulldozers
8. Skid-steer loaders

9. Motor graders
10. Crawler loaders
11. Trenchers
12. Scrapers
13. Common dump trucks

❖ **Modern equipment used in construction**

➢ Depending on its application, construction machines are typically classified in one of four categories:-

❖ **Earth moving equipment**

➢ Construction methods there are many different types of earthmoving equipment, including excavators, loaders, motor graders, trenchers, bulldozers and backhoes. These machines are used to shift large amounts of dirt, big foundations, and landscape areas. Excavators, for example are commonly used to dig trenches, cut brush in forests, demolish building and dredge rivers. Backhoe loaders typically combined with a tractor and have a front bucket or shovel with a small backhoe in the rear.

❖ **Material handling equipment**

➢ Some of the most common types of material handling equipment include cranes, forklifts, hoists and conveyors. You'll often see cranes at construction site lifting and lowering heavy materials and transporting them to other areas. Cranes are operated by a series of cables and are frequently used in engineering projects that require temporary structures. Forklifts can be used everywhere from retail stores to warehouses and construction sites. Larger forklifts are able to lift about 50 tons.

❖ **Construction equipment**

➢ Construction equipment is a broad term to describe machines like concrete mixers, pavers, heavy-duty pumps, stone crushers, road rollers and tunneling equipment. Tunnel boring machines also known as moles are used to excavate underground spaces and are able to bore through sand, dirt and rock. Road rollers or roller compactors are engineering vehicles used to make concrete, soil or asphalt more compact. These are often used at construction sites, agricultural fields and waste landfills.

❖ **Engineering vehicles**

➢ The most common vehicles used at modern construction site are tankers, trailers and dumpers. They' are specifically designed for civil engineering tasks and often involve earth moving. Dumpers differ from dump trucks because their load is in front of the driver instead of behind the cab. Tip trucks are frequently used for mining and quarrying operations because they are durable and maneuverable.

❖ **Excavator construction equipment**

➢ Excavator is large machinery that can be driven on wheels or tracks, but tracks are more standard for such large machinery. An excavator has a long arm attached to a pivoting cab

that can rotate 360 degrees. The long arm is operated off the cab with a high vision facility.

❖ **Backhoe loader**

➢ Backhoe loaders have a body that is similar to a farm tractor an adjustable shovel is attached to the back for digging. This machine is in a medium-sized construction facility. It is capable of working in a limited space and it can perform various operations like moving dirt, backfill excavations, dig holes and trenches and place pipes and other materials. The bucket in the back can be changed to dig trenches of different widths.

❖ **Bulldozer**

➢ A bulldozer is a powerful, extremely heavy machine employed to move dirt. Bulldozer considered the strongest and most solid heavy machinery in the construction industry. Bulldozers have a wide, flat blade in front of the cabin and are operated using two hydraulic pistons to move the blade in a limited range of angles and depths. A bulldozer's heavyweight can crush the solid stones in the way of its operations.

14.1.4 Engineering Aspect Of Soil mechanics- Environmental Impact Assessment

❖ An environmental impact assessment (EIA) study plays a vital role and is a major prerequisite, in strengthening undertakings to prevent negative impacts, irreversible destruction and abuse of the environment of construction projects and activities. In most countries, it is a compulsory requirement for the approval of any infrastructure project with perceived substantial impacts on the environment. If properly conducted, it ensures an improved and effective project implementation. Hence, the expertise and financial capability of companies and the government can be put to use in the formulation of a meaningful EIA.

❖ In an ideal EIA assessed project, potential problems are addressed before the implementation stage to prevent any degradation in the environment. Among these potential problems are the geological hazards that can potentially threaten the environment and human lives if not mitigated appropriately. Geological hazards could negatively affect the value, integrity, and accessibility of a country's assets. Several studies have been conducted that assessed areas with high susceptibility to geological hazards and evaluated the disaster resilience capacity of the communities within.

❖ These geological threats include: compressible ground and shrink-swell soil, slope instability and landslides, ground dissolution, liquefaction and collapse, fluvial, coastal and groundwater flooding, aggressive ground conditions and mining hazard. Mining activities if not appropriately practiced will pollute surface and groundwater systems and slowly affect other extensive areas.

➢ **Integration of geotechnical / geological aspects in EIA**

➢ By integrating hydro geotechnical information, the argue that "the effects of projects on the environment (water and soil) are properly evaluated and mitigated where necessary". Some studies demonstrated that typical geotechnical engineering methods can be

integrated in the conduct of EIA such as the conduct of soil investigation and drilling up to 10m in depth, wherein soil and water samples were brought in the laboratory for analysis. Geotechnical engineering procedures are the first that are being conducted in any construction process, they are very significant because they influence the sustainability of the engineering structure. Geo-structure (slop, dams, retaining structures, foundation) are essential components of all infrastructures. The failure of these structure will undoubtedly pose threat and danger on the surrounding environment. The soil was fine-grained/ clay, with high plasticity overlying the aquifer. Flooding and erosion are the identified problems of the authors in the said area.

- **EIA in hydropower plant projects**
- A case study for a mini hydropower project in Sri Lanka is considered in a study. The project incorporates geological aspect in the conduct of EIA study. The main objective of the author is to identify the existing surface and subsurface geological conditions and describe the stability condition of the overburden soil and identify geological hazards for the main structure in the power plant. In this study, no clear methodology was stated . the results depended on interviews from the people around the area and field observation only. Nonetheless, they have determined the possible geological hazard of the project area. The authors have established that the project area was at moderate risk for a landslide. Additionally, the investigation has shown that exposed cuts during construction may lead to slope failures if left untreated. The bedrock was highly foliated and moderately jointed. The opening of joints and water leakage in the reservoir could occur due to some activities, if not properly executed.

- **EIA in waste facility projects**
- Municipal solid Waste (MSW) landfills are one of the engineering projects subject to geological hazards that need the integration of geological aspects in its EIA. MSW is a type of waste that is generated by humans on a day to day basis. They include liquid and gaseous wastes, garbage, industrial and agriculture wastes. The geotechnical aspects considered in MSW landfill design include the overburden in pressure due to the weight of the waste, settlement and bearing capacity of the soil. In landfill sitting, a broad understanding of the hydro geological characteristics of the area is needed. One study discussed the importance of geophysical and hydro geological techniques in identifying a suitable site for a waste facility. The identification process includes the characterization of the subsurface strata, location of the groundwater table and determination of the infiltration rates of the soil. A paper describes the environmental assessment process for the selection of solid waste disposal facilities for small communities. The process proposes decision parameters for landfill development and fills the gap in EIA with the stepwise procedure forwarded by the authors. Communities must remember that even when environmental conditions are good, there is still a chance that disaster can generate unimaginable losses when people are not prepared or informed about the impacts or risks of certain activities.
- **EIA In Mining Industry**
- Another necessary integration of hydro geological aspect in EIA studies is in mining sites, with particular focus on the groundwater system. Mining provides livelihood and power generation among other benefits to mankind. Mining, however, leads to adverse changes

in the quality of the air, water and soil. Mineral exploitation has historically caused extensive impacts on the environment.

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

❖ **Water supply**

- A water supply system is a network of pumps, pipelines, storage tanks and other appurtenances. It must deliver adequate quantities of water at pressures sufficient for operating pumping fixtures and firefighting equipment, yet it must not deliver water at pressures high enough to increase the occurrence of leaks and pipeline breaks. Pressure-regulating valves may be installed to reduce pressure levels in low-lying service areas.
- Water main supply pressure of 8-12 meter (25-40 feet) can supply a typical two-storey building, but higher building may need pressure booster systems.

