DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
IsraVillage
Rajkot District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
Vadi Nirmal	Civil Engineering	180893106070
Vasoya Dharmik	Civil engineering	180893106074
Gadhvi Hiren	Electrical Engineering	180893109016

Shri Labhubhai Trivedi Institute of Engineering & Technology Rajkot.

Asst. Prof. Mehul M. Chavda

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

DETAIL PROJECT REPORT

ON

Vishwakarma Yojana: Phase VIII

AN APPROACH TOWARDS RURBANISATION

Isra Village
Rajkot District

Prepared By

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
Vadi Nirmal	Civil Engineering	180893106070
Vasoya Dharmik	Civil Engineering	180893106074
Gadhvi Hiren	Electrical Engineering	180893109016

Shri Labhubhai Trivedi Institute Of Engineering & Technology, Rajkot.

Asst. prof. Mehul M. Chavda

Year: 2020-21

Gujarat Technological University,
Chandkheda, Ahmedabad – 382424 Gujarat

CERTIFICATE

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

Detail Project Report for,

VILLAGE ISRA
DISTRICT RAJKOT

Under

Vishwakarma Yojana: Phase-VIII

In partial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA

During the academic year 2020-21.

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

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
Vadi Nirmal	Civil engineering	180893106070
Vasoya Dharmik	Civil engineering	180893106074
Gadhvi Hiren	Electrical engineering	180893109016

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

ABSTRACT

The major population of our country is living in villages which is around 833.1 million. In India major group of people in village is farmer and very few other groups. Some essentials and market centers are not near by the village and some basic facilities are also not there. Arable land is one of the major reason why they cannot go city for permanent base. Vishwakarma Yojana gives us a chance to show our gratitude to our nation development with the help of our knowledge and guidance by our professor we can give some basic important amenities which are not available in village like library, solid west management drinking water etc. This can be achived by considering various aspects such as physical, social, and Renewable infrastructural facilities. The concept of rurbanization at regeneration and revitalization of both the physical as well as social environment in villages. It is designed to reduce and remove the rural-urban divide and to lead to process of rural transformation that is not exploitative. Vishwakarma Yojana is an approach towards Rurbanization, it has been proposed to provide the benefit of real world experience to engineering student and apply their technical knowledge in the planning, development and management of rural infrastructure facilities.

According to Census 2011 information the location code or village code of Isra village is 360490. Isra village is located in Upleta Tehsil of Rajkot district in Gujarat, India. It is situated 7km away from sub-district headquarter is Upleta and it is 102 km away from district headquarter Rajkot. As per 2009 stats, Isra is also a gram panchayat. The total geographical area of village is 872 hectares. Isra village total population is 2164 peoples. There are about 457 houses in Isra village. Upleta is nearest town to Isra which is approximately 7km away.

The existing condition of village is adequate main source of drinking water like tap water, well, Bore well etc. To serve water in entire village it has one water tank with sufficient capacity. It Has quit good condition closed drainage system and good condition road network. For village development we design for public facilities are like public toilet and garden, Public Health centre, Community hall, Public library, Transport system etc.

In part 1 on the basis of survey data, which we have collected from Isra village and interaction with villagers, Sarpanch and Talati, we have finalized some designs for the further development of the village as, Bio gas plant, community hall, General shop. by introducing above mentioned amenities all the facilities can be made available to villagers which may reduce the migration. This will sustain the culture of cooperative living. Socioeconomic development will occur giving a sense of livehood to the dwellers yet maintaining the essence of a village. And in part 2 we have decide some design for future scope of the village development as, solid waste , internal road, library, recreational centre.

For future development of village we will give best design of public facilities for villagers.

Keyword: Primary school, Library, Public toilet, overhead water tank, Road network, Transportation system, Irrigation system, primary health center, sub center, smart farming technology.

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.

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

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

An act of gratitude is expressed to our internal guide / Evaluator / Nodal Officer, **Asst. prof. Mehul M. Chavda from college shree Labhubhai Trivedi Institute Of Engineering And Technology** for their invaluable guidance, constant inspiration and active involvement in our project work.

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

We are also thankful to **Ms. Darshana Chauhan, Vishwakarmrma Yojana**, for all support during our work. We therefore, take this opportunity for this Project work expressing our deep gratitude and sincere thanks for her cooperation to produce this project work in the present form.

Above all we would like to thank our Parents, family members and Friends for their encouragement and support rendered in completion of the present this work.

CONTENT

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

SHORT NAME/SYMBOL	FULL NAME
GSRTC	Gujarat state road transport corporation
GDP	Gross domestic product
NWDA	National water development agency
GOG	Government of Gujarat
GHB	Gujarat housing board
GUDA	Gandhinagar urban development agency
GEB	Gujarat electric board
G.L /L.L /S.L	Ground level / lintel level / slab level
HDPE	High density polyethylene
IL&FS	Infrastructure leasing and financial service limited
ITI	Industrial training center
IAY	Indira awasa yojana
ICAP	Integrated cluster action plan
IRDP	Integrated rural development programme
ICT	Information and communication technology
ITDP	Integrated tribal development programme
IMIS	Integrated management information system
IEC	Information, education ,communication
IPC	Interpersonal communication
JN NURM	Jawaharlal Nehru national urban renewal mission
KPO	Knowledge process outsourcing
KLD	Kilo liter per day
KV	Kilo volt
LED	Liquid emitting display
MLD	Million liter per day
MFAL	Marginal farmers and agricultural laboure agencies

Chapter: 1
Ideal Village visit from Kuvadva village of rajkot district of Gujarat state (Civil Concept)

1.1Background & Study Area Location

Background

We visited ideal village KUVADVA on 3th November, 2020. kuvadva is located near rajkot Taluka in Rajkot district in the state of Gujarat, India. The village is located at about 17 km from the District Rajkot. The village follows the Panchayati raj system from the 1950. There has been use of advanced technology in education. Some of the facilities provided by the panchayat include gutter project, health care center, banking facility.

In kuvadva village there are 2 private and 4 government schools and 6 Anganwadi are Exist. In these schools and college more than 3000 students are from the nearby Villages. There is also one private Arts college available in this village. In private schools, teaching is given by Modern technology like, projector.

(Fig 1. Kuvadva Village)

(Fig 1.Kuvadva village)

(Fig 2. Image of primary school & Aangandwadi of kuvadva village)

Study area Location

kuvadva is a village in Rajkot taluka in Rajkot district Gujarat state, India. It is located 17 KM towards from district head quarter. According to latest census report of 2011 Moviya village have 8214 population with 4240 Male &3974Female. Total land area of approximate 800(hector)

1.2Concept: Ideal Village

1.2.1Objectives

Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages. Contribute towards social empowerment by engaging all sections of the community in the task of village development. Create and sustain a culture of cooperative living for inclusive and rapid development.

Prevent distress migration from rural to urban areas, which is a common phenomenon in India's villages due to lack of opportunities and facilities that guarantee a decent standard of living. Make the model village a hub that could attracter sources for the development of other villages in its vicinity.

1.2.2 Live Case studies of ideal village of Gujarat

The Ideal village kuvadva have good Infrastructure facilities and Sufficient (24 hr) Electricity for Domestic as well as agriculture purpose. Also have transportation facility and connected to City or Town with good WBM road.

The village lanes and streets will be free of all avoidable dust. It will have houses of worship for all, also a common meeting place, a village common for gracing its cattle, a cooperative dairy, primary and secondary schools.

1.2.3The Idea of a model/Smart Village

The idea of an ―Adarsh Gram or model village has been explored earlier as well, most notably through the Pradhan Mantri Adarsh Gram Yojana, launched by the Central Government in 2009-10. The scheme was implemented in pilot mode in 1000 villages of Assam, Bihar, Himachal Pradesh, Rajasthan and Tamil Nadu, with an allocation of Rs 10 lakh per village. This limit was later raised to Rs 20 lakh per village.

The target villages under the scheme were those with more than 50% of the population belonging to Scheduled Castes (SCs). Additionally, State governments have also taken steps in this direction. Himachal Pradesh launched a Mukhya Mantri Adarsh Gram Yojana along similar lines in 2011, with the allocation of Rs 10 lakh per village.

1.2.4 Ancient History Civil / Electrical concept about Indian Village / Foreign Countries Perspective and its Development

India's history and culture are dynamic, spanning back to the beginning of human civilization. It begins with a mysterious culture along the Indus River and in farming communities in the southern lands of India. The history of India is punctuated by constant integration of migrating people with the diverse cultures that surround India. Available evidence suggests that the use of iron, copper and other metals was widely prevalent in the Indian sub-continent at a fairly early period, which is indicative of the progress that this part of the world had made. By the end of the fourth millennium BC, India had emerged as a region of highly developed civilization.

The Concept explores the idea of the Indian village in historical and contemporary context. It examines the ways in which this idea has ideologically interacted with the state. It brings out the reasons for the considerable analytical and theoretical significance that the idea of the village has had for Indian sociology. The Concept of villages is particularly concerned with the ideological and political implications of the idea of the village.

1.3Detail study (Socio economic, physical, demographic and infrastructure details) of Ideal village / Smart Village with photograph

Physical Infrastructure

- There are government and private schools, Aanganwadi, bank, post office and primary health Centre.
- There are 1152 houses in kuvadva village. 90% Pucca & 10% Kutchha houses are available. There are 1 overhead tanks one of 1,00,000 liter.
- There is no railway station in village. But Nearest railway station is available in Rajkot. It is far 18km from kuvadva village. In village 1 GSRTC bus stop having good condition. Also local transport facilities available like auto, chakkda etc.
- Good sanitation facility. In village there are 1 public toilet available. Main Source of Irrigation is well and bore wall and water of fulzar and macchu dam is avilable . Villagers need canal for better irrigation.

Sr no.	Facility	Adequate	Inadequate	Remarks
1	PHC centre	YES	-	30 bed
2	Private clinic	YES	-	1 nos.
3	Animal Hospital	-	YES	-
4	Aanganwadi	YES	-	6 nos.
5	Primary schools	YES	-	4 (gov), 2 (private)
6	Secondary School	YES	-	4 nos.
7	Higher sec. school	-	YES	-
8	ITI based training centre	-	YES	-

(Table 1 Infrastructure facility)

Social Infrastructures

- In Social Infrastructure facility village have Post office for Post and courier facilities.
- There is 1 Government CHC and 1 Privet hospitals are in village. Also bed facilities are available in both hospitals.
- There is 1 Community Hall available for functions. Community building require maintenance work.
- Birth and death registration office are available in gram panchayat.

(Fig 3. Public buildings of kuvadva)

Water

A over head water tank is available in the village. The capacity of this water tank is 1,00,000 liter. Tap water is distributed in the village through pipe lines. The main sources of water in the village is open well, tube well, river (fulzar river) etc.

Drainage system

Underground drainage system is provided in whole village. But there is not proper system for outlet of the waste water. Waste water is free away 2 km apart from village. There is no waste Water treatment plant. So, they people are not treated waste water as irrigation purpose.

Solid waste management

Village peoples are not using bio gas plant. They are taking waste from house to house. Gram panchayat provide a bucket to the all people for collection of the waste.

(Fig 4. solid waste collection van)

Electricity

There is a 66 KV sub-station that supplies power to the village. Jyoti gram electricity provides the electricity to the village. 700 street light is provided in the village. Villagers can get 24*7 electricity. Single phase and 3 phase electricity system is available for farmer. Farmer can get 8-hour 3 phase electricity.

Road

The approach road of village is black topped pucca road. The main road is WBM. And internal street is R.C.C. the nearest NH is Rajkot-Ahmadabad NH8A.

Demographical Growth

- The population of kuvadva was 5400 as per 2001 census of India, which increased to 8214 in 2011. As of June 2012, the population is 9000.

- In this village total no. of houses are 1552 and 4/5 people are educated in each home.

Census	Total Population	Male	Female	Total Household
2001	5400	2870	2530	1340
2011	8214	4240	3974	1552

(Table 2 Demographical growth of Kuvadva village)

Economic Profile

- In village there is more than 70% persons are farmers. They are directly dependent on their farm.
- Annually average income of farmers is 70000 to 80000 Rs perineum.
- Here 25 % persons are migrating persons.

Worker	Total	Male	Female
Main	2540	2238	302
Marginal worker	137	80	57
Total	2677	2318	359

(Table 3 Economical Profile)

Social scenario

All type of cast is staying in this village like, Patel (PL & KP), koli, Rajput, and all other. In which 80% people are Patel cast and then after comes koli cast.

Particulars	Total	Male	Female
Total No. of Houses	1552	-	-
Population	8214	4240	**3974**
Child (0-6)	825	448	**377**
Schedule Caste	526	288	**238**
Schedule Tribe	5	2	**3**
Literacy	**80.80%**	**86.35%**	**76.96%**

(Table 4 Social Scenario)

Resources available in Ideal Village

For an MP, there are 3 primary resource streams which can be utilized for this purpose. Funds under existing schemes across different sectors such as health, education, skill development, livelihood etc. could be utilized, and based on the specific demands of the village; resources could be channelized into the development of the village.

MPLAD funds (Rs 5 crore per year) could be utilized for the construction of high quality, sustainable assets such as school buildings, hospitals, Anganwadi Centers and school kitchens for Mid-Day meals. Funds could also be channelized into road construction, and the construction of toilets in schools and homes, particularly for girls.

1.4 SWOT analysis of Ideal village (kuvadva) / Smart Village

Strength	Weakness	Opportunities	Threats
Good transportation	Transportation density	Small occupation	Air pollution
Cleanness	Somewhere dusty area	Reduce waste generation	Land pollution
Road facilities	Road condition is good	Connectivity between all major and minor road network.	Good Condition

(Table 5 SWOT Analysis)

1.5Future prospects of village

kuvadva village sarpanch aim is to development of village with new systems and technologies. They want secondary treatment plant for recycle waste water into secondary treated water for useful in agriculture purpose. Requirement of solid and liquid waste management system, RO system in main streets where required for drinking water.

1.6Benefits of the visits of Ideal village / Smart Village

By visiting of ideal village, we get exact idea of basic physical as well as social infrastructure facilities of village and it should be in every village. By visiting ideal village, we are going to plan relevant changes in village given by GTU.As a making of ideal villages following things are should be present Good drainage, Good economic condition of person, Good housing condition, Commercial building should be required, Localities facilities should be required.

1.7Civil Engineering Benefits Available in Ideal Village

In ideal village So many structure, planning & management wise facilities available which are more than any other village. That happens because of only rubrics & rules of civil engineering conceptual fundamental studies.

As a making of ideal villages following things should be present

- Good drainage,
- Good economic condition of person,
- Good housing condition Commercial buildings.

Chapter: 2
ISRA literature review – (Civil & Electrical concept)

2.1 Introduction: Urban & Rural

Urban area:

An urban area is a human settlement with high population and infrastructure facilities of built environment. Urban areas 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, 4,041 statutory town and 3,894 census towns.

Rural area:

A rural area is a land that has few homes or other buildings, and not very many people. A rural areas population density is very low. Rural areas may develop randomly on the basis of natural vegetation and fauna available in a region. According to census 2011, there are 6,40,867 villages in India. The area where more than 75% of male population is associated with agricultural activity is known as rural area.

2.2Ancient Village / Different Definition of Rural Urban Villages

Village:

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:
3.A minimum population of 5,000; ii) At least 75 per cent of the male main working population engaged in non-agricultural pursuits.

2.3 Scenario: Rural/Urban India and Gujarat as Per Census 2011 and Least Population

Population Growth:

Population by Rural Urban Residence – India – 2011
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	83.3	9.1

(Table 6. Population of Rural and Urban areas as per census 2001 and 2011)

Population in crores in Gujarat

	2001	2011	Difference
Gujarat	5.06	6.04	0.98
Rural	3.16	3.47	0.31
Urban	1.90	2.57	0.67

(Table7. Population in Gujarat)

2.4 Rural Issues and Concern

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

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

2.5 Various Measures for Rural Development

Rural development is the national necessity and it has following measures: To develop living standard of rural mass.

- To develop rural youths, children etc.
- To develop infrastructure facility in rural area.
- To develop rural institutions like Panchayat, cooperatives, post, banking and credit etc. To develop agriculture, animal husbandry and other agricultural related areas.
- To provide minimum facility to rural mass in terms of drinking water, education, transport, electricity and communication.

2.6 Importance in rural context

- Attracting investment in rural area.
- Stimulate local economic development with emphasis on reduction of poverty & unemployed persons in rural areas.
- Spreading the development in the region.

2.7Sustainable Village Development Concept

Sustainable development is a organizing principle for sustaining finite resources necessary to provide for the needs of future generations of life on the planet. It is a process that envisions a desirable future state for human societies in which living conditions and resource-use continue to meet human needs without undermining the “integrity, stability and beauty” of natural biotic systems.

- Objectives of sustainable development:

1.Good health
2.Good quality education
3.Gender quality
4.Distribution of clean water and sanitation
5.No poverty

2.8 Other Projects / Schemes

Followings are the schemes or projects by govt. sector:
i) Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
ii) Pradhan Mantri Gram SadakYojana (PMGSY)
iii) Indira AwasYojana (IAY)

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

The MGNREGA was initiated with the objective of "enhancing livelihood security in rural areas by providing at least 100 days of guaranteed wage employment in a financial year, to every household whose adult members volunteer to do unskilled manual work". Another aim of MGNREGA is to create durable assets (such as roads, canals, ponds and wells). Employment is to be provided within 5 km of an applicant's residence, and minimum wages are to be paid. If work is not provided within 15 days of applying, applicants are entitled to an unemployment allowance. That is, if the government fails to provide employment, it has to provide certain unemployment allowances to those people. Thus, employment under MGNREGA is a legal entitlement.

Over the last decade it has been observed that more than half the NREGA funds have been spent on water related projects. This was very much needed because water bodies have been shrinking especially in rural India. India became a water deficient nation 5 years ago and every year since then the water level has been shrinking. Though over Rs 20,000 crores under MGNREGA has been spent each year during the last decade on developing rural water bodies, wells, aquifers, catchment areas they were not permanent assets.

ii)Pradhan Mantri Gram SadakYojna (PMGSY):
Pradhan Mantri Gram SadakYojana (PMGSY) was launched on 25th December 2000 as a fully funded Centrally Sponsored Scheme to provide all weather road connectivity in rural areas of the country. The program envisages connecting all habitations with a population of 500 persons and above in the plain areas and 250 persons and above in hill States, the tribal and the desert areas.According to latest figures made available by the State Governments under a survey to identify Core Network as part of the PMGSY program, about 1.67 lakh Unconnected Habitations are eligible for coverage under the program. This involves construction of about 3.71 lakh km. of roads 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 persons and above (500 persons 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 involve 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 comprises 60% up gradation from Government of India and 40% renewal by the State Governments.

iii)Indira Awas Yojna (IAY)

The objective of Indira AwaasYojana is 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.

2.9Ancient / Existing Electrical concept Literature Review for village Analysis on requirement of achieving smart power in a smart city

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

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

3.1 Concept, definition and Practices

Concept:

In a Smart Villages, access to sustainable energy services acts as a catalyst for Development – enabling the provision of good education and healthcare, access to Clean water, the growth of productive 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.

3.2 Bench Marks-Vision-Goals, Standards and Performance Measurement Indicators

In order to enhance and improve the quality of "public services", 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 of its services—which 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 in 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

1.Smart energy: Both residential and commercial buildings in smart cities are more efficient, using less energy, and the energy used is analysed and data collected. Smart grids are part of a development of a smart city, and smart streetlights are an easy entry point for many cities, since LED lights save money and pay for themselves within a few years.

Smart transportation:A smart city supports multi-modal transportation, smart traffic lights and smart parking. by making parking smarter, people spend less time looking for parking spots and circling city blocks. Smart traffic lights have cameras that monitor traffic flow so that it's reflected in the traffic signals.

2.Smart infrastructure:
Having a smart infrastructure means that a city can move forward with other technologies and use the data collected to make meaningful changes in future city plans.

3.Smart mobility:
Mobility refers to both the technology and the data which travels across the technology. The ability to seamlessly move in and out of many different municipal and private systems is essential if we are to realize the promise of smart cities. Building the smart city will never be a project that is "finished." Technology needs to be interoperable and perform to expectations regardless of who made it or when it was made.

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 (MoUD), among other things, area-based plans allow for the purchase 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 technology-based solutions for better traffic management. Pan city development plans for metros such as New Delhi and Mumbai have proposed smart parking to managed the increasing volume of cars while Agra has mooted the One Agra, one card' for cashless transaction across public transport systems, museums and other tourist attractions.

3.5 Issues & Challenges

The establishments 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 needs effective horizontal and vertical coordination between various institutions involving institutions providing various municipal amenities as well as effective coordination between central government (MoUD), 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

What is smart infrastructure?
Smart Information and Communications Technology (smart ICT) has the potential to transform the way we plan and manage infrastructure. New developments in computer hardware, new applications and software are changing the face of the infrastructure sector, and society more generally; driving greater efficiency, increasing productivity, and greatly simplifying construction processes and life-of-asset maintenance.

(Fig 5 . vad vajdi infrastructure facilities)

3.7 Cyber Security

Cyber security is concerned with the security of data, and the applications and infrastructure used to store, process and transmit the data. It is understood as the process of protecting data and info by preventing, detecting and responding to cyber security events. Such that events, which include intentional attacks and accidents, are changes that may have an impact on organizational operations.

3.8 District Cooling & Heating

Air condition from Hammond services:

In the Southeast, air conditioners are almost crucial pieces of equipment for home comfort. However, it can be difficult to find the right air conditioner 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. Get the most bang for your buck with an air conditioner that won‘t cost a fortune to run. If you‘re having trouble choosing an air conditioner for your home, contact us today – we can help you weigh your options!

3.9 Strategic Options for Fast Development

Strategy

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.

3.10India'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 function of a Government can be categorized into National, State and Local. Local Self-governments are those bodies that look after the administration of an area and small community such as small village, town or a city.