❖ **Systems for boosting water pressure**

- Pumping from a ground level or basement gravity tank to a gravity roof tank.
- Pumping from a gravity storage tank or public water main into a hydro-pneumatic pressure tank that uses captive air pressure to provide adequate drinking- water supply pressure.
- Installation of booster pumps sets consisting of multiple staged pumps or variable speed pumps that draw water directly from a gravity storage tank or the public water main. Multistage booster pump sets typically include discharge pressure regulating valves to maintain a constant drinking- water supply pressure.
- Where booster pump sets are permitted to draw directly from public water mains, the public drinking-water supply must be adequate to meet the peak demands of all building area. Otherwise, there is a high risk of backflow and subsequent contamination of the main from building not equipped with a booster pump.
- Water must be stored on site during periods when adequate pressure is available to fill a gravity storage tank. The size of the storage tank will vary according to the daily water demand of the building, and availability of adequate pressure available in the public water mains.
- Multi-storey building can usually be divided into zones of water pressure control. The lower two to three storey's can generally be supplied directly from the pressure in the public water main. Upper storey's, usually in groups of five to eight storey's, can be supplied from pressure-boosted main risers through a pressure reduction valve for each group.
- System can be up-fed or down-fed. Up-fed systems usually originate from a pressure booster pump set or hydro-pneumatic tank in the basement of the building. Down-fed systems usually originate from a rooftop gravity tank. Where a building is divided into water pressure zones, care must be taken not to cross-connect the piping between two or more zones.
- Where hydro pneumatics tanks are used for storage, the tank is filled to one third to a half full by a float level device that controls the drinking-water supply source (a well pump or pressure booster pump). The pressure is maintained at the desired operating level by an air compressor. As the building uses water from the tank, the water level and air pressure

drop. When the water level drops to the "on" setting of the float level control, the well pump or booster pump starts and raises the water level in the tank to the "off" level. This restores the pressure in the tank.

- Hydro pneumatics tanks are typically made of steel or fiberglass and must be rated for the system operating pressure. Steel tanks must have a protective coating of suitable composition for drinking-water contact on the inside to protect the tank from corrosion and avoid contaminating the water.

❖ **Sewerage system(drainage system)**

- In the sewage system for a multi-storey's building, the drains from the plumbing fixtures are connected to vertical drain stacks that convey the waste and sewage to below the lowest floor of the building. The sanitary drainage system from a building should discharge to the public sewer by gravity. All plumbing fixtures located below ground level should be pumped into the public sewer or the drainage system leading to the sewer. The pump discharge rate should be controlled so as not to cause scouring of the internal bore of the pump line or the drainage or sewer system into which it discharges. High-velocity discharge rates may also cause the flooding of adjoining plumbing fixtures or overloading of the sewer itself. The sump pits for sewage pumps must have sealed covers, be vented to outdoors and have automatic level controls and alarms.

❖ **Vacuum drainage systems**

- In a vacuum drainage system, the differential pressure between the atmosphere and the vacuum becomes the driving force that propels the wastewater towards the vacuum station. Below provides a summary of the advantages and disadvantages of vacuum drainage system. Vacuum drainage systems should be considered when one or more of the following conditions exist:-
    - Water shortage
    - Limited sewerage capacity
    - Where separation of black water and grey water is desired
    - Where drainage by gravity becomes impractical

❖ **Advantages**

- Low installation costs
- Environmentally safe
- Electrical power only required at vacuum station
- Always self-cleansing
- No possibility of vermin in pipelines
- Possible water-saving technique if vacuum toilets used
- Ability to easily separate greywater and black water
- High turnaround time- no need for cistern to refill for subsequent flushes

❖ **Disadvantages**

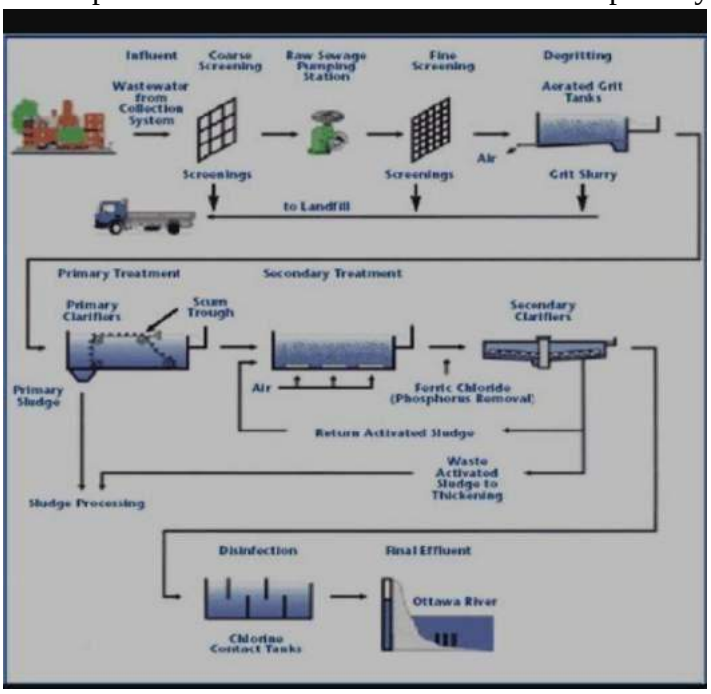
- High component costs
- Mechanical components possibility of failure
- Skilled design, installation and maintenance required regular maintenance required
- High velocity water may cause transient plumbing noise

❖ **Waste water**

- Waste water is water that has been used and must be treated before it is released into another body of water, so that it does not cause further pollution of water sources. Waste water comes from a variety of sources. Everything that you flush down your toilet or rinse down the drain is waste water. Rainwater and runoff, along with various pollutants, go down street gutters and eventually end up at a wastewater treatment facility. Wastewater can also come from agricultural and industrial waste water can be difficult to treat, whereas domestic wastewater is relatively easy to treat. Though it is increasingly difficult to treat domestic waste, due to increased amounts of pharmaceuticals and personal care products that are found in domestic wastewater.

❖ **Waste water treatment**

- There are several levels of wastewater treatment; these are primary, secondary and tertiary levels of treatment. Most municipal wastewater treatment facilities use primary and secondary levels of treatment.



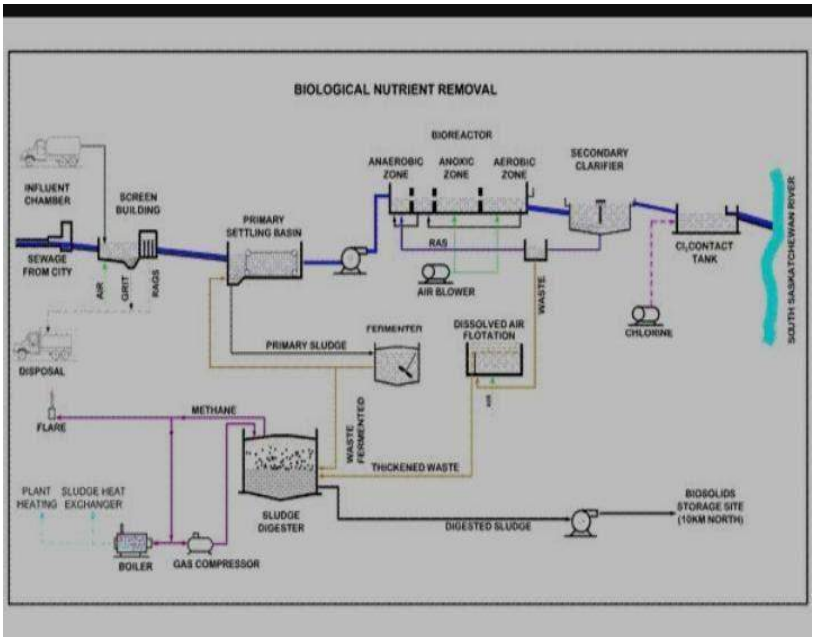
- The primary level of treatment uses screens and settling tanks to remove the majority of solids. This step is extremely important, because solids make up approximately 35 percent of the pollutants that must be removed. The screens usually have openings of about 10 millimeters, which is small enough to remove sticks, garbage and other large materials from the wastewater. This material is removed and disposed of at the landfill.
- The water is then put into settling tanks (or clarifiers), where it sits for several hours, allowing the sludge to settle and a scum to form on the top. The scum is then skimmed off the top; the sludge is removing from the bottom and the partially treated wastewater moves on to the secondary treatment level. The primary treatment generally removes up to 50 percent of the biological oxygen demand (BOD; these are substances that use up the oxygen in the water), around 90 percent of suspended solids, and up to 55 percent of fecal coli forms.

While primary treatment removes a significant amount of harmful substances from wastewater, it is not enough to ensure that all harmful pollutants have been removed.

- Secondary treatment of wastewater uses bacteria to digest the remaining pollutants. This is accomplished by forcefully mixing the wastewater with bacteria and oxygen. The oxygen helps the bacteria to digest the pollutants faster. The water is then taken to settling tanks where the sludge again settles, leaving the water 90 to 95 percent free of pollutants. The picture below shows the setting tanks in the Winnipeg wastewater treatment plant. Secondary treatment removes about 85 to 90 percent of BOD and suspended solid and about 90 to 99 percent of coli form bacteria.

- Some treatment plants follow this with a sand filter, to remove additional pollutants. The water is then disinfected with chlorine, ozone or ultraviolet light and discharged.
- The sludge that is removed from the setting tanks and the scum that is skimmed off the top during the primary steps are treated separately from the water. Anaerobic bacteria (anaerobic bacteria do not require oxygen) feed off of the sludge for 10 to 20 days at temperatures around 38 degrees Celsius. This process decreases the odor and organic matter of the sludge, and creates a highly combustible gas of methane and carbon dioxide, which can be used as fuel to heat the treatment plant. Finally, the sludge is sent to a centrifuge, like the one shown in the picture below. A centrifuge is a machine that spins very quickly, forcing the liquid to separate from the solid. The liquid can then be processed with the wastewater and the solid is used as fertilizer on fields.

- Tertiary (or advanced) treatment removes dissolved substances, such as color, metals, organic chemicals and nutrients like phosphorus and nitrogen. There are a number of physical, chemical and biological treatment processes that are used for tertiary treatment. One of the biological treatment processes is called biological nutrient removal (BNR). This diagram shows the treatment steps that wastewater goes through.



- In this treatment plant, wastewater first undergoes primary and secondary treatment. For the tertiary treatment, the BNR process occurs in the bioreactors. The BNR process uses bacteria in different conditions in several tanks, to digest the contaminants in the water. The three tanks have unique environments, with different amounts of oxygen. As the water has passes through the three tanks, the phosphorus is removed and the ammonia is broken down into nitrate and nitrogen gas, which other bacterial processes cannot do. The BNR process can remove over 90 percent of phosphates, while traditional processes remove much less than 90 percent. The water spends approximately nine hours in the bioreactors, before entering the secondary clarifier, which is a settling tank, where the bacteria-laden sludge settles to the bottom of the tank.

- Waste water is water that has been used and must be treated before it is released into another body of water, so that it does not cause further pollution of water sources. Waste water comes from a variety of sources. Everything that you flush down your toilet or rinse down the drain is waste water. Rainwater and runoff, along with various pollutants, go down street gutters and eventually end up at a wastewater treatment facility. Wastewater can also come from agricultural and industrial waste water can be difficult to treat, whereas domestic wastewater is relatively easy to treat. Though it is increasingly difficult to treat domestic waste, due to increased amounts of pharmaceuticals and personal care products that are found in domestic wastewater.

14.1.6 Technical Case Study

We have selected a construction site “Veraval-Talala Road” as a technical case study. It is located on the between Talala to Veraval. This is a Bituminous and RCC type of road. The project was awarded to “Digvijay Construction Pvt. Ltd.” to complete the contraction of project.

❖ **Design**

- The design of “Veraval-Talala Road” of length is 23.300 km. The width of the road 5m. Road are Bituminous and RCC types of road.
- The road chainage 2/00 to 25/300.

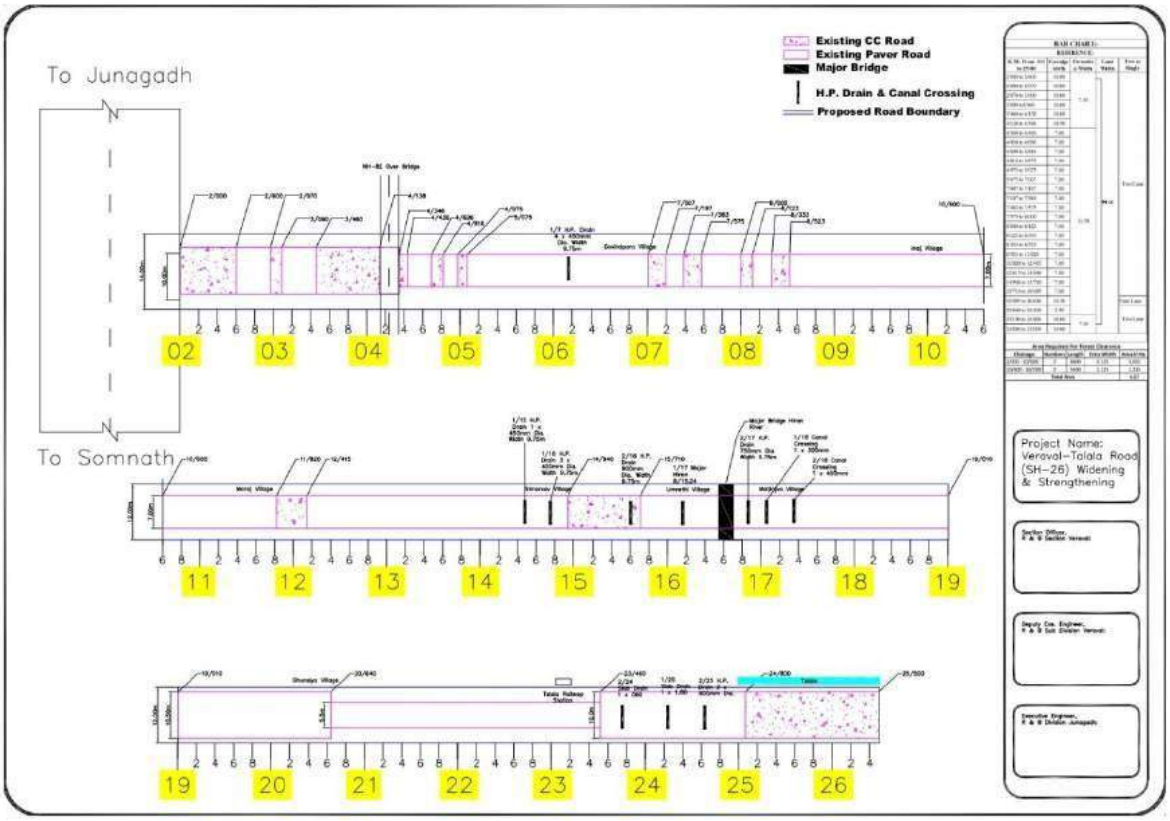


Figure No: 68 Road design

❖ **Road types Details**

Sr. No	Chainage	Pavement types
1	10/400 – 8/563	Bitumen
2	8/843 – 8/563	Bitumen
3	8/863 – 8/370	CC
4	8/563 - 8/370	Bitumen
5	8/370 - 8/159	CC
6	8/159 - 7/966	Bitumen
7	7/966 - 7/558	CC
8	7/588 - 7/367	Bitumen
9	7/367 - 7/160	CC
10	7/160 - 6/967	Bitumen
11	6/967 - 5/037	CC
12	5/037 - 4/936	Bitumen
13	4/936 - 4/737	CC
14	4/737 - 4/620	Bitumen
15	4/620 - 4/352	CC
16	4/352 - 4/263	Bitumen

Table No: 44 Road type details

❖ **Cost**

➢ The "Veraval-Talala Road" nearly cost is **Rs. 21, 95, 77,955.0400**.

❖ **Construction site**

➢ Construct by "Digvijay Construction Pvt. Ltd."

Figure No: 69 Bituminous Pavements

Figure No: 70 CulvertConstruction

Figure No: 71 Retaining wall Construction

❖ **Advantages**

- In road transport, routes and timings can be adjusted and changed to suit individual requirements with ease.
- The peoples are easily and speedily travel from one place to other place.
- The peoples are transport to goods speedily.
- Decrease the accidental issue.