These bodies are appointed by the Government representing the local inhabitants, which raises its revenue partially through local taxation and other typres of means. The Local Self-Government can be divided into various classes like Corporations, Cities, Town Municipalities and Town Panchayat on the basis of population. The administration system has 3 levels: village, block and district. Panchayat operate at a village level.

The Panchayat of India are the local bodies working for the welfare of the village. Panchayat is a form of Indian political system which combines five neighboring villages known as panch.

3.12 Smart Initiatives by District Municipal Corporation

Rajkot Municipal Corporation set up 80 MLD plant for solid waste management at Madhapar:

RAJKOT: Rajkot Municipal Corporation (RMC) will set up a sewage treatment plant (STP)with capacity of 80 million liter per day (MLD) at Madhapar. This will increase the civic body's installed STP capacity to nearly 170 MLD in couple of years.

Deputy Chief minister Nitin Patel will lay foundation stone for the Rs 45.7 crore project at Madhapar. The central government has a approved 80 MLD plant under the AMRUT (Atal Mission for Rejuvenation and Urban Transformation). The Centre will contribute 33% towards the project, while state's share will be 37% and rest will be borne by the RMC. The new plant, with latest technology, will work according to new guidelines of the Central Pollution Control Board.According to RMC officials, the new STP will be take in operational in next two years and untreated sewage from various parts of the city will be treated at the new facility.

RMC's current capacity of treating sewage water is 95.5 MLD as against the 170 MLD sewage generation. Because of lower capacity, untreated sewage water is dumped into Aji (2) and Nyari (2) dams. These two water bodies are contaminated due to effluent being released into them, said

an official. There are two existing STPs in the city—one at Madhapar (44.5 MLD) and another at Raiyadhar (51 MLD).

3.13Any Projects Contributed Working by Government / NGO / Other Digital Country Concept

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.

3.14How 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. Then with the help of other government or private engineers, one can implement other countries smart villages projects in Indian village.

3.15 Electrical concept

Fig 6 . Roof top solar system

Most of village is covered with solar street light but we also need solar roof top system to produce more electricity and it is an economic way.

Chapter: 4
About Isra village

4.1 Introduction

Vishwakarma yojna would provide “design to delivery” solution for development of villages in “rurban”areas. Rural soul + urban amenities=R-urban town. Isra is a medium size village located in Upleta Taluka of Rajkot district, Gujarat.

4.1.1Introduction about Isra village details

Isra village 457 families residing. The Isra village has population of 2164 of which 1124 are males while 1040 female as per population census 2011. In isra village population of children with age 0-6 is 232 which makes up 10.72 percentage of total population of village. Avareage sex ratio of isra village is 925 which is higher than Gujarat state average of 919. Child sex ratio for the isra as per census is 706, lower than Gujarat average of 890.

Particulars	Total	Male	Female
Total no of house hold	457		
Population	2,164	1,124	1,040
Child(0-60	232	136	96
Schedule caste	327	179	148
Schedule tribe	0	0	0
Literacy	76.35%	83.60%	68.75%
Total worker	1,232	686	546
Main worker	938	-	-
Marginal worker	294	88	206

(Table 8.population in Isra)

4.1.2 Justification/ need of the study

The developmental work in villages that could under taken as per the need of the village includes, physical infrastructure facilities (water, drainage, road, electricity, solid waste management, strom water network, telecommunication & other), social infrastructure facilities (education, health, sanitation) socio cultural facilities (community hall, library, recreation facilities & other) and sustainable infrastructures (rain water harvesting, bio gas plant, eco toilets, solar street lights & other) for effective development of villages.

4.1.3Study area (broadly define)

rural development, it is process of improving the quality of life and economic condition of people living in rural villages. In general sense rural development means all around development of social, cultural and economic condition of the rural people in the country. Our government of india had taken some rural development action. Condition, income, employment opportunities and other infrastructure facilities etc.

- Lack of primary treatment and health center.
- Lack of institution for higher secondry level education.

- Need construction of each & every road of villages including street road and main road.
- Lack of technology for sustainable energy like solar energy.

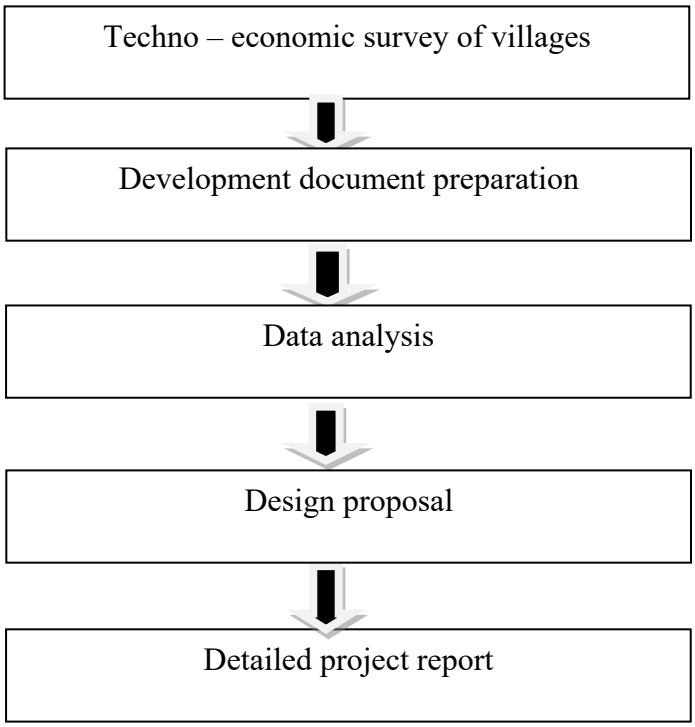
4.1.4 objective of the study

- "stop migration from rural to urban due to lack facilities and amenities of human being life structure."
- "to improve facilities in rural area for better development and reducing population growth of urban area."
- "creation of infrastructure – connectivity, civic and social infrastructure along with provision of alternative economy generation is the key pillars that the concept hinges on."

4.1.5 scope of the study

Rural development is continuos process with various infrastructure developments. Rural development is a dynamic process, which is mainly concerned with the rural areas. These include agricultural growth, putting up of economic and social infrastructure, fair wages as also housing and house sites for the landless, village planning, public health, education and function literacy, communication. The study will focus the development trend, intensity of growth of the village, and find out the problems related to the socio –cultural or physical development of the area, social infrastructure service, and the administrative system of the village.

4.1.6 methodology frame work for development of your village



4.1.7 Available methodology for development of related to civil/electrical

- Panchayat ghar
- Aanganwadi

- Primary school
- Under ground water tank
- Overhead water tank
- Drainage system
- Post office
- Roads
- Bus station
- Temples

4.2 Isra village study area profile

4.2.1 Study area location with brief history land use detail

(Fig 7. Isra village study area)

District	Rajkot
Taluka	Upleta
Total geographical area (ha)	872
Area under forest(ha)	84
Agriculture land(ha)	694
Barren and uncultivable land(ha)	-
Permanent pastures and grazing land((ha)	-
Area use for residing	30
Area use for irrigation	166

(Table 9.isra village land record)

4.2.2 Base location map, land map, gram tal map

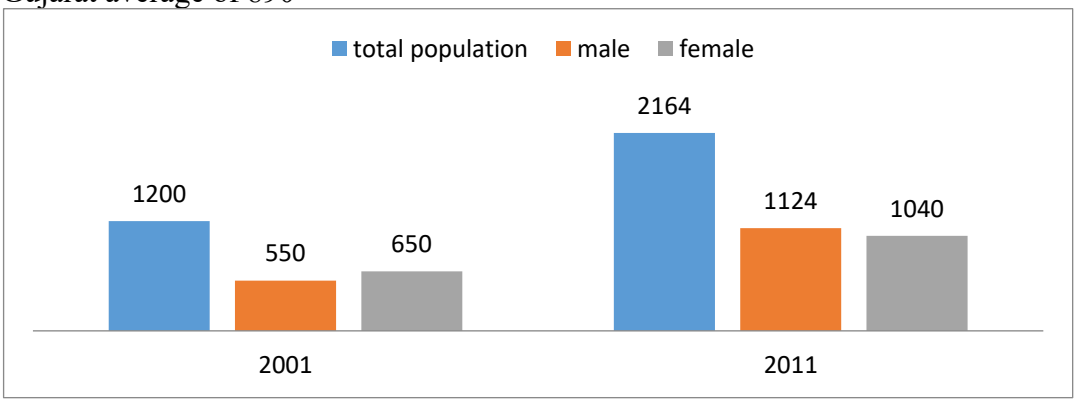
(Fig 8. location map)

(Fig 9. gramtal map)

4.2.3 Physical & demographical growth

Demographical growth

The isra village has population of 2164 of which 1124 are males while 1040 are females as per population cansus 2011.in isra village population of children with age 0-6 is 232 which makes up to 10.72% of total population of village. Average sex ratio of isra village is 925 which is higher than Gujarat state average of 919. Child sex ratio for the isra as per cansus is 706, lower than Gujarat average of 890



(Table 10.population indicate)

Physical growth

Sr no	Facilities	Available
1	water source	Narmada yojana and bhader dam (overhead tank and under ground sump)
2	Drainage	Underground drainage
3	Roads	WBM road kutchha internal road
4	Transportation	Private vehical and st bus

(Table 11.physical growth of isra)

4.2.4 Economic generation profile/ banks

	Total	Male	Female
Total worker	1232	686	546
Main worker	938	598	340
Main worker	487	325	162

cultivator			
Agriculture laboure	295	155	140
Household industries	5	2	3
Marginal worker	294	88	206
Non working person	932	438	494

(Table 12.economic generation)

4.2.5 Actual problem faced by villagers and smart solution

Problem 1-lake of sanitation facilities
Solution –provide a public toilet
Problem 2 – problem of higher education
Solution – provide secondary or higher secondary school
Problem 3- road facilities is not good
Solution – maintain & repair the road
Problem 4- drainage problem
Solution – economical design of drainage

4.2.6 Social scenario – preservation of tradition, festivals, cuisine

People are preserving the tradition with different type of activities which ancestors were did.

1) Learn about religious traditions
2) Follow up of family tree.
3) Acceptances of the change of life.
4) Share of art and technology

Festivals :- preservation of festivals is not a big deal because today's generation very well knowAnd enjoy those festivals. Holi, diwali, maker-sankranti, eid, etc.

Cusine :- it is depending on the caste and choice of particulars (gujarati, Punjabi, south-indian)

4.2.7 Migration reason/ trend

- unemployment is resuced and people get better job opportunities
- migration help in improving the quality of life of people.
- Migration of skilled workers leads to a greater economic growth of the region.
- Children get better opportunities for higher education.
- The population density is reduced and the birth rate decrease.

4.3 Data Collection Isra (Photograph/Graphs/Charts/Table)

4.3.1 Describe Methods for data collection

Personal interview survey is defined as one in which an interviewer is present to record the responses provided by the respondent in answer to a series of questions posed by the interviewer.Personal interview surveys have long been associated with our project, with home interview surveys providing the major means of data collection for the same.

4.3.2 Primary details of survey

- During primary survey work we have collected following details.
- Demographical detail
- Geographical detail
- Occupational detail
- Physical infrastructure facility

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

According to our survey there is total 30 hectors area of land usage for residing. This included 457 Houses which is recent no. of houses. Average area of house is about to 80 sqm per house. There are no such facilities of geo-tagging in house. But Under Digitalization Each Family Has cell phone facilities today. So that we can tag easily with any device of house.The village also having Mobile network tower & Communication facilities.

4.3.4 No of Human being in One House

No. of People in one House = Total population of people = 2164 = **5 People in one house**
Total no. of households 457

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

Pucca house the materials used for the construction like stone, brick, cement, concrete or timber. Houses made from mud, thatch, unburnt bricks, bamboos, grass, reeds or other low-quality materials are called kutcha houses.

Major economy of the village is agricultural activities so that, they bought construction material from other villages. And those materials are reinforcement steel, cement, standard brick etc.

4.3.6 Geographical Detail

Sr. No.	Description	Detail
1.	Area of Village (Approx.)	**872 hector**
2.	Forest Area	**84 hector**
3.	Agricultural Area	**694 hector**
4.	Residential Area	**30 hector**
5.	Other Area	**-**
6.	Distance to the nearest railway station	**Upleta – 7 Km**
7.	Name of the nearest town with Distance	**Upleta – 7 Km**
8.	Distance to the nearest bus station	**Isra – 0 Km**
9.	**Whether village is connected to all road for the any facility or town or City?**	**Yes**

(Table 13 Geographical Detail)

4.3.7 Demographical Detail

Particulars	Total	Male	Female
Total no of house hold	457		
Population	2,164	1,124	1,040
Child(0-60	232	136	96
Schedule caste	327	179	148
Schedule tribe	0	0	0
Literacy	76.35%	83.60%	68.75%
Total worker	1,232	686	546
Main worker	938	600	338
Marginal worker	294	88	206

(Table 14.demographical detail)

4.3.8 Occupational Detail - Occupation wise Details / Majority business

Name of Three Major Occupation groups in Village	**1.Farming**
	2.Laboure
	3.Marginal Activities

(Table 15.occupation detail)

4.3.9 Agricultural Details / Organic Farming / Fishery

In this village most of the peoples are doing farming. So, most of the income of the village is based on agriculture. About 457 People are Agricultural Labor according to census 2011. Main Occupation of Village is Agriculture activity. About 694 hector Land area is covered by Agricultural farming.

Major crops grown in the village	**1.Cotton**
	2.Groundnut
	3.Wheat

(Table 16. Major Crops)

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses

Sr. No	Facilities	Available
1.	Water Source	River and well
2.	Drainage	Underground Drainage (50%)
3.	Roads	Main Road =RCC Internal Street - WBM Roads State Highway (SH)
4.	Transportation	S.T Bus, Chhakda & Private Vehicle
5.	Electricity	Government (More than 6 Hours)
6.	Sanitation	Not available
7.	Irrigation	Main Sources – well and river
8.	Housing	80 % Pucca House

(Table 17. Physical Infrastructure Facilities)

In this village mainly agricultural based on nursery for growing trees and plants of flowers and fruits. It is distributed nearby village and cities.

4.3.11Tourism development available in the village for attracting the tourist

There are 2 temples available in Isra village for tourism prospect.

4.4 Infrastructure Details (With Exiting Village Photograph)

4.4.1 Drinking Water / Water Management Facilities

4.4.2Drainage Network / Sanitation Facilities

There is underground drainage facility in Isra . It is closed drainage system. The drain water is discharged directly in to its nearby water body.

(Fig-10 water tank)

4.4.3Transportation & Road Network

People use their personal vehicles and S.T bus to go anywhere. One Bus station available in Village and Railway Station is 7 Km (upleta) far from Village. Major road is connecting to SH. Main road of village is Rcc roads and Internal Street Road of Isra is kuchha Roads.

4.4.4 Housing condition

There are both Kutchha (80 %) and pucca houses (20 %) existing in village. Majority of houses in village are Pucca. The condition of Kutchha house is very poor because the roof is not proper and wall is becoming slide. The condition of pucca house is good. The slogan like ―Save Water and Save Tree‖ etc. write on wall of some pucca houses.

(fig 11. housing condition)

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

Sr. No.	Facilities	Available	No.
1.	Health	ICDS (Anganwadi)	2
		Sub-Centre	1
		Private Clinic	1
2.	Education	Anganwadi	2
		Primary School	1

3.	Socio-Culture Facilities	Library	**0**
		Assembly Polling Station	**1**
		Pond	**1**
		Birth & Death Registration Office	**1**
4.	Other Facilities	Post Office	**1**
		Public Distribution system	**1**
		Panchayat building	**1**
		Milk Co-operative society	**1**
		Small scale industries	**1**
		Mahila Mandal	**1**

(Table 18. Social Infrastructure facilities)

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

In Isra village existing condition of public building (Gram panchayat, Aanganwadi, Post office, Bus Station) all of these is in good condition. All of these no maintenances.

4.4.7Technology Mobile/ WIFI / Internet Usage Details

- Only 4 houses have private Wi-Fi connection. Approx. 50 % uses of mobile internet.
- There is only Few computers are in Schools & Panchayat Ghar available in village.

4.4.8 Sports Activity as Gram Panchayat

There is no sport activity as Gram panchayat or by govt.

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

Sr. No.	Socio-Culture Facilities	Available
1.	Community Hall	**No**
2.	Public Library	**No**
3.	Public Garden	**No**
4.	Village Pond	**Yes**
5.	Recreation Centre	**No**
6.	Cinema Hall	**No**
7.	Assembly Polling station	**Yes**
8.	**Birth & Death registration office**	**Yes**

(Table19. socio-Culture facilities)

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

Any other facilities of village is not available.

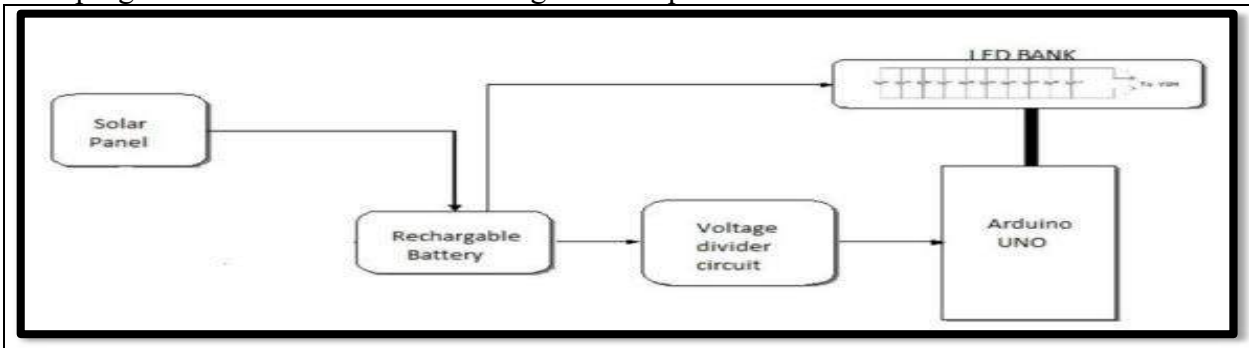
4.4.11 Any other details

In the village, the road facility needs maintenance. Water logging problem occurs every monsoon. There is no bio – gas plant, solid waste management plant and rain water harvesting system or no other sustainable facilities available in the village.

4.5 Electrical concept

4.5.1 Renewable energy sources planning particularly for villages Auto Intensity Controlled Solar LED Street Lights/High Power LED

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



(fig 12. Renewable energy block diagram)

BLOCK DIAGRAM

Explanations of Each Block:

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

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

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

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

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

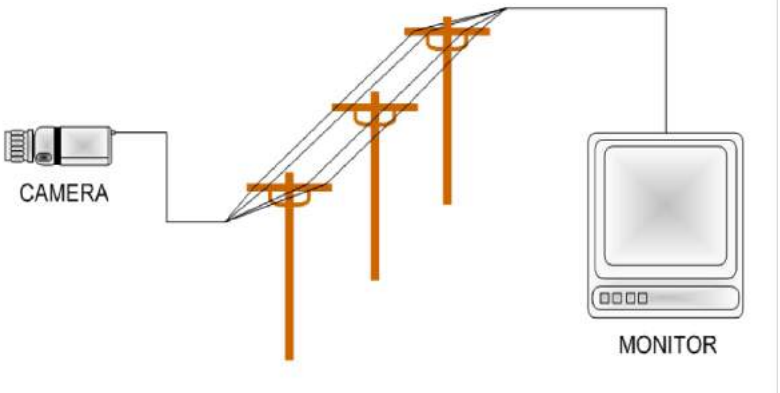
WORKING:

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

4.5.2 Village CCTV scheme purpose

Introduction

The defined purpose of the CCTV scheme within Village is to promote public confidence by developinga safe and secure environment for the benefit of those residing, employed, visiting or using the facilities of the area covered by the Village CCTV system.



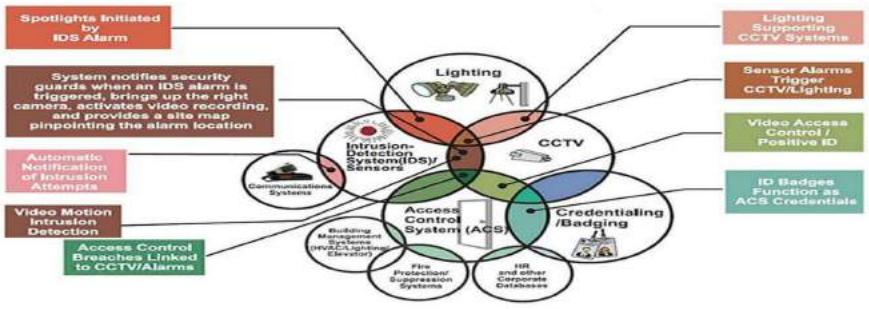
(Fig 13.CCTV diagram)

Reduce the fear of crime by persons living and work in the village;

- provide immediate data on vehicle movements after a crime event
- reduce fly tipping in the area by checking vehicle movements after such events
- to assist the police, the Parish Council and Law Enforcement Agencies with identification,

detection, apprehension and prosecution of offenders by examining and using retrievableevidence relating to crime, public order or contravention of bye-laws;

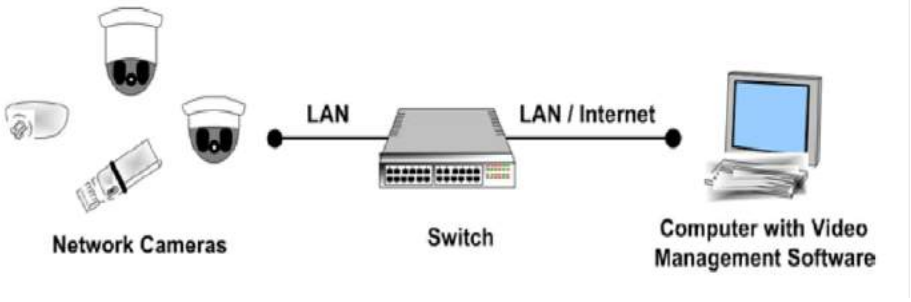
- to deter potential offenders by publicly displaying the existence of CCTV, having cameras clearly sited that are not hidden, and signs on display throughout Village CCTV Scheme Proposal



(Fig 14. Diagram)

The scheme would consist of the following:

- CCTV cameras located around the village, 4 focused on the villages entrances/exits and 2 located on the major streets within the village
- High resolution cameras, sending data via broadband to a central secure server
- Cameras focused on roads record only when motion detected
- Data stored for a limited time period on the central secure server (Managed by Initsys Ltd)



(Fig15.CamerNetwork)

Privacy Impact Assessment Need

Using CCTV can be privacy intrusive because it is capable of putting law-abiding people undersurveillance and recording their movements as they go about their day to day lawful activities.Careful consideration should be given to whether to use it, or not. The fact that it is possible, affordable and has public support should not be the primary motivating factor. area Neighborhood Watch Group should take into account what benefits can be gained, whetherbetter solutions exist, and what effect it may have on individuals. The existence of a 'Pressingneed' should be established.area Neighborhood Watch Group considers these matters objectively as part of anassessment of the scheme.