❖ **Road map**

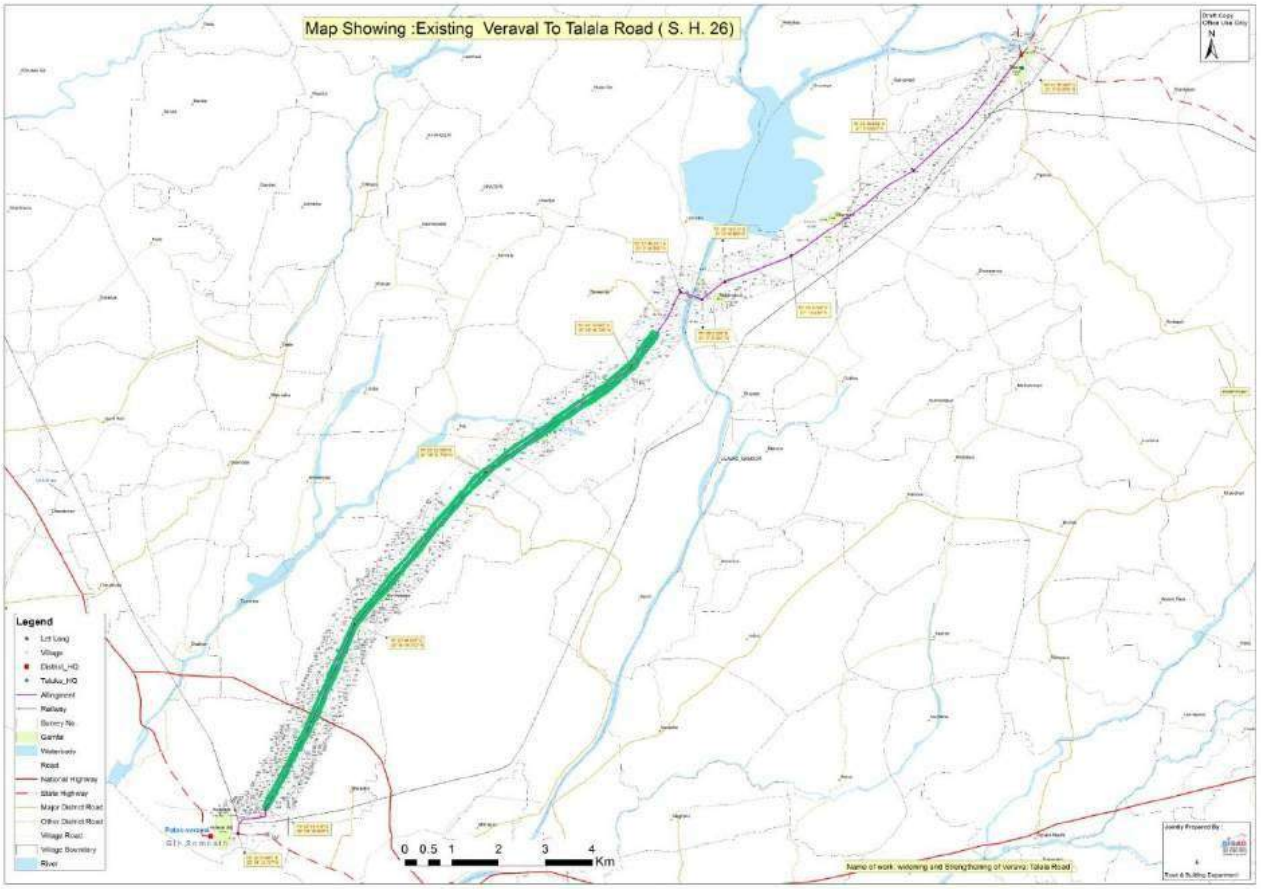


Figure No: 72Road map

Chapter 15: Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society

(For Makhiyala village development, villagers' happiness, comfortable and for enhancement of the village)

A) Immediately b) within 1 year c) Long term (3-5 years) along with cost estimation.

Sr. No	Design Name	Period to Implement	Amount (Rs)	Benefit
1	**PHYSICAL INFRASRUCTURE**			
	MEDICAL SHOP	Within 1 year	1,83,082	-Medicines are easily perches of village peoples
	CLINIC CENTER	Long Term (3-5 years)	7,55,000	-village people health issues are easy and speedily
2	**SOCIAL INNFRASTRUCTURE**			
	PUBLIC GARDEN	Long Term (3-5 years)	8,81,106	-Enjoyment & playing for village peoples and children -Extra activity
	COMMUNITY HALL	Long Term (3-5 years)	1,016,945	- For general meetings & other small functions -Helpful for awareness program
3	**SUSTAINBLE INFRASTRUCTURE**			
	SOLAR WATER PURIFIRE	Within 1 year	3,50,000	- clean and pure drinking water is available -reductions is illness -improvement
	VEGETABLE MARKET	Immediately	44,67,717	- Shopping of fresh vegetables
4	**SMART VILLAGE DESIGN**			
	INTERNET CAFÉ	Long Term (3-5 years)	2,47,000	-To easily online work of people
	KNOWLEDGE CENTER	Long Term (3-5 years)	7,00,000	-To increase people's knowledge
5	**SOICIO – CULTURE INFRASTRUCTURE**			
	PUBLIC LIBRARY	Immediately	6,73,600	-improve literacy and increase education functions
	PARTY PLOT	Within 1 year	7,62,933	-To perform any function

6	HERITAGE DESIGN			
	CHABUTARO	Immediately	1,21,663	-To drinking water the birds

Table No: 45 Design impact and society

B) If possible, List the sources of the funding available with the Village gram panchayat

- Fourteen (14th) finance commissions.
- ATVT Grant (Apno Taluko Vibrant Taluko)
- MLA Grant
- Member of Parliament Grant
- MGNREGA Grant (Mahatma Gandhi National Rural Employment Guarantee Act 2005)
- NREGA (National Rural Employment Guarantee act)
- Gram Panchayt Grant

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

Vishwakarma Yojana: Phase VIII

MAKHIYALA VILLAGE SURVEY

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

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?	Yes	Agricultural Production
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?	Yes	Kishan Sahkari mandali
6	Is women health awareness Program organized in village?	Yes	
7	Are women having opportunity to work and income?	Yes	
8	Child girl education is appreciated in village?	Yes	
9	Facility of vaccination to child is available in village?	Yes	In Sub-center
10	Are village people aware about child vaccination and done To each and every child as per norms?	Yes	
11	Women help line number information is provided to Village people?	Yes	
12	Is water scarcity in village? How many days per year?	Yes	Given in two days
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?	Yes	
16	Is any death of patient occurred due to unavailability of Medical facility in village?	No	
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age And type of disability and reason of disability.	Yes	Male Disability
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?	Yes	
20	Life Living standard of girls and women is appreciated And uplifted in village?	Yes	

Table No: 46 Survey by interviewing with Talati

Chapter 17: Irrigation / Agriculture Activities and Agro-industry. Alternate techniques and solution

- In many countries of the Mediterranean region, characterized by frequent drought periods, agricultural production often occurs under water deficiency or conditions that cause the depletion of the existing water resources. In these areas, the reuse of reclaimed wastewater for crop irrigation could contribute to mitigate/ decrease water shortage, support the agriculture sector and protect groundwater resources. The effects of irrigation with treated agro-industrial wastewater on soil properties, crops yield and qualitative traits of crop product, including their microbiological safety, were assessed. Groundwater (GW), secondary treated wastewater (SW) and tertiary treated wastewater (TW) from an innovative "on – demand" UV disinfection system were used to irrigate tomato and broccoli, cultivated in succession.
- The three irrigation water sources and the corresponding irrigated soils, plants and crop products were analyzed for the main physico-chemical characteristics, quail-quantitative parameters and fecal indicators. SW and TW showed higher values of the main physico-chemical parameters than GW. SW irrigated soil resulted in a significant increase of NH4-N, NA+ , SAR, EC during the first tomato crop cycle, and PH during the broccoli growing season. Irrigation with treated wastewater did not significantly affect the marketable yield nor the qualitative traits of tomato and broccoli crops, except for the NA+ and NO_3- content. High level of E. coli (limit for reuse), fecal coli forms and fecal enterococci (up to 10^4 CFU 100 ml^{-1}) were observed in the SW and, when chlorination was not done, in the TW. Nevertheless, E. coli was not isolated from any sample of soil, plant and crop product, probably due to its rapid die-off. Moreover, low concentrations of fecal coli forms and total heterotrophic count were found in plant and crop product. The drip irrigation system used, which avoided the close contact between water and plant, may have contributed to this. Under the conditions applied in this study, the reuse of treated agro-industrial wastewater for irrigation can be considered an effective way to cope with agricultural water shortage in the Mediterranean area.

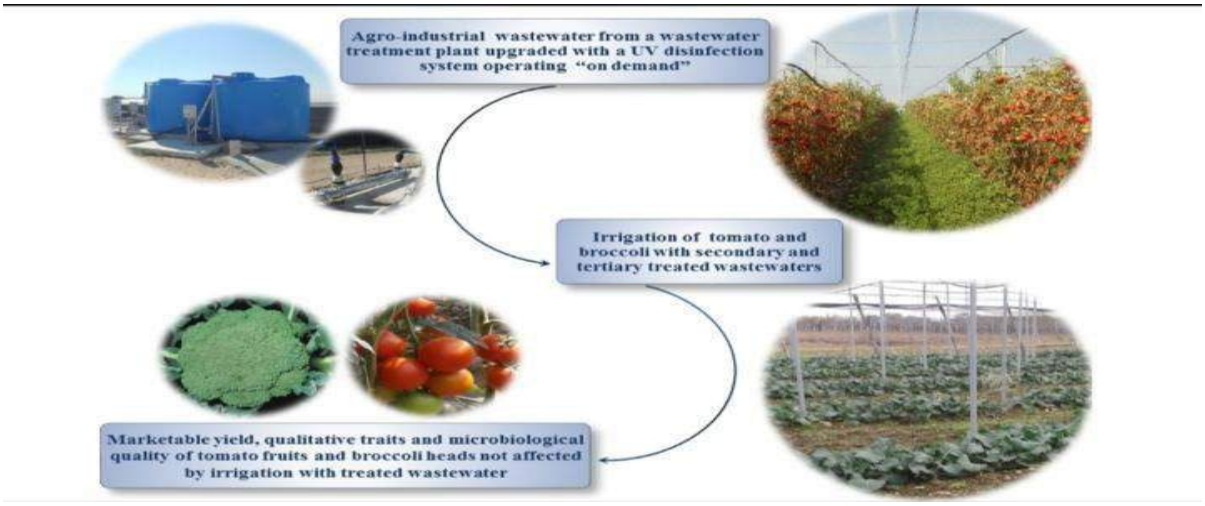


Figure No: 73 Agricultural

❖ Introduction

- A number of Mediterranean countries suffer from water scarcity, which has become severe in recent years due to global climate change causing frequent and long lasting periods of drought. Particularly during the summer, these areas experience severe water supply and demand imbalances. In the last decades, many Italian regions have faced the negative impact of drought and the resource scarcity has mostly penalized agricultural activities, which uses more than 50% of the total available water, while other high priority demands, such as those from civil and industrial sectors. Water shortage has a serious impact on the local economy, mostly based on agriculture.

- Treated municipal wastewater is the most readily available source of water to meet the increasing demand for crop irrigation. Indeed, in recent years, wastewater recycling in agriculture has gained importance as component of agricultural water supply in several water-scarce countries. Wastewater reuse not only provides significant amount of irrigation water, but also contributes to conserve potable resources and reduces the environmental impact related to the effluents discharge into water bodies. Furthermore, soil application of treated wastewater also constitutes a reliable source of nutrients (especially nitrogen, phosphorus and potassium) and organic matter useful for maintaining the fertility and the productivity of the soil. Treated wastewater use for crop irrigation can improve growth and yield of herbaceous species and can also enhance the economical benefits for farmers, due to reduced need for fertilizer.

- However, the chemical composition of wastewater has to be monitored to avoid imbalance in nutrient supply, which may result in excessive vegetative growth, uneven fruit maturity, reduced quality and quantity of yields. Treated wastewater should be used for irrigation under controlled condition, also to minimize hazards to agricultural products, soil and groundwater from toxic and pathogenic contaminants.

- Wastewater may contain a variety of pollutants, such as salts, heavy metals, organic compounds, enteric bacteria and viruses. An excessive accumulation of trace metals, such as Cd, Cu, Fe, Mn, Pb and Zn, in soil through irrigation creates problems for agricultural production and leads to metal uptake by crops, so affecting food quality and safety. One of the crucial issues in the reuse of treated wastewater for crop irrigation is the residual presence of pathogenic microorganism, which represents a potential health risk to consumers when they enter in food chain.

- In Italy, there are strict regulations for reclaimed wastewater reuse, especially for levels of some chemical compounds and for microbial parameters. With regard to microbiological contamination levels, the corresponding guidelines allow unrestricted crop irrigation with a bacteriological effluent quality characterized by less than 10 CFU 100 ml^{-1} of E. coli in 80% of samples.

- Several experimental evidences underline the effect on soil and yield of reclaimed urban wastewater application for vegetable and fruit crops irrigation in the Mediterranean area. Our research activity focuses instead on treated agro-industrial wastewater reuse in agriculture.

2. Materials and methods

2.1 Study area and experimental site

- The study was carried out in open field, from April 2012 to September 2013, in the north-west part of the Apulia region (southern Italy), at stornarella, in the Foggia district. The area is characterized by a Mediterranean climate, with air temperatures that drop below 0^0 in winter and exceed peaks of 40^0 C in summer. The long-term average annual rainfall is 590 mm, with precipitations unevenly distributed throughout the year and predominantly concentrated in the period from October to April. During the experimental period, the daily meteorological parameters, such as maximum and minimum air temperature, maximum and minimum air relative humidity, wind speed and total precipitation were recorded. These were measured by a weather station placed close to the experimental field and recorded using a data-logger.
- The study area is characterized by a widespread presence of agro-food industries specialized in vegetables processing. The experimental site was located within the fiordelisi agricultural and food manufacturing company. Fiordelisi's activity includes growing, processing, packaging and marketing of preserved, ready-to-eat vegetables, such as tomato, eggplant, zucchini and pepper. This activity involves the production of large quantities of wastewater that undergoes a purification process before being discharged according to local regulations. To this purpose, the Fiordelisi Company is equipped with a wastewater treatment plant (WWTP). The WWTP was upgraded in order to produce effluents suitable for reuse, thus supplying the two types of treated wastewater used for crops irrigation during the experimental period, one produced by the conventional treatment system and the other by the upgraded configuration. The reclaimed water was then used within a closed-circle system where the wastewater produced as a by-product from vegetables processing becomes a water resource for vegetable crops irrigation, according to the criteria of recycling treated wastewater as a component of agricultural water supply, in water-scarce environmental conditions.
- In the years 2012 and 2013, the Fiordelisi company produced about 1, 00,000 m^3y^{-1} of wastewater, mainly composed of washing and processing water (vegetables cooking, steaming, bottles washing etc.), water from cleaning floors and equipment, and toilet water. The wastewater was purified in the WWTP based on the following processes.
  1. Primary treatments, such as screening, oil removal, equalization, and PH adjustment
  2. Secondary treatments, such as activated sludge process and chemically assisted secondary sedimentation
  3. Tertiary treatments, such as chlorination, sand filtration, membrane ultra filtration and UV radiation.

- The effluent of the secondary sedimentation is called secondary treated wastewater (SW), whereas the UV outlet is called tertiary treated wastewater (TW). SW and membrane filtered effluent were conveyed to the respective 10 m^3 storage tanks. In order to maximize its effectiveness and save on energy costs, the UV disinfection system was operated in-line with irrigation. Thus the TW was disinfected just before being distributed to the plants. Periodical backwashing of the sand filter (15 min duration every 8 h of operation) and the ultra filtration membranes (30 sec duration every 45 min of operation) was performed with the membrane permeate. Membranes were also cleaned chemically

(with diluted soda and sodium hypochlorite) approximately every 10 days, according to the procedures suggested by the manufacturer. Membrane ultra filtration was monitored for the operating pressure and permeates flux.