Closed circuit television (CCTV) records images of people in certain public places includingtown centers, roads, airports, and on public transport. CCTV images can be used as evidence in court. You can request CCTV recordings of yourself.

Explanation of the Network Link

Choose the devices according to different villages and the roads

The distance between the control room and the village A is 4KM, with complicated situation which is not suitable for the wired option. Todaair chose the DIP3510-H, with high end Qualcomm chipset inside, 5KM transmission distance, which makes it the best choice for this case.

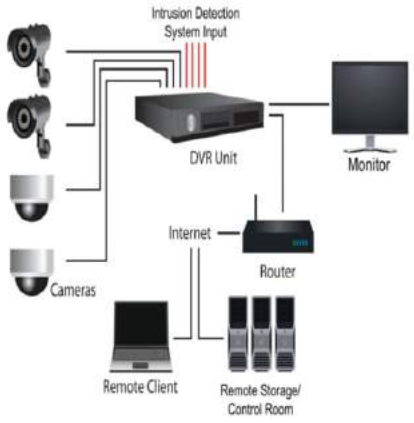
The distance among the village B, the vicinity of factories road and the control room is 2KM. Todaair chose the DIP356—H,with 3KM transmission range, high end Qualcomm chipset, making it easy to meet the needs of the transmission task.

Surveillance Points

As the surveillance points are set in the village entries, exits, traffic arteries, farm, fishing pool, crossroads and Other important area, it's an outdoor and complicated environment. To ensure the performance, the HD 1.3 megapixel IP cameras are selected in this project. And the cameras can be set remotely to adjust different parameters in order to cover different directions and set event alarm to enhance the safety system.

Control Room

All devices, such as the bullet/dome cameras, HD decoder, will be managed in the control room. The status Of The surveillance devices and servers will be monitored in real time. The time will be synchronized and theuser rights will be configured according to the management.



(Fig 16 . cctv control room)

Solution Analysis

As the IP cameras are selected here and the bandwidth of each camera is about 4MB/s, each surveillance point needs at least 12MB/s bandwidth. Todaair chose the wireless access points

with 300Mbps and 150Mbps to ensure the bandwidth of the whole system is sufficient for the devices.
The wireless devices selected in this project are included a built-in 60 degree internal antenna, which makesthe installation convenient. As there are many scattered surveillance points in this project and the environment is complicated, the wireless access points should be installed in a high place to avoid the block from the talltrees and the high buildings.
Great attention should be paid on the installation degree of the wireless devices as it will have a great impact on the wireless signal strength. An elevation bracket is recommended for the installation.

16 ports PoE switch was used in control room and 8 ports PoE switch or data switch was applied in this solution where there were 2 or 3 devices.Repeater mode was used in the situation when there were some obstacles.

One pair of 300Mbps APs can match with 4 pieces of 720P IP cameras. If there is only one piece of camera, the 150Mbps is enough for the application. If 3 or 4 pieces of cameras connecting with one piece of 300Mbps Ap, switch is recommended in the application.2.4 GHz and 5.8 GHz were used to avoid the interference in the dense place.

4.5.3 Electricity Facilities with Area

Automatic Water Plant System

Introduction

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

Block diagram

(Fig-17 Block diagram for Automatic Water Plant System)

There are two functional components. They are the moisture sensors module and the motor driver for motor pump. Thus the Arduino Board is programmed using the Arduino IDE software. The function of the moisture sensor is to sense the temperature content present in the soil, and also it

measure moisture level in the soil. The motor driver interrupts the signal to, water pump supplies water to the plants. This project uses microcontroller Arduino Uno board to controls the motor and monitor soil moisture. Follow the schematic to connect the Arduino to the motor driver, and the driver to the water pump. The motor can be driven by a 5 volt battery, we can also supplies power from external source or from Arduino board. The Arduino Board is programmed using the Arduino IDE software.

Working

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

Hence, the moisture sensors measure the moisture level (water content) of the different plants. If the moisture level is goes to be below the desired and limited level, the moisture sensor sends the signal to the Arduino board which triggers the Water Pump to turn ON and supply the water to respective plant using the Rotating Platform/Sprinkler. When the desired moisture level is reached, the system halts on its own and the water Pump is turned OFF.

4.6 Existing Institution like - Village Administration – Detail Profile

Village Administration

- Construction of public facilities; like road, drainage, drinking water facilities.
- Implementation of welfare schemes
- Settlement of disputes
- Maintenance of land records

4.6.1 Bachat Mandali

(fig 18. isra sahkari madly)

4.6.2 Dudh Mandali

Dairying is a source of income for millions of rural milk producers, which contributes towards strengthening the livelihoods of small holder milk producers who form majority of India's milk production system. There is no Dudh Mandali in village.

4.6.3Mahila forum

Mahila Forums are voluntary service organizations which work for the betterment of the women in the villages of India. These rural women are interested in working together with the help of Gram Sevikas, Mukhya Sevikas, Supervisor, and Program Officer.

4.6.4Plantation for the Air Pollution

In Isra village around the gram panchayat building, around the Primary school and around the lake tree plantation is done.

4.6.5 Rain Water Harvesting - Waste Water Recycling

There is no Rain water harvesting system or no other sustainable facilities available in the village. Need rain water harvesting system in the Village.

4.6.6Agricultural Development

Employment - In countries whose share of overall employment in agriculture is at high levels, for example where farmers represent over 50% of the workforce, farming is likely to be the key economic activity determining the progress of rural development.

Related economy - The farm sector in every country supports a range of ancillary and service industries, generating economic activity in supply and distribution chains as well as processing industries

Environmental and cultural services - Throughout rural areas, farming may contribute to rural development by providing **environmental and cultural services** to society.

4.6.7Any Other

No other existing institution available in Isra village.

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

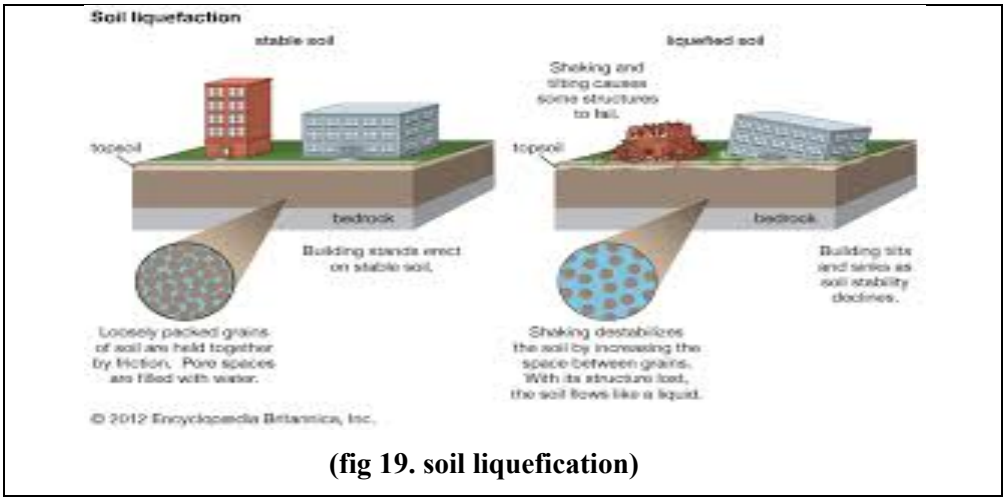
5.1 Concept (Civil)

5.1.1 Advance Sustainable construction techniques / Practices and Quantity

- The construction industry is repeatedly criticized for being inefficient and slow to innovate.
- The basic methods of construction, techniques and technologies have changed little since Roman times. But the application of innovation in the construction industry is not straight forward. Every construction project is different, every site is a singular prototype, construction works are located in different places, and involve the constant movement of personnel and machinery.
- The term 'advanced construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies.
- Incorporating advanced construction technology into practice can increase levels of quality, efficiency, safety, sustainability and value for money.

The adoption of advanced construction technology requires an appropriate design, commitment from the whole project team, suitable procurement strategies, good quality control, appropriate training and careful commissioning.

5.1.2 Soil Liquefaction



(fig 19. soil liquefication)

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

solid behaves like a liquid. In soil mechanics, the term "liquefied" was first used by Allen Hazen[1] in reference to the 1918 failure of the Calaveras Dam in California. He described the mechanism of flow liquefaction of the embankment dam.

5.1.3 Sustainable Sanitation

(fig 20. sustainable sanitation)

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

5.1.4 Transport Infrastructure / system

Transport infrastructure consists of the fixed installations, including roads, railways, airways, waterways, canals and pipelines and terminals such as airports, railway stations, bus stations, warehouses, trucking terminals, refueling depots (including fueling docks and fuel stations) and seaports.

5.1.5 Vertical Farming

(fig 21. vertical farming)

Vertical farming is the practice of growing crops in vertically stacked layers. It often incorporates controlled-environment agriculture, which aims to optimize plant growth, and soilless farming techniques such as hydroponics, aquaponics, and aeroponics.

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

Mechanism of Corrosion

The corrosion process that takes place in concrete is electrochemical in nature. Corrosion will result in the flow of electrons between anodic and cathodic sites on the rebar. For corrosion to occur, four basic elements are required:

- Anode – site where corrosion occurs and current flows from.
- Cathode – site where no corrosion occurs and current flows to.
- Electrolyte – a medium capable of conducting electric current by ionic current flow (i.e. soil, water or concrete).
- Metallic Path – connection between the anode and cathode, which allows the current return and completes the circuit.

The corrosion of steel in concrete in the presence of oxygen but without chlorides takes place in several steps:
At the anode, iron is oxidized to the ferrous state and releases electrons

$$Fe \; Fe^{2+} + 2e^-$$

These electrons migrate to the cathode where they combine with water and oxygen to form hydroxyl ions

$$2e^- + H_2O + 1/2O_2 \; 2OH^- \; / \; Fe^{2+} + 2OH^- \; Fe(OH)_2$$

In the presence of water and oxygen, the ferrous hydroxide is further oxidized to form Fe_2O_3

$$4Fe(OH)_2 + O_2 + H_2O \; 4Fe(OH)_3 \; / \; 2Fe(OH)_3 \; Fe_2O_3.2H_2O$$

The corrosion of steel in concrete in the presence of chlorides, but with no oxygen (at the anode), takes place in several steps:
At the anode, iron reacts with chloride ions to form an intermediate soluble iron chloride complex

$$Fe + 2Cl^- \; (Fe^{2+} + 2Cl^-) + 2e^-$$

When the iron–chloride complex diffuses away from the bar to an area with higher pH and concentration of oxygen, it reacts with hydroxyl ions to form $Fe(OH)_2$. This complex reacts with water to form ferrous hydroxide.

$$(Fe^{2+} + 2Cl^-) + 2H_2O + 2e^- \; Fe(OH)_2 + 2H^+ + 2Cl^-$$

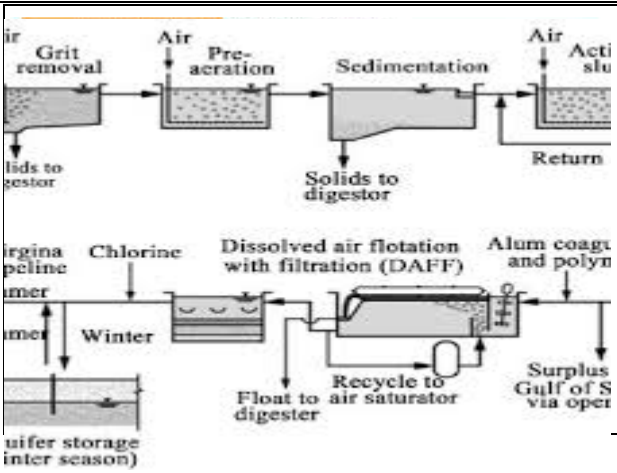
The hydrogen ions then combine with electrons to form hydrogen gas

$$2H^+ + 2e^- \; H_2$$

As in the case of corrosion of steel without chlorides, the ferrous hydroxide, in the presence of water and oxygen, is further oxidized to form Fe_2O_3

$$4Fe(OH)_2 + O_2 + H_2O \; 4Fe(OH)_3 \; / \; 2Fe(OH)_3 \; Fe_2O_3.2H_2O$$

The corrosion products resulting from the corrosion of steel reinforcing bars occupy a volume five to ten times that of the original steel. This increase in volume induces stresses in the concrete that result in cracks, delamination and spalls. If left untreated, the process continues which further accelerates the corrosion process by providing an easy pathway for water and chlorides to reach the steel until the concrete becomes structurally unsound.



(fig 22. sewage treatment plant)

Prevention & Repair Measures of RCC Structure

Patch Repair

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

Electrochemical Process

Electrochemical techniques provide a useful set of methods for preventing or limiting further damage to structures affected by reinforcement corrosion.

Cathodic Protection (CP): In cathodic protection, the corroding anodic areas of steel are made cathodic by the supply of electrons from an anode applied either to the concrete surface or embedded. There are two ways of applying cathodic protection to structures: Galvanic and Impressed Current CP

Corrosion Inhibitors - Corrosion Inhibitors are one of a variety of techniques that can be employed in an effort to suppress and control the rate of steel corrosion in concrete structures particularly in the case of hidden or latent damage, although their long-term effectiveness in reinforced concrete is still open to debate and the subject of detailed research.

Surface applied and drilled-in inhibitors – used as a curative or preventative measure.
Using **Cathodic Protection** to Control Corrosion of Concrete Infrastructure in Marine Environments.

5.1.7 Sewage treatment plant

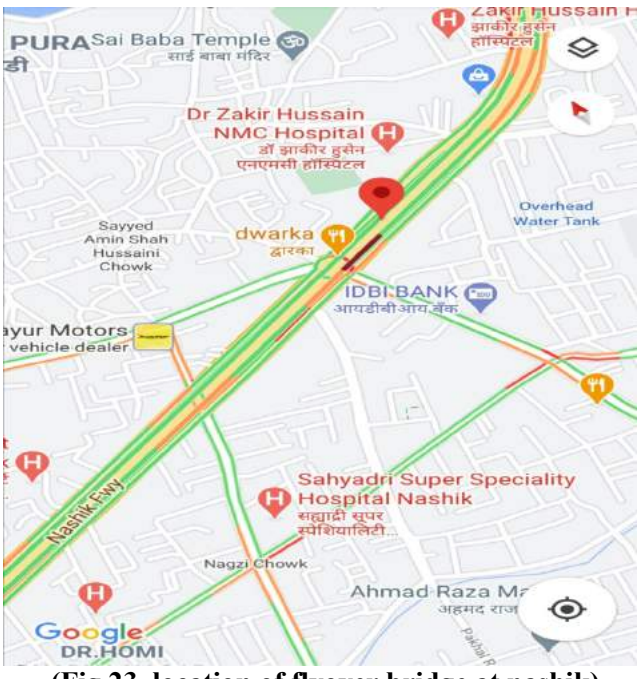
Sewage treatment is the process of removing contaminants from municipal wastewater, containing mainly household sewage plus some industrial wastewater. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater (or treated effluent) that is safe enough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

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

5.1.8 Technical case study "ON FLYOVER AT NASHIK ON NH 3"

INTRODUCTION

The work has been awarded to M/s Larsen & Toubro-M/s Ashoka Buildcon Limited Consortium and agreement is signed with the Concessionaire M/s L & T- PNG Tollway Private Limited, on 8th July, 2009. Design & Preconstruction activates are in progress. Work is expected to be started in January, 2010. The construction period is 30 months (including monsoon period.) Project envisages up gradation of existing 2 lane carriageways to 6 lane divided carriageway i.e (3-lane on each side) configuration with 5m wide median at centre.This project involves construction of 5.50 km long (4lane) flyover for through traffic flying over four busy junctions viz. Aurangabad Naka Junction, peth Junction, Dwarka Junction & Mumbai Naka. Along this 5.5 Km long flyover, 4 lane divided carriageway at grade road in addition to 2-lane service road on either side (total 12-lane carriageway within the city portion) with Up/Down ramps at Dwarka Junction where NH-50 meets with NH-3 are being provided. The Pimpalgaon Nashik Gonde mad project serves with a elevated corridor, seven flyovers, two major bridges, six vehicular under passed, six pedestrian under passes, six pedestrian under passes and a subway. The flyover passing through Nashik city a Pathardi is India's longest integrated flyover. The Elevated Corridor in Nashik is India's first externally strutted segmental box girder. The Pimpalgaon Nashik Gonde road project is a six lane, 60 km route built at a cost of Rs. 940 cores. The Elevated Corridor is the second longest flyover in Maharashtra. (The longest flyover-the Mumbai eastern highway, was inaugurated in Mumbai on June 13, 2013, a day before the Nashik elevated corridor). The Nashik flyover stands on 172 pillars with 12 segments each. It is made up of 2064 segments. The strutted segmental technique was first used for a bridge in Bangkok. The Elevated Corridor in Nashik is the second of its kind in Asia and first in India. The design of the flyover and its technique strengths it to bear heavy load capacity and increases its life up to 100 years. It has been categorised as 'A Class' loading design. The Elevated Corridor also gives the city 12 lane road for traffic



(Fig 23. location of flyover bridge at nashik)

passing through the city. The flyover from Mumbai Naka to Adgaon is four lanes, it has four lane grade roads on both the sides and below this is the four lane service road. Four flyovers are in the Nashik Municipal corporation limit and two are outside it. There are 8 underpasses beneath these flyovers that will facilitate city traffic movement. A part from these flyovers it has two major bridges and 11 small bridges and a subway. There are 34 bus bays and 4 Truck lay byes. The project has been delayed by about a year and some underpasses are yet under construction.

OBJECTIVES OF THE STUDY

- To understand the structural features of flyover.
- To understand method of construction by using precast box girders.
- To know the details of foundation adopted for supporting the piers.

NECESSICITY

- To minimize traffic problems at major intersections such as Dwarka, Mumbai naka etc.
- To minimize rate of accidents.
- To reduce time for vehicles passing over the flyover.

METHODOLOGY

The segments are transported to the site from the P.C. yard then at the site there is launcher resting on two piers. First of all segments ES1 and RS1 are lifted then each consecutive segments are lifted with the help of launcher from both the piers towards the centre of the span. For joining the two consecutive segment gluing material is used which consist of epoxy resin and hardener. These two elements after mixing with each other are to be applied within 2 hrs. Only.

FOUNDATION

The types of foundation mainly used are as follows:

- Open foundation
- Pile foundation

The selections of type of foundation depends upon the standard penetration number followed by standard penetration test, following conditions were considered while deciding the type of foundation:

(Fig 24. Foundation of pier)

- If span is greater than 50, then open foundation is used at the particular place.
- If span is less the 50 then use pile foundation is used at the particular place.
- The Concrete used for foundation is of M35 grade. The concreting work is done by time method.

PIERS

- The piers are mainly of two types
- 1. Fixed pier
- 2. Free pier

(Figure 25. Pier at the site)

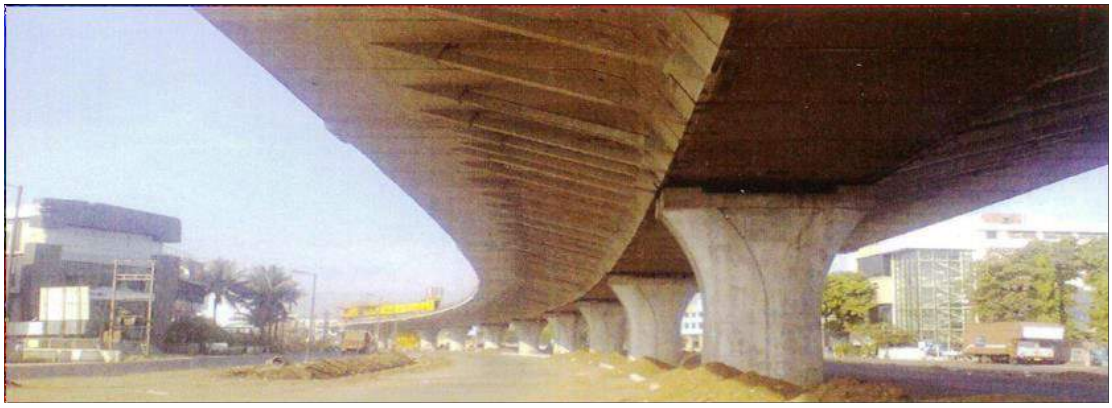
The fixed pier carry's dead load and moments whereas the free pier carry's only dead load Position of piers are such that they are alternately placed such as one fixed pier & one free pier. Shape of pier, the area is larger at top and that is obtained by providing parabolic curve at upper side of the pier. The height of the pier above the ground level excluding the pier cap is 350mm. A pier cap is also provided of 500mm thickness at the top of pier. The main reason behind such an arrangement is that the free pier provides space for shacking & while the fixed pier is rigid and firm. The average distance between the two consecutive piers is 30m.

Following activities are carried out while casting of pier

- Steel reinforcement
- Placing the shuttering for pier, the shuttering is made of steel.
- Concreting with RMC and boom placer.
- Removal of shuttering after the 24 hrs. of concreting
- White wash (lime) is applied to pier so as to maintain the heat of hydration & balance the chemical reaction and also it is dressed with jute sheets.

SEGMENTS

Segments are the heart and soul of this elevated corridor, there details are as follow:



(Fig 26. Segments of the elevated corridor Segments are design for different span:)

- 30m-68 no of curve span.
- 30m-160 no of straight span.
- 40m-5 no of span.
- 26.8m-2 no of span.

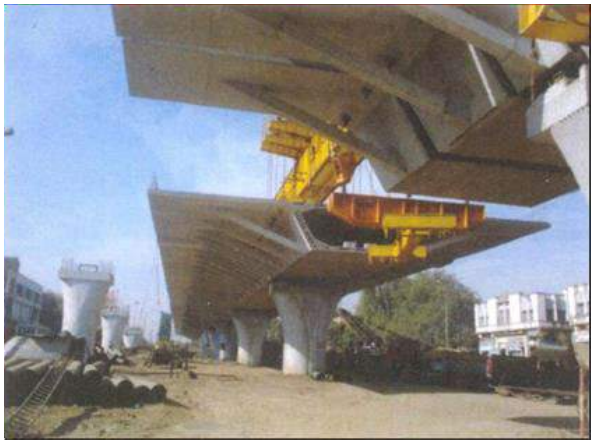
- 25m-1 no of span.
- 23.1m-2 no of span.
- 21.865m-1 no of span.

Above figures are including the ramps at various junctions. There are in all total 171 no of span. Specific name or we can say designation is given to every span. 12 segments are placed between two consecutive piers covering a span of 30m Length of each segment is 19.7m approximately. There specification ore as follows:

- Es-2(parabolic) 1.5m in width, web thickness – 600mm, 2Nos.
- Rs1-2(parabolic) 1.5m in width, web thickness – 600mm, 2Nos.
- Rs2-2(parabolic) 3m in width, web thickness – 600mm, 2Nos.
- Rs3-2(parabolic) 3m in width, web thickness – 600mm, 350mm (varying thickness) 2Nos.
- Rs 4-4 (straight) 3m in width, web thickness-350mm. 4Nos.

(Fig 27. Segment being lifted ad placed)

(Fig 28. Placing of segment in order)



(Fig 29. Segment being placed in position)

(Fig 30. Final view of an span)

ADVANTAGES AND DISADVANTAGES

ADVANTAGES

- As it is said infrastructure plays very important role in growth of nation thus this infrastructure project is important for national growth from infrastructure point of view
- Due to precast methods used much time is saved and speedy construction activities are carried out.
- Less Hindrance to traffic

DISADVANTAGES

- Many trees were cut during the project so it indirectly affects the environment.
- Transportation of segments from yard to site affects the project cost drastically.

(Fig 31. very big container at Dwarka Circle)

- Big container making problem at the Dwarka junction.

COST

The **flyover**, which was raised at a **cost** of Rs 980 crore, connects Pathardi-Phata and Adgaon Naka. Its construction began on January 4, 2010.

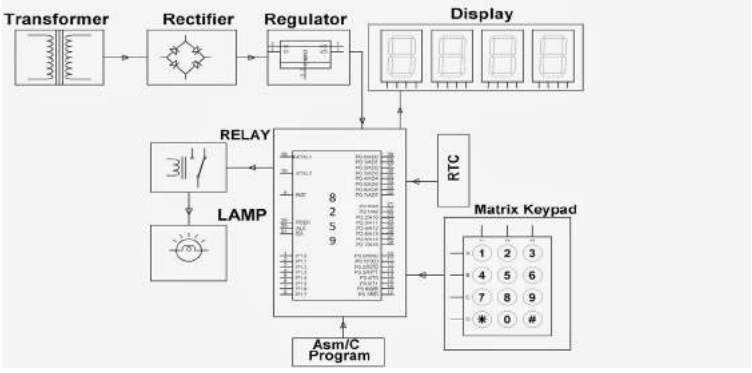
CONCLUSTION

- Precast segmental construction is a versatile technique for construction of present day fast track jobs.
- Segments can be cast away from actual site, thereby minimizing hindrance to traffic & public in urban environment.
- In casting yard better control on quality & dimensional tolerances can be achieved. Segment casting can start independently as work on foundations progresses, their-by reducing overall completion time.
- Segmental construction technique has been a very effective and economical technique in above situations.
- This project will add beauty to the Nashik city with its appealing aesthetics.
- Selecting innovative design concepts and construction methodologies can tackle problems occurring in construction. A well-conceived construction mythology can result into least traffic disturbance, construction delays and noise & visual pollution.

5.2Concept (Electrical)

5.2.1 Programmable Load Shedding

In today's world, there is a continuous need for automatic appliances with the increase in standard of living, there is a sense of urgency for de it's that would veloping circu ease the complexity of life.



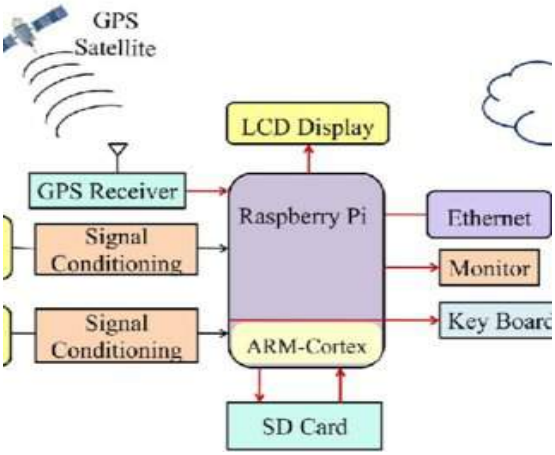
(Fig 32. programmable load)

The project is designed to operate an electrical load multiple number of times as per the program. It overcomes the difficulties of switching the load ON/OFF manually. This proposed has an inbuilt real time clock (RTC) to keep tracking the time and thus to switch ON/OFF the load accordingly.

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

5.2.2 Railway Security System using IoT

The objective of this project is to create a Security System for the goods that are carried in open top freight trains. The most efficient way to secure anything from thieves is to have a continuous observation. So for continuous observation of the open top freight train, Camera module2 has been used. Passive Infrared Sensor (PIR) 1 has been used to detect the motion or to sense movement of people, animals, or any object. So whenever a motion is detected by the PIR sensor, the Camera takes a picture of that particular instance. That picture will be send to the Raspberry PI which does Skin Detection Algorithm and specifies whether that motion was created by a human or not. If a human makes it, then that picture will send to the drop box.

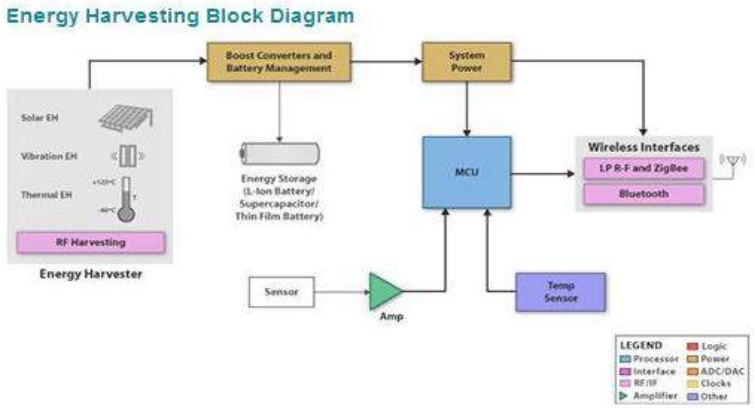


(Fig 33. railway system)

Any Official can have a look at the same. The existing system has a CCTV installed at various critical locations like bridges, railway stations etc. but they does not provide a continuous observation. This paper describes about the Security System that provides continuous observation for open top freight trains so that goods can be carried safely to its destination.

5.2.3 Management through Energy Harvesting Concept:

Energy harvesting (also known as power harvesting or energy scavenging or ambient power) is the process by which energy is derived from external sources (e.g., solar power, thermal energy, wind energy, salinity gradients, and kinetic energy, also known as ambient energy), captured, and stored for small, wireless autonomous devices, like those used in wearable electronics and wireless sensor networks.



(Fig 34. energy harvesting system)

Energy harvesters provide a very small amount of power for low-energy electronics. While the input fuel to some large-scale generation costs resources (oil, coal, etc.), the energy source for energy harvesters is present as ambient background. For example, temperature gradients exist from the operation of a combustion engine and in urban areas; there is a large amount of electromagnetic energy in the environment because of radio and television broadcasting.

5.2.4 Moisture Monitoring System

Soil moisture sensors aid good irrigation management. Good irrigation management gives better crops, uses fewer inputs, and increases profitability. Soil moisture sensors help irrigators to understand what is happening in the root zone of a crop.Scheduling irrigation To be used effectively, soil moisture sensors must be:

(Fig 35. moisture monitoring system)

- used in an irrigation shif that delivers water evenly
- installed correctly and placed in an area which is representative of the crop being grown
- used in combination with other irrigation management information (soil moisture sensors only measure a tiny area of an irrigation shift):

- evaporation-based scheduling
- soil moisture monitoring
- Grower observation.

Sensor types
There are basically two groups of sensors:

- potential sensors, such as tensiometers and granular matrix sensors
- soil moisture sensors that give a % or relative content of soil moisture

5.2.5 Home Automation using IoT / Any other methodology

Applications of home automation

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

- lighting control
- hvac
- lawn/gardening management
- smart home appliances
- improved home safety and security
- home air quality and water quality monitoring
- natural language-based voice assistants
- better infotainment delivery
- air-driven digital experiences
- smart switches
- smart locks
- smart energy meters

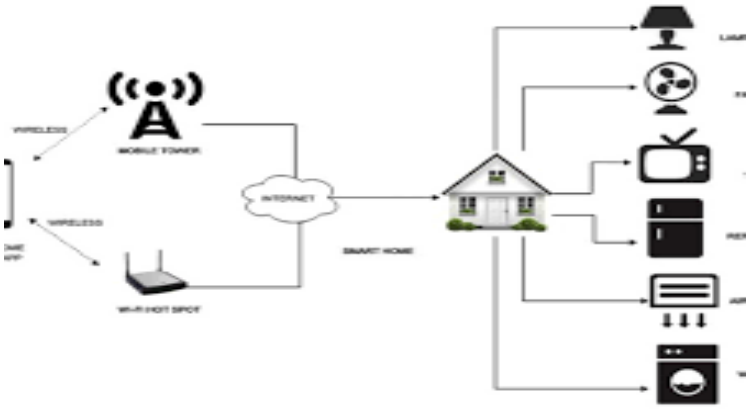
The list is still not exhaustive and will evolve over the time to accommodate new iot use cases.Now that you are familiar with home automation applications, let's have a detailed look at what components are involved in building a typical home automation prototype.

Home automation components

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

- iot sensors
- iot gateways
- iot protocols
- iot firmware
- iot cloud and databases
- iot middleware (if required)

Iot sensors involved in home automation are in thousands, and there are hundreds of home automation gateways as well. Most of the firmware is either written in c, python, node.js, or any other programming language.The biggest players in iot cloud can be divided into a platform-as-a-service (paas) and infrastructure-as-a-service (iaas)



(Fig 36. home automation)

5.2.6 PC Based Electrical Load Control

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

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

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

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

5.2.7 Electrical Parameters Measurements

Parameters			
Parameters	CPCC	FBEC	CRSD
Thickness of Coating	175 mm – 300 mm	300 mm – 675 mm	No coating required
Type of Protection to rebar	Extrinsic	Extrinsic	Intrinsic
Pre-treatment	Pretreatment is Required before coating	Pretreatment is required before coating	No pre-treatment required
Treatment to surface	Before coating the surface made little rough when some damage is introduced.	Before coating the surface made little rough when some damage is introduced	The surface of The finished good is not disturbed or damaged at all.

Chapter: 6
Swatch Bharat Abhiyan (Clean India)

As Mahatma Gandhi has said, "Cleanliness is next to Godliness"
Honorable Prime Minister Shri. Narendra Modi has highlighted the importance of cleanliness and has announced 'Swatch Bharat Abhiyan.

"Cleanliness" Just the word creates a pristine feeling in one's mind. The mind is invigorated with cheer. The institution of the School does the noble task of inculcating this habit of worshiping beauty in the form of cleanliness. In the journey towards prosperous India, the first step begins with cleanliness. Along with our body & mind, we also need to take responsibility of keeping our surroundings clean.

6.1Swatchhta needed in allocated village -Existing Situation with photograph

(Fig 37.swatchhta abhiyan)

- water accumulation on road
- Garbage accumulation on road

6.2 Guidelines - Implementation in allocated village with Photograph

Behavior change has been the key differentiator of Swatch Bharat Mission and therefore emphasis is placed on Behavior Change Communication (BCC). BCC is not a 'stand-alone' separate activity to be done as a 'component' of SBM-G, but about mobilizing and nudging communities into adopting safe and sustainable sanitation practices through effective BCC.

6.3 Activities Done by Students for allocated village with Photograph

Household Toilet: Making a toilet in all houses of the village under government schemes to make village clean.

Solid Waste Management: We are observing that in our village a big problem is solid waste so by providing a solid waste management with fixed dustbins in village and also giving a dustbin

collection management system to make village clean.

- Ban on plastic bag, use paper bags.
- Avoiding of chewing of tobacco, gutka etc.
- Giving a proper education of cleaning village to the villagers.
- Motivate villagers to make clean village and improve the habit of use of dustbin in stand of throwing waste on ground. Providing sweepers & Cleaners for cleaning of village

Chapter: 7
Village condition due to Covid-19

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

(Fig 38. covid 19 condition)

In gram panchayat in the Isra village, the use of Social Media whatsapp group has been used to create awareness among the masses in the villages. Information at the grassroots level is being given to the people by putting posters everywhere. Regular cleaning operations are being carried out and sodium hypochlorite is being sprayed on the roads in Gram. Face masks are being distributed to the citizens by Gram Panchayat members and social organizations and citizens are also being told not to touch their eyes, nose, and mouth, wash hands with soap frequently and maintain personal distance. Along with ration distribution to villagers, fodder for abandoned cattle is also being provided by a social service organization.

Orientation is being provided to villagers and migrants on social distancing and what precautions they must take in Rajkot district for those who returned to village. Awareness is also being provided on social distancing and hand washing to MNREGA agricultural labour and workers by PR officials

7.2 Activities Done by Students for allocated village with Photograph

- We talk with sarpanch and villagers about covid-19 and we should take preventation about it.
- We explain guidelines given by government for unlock.
- We explain some home remedies for improve their immunity. We explain importance of mask, sanitizer and social distancing.

7.3 Any other steps taken by the students / villagers

No others steps are taken.

Chapter: 8
Sustainable Design Planning Proposal (Prototype Design) - Part- I (Scenario / Existing Situation / Proposed Design in Auto cad / Recapitulation Sheet / Measurement Sheet / Abstract Sheet / Sustainability of Proposal / Any other software)

8.1 Design Proposals

In the general observation, we perform techno economic survey. In techno economic survey we studied like physical Infrastructure facility, Social Infrastructure Facility, Sustainable Infrastructure Facility.

- Solid waste management
- Primary School
- Water tank
- Public Toilet
- Community hall
- Waste water treatment plant
- Bio gas plant

8.1.1 Sustainable Design (Civil)Bio Gas Plant(Figure is at the end of the document)

Environmentally Sustainable design is the philosophy of designing physical or social objects, the built environment, and services to comply with the principles of ecological sustainability. And the design Follows same Rules Called Sustainable design.

Bio gas plant

Bio gas plant is one of the economical solutions for renewable energy sources for a rural area. It transforms rural village in to clean village and also provide gas as energy source and gives fertilizer at end. The system consists of digester tank, Gas holder, Inlet and outlet, fixtures to burn gas.

Numbers of animals to one of the villagers = 09
(As per survey) as per standard data, assume per day dung of animal =10 Kg.

So total per day dung = 9 X 10 = 90 Kg/day

Design of Digester tank

Assume retention period (RT) = 60 days.
Assume mixing proportion of solid and water is 1:1
Now total amount of slurry per day (Sd) = Total per day dung + Water amount
= 90 + 90
= 180 Kg/day
= 180 lit/day
= 0.18 m3 / day

Volume of digester tank (Vd) = **Sd X RT**
= 0.18 X 60
= **10.8 m3**

Assume shape of digester tank is cylinder. (Digester volume for one unit)

Total digester volume (Vd) = π R2 h

18 = π R2 X1.5 (Assume h = 1.5m)

R = 1.51 m

So, dimension of digester tank is **R = 1.6 m & h**
= 1.5 m (Provided)

Design of Gas Holder

Assume digester temperature = 26-28 ˚C From fig find Gd by taking RT = 60 days

Specific gas production Gd = 34 Lit /Kg/day Daily gas production (G) = Gd X Feed volume
= 34 X 180
= 6120 Lit.
= **6.120 m3**

Now assume gas holder capacity = 48 %

Gas holder volume = Daily gas production X Capacity of holder
= 6.12 X 0.48
= **2.94 m3**

Gas holder volume = 3.1 m3 (Provided)

Assume shape of gas holder is **cylinder.**

Volume = π r2 h

3.1 = π x r2 x 0.40 (Assume h = 0.40 m)

r = 1.57 m

So, dimension of gas holder is **r = 1.7 m & h = 1 m (Provided)**

Design of Inlet and Outlet

Total volume of slurry mixes per unit = 0.18 m3 / day

Total volume of slurry = 0.18 m3 / day (Assume Single time filling operation) Provide rectangular tank

Total volume for one time mixing of slurry = L × B × H

0.18 = L × B × H (Take H = 0.50 m)

0.18 = 0.5B X B X 0.50 (Assume Rectangle chamber

With L=0.5B)

B = 0.72 m

Provide B =0.80m
L=0.50m

Dimension of inlet are 0.5 m X 0.8 m X 0.5 m
Here, **0.18 m3 / day required < 0.2 m3/day provided. Provide same size for outlet tank also.**

MEASURMENT SHEET (Bio gas plant)

Sr no.	Description of item	Nos	Length (M)	Width (M)	Height (M)	Quantity (cum)	Total quantity(cum)
1	**Excavation for foundation**						
	Inlet chamber	1	0.90	1.29	0.25	0.29	
		1	0.79	0.80	0.25	0.158	28.10
		1	0.79	0.80	0.75	0.367	
	Digester chamber	1	9.07	1.29	2.19	25.63	
	Outlet chamber	1	1.43	1.00	1.01	1.44	
	For inlet and outlet pipe	2	0.90	0.30	0.80	0.216	
2	**p.c.c in foundation**						
	Inlet chamber	1	0.90	1.29	0.10	0.116	
		1	0.79	0.80	0.10	0.063	
	Outlet chamber	1	1.43	1.00	0.10	0.143	
3	**Cement concrete for foundation**						
	Inlet chamber	1	0.90	1.29	0.23	0.267	
		1	0.79	0.70	0.23	0.127	
		1	0.79	0.70	0.23	0.127	

	Digester chamber	1.10	$=3.14X1.7^2$ $=9.07$		0.23	2.29	
	Outlet chamber	1	0.90	1.00	0.23	0.207	
4	**Masonry work**						
		1	4.5	0.12	0.5	0.27	65.49
		1	1.4	0.12	0.7	0.117	
	Digester chamber length =2X3.14X1.7 =10.676	1	10.676	0.23	1.73	4.25	
	Outlet chamber	1	0.10	0.45	0.780	0.0351	
		1	0.10	0.85	0.323	0.027	
	Plastering double coat water proof						
	Inlet chamber	1	3.4	-	0.5	1.7	
		1	2.7	-	1.00	2.7	
5	**Digester chamber**	1	21	-	1.72	36.12	
		1	22.25	-	1.00	22.25	
	Outlet chamber	1	3.4	-	0.8	2.72	
6	**200mm dia pipe required**	1	2.4 m				2.4
7	**Mechanical mixing unit**	1	90 number				90

(Table 20 MEASURMENT SHEET (Bio gas plant))

COST SHEET					
Sr no	**Description of item**	**Quantity**	**Unit rate**	**Unit**	**Total amount**
1	**Excavation for foundation for depth 1.5m to 3m including sorting out and stacking of useful material and disposing off the excavated stuff up to 50mt lead.**	28.10	95	Cumec	2669
2	**Providing and laying cement concrete 1:4:8 and curing complete in foundation**	0.385	1900	Cumec	731.5
3	**Providing and laying cement concrete work 1:1:2 and complete curing excluding cost of for work and reinforcement**	3.018	3400	Cumec	10261
4	**Brick work using common burnt clay building brick in foundation in C:M(1:5)**	4.69	3300	Cumec	15477
5	**Providing 20mm thick plaster in single coat in single or half brick walls smooth in 1:3**	65.49	140	Sq.mt	9168.6
6	**R.c.c heavy duty pipe**	2.4	250	Rmt	600
		Total cost			**38907.1 rs**
		Add 1.5% water charge			**583.6rs**
		Add 10% contractor profit			**3890.71rs**
		Net cost			**43381.41rs**

(Table 21. cost sheet of bio gas plant)

(R & B 2015-16 SOR USE FOR THIS DESIGN)

8.1.2 Physical design (Civil)Garden (Figure is at the end of the document)

Among various physical design play ground is not available in ISRA village And so it is design below.