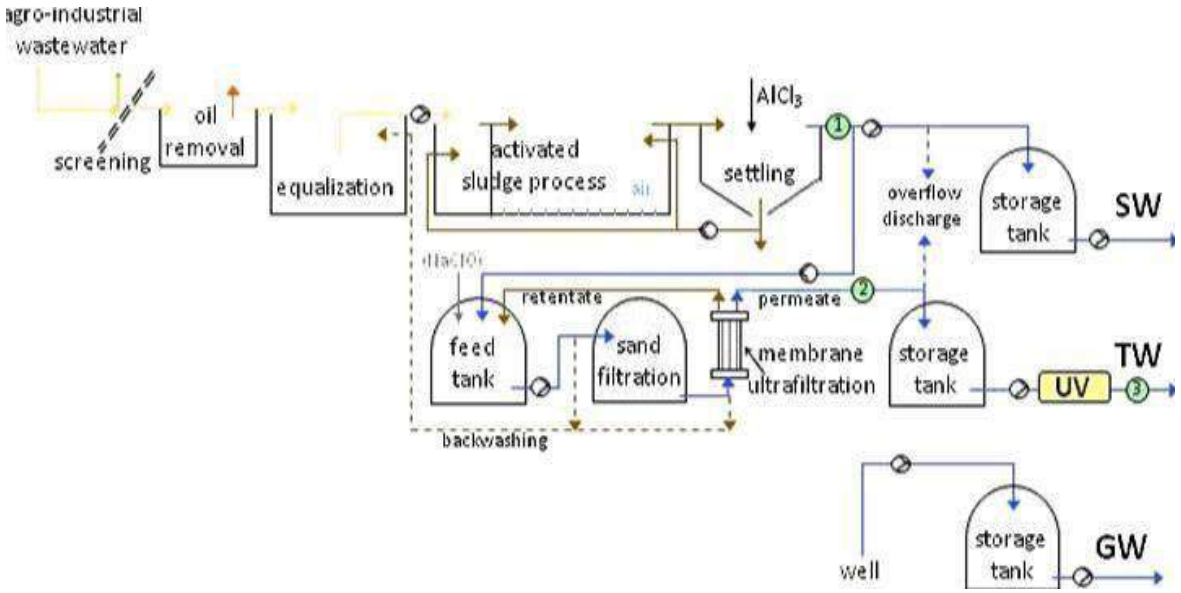


Figure No: 74 study area

- The wastewater treatment plant (WWTP) operated at Fiordelisi Company. The scheme shows the production processes of the two different types of reclaimed wastewater, before being used in the experimental field. In the figure, the supply scheme of GW is also reported.
- The experiments were carried out in a clay-loam soil (USDA classification), with a field capacity (-0.03 MPa) of 30.5% dry weight (dw), a wilting point (-1.5 MPa) of 15.9% dw and a bulk density of 1.4 Mg m^{-3}. The main physico-chemical properties of the 0-0.60 m soil layer of the experimental field, as characterized before trial started, are: sand, 40.1%; loam, 32.5%; clay 27.4%; organic matter 1.6%; Olsen p_2o_5, 80.1 mg kg^{-1}; ac-extractable k_2o 730.0 mg $kg^{-1;}$ total N, 0.8% ; mineral NO_3-N, 4.8 mg kg^{-1}; mineral NH_4-N 7.5 mg kg^{-1}; PH 7.9; electrical conductivity 0.5 ds m^{-1}; sodium absorption ratio of soil sutured paste extract (SAR) 4.9.

2.2 Crop rotation and agronomic conditions

- During the experimental period, three vegetable crops were grown in close succession: processing tomato, broccoli and processing tomato. Tomato, cultivar “manyla”, was transplanted as to the first crop cycle. Broccoli ibrid “partenon” F1, was transplanted. And tomato, cultivar “manyla”, was transplanted as the second crop cycle. The seedlings were transplanted in double rows (40 cm apart) spaced at 250 cm, at a distance of 30 cm along each single row, realizing a final plant density of 2.7 plants m^{-2}. Tomato and broccoli plants were grown under a net house structure, which was covered with an anti-hail net. In particular, tomato plants were grown vertically using nylon threads positioned between the plant collar and iron wires, arranged longitudinally in the direction of the plant rows and fixed to the upper part of the net house, at 2.5 m from the ground.

- During each growing season, the plants were irrigated whenever the soil water deficit in the effective root zone (0-50 cm in depth) was 40% of the total available soil water. This irrigation threshold was assessed through a continuous monitoring of the volumetric soil water content using probes operating in the frequency domain reflectometry and installed in each plot prior to crops transplanting at 5,15,25,35 and 45 cm soil depth. At each irrigation, the soil water content was increased to field capacity, with a water volume varying from 100 to 400 m^3ha^{-1}, depending on the crop growth stage. The seasonal irrigation volumes were 4957 m^3 ha^{-1} for tomato crop, 922 m^3 ha^{-1} for broccoli crop and 4070 m^3 ha^{-1} for second time tomato crops. A drip irrigation method was used for the three crops. This comprised single drip line, with drippers at 21 h^{-1} flow rate, spaced every 40 cm, and placed in the middle of each couple of plant rows. During the two tomato crop cycles, the drip lines were placed under a black plastic mulching film.
- All agricultural management practices, including fertilization, weed and pest control applied to the three crops, were performed according to the agronomic techniques commonly adopted by local farmers. Before transplanting, the soil was sub soiled to a depth of 45 cm and its surface was milled. A pre-transplanting fertilization was then applied by distributing 35 kg ha^{-1} and 70 kg ha^{-1} P_2O_5 Before the two tomato cropping cycles started, and 21 kg ha^{-1} and 35 kg ha^{-1} P_2O_5before the broccoli cropping cycle started. Throughout each of the two tomato crop cycles, 75 kg ha^{-1} and 100 kg ha^{-1} P_2O_5 were added through fertirrigation. During the broccoli crop cycle a top-dressing fertilization was applied to the soil by distributing 63 kg ha^{-1}.

2.3 Experimental layout

- During the first tomato crop cycle, two irrigation treatments were applied: irrigation with GW and irrigation with SW. during the broccoli and the second tomato crop cycles a third treatment was also considered: irrigation with TW. The tertiary treatment of wastewater produce by Fiordelisi Company was introduced in September 2012, just before the start of the broccoli crop cycle, to produce effluents with lower suspended solids and microbiological pollution.
- GW represents the irrigation source normally used by local farmers for crop irrigation; it was withdrawn from a prelatic well located near the experimental field and stored in a 10 m^3 tank before being used for tomato and broccoli irrigation. GW, SW, and TW were directly pumped from their storage tanks to the drip irrigation system used for plants watering. As previously mentioned, TW was UV disinfected in-line with the distribution.