- **Plan of garden:-**

Measurement sheet (Garden)

Item no	Item description	No	Length (m)	Width (m)	Height (m)	Quantity (m^3)
1	**Excavation of Foundation inSoft Murom, Soil or Sand from 0.0 mtr.to 1.50 mtr depth including lifting and laying in 90 mtr. lead area as instructed**	1	45.4	0.9	0.3	**12.258**
2	**P.C.C work [1:4:8]**	1	45.4	0.9	0.3	**12.258**
3	**Wall**	1	45.4	0.23	1.5	**15.663**
4	**20mm thick plaster**	1	94		1.5	**141**
	deduction gate	1	5.68		1.5	**8.52**
	total =	**132.48**				
5	**brick wall**	1	60.66	0.23	0.6	**8.37108**
6	**earth filling**					
	middle part	1	7.12	6.62	0.3	**14.14032**
	side part	1	36.95	1	0.3	**11.085**
	under walk path	1	30.33	0.75	0.5	**11.37375**
	total =					**36.59907**

(Table 22 measurement sheet garden)

Cost sheet

Item Description Material	**Quantity**	**Per**	**Rate**	Amount
Excavation of Foundation in Soft Murom, Soil or Sand from 0.0 mtr. To 1.50 mtr depth including lifting and laying in 90 mtr. lead area as instructed	12.26	m^3	96.90	**1187.99**
P.C.C in foundatioin1:3:6	12.26	m^3	1900	**23294**
Brick Masonry Super Structure in	15.66	m^3	3218	**50393.88**
Filling with foundation & plinth with selected garden soil in layer of 20cm including watering and ramming complete	36.60	m^3	290	**10614**

Water Proof Cement Plaster 20 mm thick using Water Proofing Compound and in the ratio of 1:3 with necessary finishing	132.48	m^2	203	**26893.44**
Carpet lawn	47.17	m^2	260	**12264.2**
Tree plantation	18	No	220	**3960**
Supply & Fixing of CC Precast interlocking paving blocks of size 60 mm thick and of compressive strength of 250 kg / sq.cm (Red / Yellow / Grey Color), to be supplied and fixed as instructed with Concreting 1:2:4 the end blocks (without Cement joints) in bedding of Bhogavo	22.73	m^2	348	**7910.04**
Total =136517.55				
Add 3% contingency = 4095.52				
Contractor profit 10% =13651.75				
Add 2% Work charge = 2730.35				
Total cost = 156995.17 Rs				

(Table 23. cost sheet of garden)

(R & B 2015-16 SOR USE FOR THIS DESIGN

8.1.3 Social design (Civil)Public Toilet(Figure is at the end of the document)

As an "away-from-home" toilet room, a public toilet can provide far more than access to the toilet for urination and defecation. People also wash their hands as safety purpose, use the mirrors for grooming, get drinking water (e.g. refilling water bottles or barrel), attend to menstrual hygiene needs, and use the waste dust bins

ESTIMATE FOR PROPOSED TOILATE COMPONENT AT VARIOUS LOCATIONS IN ISRA, RAJKOT, GUJARAT STATE - ALT # 1

Measurment sheet (Public Toilet)

Sr no	Description	Qty	Unit	Rate as per s .o, r	Rate	Amount
1	**Excavation for foundation up to 1.5 Meter depth including sorting out and stacking of useful materials and disposing of excavated stuff up to 50 Meter lead**					
	(a) For Loose or Soft soil	7.60	M^3	67.20	67.87	515.81

2	**Excavation for foundation up to 1.5 Meter depth including sorting out and stacking of useful materials and disposing of excavated stuff up to 50 Meter lead**					
	(b) Dense or hard soil	7.60	M^3	86	86.86	660.14
3	**Excavation for foundation up to 1.5 Meter depth including sorting out and stacking of useful materials and disposing of excavated stuff up to 50 Meter lead**					
	(c) Hard Murom	3.80	M^3	146	147.46	560.35
4	**Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not**	9.20	M^3	76.50	77.27	710.88
5	**Providing and laying cement concrete 1:3:6 (1 Cement: 3-coarse sand: 6- Hand broken stone aggregate 40 mm. Nominal size) and curing complete excluding cost of form work in: (a)Foundation and plinth (Up to 10 ton)**	3.30	M^3	2286.00	2308.08	7619.04
6	**Providing laying ordinarycement concrete M-150 and curing complete including the cost of form work and excluding cost of reinforcement for**	1	M^3	4048.00	4088.48	4088.48

	reinforcedconcrete work in: RCC Coping / Wass caps					
7	**Providing laying Controlled cement concreteM-200 and curing complete including the cost of form work and excluding cost of reinforcement for reinforced concrete work in: RCC Slabs & Landings**	3.30	M^3	4951.00	5000.51	16501.68
8	**Providing and laying reinforcement for R.C.C. work and bending binding & placing in position completed up to floor two level thermo Mechanical Treated Bars (CRS) as per I.S.standard**	330.00	M^3	43.7	44.14	14566.20
9	**White stone bela masonry block in course in super structure with stone of approved quality in cement mortar 1:6 (1 cement: 6 coarse sand) including racking the joints etc. complete. (Upto 10 ton)**	3.70	M^3	3239	3271.39	12104.14
10	**White stone bela masonry work in partition walls up to 15 cm thickness in cement mortar 1: 4 coarse sand)**	19.00	M^2	370	373.7	7100.30
11	**Coursed rubble masonry with stone of approved quality in foundation and plinth in cement**	2.40	M^3	2107	2128.07	5107.37

	mortar 1: 4 (1Cement: 4 Coarse Sand) etc. complete (Upto 10 ton)					
12	**Providing 15 mm thick cement plaster in single coat on fair side Brick / concrete walls for interior plastering up to floor two level and finished even and smooth in & Extra over items for finishing with a floating coat of neat cement slurry. (ii) Cement mortar 1:4 (1 cement: 4 sand)**	10.00	M^2	126.6	127.87	1278.70
13	**Providing 10 mm thick cement plaster in single coat on fair side Brick / concrete walls for interior plastering up to floor two level and finished even and smooth in & Extra over items for finishing with a floating coat of neat cement slurry. (ii) Cement mortar 1:4 (1 cement: 4sand)**	19.50	M^2	118.9	120.09	2341.76
14	**20 mm thick and faced cement plaster on walls up to height 10 meters above ground level consisting of 12 mm thick backing coat of c.m. 1:3 (1: cement, 3: sand) and 8 mm thick finishing coat of c.m. 1:1 (1: cement 1: sand) etc. complete**	61.90	M^2	189	190.89	11816.09
15	**Providing and laying white glazed tiles of 6**	19.50	M^2	629	635.29	12388.16

	mm thick in flooring treads of steps and landing laid on a bef of 12 mm thick cement mortar 1:3 (1: Cement - 3 Coarse Sand) finished with flush pointing in white cement.					
16	**Providing and laying white glazed tiles of 6 mm thick in skirting of steps and dado on 10 mm thick cement plaster 1:3 (1: Cement - 3 - Coarse Sand) and joined with white cement slurry (up to 10 ton)**	21.00	M^2	695	701.95	14740.95
17	**Providing and laying Ceramic tiles 6 mm thick in flooring treads of steps and lending laid on a bed of 12mm thick cement mortar 1:3 (1-cement:3-course sand) finishing with flush pointing in white cement.**	19.50	M^2	636	642.36	12526.02
18	**Providing and laying broken china mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 to plain or slope and to be tempered to bring mortar creme out up to surface using white cement including rounding off junctions and extending them up to 15 cm along the wall clearing with water and**	19.50	M^2	471	475.71	9276.35

	oxalic acid etc. as directed.					
19	**Providing & fixing FRP Frame size 100 x 50 mm and 28 mm thick FRP Depress Panel Shutter having extra reinforcement on sides and edges and get coat finish. The core of the shutter is to be filled up with injected fire-retardant grade polyurethane foam done insitu along with embedded wooden pieces for stiffing and also for taking hinges and fixtures. The whole FRP frame and shutter is to be waterproof weather proof termite proof and resistance to mild acid / Alkali, rates are to be inclusive of S.S. hinges with necessary screws and aluminum fixtures and fastening**	11.90	M^2	3282	3315.83	39458.38
20	**Providing & fixing extruded aluminum window having extruded aluminum color anodized section frame main outer size 127 mm x 38.10 mm x 1.35 mm (of jindal section no: 2443, @ wt. 1.384 kg/mt.), horizontal four track member size 120.20 mm x 31.75mm x 1.10 mm**	2.40	M^2	1386	1399.86	3359.66
21	**Providing & fixing 35**	11.90	M^2	4699	4745.99	65477.28

	mm thick shutters for doors, windows and clearstory windows including India teak wood frames 12 cm x 7 cm in size including black enamelled Iron oxidize fixtures & fastenings including primer coat of approved quality and two coats of oil paint etc. complete (2) Fully Paneled					
22	**Distempering with dry distemper of approved brand and manufacture (two coats) and of required shade on wall surface of given and even shade, over and including a priming coat of whiting after thoroughly brooming the surface free from mortar dropping and other foreign matter.**	115.40	M^2	30.7	31.01	3578.55
23	**Finishing wall with water proofing cement paint of on wall surfaces (Two coats) to give an approved brand and manufacture and of required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powered materials**	136.99	M^2	36.4	36.76	5035.75
24	**Providing laying and joining in true line and**	10.00	m	229	231.29	2312.90

	level 50 mm dia. U.P.V.C. pipe (SCH. 40) for cold water including fittings make					
25	**Providing laying and joining in true line and level 15 mm dia. U.P.V.C. pipe (SCH. 40) for cold water including fittings**	3.00	m	84.9	85.75	257.25
26	**Providing laying and joining in true line and level 25 mm dia. U.P.V.C. pipe (SCH. 40) for cold water including fittings**	3.00	m	107	108.07	324.21
27	**Providing laying and joining in true line and level 32 mm dia. U.P.V.C. pipe (SCH. 40) for cold water including fittings**	10.00	m	139	140.09	1400.90
28	**Providing and fixing water closet squatting pan (Indian type W.C. Pan) Size 580 mm. (Earth work, Bed concrete foot rests and trap to be measured and paid for separately). (A) Vitreous China. (I) Long pattern white color**	1	each	591	596.01	596.91
29	**Providing and fixing PVC SWR Nahni IS 14735 for drain - 100 mm diameter with jail of the following nominal diameter of self-cleansing design with C.I. scread down or hinged grating including the cost of**	2.00	each	351	351.51	703.02

	cutting and making good the walls.					
30	**Constructing brick masonry chamber for underground C.I. Inspection chamber and bends with bricks having crushing strength not less than 35 Kg/cm2 in cm. 1:5 C.I. Cover with frame (light duty) 455 mm. x 610 mm.**	1.00	each	2538	2563.38	2563.38
31	**Providing and fixing wash basin with single hole for pillar tap with C.I. or M.S. brackets painted white including cutting holes and making good the same but excluding fittings: (A) Vitreous China. (II) Flat back wash basin 550 mm x 400 mm size**	1.00	each	947	956.47	956.47
32	**Providing and fixing C.P. brass waste for wash basin or sink. (1) 32 mm dia**	1.00	each	78.5	79.29	79.29
33	**Providing, laying and jointing in true line and level 110 mm diameter U.P.V.C. (Type B) conforming to IS 13592-1992 with one end plain and other end socketed with rubber ring & fittings conforming to ISI 14735-1999**	10.00	m	525	530.25	5302.50

34	**Providing and fixing in position cowl vent to pipes. (1) 100 mm dia**	3.00	each	494	498.94	1496.82
35	**Providing and fixing to wall celling and floor 10.0 Kg F/cm2 working pressure polythene pipes of the following outside Dia.**	4.00	m	251	253.51	1014.04
36	**Providing and fixing screw down bib tapes of following size: (A) Brass screw down bib tap polished bright. (I) 15 mm dia.**	1.00	each	216	218.16	218.16
37	**Providing and fixing Pillar Tap, capstan head, and screw down high pressure with screws, shanks and back nuts. (A) 15 mm. Dia**	1.00	each	356	359.56	359.56
38	**Providing and fixing chromium plated brass half turn flush cock of approved quality including fixing in pipe line etc. complete. . . (II)25 mm. Dia**	1.00	each	275	277.75	277.75
39	**Providing and fixing gun metal check or no return full way wheel valve. (A)15 mm. Dia**	1.00	Each	216	218.16	218.16
40	**Providing and fixing gun metal check or no return full way wheel valve. (B)20 mm. Dia**	1.00	each	235	237.35	237.35
41	**Providing and fixing gun metal check or no return full way wheel valve.**	1.00	each	485	489.85	489.85

	(C)25 mm. Dia					
42	**Providing erecting and fixing double coated Syntax PVC. (ISI) water tank of required capacity each with all necessary fittings and connection etc. complete on terrace.**	2000	liter	4.6	4.65	9300
	SUB TOTAL					**270399.30RS**

(Table 24. measurement sheet public toilet)

8.1.4 Socio-Cultural design (Civil)Post office(Figure is at the end of the document)

A post office is a public department that provides a customer service to the public and handles their mail needs. Post offices offer mail-related services such as acceptance of letters and parcels; provision of post office boxes; and sale of postage stamps, packaging, and stationery. In addition, many post offices offer additional services: providing and accepting government forms (such as passport applications), processing government services and fees (such as road tax), and banking services (such as savings accounts and money orders). The chief administrator of a post office is called a postmaster.

Prior to the advent of postal and ZIP codes, postal systems would route items to a specific post office for receipt or delivery. During the nineteenth-century, in the United States, this often led to smaller communities being renamed after their post offices; particularly after the Post Office Department ceased to permit duplicate station names within a state.

In many jurisdictions, mail boxes and post office boxes have long been in widespread use for drop- off and pickup (respectively) of mail and small packages outside post offices or when offices are closed. Deutsche Post introduced the Pack-Station for package delivery (both drop-off and pickup) in 2001. In the 2000s, the United States Postal Service began to install Automated Postal Centers (APCs) in many locations both in post offices (for when they are closed or busy) and in retail locations. [9] APCs can print postage and accept mail and small packages.

Measurement sheet (post office)

Item NO.	Item Description	No	Length	Width	Height	Quantity
1.	**Earth work in excavation for foundation**	1	73.18	0.9	0.8	**52.69 m^3**
2.	**P.C.C work [1:4:8]**	1	73.18	0.9	0.1	**6.59 m^3**
3.	**Brick masonry up to plinth cm. [1:6]**					
	Step 1:	1	75.58	0.5	0.20	**7.56 m^3**

	Step 2:	1	76.18	0.4	0.20	**6.09 m^3**
	Step 3:	1	76.78	0..3	0.75	**17.27 m^3**
	Total = 30.92 m^3					
4.	**Super structure**	1	77.2	0.23	3.05	**54.16 m^3**
	Deduction for door and Window					**6.68 m^3**
	Lintel		20.71	0.23	0.15	**0.71 m^3**
	Total = 46.77 m^3					
5.	**D.P.C**	1	76.78	0.3	-	**23.03 m^2**
6.	**Parapet wall**	1	43.47	0.3	0.7	**9.13 m^3**
7.	**Plaster**	1	122.37	-	3.05	**373.22 m^2**
	Deduction for door ar					**29.05 m^2**
	Total = 344.17 m^2					
8.	**Earth filling in plinth**					
	Public post	1	3.56	2.95	0.45	**4.73 m^3**
	Mail shorting	1	3.56	5.08	0.45	**8.14 m^3**
	Cashier	1	3.56	3.25	0.45	**5.21 m^3**
	Break room	1	2.77	2.41	0.45	**3 m^3**
	Manager office	1	2.95	3.25	0.45	**4.31 m^3**
	W.C	1	1.73	2.41	0.45	**1.88 m^3**
	Lobby	1				**13.67 m^3**
	Total = 40.94 m^3					
9.	**door and window work**					
	D	1	2.14	-	2.14	**4.58 m^2**
	D1	1	1	-	2.14	**2.14 m^2**
	D2	6	0.91	-	2.14	**11.68 m^2**
	W	3	0.91	-	1.40	**3.82 m^2**
	W1	4	1.22	-	1.40	**6.83 m^2**
	Total = 29.05 m^2					
10.	**R.C.C work for slab [1:2:4]**	1	125.07 m^2		0.10	**12.51 m^3**
11.	**R.C.C chajja**					
	W	3	1.21	0.6	0.10	**0.22 m^3**
	W1	4	1.52	0.6	0.10	**0.36 m^3**
	Total = 0.58 m^3					
12.	**Mosaic tiles flooring**					
	Public post	2	3.05	3.66	-	**22.33 m^2**
	Mail shorting	1	5.18	3.66	-	**18.96 m^2**
	Cashier	1	3.35	3.66	-	**12.26 m^2**
	Break room	1	2.51	2.87	-	**7.20 m^2**
	W.C	1	2.51	1.83	-	**4.59 m^2**
	Manager office	1	3.35	3.05	-	**10.22 m^2**
	Lobby Part 1:	1	5.41	3.40	-	**18.39 m^2**
	Part 2:		3.73	3.53	-	**13.17 m^2**

	Total = 107.12 m^2

(Table25 Measurement sheet post office)

cost sheet

Item Description Material	**Quantity**	**Per**	**Rate**	Amount
Excavation of Foundation in Soft Murom, Soil or Sand from 0.0 mtr. to 1.50 mtr depth including lifting and laying in 90 mtr. lead area as instructed	52.69	m^3	96.90	**5105.66**
P.C.C in foundation in 1:3:6	6.59	m^3	1900	**12521**
Brick masonry up to plinth cm. [1:6]	30.92	m^3	4196	**129740.32**
Filling of Plinth in layers of 0.23 m thick including murrum and sprinkling of water, compaction etc. complete	40.94	m^3	326	**13346.44**
brick Masonry Super Structure in proportion of 1:6	46.77	m^3	3218	**150505.86**
Cement Plaster 12 mm thick using Cement Mortar in proportion 1:3 with Niru Finishing curing, etc. complete	344.17	m^2	182	**62638.94**
RCC work with varying coat, curing, rough finishing etc. complete in the proportion of 1:2:4	13.09	m^3	3897	**51011.73**
Providing & Fixing Dark Colour Mosaic Tiles (Approved quality with Polishing after bedding Lime: Mortar in proportion of 1:1.5 and fixing it in Cement Paste and with Wax finishing	107.12	m^2	351	**37599.12**
Flush Door 25mm thick with Teak wood frame for Door& windo with polishing / oil painting using company viz. Kitply/ Century / Dura / Everest	29.05	m2	3090	**89764.5**
Total = 552233.57				
Add 3% contingency =16567.00				
Contractor profit =55223.35				
Add 2% Work charge = 11044.67				
Total cost =585367.57Rs				

(Table 26. Cost sheet of post office)

8.1.5 Smart Village Design (Civil)

Measurment Sheet (Water Harvestin

Item no.	Item Description	No	Length (m)	Width (m)	Height (m)	Quantity (m^3)
1	Earth work in excavation		1	1	0.5	**0.5**
			1.2	1.2	1.2	**1.728**
			1	1	1.85	**1.85**
					Total	**4.078**
2	P.C.C work [1:4:8]		1.1016	1.1016	0.15	**0.182028**
			1.4	1.4	0.15	**0.294**
			1.017	1.017	0.15	**0.155143**
					Total	**0.631172**
3	**Brick masonry**					
	PART 1	1	1.2032	0.1016	0.5	**0.061123**
		2	1	0.1016	0.5	**0.1016**
	PART 2	1	1.2032	0.1016	0.9	**0.110021**
		1	1.2032	0.1016	1.55	**0.18948**
		2	1.1968	0.1016	1.05	**0.255349**
	PART 3	1	1.2032	0.1016	1.7	**0.207817**
		2	1	0.1016	1.7	**0.34544**
					Total	**1.270829**
4	**Plaster**					
	PART 1	4	1		0.5	**2**
	PART 2	2	1.1968		1.05	**2.51328**
		2	1		1.05	**2.1**
	PART 3	4	1		1.7	**6.8**
				TOTAL		**13.41328**

(Table 27. Measurment sheet of water harvesting)

Cost sheet

Item Description Material	Quantity	Per	Rate	Amount
Excavation of Foundation in Soft Murom, Soil or Sand from 0.0 mtr. to 1.50 mtr depth including lifting and laying in90 mtr. lead area as instructed	4.078	m^3	96.90	**395.15**
P.C.C in foundation i	0.631172	m^3	1900	**1197**
Brick Masonry Super Structure in proportion of 1:6	1.27	m^3	3218	**4086.86**
Water Proof Cement Plaster 20 mm thick using Water Proofing Compound and in the ratio of 1:3 with necessary finishing	**13.41**	m2	203	**2722. 23**
Plumbing work 3.30m PVC PIPE & 2 ELBOW	**3.30**	M	As per market rate	**1000**
Total =9401.24				
Add 3% contingency = 282.03				
Contractor profit 10% =940.12				
Add 2% Work charge = 188.02				
Total cost = 10811.41Rs				

(Table 28. cost sheet of water harvesting)

(R & B 2015-16 SOR USE FOR THIS DESIGN)

8.1.6 Heritage Village Design (Civil)

Waste Water treatment plant by activated Charcoal treatment

Introduction

Water scarcity has become a major issue in today's world. The present scenario demands the need of conserving water resources. In addition, there is lot of advanced technologies developed in purifying and recycling wastewater produced. The recycled water is stored in the tank and used whenever the need arises.

The underground water table is low and reducing because of poor rainfall. The rate of natural recharging in the aquifer has become slow due to the low amount of rainfall. In addition, the water in the borehole is diminishing very fast and need for boreholes are increasing. Hence, the process

of Purifying and recycling water is the need of the present. Activated charcoal is increasingly used for purifying water. The recycled water can be used for multi purposes.

Objective

The main objective of this Activated charcoal filtering tank is to meet the water needs of the Jashapar village people. Charcoal is used to remove contaminants and impurities, using chemical adsorption active. Charcoal carbon filters are most effective at removing chlorine, sediment, volatile organic compounds (VOCs), taste and odor from water. The purified water is stored in underground tank. The water is pumped and stored in overhead tanks. The recycled water is used to meet the water needs of the Jashapar village people. The wastewater generated from the village including water from the bathrooms, kitchen sinks and the laundry is recycled and used for cleaning and other purposes.

Data Collection

Capacity of tank = 70000 liters
Size of filtration tank = 5.5 m X 2.6 m X 4 m
Size of storage tank = 7.6 m X 4.5 m X 2 m

Analysis of waste water outflow

Average waste water outflow = 15000
lit/day (assume) Factor of safety = 1.5
Total amount of waste water flow outflow = 15000 X 1.5 = **22500 lit/day**

FILTRATION UNIT DETAILS

Materials: Activated charcoal, coarse aggregate, Fine aggregate.
Top Layer: Activated Charcoal, Middle
Layer: Fine Aggregate, Bottom Layer:
Coarse Aggregate.