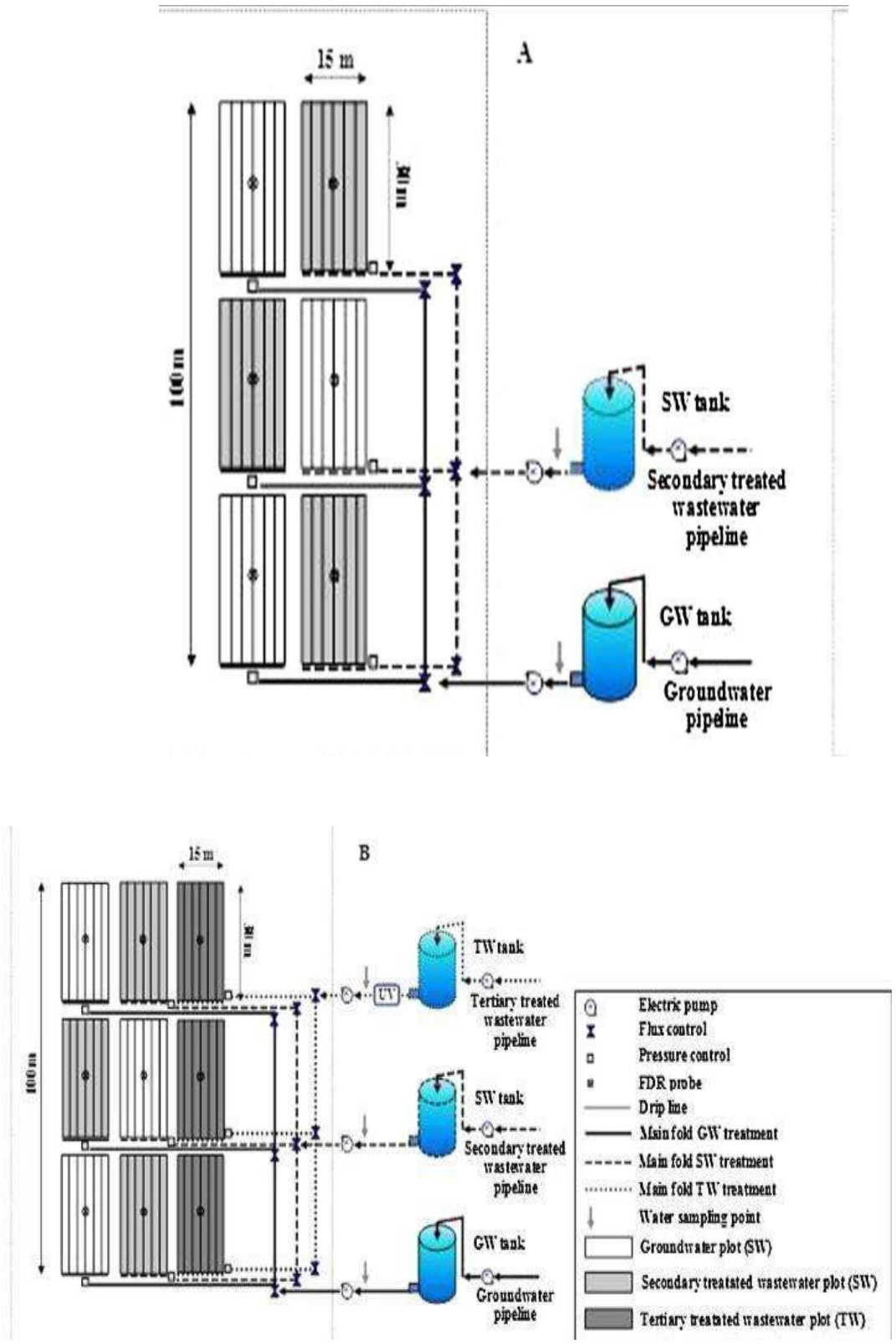


Figure No: 75 Experimental layouts

- Layout of the experimental field and irrigation system, during the tomato 2012 growing season (A); the broccoli 2012-2013 and the tomato growing seasons 2013 (B).
- The experimental field was arranged according to a complete randomized block design with the irrigation treatment , each one replicated three times for a total of 6 plots for the

first tomato crop (2 irrigation treatment *3 replicates) and 9 plots for the broccoli and the second tomato crops (3 irrigation * 3 replicates).

2.4 Water, soil, plant and crops product sampling

- The raw agro-industrial wastewater produced by Fiordelisi was collected after the equalization step. Samples of SW immediately after the settling process, sample of membrane permeate immediately after membrane ultra filtration and samples of TW immediately after the UV disinfection, were collected. Sampling was performed monthly. Irrigation water samples were collected monthly, over the whole irrigation period of each crop, after tank storage and immediately before their inlet in the irrigation system. At each sampling date, three samples of each water type were collected using sterile 1000-ml glass bottles and transported to the laboratory in refrigerated bags. They were then kept in a refrigerator at $+4^0$C, and examined within 24 hour of collection.
- Soil samples were collected in triplicate from the GW, SW and TW irrigated plots, before each crop transplantation and, at monthly intervals, during each crop cycle. All soil samples were taken from a 0-30 cm soil layer (high density root zone), from under the drippers, by using a soil auger. They were air-dried and passed through a 2 mm sieve, before the laboratory analysis.
- During each growing season, samples of tomato and broccoli plants were collected at the same time of soil sampling in triplicates from each experimental plot. Samples of tomato fruits and broccoli heads were collected at each harvesting date, from the sampling area of 20 m^2 of each experimental plot. Plants, tomato fruits and broccoli heads were immediately transported to the laboratory in refrigerated bags and analyzed within few hours from the sampling.

3. Conclusions

- In the present study, the long-term re-use of SW and TW for irrigation of tomato and broccoli crops cultivated in close succession over a period of three years was compared with conventional GW.
- SW and TW, deriving from reclamation process of wastewater produced by an agri-food company which cultivates and processes vegetables, were characterized by higher levels of several chemical parameters than GW. The two treated agro-industrial wastewaters showed higher content of plant nutrients, such as NH_4-N, NO_2-N, PO_4-P, K^+, Ca^{2+}, Mg^{2+}, BOD_5, COD and TSS; on the contrary GW showed higher concentration of NO_3-N. Considering the seasonal irrigation volumes applied to tomato and broccoli crops during the experimental trial, a significant contribution of nutrients from the treated agro-industrial wastewater have been observed. Particularly high resulted the potassium supply. For GW a high NO_3-N contribution was detected. Under the conditions of this study, the findings of the experimental activity indicate that treated agro-industrial effluents have the potential to provide good amounts of nutrients which would be taken into account by farmers in the crop in the fertilization plans.

Chapter 18: Social Activity

❖ **Clean India**

- Clean India and green India are the two sides of one coin, i.e., sustainable development in India. Clean India or swatch Bharat Abhiyan (SBA) was the dream of the father of the nation.
- A clean India would be the best tribute India could pay to Mahatma Gandhi on his 150 birth anniversary in 2019.
- Mahatma Gandhi was mindful of the poor position of Indian rural people at that time and he dreamt of a cleaner India, where he emphasized on cleanliness and sanitation as an intact function of surviving.
- In June 2014, the then president of indiapranab Mukherjee in his address to parliament said, "for ensuring hygiene, waste management and sanitation across the nation a "Swachh Bharat Mission" will be established. This will be our tribute to mahatma Gandhi on his 150th birth anniversary to be celebrated in the year 2019".

Figure No: 76

❖ **Green India**

- Green India mission is a national mission under of the National Action Plan on Climate Change (NAPCC), recognizes that climate change phenomena will seriously affect and alter the distribution, type and quality of natural of biological resources of the country and the associated livelihoods of the people.

Figure No: 77

Chapter 19: SAGY Questionnaire

SANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Makhiyala Gram Panchayat: Makhiyala Ward No. 2

Block: Junagadh District: Junagadh

State: Gujarat L S Constituency: Junagadh

1. Family Identity and Size

Name of Head of Household	Arjanbhai Nathabhai Nandania						Male/ Female	M
SECC Survey ID:		Family Size	6	Over 18	5	6 to 18	1	Under 6	0

2. Category & Entitlement Details (Tick as appropriate)

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

2. Adults (above 18 years)

Name	Age	Sex M/F/O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/N)	Bank A/C (Y/N)	Social Security Pension[5]
Arjanbhai	48	M	N		10	Y	Y	0
Hiriben	45	F	N		8	Y	Y	0
nathabhai	72	M	N		6	Y	Y	0
Uji ben	70	F	N		3	Y	N	0

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
kishan bhai	18	M	N		12 Pass	Y	1st year	Y
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—

4. Children below 6 years

Name	Age	Sex M/F/O	Disability Yes/No	Going to School (Y/N)	Going to AWC Y/N	De-worming Done	Fully Immu-nised Y/N	Mother's Age at the time of Child's Birth
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—

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

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

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

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

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

NSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

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	N	Y
Children	N	N

9. House & Homestead Data

Own House: Yes / ~~No~~	No. of Rooms: 2
Type: Kutcha / Semi Pucca / Pucca ✓	
Toilet: Private / Community / Open Defecation	
Drainage linked to House: Covered / Open / None	
Waste Collection System	Door Step / Common Point / No Collection System
Homestead Land: Yes / ~~No~~	Kitchen Garden : Yes / ~~No~~
Compost Pit: Individual/ Group/ ~~None~~	Biogas Plant: Individual/ Group/ ~~None~~

10. Source of Water (Distance from source in KMs)

Source of Water		Distance
Piped Water at Home	~~Yes~~ / No	
Community Water Tap	Yes / ~~No~~	
Hand Pump (Public / Private)	~~Yes~~ / No	
Open Well(Public / Private)	Yes / ~~No~~	
Other (mention):		

11. Source of Lighting and Power

Electricity Connection to Household: ~~Yes~~ / No
Lighting: Electricity/Kerosene/Solar Power
Mention if Any Other: _____
Cooking: ~~LPG~~/Biogas/Kerosene/Wood/Electricity
Mention if Any Other: _____
If cooking in Chullah: ~~Normal~~/ Smokeless

12. Landholding (Acres)

1. Total		2. Cultivable Area	
3. Irrigated Area		4. Uncultivable Area	

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	X
Sharecropping /Farming Leased Land	✓
Animal Husbandry	✓
Pisciculture	X
Fishing	X
Skilled Wage Worker	✓
Unskilled Wage Worker	✓
Salaried Employment in Government	X
Salaried Employment - Private Sector	X
Weaving	X
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	Kg	250
Bajaro	Kg	220

17. Livestock Numbers

Cows: ✓	Bullocks: X	Calves: X
Female Buffalo: ✓	Male Buffalo: X	Buffalo Calves: X
Goats/ Sheep: X	Poultry/ Ducks: X	Pigs: X
Any other: Type No		No.
Shelter for Livestock: Pucca / ~~Kutcha~~ / None		
Average Daily Production of Milk(Litres): 15		

18. What games do Children Play

No

19. Do children play musical instrument (mention)

Schedule Filled By: Yash and Happin
Principal Respondent:
Date of Survey: 17-03-2021