PROCESS OF MODEL FILTRATION UNIT

Collection of Materials

- Sand
- Aggregate
- Charcoal

Cleaning of Materials - Clean sand and aggregate

Filing the Materials in Model Filtration Unit

- Top Layer: Activated Charcoal,
- Middle Layer: Fine Aggregate,
- Bottom Layer:

Coarse Aggregate P^h
Value - 6.5 to 7.5

Costing

Material	Quantity	Rate per unit	Rate
Sand	2 Tonne	1500 Rs. per Tonne	**3000 Rs.**
Aggregate	1.5 Tonne	700 Rs. Per Tonne	**1100 Rs.**

Activated Charcoal	215 kg	60 Rs. /kg	**12900 Rs.**
Pipe (40 mm Dia.)	100 m	410/- per m.	**41000 Rs.**
Other construction and labor cost	-	-	**15000 Rs.**
Total Cost	-	-	**73000 Rs.**

(Table 29. cost of waste water treatment plan)

(R & B 2015-16 SOR USE FOR THIS DESIGN)

8.1.7 Electrical Design 1

A PV module is an assembly of photo-voltaic cells mounted in a framework for installation. Photo- voltaic cells use sunlight as a source of energy and generate direct current electricity. A collection of PV modules is called a PV Panel, and a system of Panels is an Array. Arrays of a photovoltaic

system supply solar electricity to electrical equipment.

Each module is rated by its DC output power under standard test conditions (STC). Power typically ranges from 100 to 365 Watts (W). The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230 W module will have twice the area of a 16% efficient 230 W module. Some commercially available solar modules exceed 24% efficiency.

- Solar panel:

Solar panel efficiency can be calculated by MPP (maximum power point) value of solar panels.Solar inverters convert the DC power to AC power by performing the process of maximum power point tracking (MPPT): solar inverter samples the output Power (I-V curve) from the solar cell and applies the proper resistance (load) to solar cells to obtain maximum power.

Solar panel efficiency can be calculated by MPP (maximum power point) value of solar panels.Solar inverters convert the DC power to AC power by performing of maximum(MPPT): solar inverter samples the output Power (I-V curve) from the solar cell and applies the proper resistance (load) to solar cells to obtain maximum power

Cost

Item no	item description	No	Price	total cost
1	200Ah battery	2	12500	**25000**
2	700watt UPS	1	3300	**3300**
3	12V , 150watt solar panel	8	7500	**60000**
4	miscellaneous cost		500	**500**
5	labor cost		2000	**2000**
			total cost	**90800Rs**

(Table 30.solar cost)

- **UPS = 700 watt**
- **Battery size: -**

554 / 12 v = 46.16 Amp, provide = 50 Amp Backup time = 8 hours

554 × 8 = 4432 watt

4432 / 12 v = 369.33Amp

Battery charge load = 10 %

36.95 Amp, provide 40 Amp

We should have = 2 battery 200 Amp

- **Number of solar panels: -**

50 + 40 = 90 Amp

Use – 12v and 150 watt
Total load: - 90 × 12 v =
1080 watt

1080 / 150 watt = 7.2 panel, **provide 8 panel**

8.1.8 Electrical Design 2

Solar Street light Installation Design

The solar street light does not need to set up the transmission line or route the cable, and no any special management and control are required. It can be installed in the entire public place such as the square, the parking lot, the campus, the street or the highway etc.

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

Components required for a single Solar Street Light Pole:
(1) Solar cell
(2) LED lamp
(3) Light pole
(4) Control box (charger, controller, battery)

Calculation for Solar Street Light Installation
As we seen above our basic components required are Solar Cell, LED Lamp, Light Pole and Control Box (It consists of Charger, Controller, and Battery). Now these components are available in Different Ratings as per our requirement. And hence cost of that component also varies with the change in rating.

Selection of Component Rating

So here are some calculations formulae which will help us know the rating of component to be Used To calculate the power of Photovoltaic Cell required

p $(pv) = (1/n1n2) \times (Pled \times hled/\text{h}\ (pv)) \times k$

Where:

1 ---------- Charging efficiency of the battery

2 ---------- Efficiency of the LED driver circuit

PLED ---------- Power consumption of the LED (W)

HLED ---------- Daily lighted time of Lamps (h)

h (pv) ---------- Average of daily peak sunshine hours

k ---------- Loss coefficient of solar panel

To calculate the capacity of Battery required

The capacity of the battery can be calculated by the following formula

$C = (D + 1)\ k1\ (1 - k2)$

In the formula

C --------- Standard capacity of the battery.

Q --------- Power consumption per day of the lamps.

D --------- Maximum number of continuous rainy days.

k1 --------- Depth of discharge (DOD), generally the DOD of VRLA is 0.75. k2 --------- Loss electricity of the battery's self-discharge. (10%)

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

Cost Calculation

Rating & costing of street light

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

(table 31. Rating street light)

Mathematical parameters are as follows:

Capacity of solar panel= Rating of LED X no of running hours

No of charging hours

- Specific design parameters for 7meter pole height:

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

(Table 32.Specification according to height)

Cost Estimation of single solar street light:

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

(table 33. Cost Estimate of Single Street Light Pole)

8.1.9 Electrical Design 3

CCTV SYSTEM DESIGN

Following a sound design process enables organizations to make purchasing decisions that result in the procurement and installation of a CCTV system that meets functional and operational requirements. As CCTV is part of a multi-layered security approach, a system design should begin with a comprehensive needs assessment to ensure security risks and mitigation plans are identified. Clear requirements, a comprehensive site survey, and proper equipment selection and installation must all be considered when designing a CCTV system.

Defining System Requirements

In order for an organization to properly implement a CCTV system, site-specific characteristics need to be assessed by a knowledgeable multidisciplinary team of personnel. This team is critical to identifying key functional and operational requirements. Functional requirements consist of determining the area of surveillance, such as a perimeter area or an access point. Operational requirements define what information a CCTV system will be expected to provide given the existing operating conditions.

Multidisciplinary System Design Team

Organizations should begin by establishing a team of people with relevant knowledge to help guide the CCTV system design process. The system design team should be involved in all phases of the project to include: needs assessment, requirements development, system design and layout, procurement, installation, and final check-out of the system. Personnel should be included from varied internal disciplines such as security, facility maintenance and management, and those who work directly with assets on-site or in controlled monitoring environments. The team may opt to consult with external subject matter experts, such as electricians, systems engineers, and information technology (IT) professionals.

Needs Assessment

A thorough risk and needs assessment should be conducted to identify locations or assets that will benefit from CCTV surveillance as part of an overall security approach. Organizations can enhance the security of facilities and critical infrastructure most effectively by defining their

overall goals and objectives for CCTV systems in terms of the requirements within their operational environment.A needs assessment gathers and analyzes four sets of requirements: functional, operational, infrastructure, and video retention.

- **Functional requirements–**Define camera coverage needs such as surveillance of perimeters, parking lots, and storage areas; surveillance of approaches to, and spaces within, buildings or other structures; and surveillance of waterfronts;

- **Operational requirements**–Define the capabilities of the CCTV system components that will enable it to provide the expected information under all operating conditions. Conditions to consider in the operational environments include day and night operations, lighting, weather conditions, and temperature changes. It is important that operational requirements are detailed and testable. For example, waterfront surveillance may demand that the CCTV system provide a recognizable image, during day or night, of any type of surface watercraft operating at speeds between 0 and 60 knots in wave heights of up to 6 feet while within 500 yards of a pier;

- **Infrastructure requirements**–Define needs for installing or accessing fiber or hard-wire cables, wireless networks, and power sources, to name a few, necessary to successfully implement an integrated CCTV system; and

- **Video retention requirements**–Define the organization's video retention and storage needs.

CCTV Site Survey

A CCTV system's effectiveness can be enhanced when integrated with access control, intrusion detection, or duress systems. Successful integration requires a comprehensive site survey which supports the development of detailed equipment specifications, installation design, and ultimately a thorough system test.

A site survey should address all aspects of specifying and building a CCTV system and it is an integral part of defining the requirements for discrete tasks and the role of each piece of equipment. Whenever possible, CCTV systems should be included in the planning and design stage of any new asset to ensure all necessary infrastructure requirements are adequately incorporated into the overall facility or asset design.

The result of a comprehensive survey of the area in which a CCTV system is to be installed or upgraded provides input to the requirements and design process. Considerations inherent in a site survey include the number of operators, local and remote operator consoles, layout, light levels, camera and lens selection and location, and power and data transmission.

System Layout Considerations

A key input to the design and specification of the layout of an outdoor CCTV system is the site survey team's collection and analysis of aerial photographs. Images can be obtained from a wide variety of sources such as satellite photographs, local government files, privately contracted aerial photography services, and a host of free web-based mapping applications. Aerial

photographs can provide information regarding on-site distances and blind areas where outdoor video coverage may be needed. Additionally, aerial photographs and detailed maps can be used during the design of the system to overlay alarm and video information useful for planning the dispatch routes of response personnel.

Interior surveys are similar to exterior surveys. Aerial photographs can be replaced with scaled computer aided drawings or blueprints of the facility being surveyed. These can be used to mark potential camera site locations to identify the necessary coverage of access points, critical assets, and desired fields of view. A camcorder is often used to determine camera positions and evaluate video images from proposed camera locations.

An important factor in the design and layout of a CCTV system is the location of its transmission hubs. Transmission routes channeled through a primary transmission hub could lead to a single point of failure in which an outage of one transmitter could disable the transmission of data from other camera sites.

CCTV System Design Considerations

System design considerations include factors such as lighting, power, transmission, and cost. These factors are important in the design and layout of a CCTV system. In addition to these factors, camera types, lenses, monitors, multiplexers, and other components are also important considerations, and are discussed in Section 3.

Selection of the CCTV components is an iterative process that takes place in conjunction with the design phase. Section 3 contains more details on common component features and specifications that should be considered when selecting equipment for a CCTV system.

Lighting

Lighting strategies, camera selection, and camera location should be considered together in the design of a CCTV system to ensure optimum performance and to prevent operational environment conflicts. Light (or illumination) levels, both natural and artificial, affect system requirements at different times of the day for exterior systems. Exterior cameras often require lenses with automatic apertures to compensate for changes in light levels. Interior cameras may require internal software to compensate for backlight, which is the contrast between low interior light levels and high exterior daytime light levels. For example, backlight compensation allows security personnel to see details of a person moving in front of a brightly lit window. Artificial lighting can affect the appearance of the image as well as the operation of the CCTV system.

Types of artificial lights include:

- **Fluorescent**–Primarily used for indoor areas in the United States, these lights produce a 60-hertz (Hz) flicker that can interfere with image quality;
- **Incandescent**–Include halogen bulbs and are used to illuminate large outdoor areas. Incandescent lights consume more power than other lighting types and are generally the most expensive to operate;

- **High-intensity discharge (HID)–**Include high- and low-pressure sodium and metal-halide lighting and are the least expensive to operate. Low-pressure sodium lights produce a yellow light that may distort true color reproduction on video. Metal-halide lights provide the best color resolution. These types of lights require a few minutes to reach their full luminance once turned on
- **Infrared (IR)–**Emit light at a much longer wavelength than white lights, and are faintly visible to the human eye as a red glow or they are not visible at all. IR lighting provides a longer illumination range than white light and can be used for discrete or covert CCTV system **illumination.** IR light can be provided by light emitting diodes (LEDs) and lasers as well as filters on incandescent bulbs; and
- **LED**–Provide high levels of brightness and intensity. These lights are highly efficient, and generate low levels of radiated heat. As such, they are increasingly used in CCTV systems.

It is important to verify that the selected lighting technology sufficiently illuminates the area of interest to meet the operational requirements. An overview of CCTV illumination is provided in the Illumination for Closed Circuit Television Surveillance Systems TechNote. Detailed information concerning lighting as it applies to security systems is available in the Security Lighting Guide. Both of these documents can be found in the the SAVER section of the DHS S&T website.

Power Distribution

A number of considerations must be taken into account when designing the power distribution system. Therefore, it is prudent to consult licensed engineers and electricians in the design and installation of a CCTV power distribution system.

Inadequate power is one of the most common problems with CCTV equipment and can often be the cause of erratic or sporadic equipment behavior. Proper system performance requires a clean, adequate power source. For example, it is possible for power to fluctuate considerably on hot days when air conditioning units overload power grids. Therefore, agencies should plan accordingly and specify power conditioning or backups as needed. The stability of the input power to CCTV equipment can be determined by taking several readings of the voltage and current levels over a short time period, or by using a voltage recorder for long-term monitoring.

An inadequate power system can affect the quality of the video across the entire system. Placement of power components is an important design consideration. Placing low-voltage power components near high-voltage lines can induce currents in the low-voltage system, presenting a hazard to personnel and equipment. Alternatively, placing a power source too far away can cause power fluctuations and also drive the installation costs up due to the larger conductor sizes needed to reduce voltage drop over long distances. Therefore, it is advisable to locate power sources close to CCTV equipment. In addition, uninterruptible power supplies (UPSs) are beneficial in protecting equipment and conditioning the power. Since there are many types of UPS products on the market, it is important to find models appropriate to the

application. Determinations about backup power requirements during a power interruption are also important. For example, some CCTV systems may have designated primary cameras focused on critical access points with a need for longer term backup power than secondary cameras such as those within internal corridors.

Voltage spikes and lightning are common phenomena affecting CCTV systems. Lightning, a common cause of voltage spikes, may cause failures and disable major pieces of equipment in buildings. When designing a system, all pieces of electronic equipment should have sufficient lightning suppression to help reduce damage and failures. Ground loop correctors help prevent voltage differentials between two or more installations or pieces of equipment powered by separate power sources (i.e., the ground loop corrector puts the separate pieces of equipment at the same ground potential).

Components of a CCTV system should ideally have an internal regulated power supply; however, this feature is often eliminated to reduce cost. This is particularly likely with low cost cameras. There are power supplies available that distribute individually fused and regulated feeds for each camera from a central location.

Video Transmission

Selecting the appropriate video transmission media, such as coaxial cable or unshielded twisted pair (UTP), is one of the most important aspects of designing a quality CCTV system. A system may include the highest quality hardware components available, but if the video signal is not transmitted by the proper media, overall performance could be degraded. Many common problems with video image quality can be avoided by selecting the appropriate transmission media and following proper installation techniques and procedures.

As CCTV technology has evolved, video transmission has progressed from analog to digital transmission. New cameras with Internet protocol (IP) capability transmit compressed video as digital data. A drawback of IP transmissions is that video places a high demand on a network's bandwidth, and the tradeoff may be image quality. One potential solution for this issue is to separate the video stream from the primary network. Section 4 provides a more detailed discussion on video transmission and IP-based CCTV systems.

Scalability

Scalability of CCTV systems refers to the ability of the system to accommodate additional components such as cameras, increased video storage, and additional monitors. Large facilities often implement CCTV systems in stages due to budget limitations or in order to verify system performance. The ability to easily incorporate hardware and software updates should be a consideration of a CCTV system design.

Cost

Cost estimates for a CCTV system should cover all aspects of the system's life cycle including planning, design, installation, operation, maintenance, and personnel costs. In addition, long-term personnel costs, such as initial and refresher training programs should be included. Hardware and software upgrades should also be a cost consideration.

Using existing CCTV infrastructure such as cameras, camera mounts, and cable runs may reduce costs. However, as the capabilities of cameras and information handling components of CCTV advance, replacing old equipment and infrastructure may improve system performance and be a more cost-effective solution.

Infrastructure

Each camera deployed in a CCTV system requires power and the means to transmit video data to monitoring and storage systems. These requirements can necessitate modifications to a facility's infrastructure, such as installing new poles for mounting cameras. When planning a CCTV installation, there are four important considerations:

1)To what extent can the system use existing infrastructure?
2)To what extent can the new CCTV system integrate with existing enterprise systems?
3)To what extent can the new CCTV system integrate with or complement other existing or planned intrusion detection and access control systems?
4)To what extent can the new system operate in parallel with existing systems and which system will influence operational procedures and response?

Employing existing infrastructure is an important factor in controlling equipment and installation costs. For example, old coaxial cable systems can be converted to IP systems by running Ethernet over coaxial cable with a converter module. Analog video and Ethernet can also be run over telephone lines.

The extent to which a CCTV system integrates with the overall security program will be a major factor in its effectiveness. Any new installation should operate in parallel with existing systems until the new system is accepted and the old system upgraded or phased out. See Section 7 for more details on system integration.

Annunciation, Assessment, and Response

The role of many CCTV systems in a comprehensive security program is to aid security personnel. For instance, when a security alarm occurs at a location not currently displayed on a monitor; the system can alert the operator by automatically switching the display to the location of the security alarm. The operator can then assess the security alarm visually and dispatch appropriate response forces.

Requirements and Design Worksheets

Basic Questions for Addressing CCTV System Requirements	
1)	What areas require coverage by the CCTV system?
2)	What are the highest value assets that need to be protected? For example: • High-value material property; • Critical infrastructure; • Intellectual property; and/or • Classified material or intelligence information.
3)	Where are the sites of greatest vulnerability?
4)	Does the information technology infrastructure adequately support the number of cameras?
5)	Will the system integrate with an existing physical security system?
6)	Will the system integrate with an existing electronic access control system?
7)	Does the security budget cover regular maintenance, training, and upgrades to the system?
8)	Does the system's installer/vendor provide adequate training to operate the system?

Sample site survey check list

Operational Environment			
Indoor			
Outdoor			
Exposure to:			
Water			
Corrosives			
Explosives			
Fire			
Extreme Temperatures			
Location of Cameras			
Access Points: Doors/Gates			
Building Exterior			
High-Security Interior Areas			
High-Security Exterior Zones			
Hallways/Corridors			
Parking Lot			
Perimeter			
Other			
Light Levels			
Day		Night	
Lens			
Wide Angle			
Normal			
Telephoto			
Zoom			
Camera Power			
12 Volts Direct Current (DC)			
24 Volts DC			
120 Volts Alternating Current (AC)			
Cameras			
Indoor			
Fixed		Pan-Tilt-Zoom	
Outdoor			
Fixed		Pan-Tilt-Zoom	
***Total Number of Cameras**			

Housings			
Dome			
Weather-Resistant			
Tamper-Resistant			
Other (e.g., Specialized Housings)			
Mounts			
Wall		Ceiling	
Pole		Corner	
Fences		Building Exterior	
Display/Monitors			
Size _____			
Split-Screen Displays			
Multi-Screen Displays			
Video Walls			
Recorders			
Digital Video Recorders (DVRs)			
Network Video Recorders (NVRs)			
Hybrid DVRs			
Transmission			
Wired			
Coaxial		Twisted Pair	
Fiber Optics		Telephone	
Category 5			
Wireless			
Laser			
Infrared			
Radio Frequency			
Microwave			
IP-Based			
Internet Protocol (IP)-Based			
Network Storage			
Direct Attached Storage (DAS)			
Storage Area Network (SAN)			
Network Attached Storage (NAS)			
Other			

8.2 Reason for Students Recommending this Design

In over village above structures are not present so we design.

8.3 About designs Suggestions / Benefit of the villagers

- primary health center
- library
- banks and atm
- use of solar system
- water harvesting
- bio gas plant
- automatic street light

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

- After completion of visit & data collection of the Isra village, we have given some ofthe designs which were to be provided under this project.
- Future scope would be study over other different urban amenities that would be sustainable in rural areas of saurashtra.
- Some of the designs which are left like water harvesting, solar panel etc. will be provided in the next semester.

1. Sustainable design : Community hall
   As the concept and practices of a sustainable built environment have evolved over the year, it is increasingly recognized that the scope should be expanded beyond individual buildings to the community scale

2. Physical design : Solid waste collection
   The population and environment transforms waste collection in public and private matter. Therefore, this leads to the need for developing solution, mainly focused on the administration, collection and disposal of waste.

3. Social design : Library
   People prefer to live near a public library if they have a choice, and often perceive library have a choice, and often perceive library access as part of an enhanced quality of life.

4. Socio-cultural design : Internal road
   These roads serve as the feeder roads as well as the roads for internal village movement. They pass through rural areas connecting the village to one another and to the nearest road of higher category connect district road.

5. Smart village design : Recreational center

Access to parks and recreation facilities leads to healthy lifestyle for people of all ages. games children play, whether it in a sports league or summer camp, encourage the development of socialization skill and improves coordination and self esteem.

6. Heritage village design : Police station

A police station is an village because people can go to the police to report cases or inform about any mishappenings in their area like theft, accident, fight, injury etc

Chapter: 10
Conclusion of the Entire Village Activities of the Project

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

After visiting of Ideal Village kuvadva and Smart Village vad vajdi we get the idea and scenario of a model village. Up till now in our mind we think the meaning of 'village' as low classpeople, leaving with ordinary life and with old mindset and old technologies. But now a day scenario is totally changed, Indian villages growing out now. With smart cities, Smart Village concept is also introduced and we are proudly said that, we are one of its part. Because through Vishwakarma Yojana we connect with the rural development concepts.

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

By providing required amenities to village, development of village can be possible. So ultimately migration to the city from village will be reduced and livelihood of villagers will increase. So healthy and prosperous life can be possible for the villagers. Ultimate growth of village and peopleare base step for the development of country. India is developing country and GDP is highlydepended on farming. As the development of village would be possible, farming techniques will increase and percentage of GDP will increase.

In this Project We suggested some basic Requirements of The Isra Village. We talked to Villagers, what they need to fulfil their basic requirements/to make their work easy. For example,there is No Primary Health Centre in the village and the nearest clinic is in Upleta village.

By providing required amenities to village, development of village can be possible. So ultimately migration to the city from village will be reduced and livelihood of villagers will increase. So healthy and prosperous life can be possible for the villagers. Ultimate growth of village and people is base step for the development of country. India is developing country and GDP is highly depended on farming. As the development of village would be possible, farming techniques will increase, and percentage of GDP will increase.

With help Gap Analysis we conclude that some of different Smart Village facilities are required as basic or primary level which still lack in village. So according to Gap Analysis of Isra village, we observed condition of existing infrastructure facilities in village such as- Primary school, Water tank, Road network, Drainage network, etc.

Chapter: 11
References refereed for this project

Various official websites

1. www.rmc.gov.in
2. www.censusindia.gov.in
3. www.rural.nic.in
4. www.sagy.gov.in
5. www.swaniti.in
6. www.niug.org
7. www.unohabitat.org
8. www.giftgujarat.in
9. www.biotec-Asia.com
10. https://panchayat.gujarat.gov.in
11. RUDA (Rajkot Urban development authority)
12. www.mdws.nic.in (ministry of drinking water and sanitation government of India)
www.gujaratgov.in

Various books referred

1. SOR of R & B department of Rajkot.
2. Rate from market survey done in Rajkot region
3. District census handbook Rajkot
4. Design of reinforced structures by N SUBRAMANIAN
5. Estimation and costing, B. N. Dutta
6. Environmental Engineering by HOWARD S. PEAVY, DONALD R. ROWE
7. Building construction by B.C. Punamia
8. Highway Engineering by R.P RETHALIYA

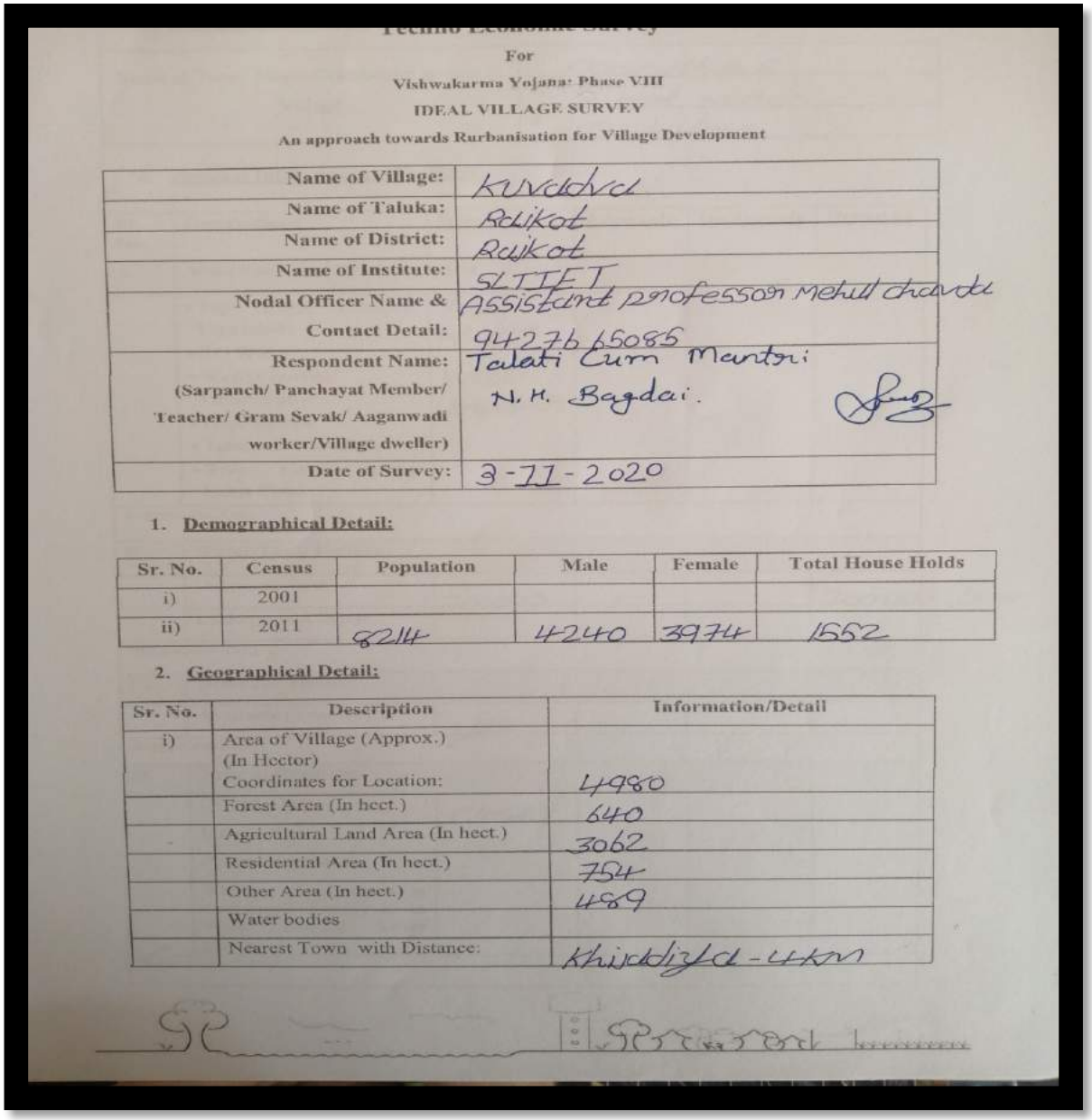
Various IS code & General Referred

1. IS 456: 2000 (Reinforced Concrete structure)
2. SP 16 (design aids to IS 456).
3. IS 10262: 1982 (recommendation guidelines for concrete mix design)
4. IS 875: 1987 (Load calculation for Building)
5. IS: 13920 -1993 (Ductile detailing of reinforced concrete structure)
6. Twelfth five-year plan (2012-2017)', manual by planning commission of Government of India,SAGE Publication India Pvt. Ltd.
7. Draft revised smart city proposal for Chandigarh
8. Norms and standards of municipal basic services in India by National institute of Urban Affair.
9. Handbook on sustainable development goals and Gram Panchayat.
10. Smart city and Smart villages by N. Viswanathan.

Chapter: 12
Annexure attachment

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

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



For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	KUVADVA
Name of Taluka:	Rajkot
Name of District:	Rajkot
Name of Institute:	SLTIET
Nodal Officer Name & Contact Detail:	Assistant Professor Mehul Chavda 9427665085
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Talati Cum Mantri N. H. Bagdai.
Date of Survey:	3-11-2020

1. Demographical Detail:

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001				
ii)	2011	8214	4240	3974	1552

2. Geographical Detail:

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	4980
	Forest Area (In hect.)	640
	Agricultural Land Area (In hect.)	3062
	Residential Area (In hect.)	754
	Other Area (In hect.)	489
	Water bodies	
	Nearest Town with Distance:	Khirasara - 4KM

3. **Occupational Details:**

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

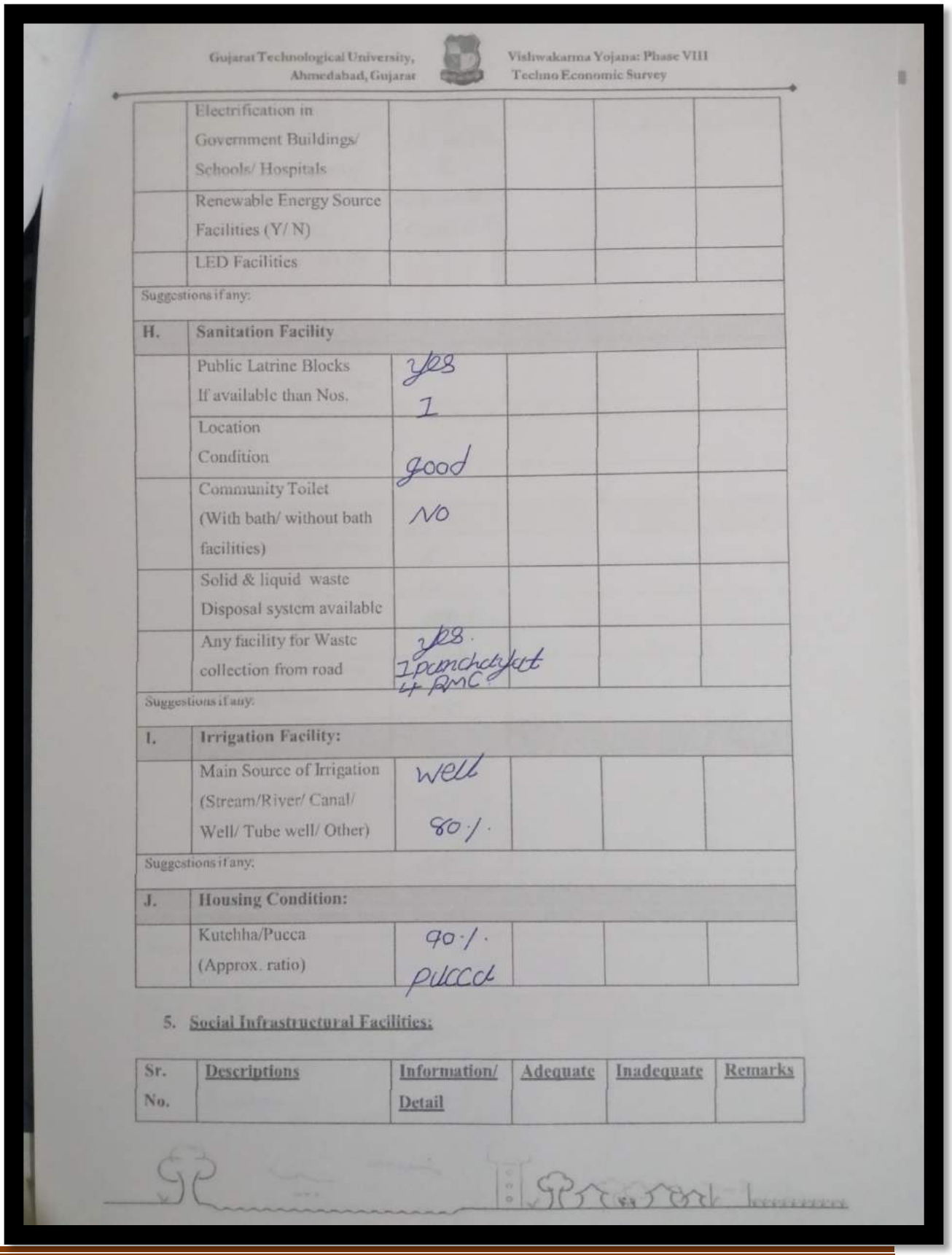
4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated) • RO Water • Well (Covered/ Uncovered) • Hand pumps • Tube well/ Borehole • River/ Canal/ Spring/ Lake/ Pond	TUP Water Well Uncover			
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity: 100000			100.000 liter
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	yes			
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	closed			
	If Open than Pucca / Kutchcha				
	Whether drain water is discharged directly in to Water bodies/ Sewer plants				
Suggestions if any:					

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

E.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	Black Topped pucca			
	Main road	WBM			
	Internal streets	RCC			
	Nearest NH/SH/MDR/ODR Dist. in kms.	Rajkot Ahmedabad NH8A			
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO (Rajkot 18 KM)			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	yes			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	All available			
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	yes Getco 24 hrs			
	Power supply for Domestic Use	24 hrs			
	Power supply for Agricultural Use	8 hrs			
	Power supply for Commercial Use	24 hrs			
	Road/ Street Lights				



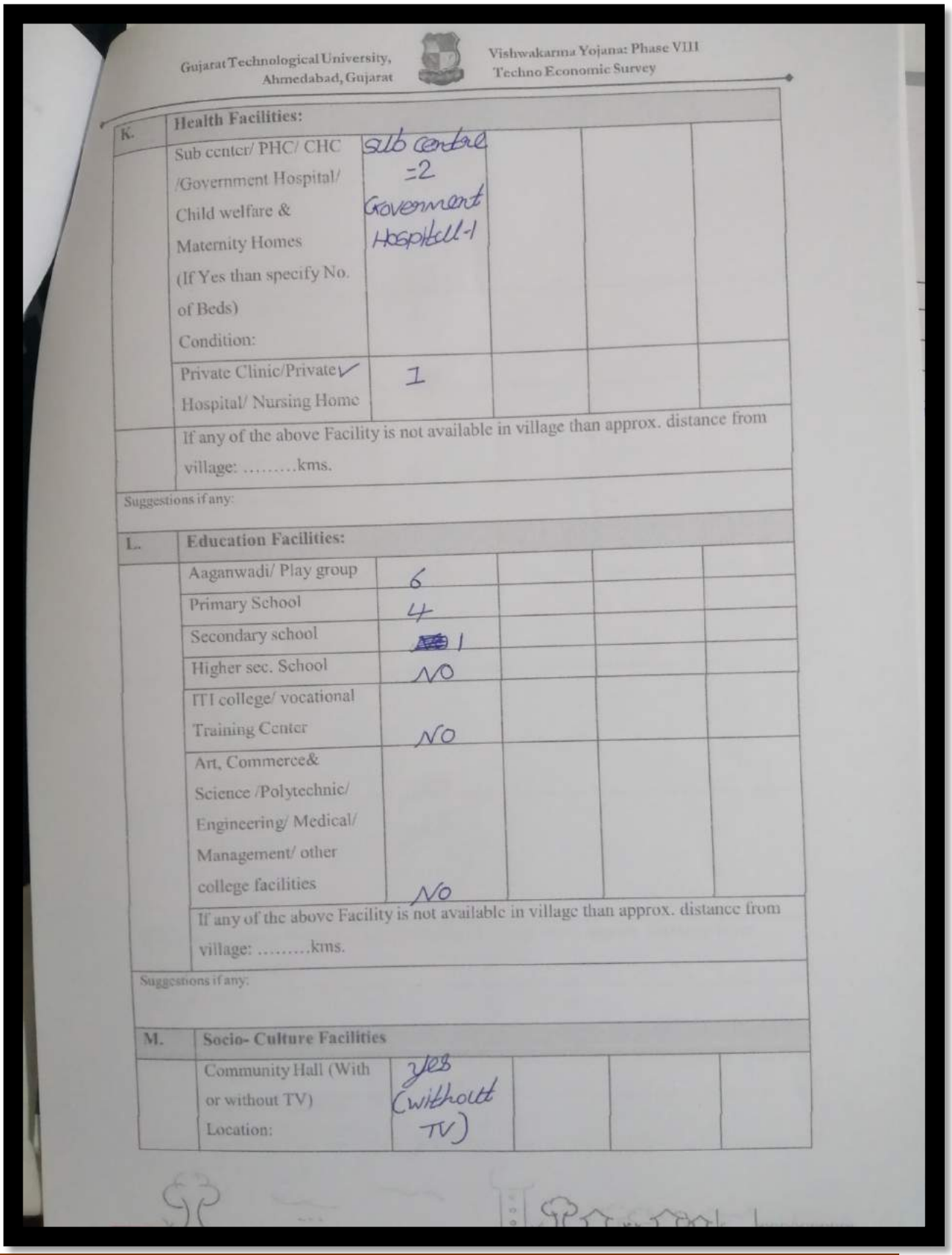
Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Electrification in Government Buildings/ Schools/ Hospitals				
	Renewable Energy Source Facilities (Y/ N)				
	LED Facilities				
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes 1			
	Location Condition	Good			
	Community Toilet (With bath/ without bath facilities)	No			
	Solid & liquid waste Disposal system available				
	Any facility for Waste collection from road	Yes. Panchayat & PMC			
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	well 80 /.			
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	90 /. pucca			

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks



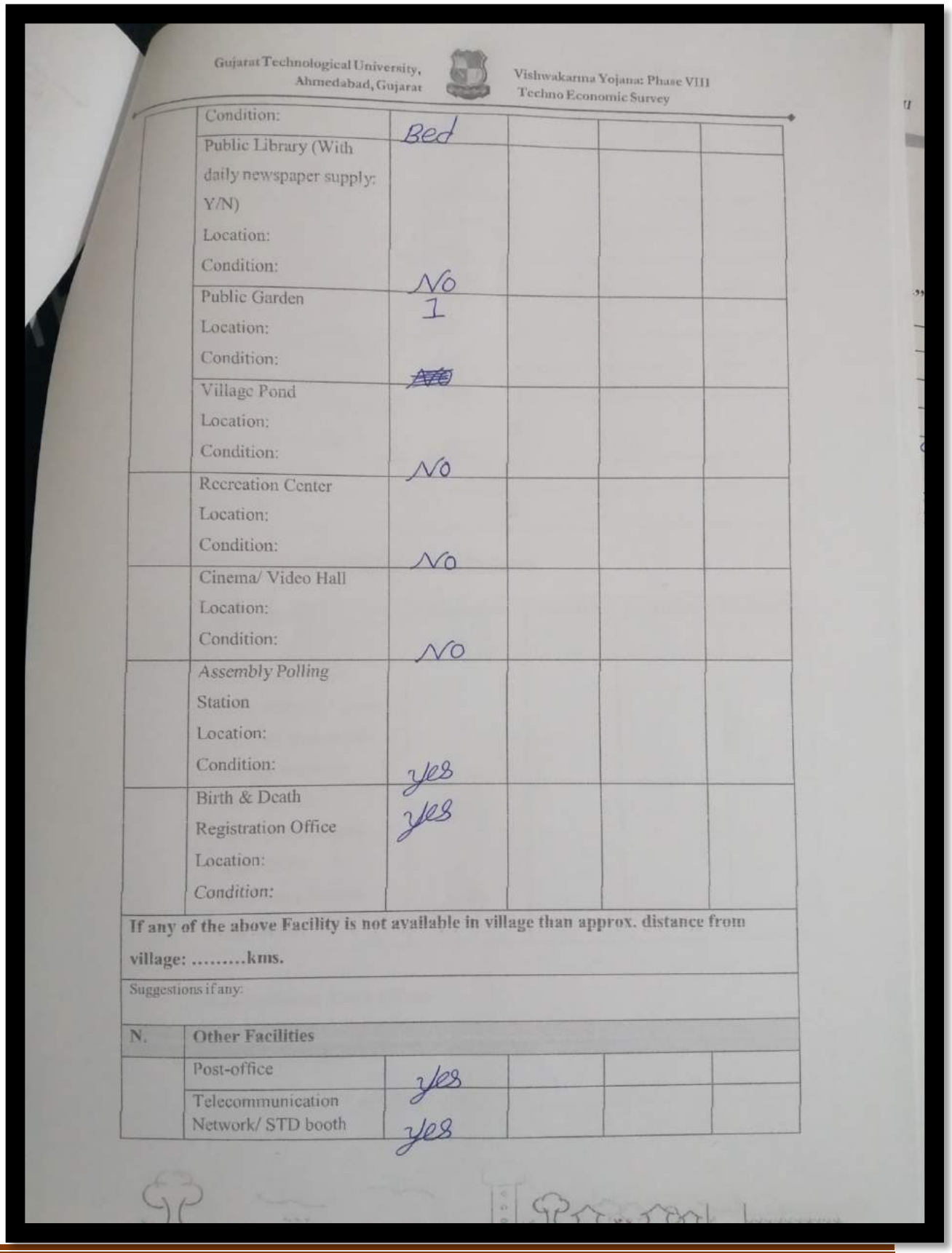
Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

K.	Health Facilities:				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	Sub center =2 Government Hospital-1			
	Private Clinic/Private Hospital/ Nursing Home	1			
	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	6			
	Primary School	4			
	Secondary school	1			
	Higher sec. School	NO			
	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: .....kms.				
Suggestions if any:					

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



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Condition:	Bed			
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	No			
	Public Garden Location: Condition:	1			
	Village Pond Location: Condition:	No			
	Recreation Center Location: Condition:	No			
	Cinema/ Video Hall Location: Condition:	No			
	Assembly Polling Station Location: Condition:	yes			
	Birth & Death Registration Office Location: *Condition:*	yes			

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

Suggestions if any:

N.	**Other Facilities**				
	Post-office	yes			
	Telecommunication Network/ STD booth	yes			

	General Market	yes.			
	Shops (Public Distribution System)	yes			
	Panchayat Building	yes			
	Pharmacy/Medical Shop	yes			
	Bank & ATM Facility	yes			
	Agriculture Co-operative Society	yes			4
	Milk Co-operative Soc.	yes			2
	Small Scale Industries	yes			
	Internet Cafes/ Common Service Center/Wi Fi	yes.			
	Other Facility				
Suggestions if any:					

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

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
O.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources				
P.	Bio-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	

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

8. Additional Information/ Requirement:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities(School Building, Health Center, Panchayat Building, Public Toilets & any other)	NO	
2.	Additional Information/ Requirement		

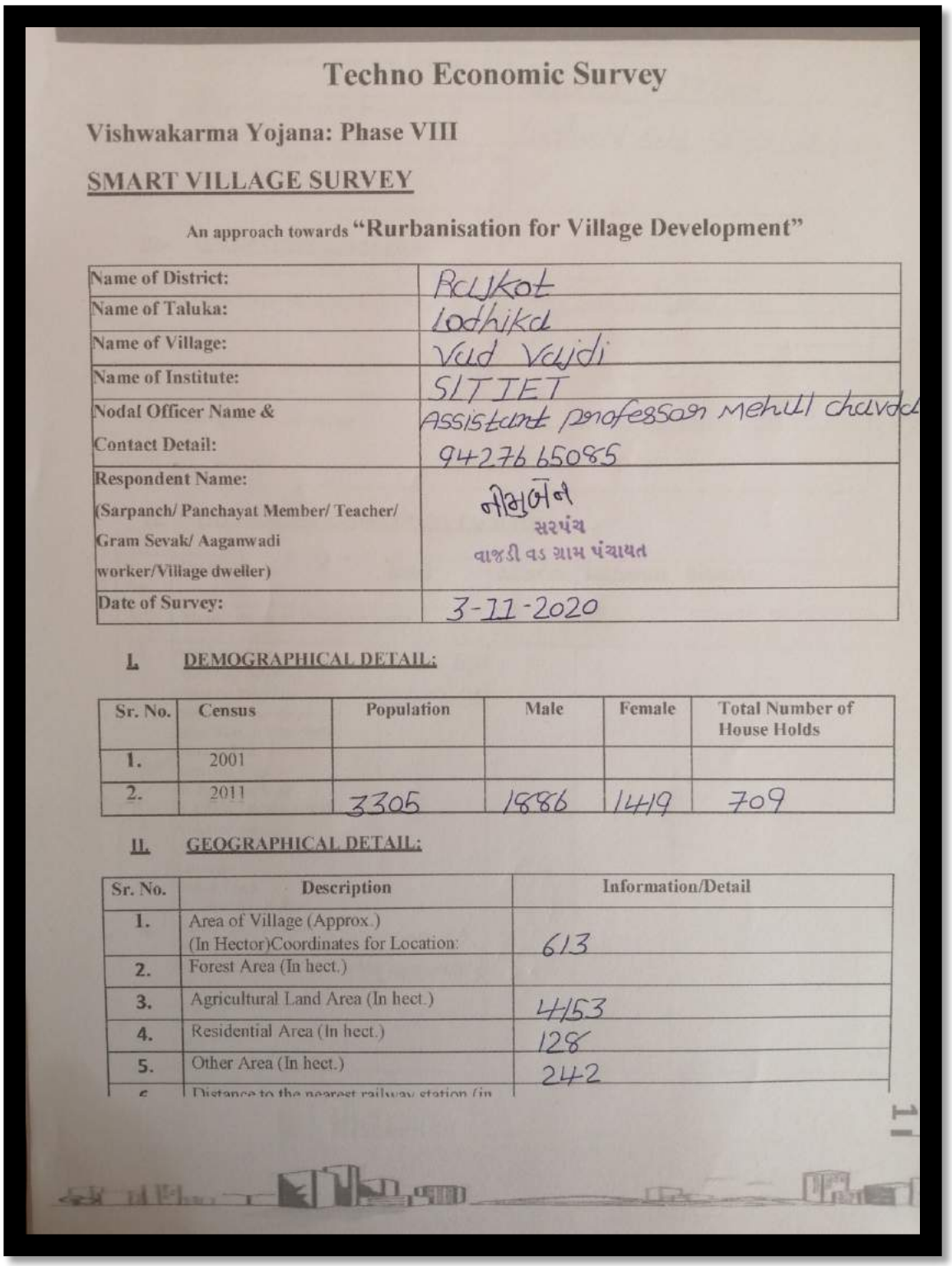
9. Smart Village Proposal Design

Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

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

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

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



Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

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

Name of District:	Rajkot
Name of Taluka:	Lodhika
Name of Village:	Vad Vajdi
Name of Institute:	SLTIET
Nodal Officer Name & Contact Detail:	Assistant professor Mehul Chavda 9427665085
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	મીનાબેન સરપંચ વાજડી વડ ગ્રામ પંચાયત
Date of Survey:	3-11-2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	3305	1886	1419	709

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	613
2.	Forest Area (In hect.)	
3.	Agricultural Land Area (In hect.)	4153
4.	Residential Area (In hect.)	128
5.	Other Area (In hect.)	242
6	Distance to the nearest railway station (in	

7.	Name of Nearest Town with Distance:	Rajkot - 12KM
8.	Distance to the nearest bus station (in kilometers):	Lodhikd Bus Stop - 4.5 km
9.	Whether village is connected to all road or the any facility or town or City?	