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: Makhiyala

b. Block: Junagadh

c. District: Junagadh

d. State: Gujarat

e. Lok Sabha Constituency: Junagadh

f. Number of Wards in the Gram Panchayat: _____

g. Number of Villages in the Gram Panchayat: _____

h. Names of Villages: Makhiyala

Demographic Information

Number of Households 777 Total Population 3687 Male 1922 Female 1765

SC HHs _____ ST HHs _____ OBC HHs _____ Other HHs _____

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	Y	—
b.	Nearest Primary Health Centre (PHC)	N	3 KM
c.	Nearest Community Health Centre (CHC)	N	—
d.	Nearest Post Office	Y	—
e.	Nearest Bank Branch (Any)	Y	—
f.	Nearest Bank with CBS Facility	N	12 KM
g.	Nearest ATM	Y	—
h.	Nearest Primary School	Y	—
i.	Nearest Middle School	Y	—
j.	Nearest Secondary School	Y	—
k.	Nearest Higher Secondary School / +2 College	Y	—
l.	Nearest Graduate College	Y	—
m	Nearest ITI / Polytechnic Centre	N	12 KM
n	Kisan Seva Kendra	Y	—

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	12 KM
p	Nearest Agro Service Centre	N	12 KM
p	MSP based Government Procurement Centre	N	12 KM
q	Milk Cooperative /Collection Centre	Y	—
r	Veterinary Care Centre	N	12 KM
s	Ayurveda Centre	Y	—
t	E – Seva Kendra	N	3 KM
u	Bus Stop	Y	—
v	Railway Station	N	4 KM
w	Library	N	12 KM
x	Common Service Centre	Y	—

IV. Sports Facilities in the Gram Panchayat

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

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 4

b. Number of villages without Angan Wadi Centres —

Names of such villages: —

c. Schools (Number)

Primary Private: — Primary Govt.: 1

Middle Private: — Middle Govt.: 1

Secondary Private: — Secondary Govt.: 1

Higher Secondary Private: — Higher Secondary Govt: 1

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention)	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)	Yes		✓			500M	
b.	Kerosene	Yes		✓			500M	
c.	Other (mention)	—						

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

VII. Coverage of Villages under different Facilities & Services

	Parameter	Villages Status[1]	Names of Villages Covered	Names of Villages not Covered
a.	Piped Water Supply Coverage to Villages	Covered ✓ well Not Covered	Makhiyala	
b.	Hand Pump Coverage in Villages:	Covered ✓ well Not Covered	Makhiyala	
c.	Coverage under Covered Drains:	Covered ✓ well Not Covered	Makhiyala	
d.	Coverage under Open Drains:	Covered ✓ Not Covered ✓ well	Makhiyala	
e.	Villages with Household Electricity Connection (Numbers)	Connected ✓ well Not Connected	Makhiyala	

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land		d.	Pasture / Grazing Land	0	g.	Check Dam	0
b.	Irrigated Land	1371.43	e.	Forests/ Plantations	0	h.	Wells/Bore Wells	
c.	Un-irrigated Land		f.	Other Common Land	—	i	Tanks /Ponds	4

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

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	
b)	Number of Households receiving pension (old age, widow, disability)	
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	
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'

Yash Kamgiya Happin Rabadiya Surveyor	ગ્રામ પંચાયત-માખીયાળા PRI Respondent (Preferably Gram Panchayat Chairperson)	સરપંચ ગ્રામ પંચાયત-માખીયાળા Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	28/4/2021 Date of Survey

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

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: Makhiyala
b. Ward Number: _____
c. Gram Panchayat: Makhiyala
d. Block: Junagadh
e. District: Junagadh
f. State: Gujarat
g. Lok Sabha Constituency: Junagadh
h. Number of Habitations / Hamlets in the Gram Panchayat: _____
i. Names of Habitations / Hamlets: Makhiyala

Demographic Information

Number of Households 777 Total Population 3687 Male 1922 Female 1765

SC HHs _____ ST HHs _____ OBC HHs _____ Other HHs _____

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	Y	—
b.	Nearest Middle School	Y	—
c.	Nearest Secondary School	Y	—
d.	Kisan Seva Kendra	Y	—
e.	Milk Cooperative /Collection Centre	Y	—
g.	Health Sub Centre	Y	—
h.	Bank	N	4 KM
i.	ATM	Y	—
j.	Bus Stop	Y	—
k.	Railway Station	N	4 KM

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

1

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	N	12 KM
m	Common Service Centre	N	12 KM
n	Veterinary Care Centre	N	12 KM

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): _____

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

vii. Education, ICDS

a. Number of Anganwadi Centres: 4

c. Schools (Number)

Primary Private: 1 Primary Govt.: 1

Middle Private: - Middle Govt.: 1

Secondary Private: - Secondary Govt.: 1

Higher Secondary Private: - Higher Secondary Govt: 1

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

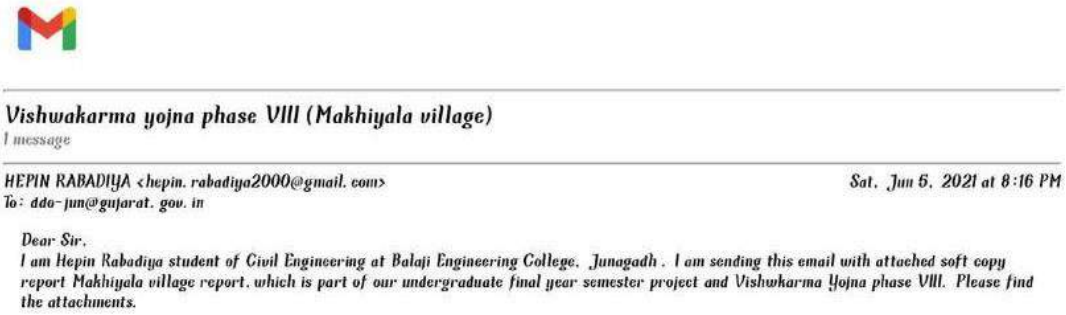
viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land		d.	Pasture / Grazing Land		g.	Check Dam	
b.	Irrigated Land		e.	Forests/ Plnatations		h.	Wells/Bore Wells	
c.	Un-irrigated Land		f.	Other Common Land		I	Tanks /Ponds	

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'

Yash Kyamgiya Happin Rabadiya Surveyor	સરપંચ ગ્રામ પંચાયત-માખીયાળા PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	સરપંચ ગ્રામ પંચાયત-માખીયાળા Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	28/4/2021 Date of Survey

Chapter 20: TDO-DDO-Collector email sending soft copy attachment in the report



Vishwakarma yojna phase VIII (Makhiyala village)
1 message

HEPIN RABADIYA <hepin.rabadiya2000@gmail.com> Sat, Jun 5, 2021 at 8:16 PM
To: ddo-jun@gujarat.gov.in

Dear Sir,
I am Hepin Rabadiya student of Civil Engineering at Balaji Engineering College, Junagadh . I am sending this email with attached soft copy report Makhiyala village report. which is part of our undergraduate final year semester project and Vishwkarma Yojna phase VIII. Please find the attachments.

Chapter 21: Comprehensive report for the entire village

- As per the guideline of Vishwakarma Yojana VIII we visited Makhiyala village is a Junagadh taluka Junagadh district of Gujarat state, India. It is located 14Km from Junagadh. Makhiyala village population is 3687.
- To know or to understand the actual necessities of village and interact with Sarpanch, Talati and other village dowelled.
- Techno-economic survey forms give much information about village by interacting with Sarpanch and Talati. But interactions with village dealers and observation of village condition are required.
- We visited all the internal part of the village and interacted with villagers directly and ask them about the present situation of village. We conducted a techno-economical the gap analysis and provided the necessary facilities to village. We saw that as per UDPEI Norma there are some non-adequate facilities.
- We provided Public garden, Medical shop, Public library, solar water purifier, Internet café and Chabutaro. Then in second stage we will provided Super market, Community hall, Party plot, Clinic center and Knowledge center. We explained all the parameter of various design such as sustainable, physical, social-cultural, smart and heritage village design.
- Over team of vy thanked all the member of the village for their support during this work period and made than understand that the implantation of such facilities can build implantations of such facilities can build a better village and hence lead to build a strongationc.
- The presentation was very much interactive and helpful to understand various amenities to be designed at village level for me overall development of the Makhiyala village as Rurbanisation.