III. OCCUPATIONAL DETAILS:

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

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

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:			100000 liters
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	A			underground Drainage
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	C.C			
	Main road	C.C			
	Internal streets	C.C			
	Nearest NH/SH/MDR/ODR Dist. in kms.	0 KM Kaldvdd	Road		
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	yes			
	Local Transportation (Auto/ Jeep/Chhakda Private Vehicles/ Other)	Auto	City BUS STBUS		
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	yes Govt 24hrs			

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

	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)	NO			Required
	LED Facilities				

Suggestions if any:

G.	Sanitation Facility				
	Public Latrine Blocks If available than Nos.	NO			
	Location Condition				
	Community Toilet (With bath/ without bath facilities)				
	Solid & Liquid waste Disposal system available	yes			Rudd Panchayat
	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)	River Tubewell			

Suggestions if any:

I.	Housing Condition:				
	Kutchha/Pucca (Approx. ratio)	pucca maximum			

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	sub centre			
	Sub-Centre				
	PHC				
	BLOCK PHC				
	CHC/RH				
	District/ Govt. Hospital	NO			
	Govt. Dispensary	NO			
	Private Clinic	NO			
	Private Hospital/	NO			
	Nursing Home	NO			
	AYUSH Health Facility	NO			
	sorography/ultrasound facility				
	If any of the above Facility is not available in village than approx. distance from village: ..2...kms.				
	Suggestions if any:				
K.	**Education Facilities:**				
	Aaganwadi/ Play group	Anganwadi			2
	Primary School	Yes			
	Secondary school	NO			
	Higher sec. School	NO			
	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 2.5..kms.	V.V.P Eng college			

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

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)				
	Public Garden				NO
	Village Pond				NO
	Recreation Center				NO
	Cinema/ Video Hall				NO
	Assembly Polling Station		School Building yes		
	Birth & Death Registration		panchayat yes		

If any of the above Facility is not available in village than approx distance from village: .6.5..kms. COSMO plocks

Suggestions if any:

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

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

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

Suggestions if any

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?				
	2. Are there any beneficiaries in the village from the following programme?				
	3. Janani Suraksha Yojana				
	4. Kishori Shakti Yojana				
	5. Balika Samriddhi Yojana				
	6. Mid-day Meal Programme ✓			yes	
	7. Intergrated Child Development Scheme (ICDS) ✓			yes	
	8. Matila Mandal Protsahan Yojana (MMPY) ✓			yes	
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme				
	11. Sanitation Programme (SP) ✓			yes	
	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)			yes	
	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)				

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Inform ation/ 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		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?	yes	

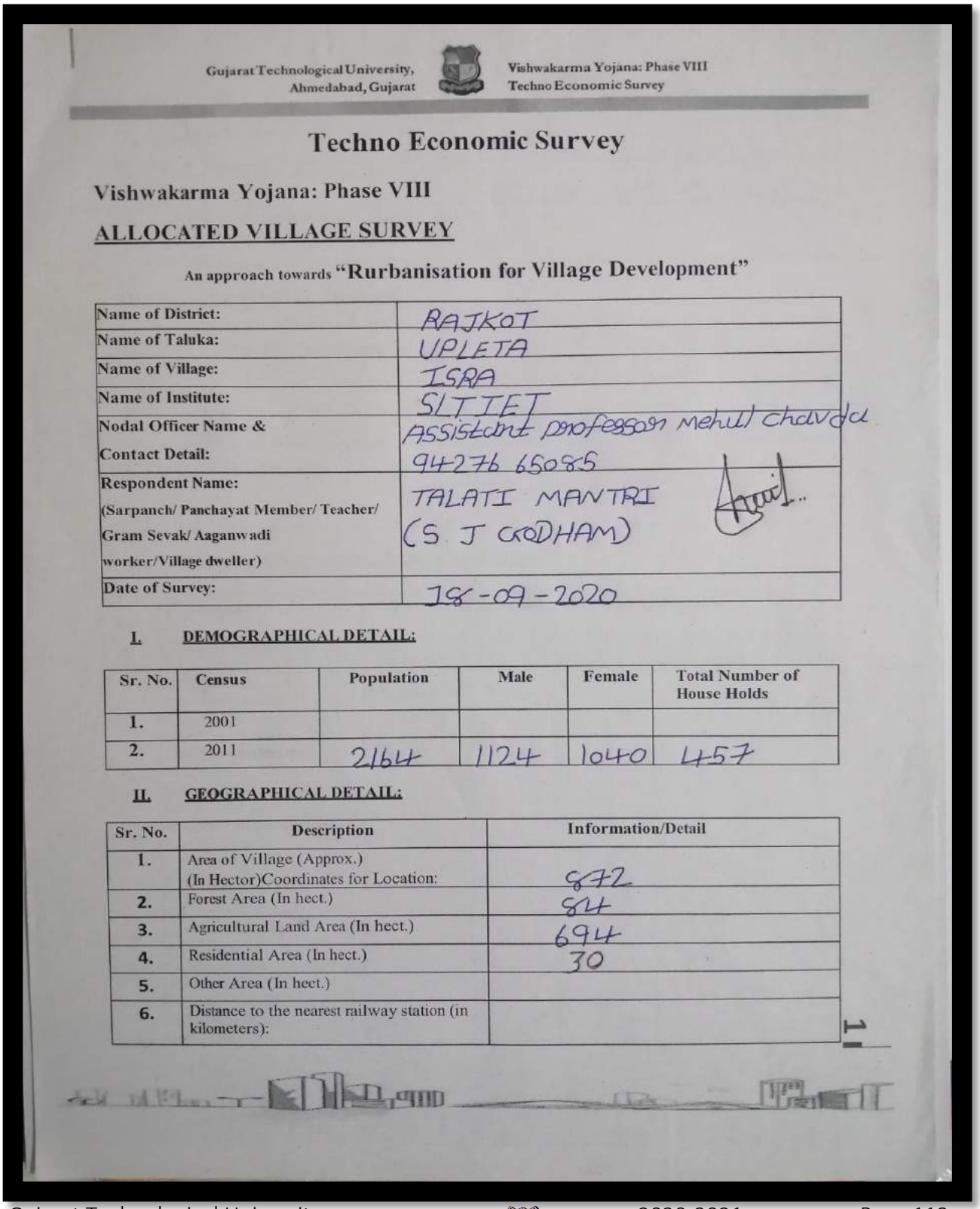
IX. Smart Village / Heritage Details

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

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

જામુબેન
સરપંચ
વાજડી વડ ગ્રામ પંચાયત

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



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

Name of District:	RAJKOT
Name of Taluka:	UPLETA
Name of Village:	ISRA
Name of Institute:	SLTIET
Nodal Officer Name & Contact Detail:	Assistant professor Mehul Chavda 94276 65085
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	TALATI MANTRI (S J GODHAM)
Date of Survey:	18-09-2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	2164	1124	1040	457

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	872
2.	Forest Area (In hect.)	84
3.	Agricultural Land Area (In hect.)	694
4.	Residential Area (In hect.)	30
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	

1

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

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

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. AGRICULTURE 2. LABOUR WORK 3.

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

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

2

	Other(Specify)Lake/ Pond				

Suggestions if any:

B.	Water Tank Facility				
	Overhead Tank	Capacity:	100000	150000	yes
	Underground Sump	Capacity:	50000		yes

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	BLACK TOPPED			Bed
	Main road	RCC			
	Internal streets	KUTTCHA			
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH(2KM)			

Suggestions if any:

E.	Transport Facility				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO (UPLETA) (7KM)			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	yes			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	AUTO CHHAKDA			

Suggestions if any:

F.	Electricity Distribution				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	yes(GOV) MORE 6 HR			

3

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Power supply for Domestic Use	24 Hrs			
	Power supply for Agricultural Use	8 Hrs			
	Power supply for Commercial Use	24 Hrs			
	Road/ Street Lights	NO			
	Electrification in Government Buildings/ Schools/ Hospitals				
	Renewable Energy Source Facilities (Y/ N)				
	LED Facilities				

Suggestions if any:

G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	NO			
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	NO			
	Solid & liquid waste Disposal system available	NO			
	Any facility for Waste collection from road	NO			

Suggestions if any:

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

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	PUCCA (70:1)			

4

V. SOCIAL INFRASTRUCTURAL FACILITIES:

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

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

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

Suggestions if any:

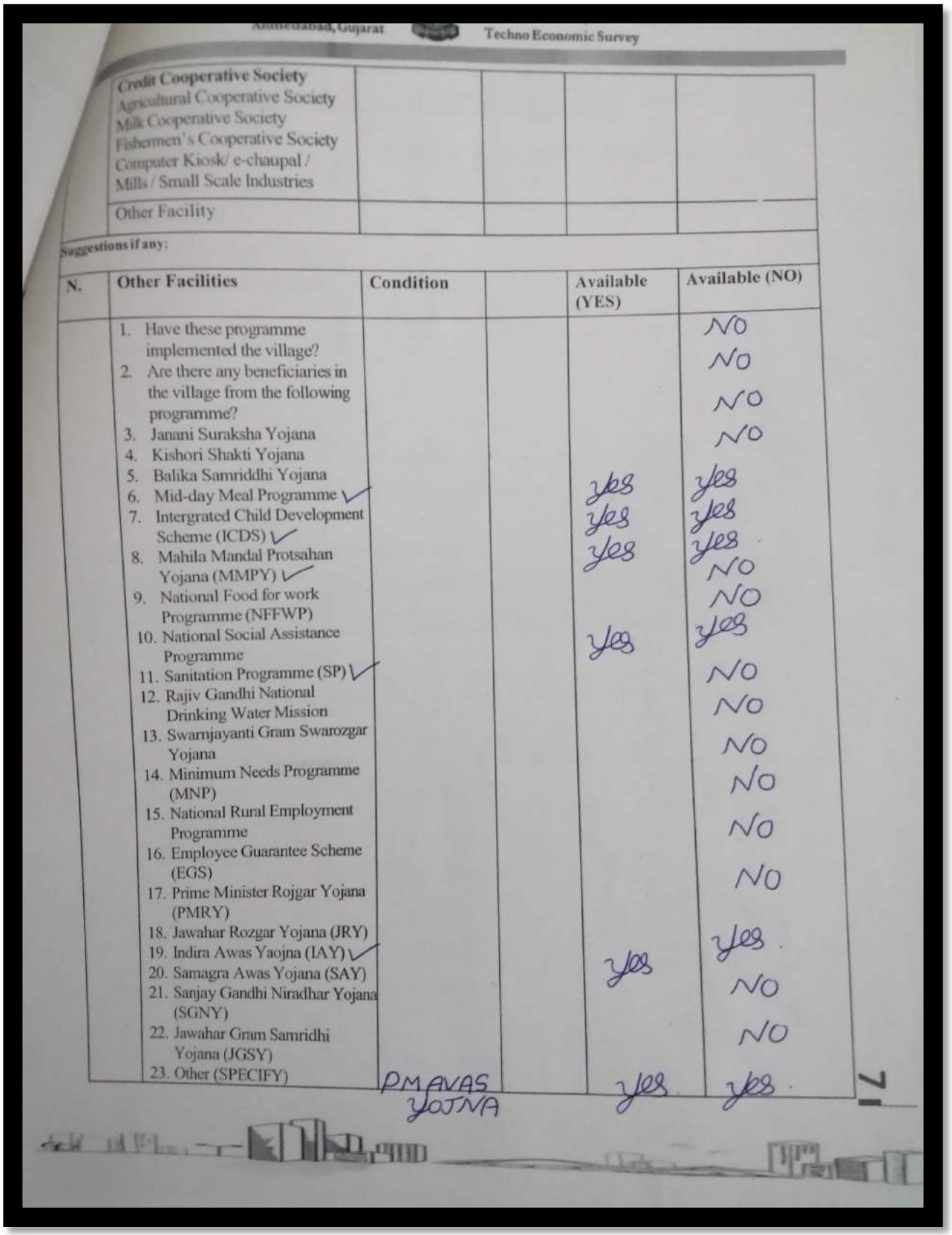
L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)				NO
	Public Library (With daily newspaper supply: Y/N)	(Daily/ news)			
	Public Garden				NO
	Village Pond				
	Recreation Center				NO
	Cinema/ Video Hall				NO
	Assembly Polling Station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

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

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office			Yes	
	Telecommunication Network/ STD booth			Yes	
	General Market			Yes	
	Shops (Public Distribution System)			Yes	
	Panchayat Building			Yes	
	Pharmacy/Medical Shop				NO
	Bank & ATM Facility				NO
	Agriculture Co-operative Society			Yes	
	Milk Co-operative Soc.				NO
	Small Scale Industries			Yes(33)	
	Internet Cafes/ Common Service Center/Wi Fi				NO
	Youth Club				NO
	Mahila Mandal				NO

9



Ahmedabad, Gujarat Techno Economic Survey

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

Suggestions if any:

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

17

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	illage Base Map Available: Hard Copy/Soft Copy				
2.	Recent Projects going on for Development of Village				
3.	Any NGO working for village development	NO			
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)	FLOOD (BHADAR, VENU RIVER 2020)			

8

Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

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

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

તલાટી-કમ-મંત્રી,
ઇસરા ગ્રામ પંચાયત

ઇસરા ગ્રામ પંચાયત • રાજકોટ • તા.ઉપલેટા, જિ.

91

12.4 Gap Analysis of the Allocated Village

Gap analysis of Isra Rajkot village

VILLAGE GAP ANALYSIS					
Village Facilities	Planning Commission/UDPFI Norms	Village Name	Isra, Rajkot.		
		Population: 2164			
		Existing	Required as per Norms	Future Projection Design	Gap
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 Population	2	1	-	-1
Primary School	Each Per 2500 population	1	1	-	0
Secondary School	Per 7,500 population	0	0	-	0
Higher Secondary School	Per 15,000 Population	0	0	-	0
College	Per 125,000 Population	0	0	-	0
Tech. Training Institute	Per 100000 Population	0	0	-	0
Agriculture Research Centre	Per 100000 Population	0	0	-	0
Skill Development Center	Per 100000 Population	0	0	-	0
Health Facility					
Govt. / Panchayat Dispensary or Sub PHC or Health Centre	Each Village	1	1	-	0
Primary Health & Child Health Center	Per 20,000 population	0	0	-	0
Child Welfare and Maternity Home	Per 10,000 population	0	0	-	0
Multi specialty Hospital	Per 100000 Population	0	0	-	0
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	1	-	1
Physical Infrastructure Facilities					
Transportation		adequate			
Pucca Village Approach Road	Each village	adequate	50% covered		
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	adequate	Pick up stand avilable(bus stand)		
Drinking Water (Mini. 70 LPCD)		Adequate			
Resting on ground	2 Nos.	250000 lit.			0
U/G Sump	1 Nos.	50000 lit.			
Drainage Network – Open		Inadequate			
Drainage Network - Cover		adequate	100% covered		
Waste Management System		Inadequate			
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	0	0	-	0
Community hall and Public Library	Per 15000 Population	0	0	-	0
Cremation Ground	Per 20,000 population	0	0	-	0

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

Sr. no.	Village Name	Discipline	Phase - I	Phase – II
1	**Khorana**	**Civil**	Public Toilet	ATM
			Bus Stand	Post office
			Community Hall	STP
			PHC Centre	Bank
			Public Garden	Rain water harvesting
			Public Library	Hall paver block
		Electrical	Solar roof top	Solar panel
			Street light	Power generator by river water
			Solar pump	Wind farm
2	**Movaiya**	**Civil**	Public garden	Bio gas plant
			Community hall	General market
			Public library	Anganwadi
			Bus stand	Post office
			Panchayat building	Godowan for agriculture product
			Public toilet	Atm
				Police station
		Electrical	House wiring	Solar library
			Street lighting	Commercial wiring

			Solar roof top	Solar street light
3	**Jaliya**	**Civil**	Chanakya Library	Soil testing laboratory
			Panchayat building	Garden
			Pay and use	Recreational center
			General market	Biogas plant
			Bus stand	Aganwadi
			Community hall	Solid waste collection
		Electrical	Solar street light	Smart garden
			Solar roof top	Solar laboratory
			Solar cleaning system	Irrigation by solar
4	**Isra**	**Civil**	Biogas plant	Community hall
			Garden	Solid waste collection
			Public toilet	Library
			Post office	Internal road
			Water harvesting	Recreational center
			Waste water treatment plant	Police station
		Electrical	Solar panel fitting	Small hydropower generation
			Solar street light	Temperature control fan
			Solar cleaning system	Water level indicates
5	**Meta khambliya**	**Civil**	Public library	Godown
			Community hall	Rain water harvesting

			Garden	Bank
			Water tank	Play ground
			Solid waste collection	Biogas plant
			Public toilet	Chabutro
6	**Visaman**	**Civil**	Compos pit	Biogas plant
			Public garden	PHC
			Solid waste management	Rain water harvesting
			Chabutro	Public library
			Shopping mall	ATM
			Community hall	Road
		Electrical	Pizo electrical generation	Solar street light
			Smart energy meter	Central control unit for irrigation water pump construction
			Solar tree	Electrical wiringand cost estimate of post office
7	**Nagar pipaliya**	**Civil**	Community hall + library	Internal road
			Post office	Public garden
			Panchayat building	Biogas plant
			Public toilet block	General market
			Skill development center	Canteen for old people

			Animal center	Fire station
		Electrical	Automatic on-off switch for water tank	Community hall wiring
			Photovolic water pump	Solar cleaning system
			Solar water purifier	Street light
8	**Derdi kumbhaji**	**Civil**	PHC	Rain water harsvesting
			Public library	Cyber café
			Community hall	Sill development center
			Public garden	Gym
			Police station	Soil testing laboratory
			Bachat mandali	Agriculture store
		Electrical	Solar street light installation design	CCTV
			Solar pump system	Solar roof installation design
			Pizo-electrical speed braker power generation design	Purification water plant

(Table No. 34. Summary Details of All the Villages Designs in Table form as Part-I and Part-II)

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

NOTE: All drawing are attached at end of the document

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

<table>
<tr>
<td> 
</td>
<td>  </td>
</tr>
<tr>
<td>  </td>
<td>  </td>
</tr>
<tr>
<td>  </td>
<td> 
</td>
</tr>
</table>

12.8 Village Interaction with sarpanch Report with the photograph

(Fig39. interaction with sarpanch)

12.9 Sarpanch Letter giving information about the village development

MAHATMA GANDHI CHARITABLE TRUST MANAGED

SHRI LABHUBHAI TRIVEDI INSTITUTE OF ENGINEERING & TECHNOLOGY

Approved by AICTE, New Delhi & Affiliated to GTU, Ahmedabad (Degree & Diploma)

Date:7/10/2020

To,
DDO,
Rajkot

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

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

The following villages are allocated to students for their projects.

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

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

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

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

Prof. Mehul M Chavda
VY-Nodal officer,
SLTIET, Rajkot
Mo.9427665085

Dr. B M Ramani
Principal,
SLTIET, Rajkot
Mo.9825779590

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

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

12.10 Comprehensive report preparation as per format

Vishwakarma Yojana is provides special scheme for development of village by GTU and Government of Gujarat in which students work together and collect data and information regards village development with the help of gram Panchayat and stake holders. Village have some basic facilities likes drinking water, drainage system, pucca road, and other facilities like primary school, primary health center, community hall, library, public latrine block, are sufficient so that village can develop. So, we will give proposal regarding sustainable energy sources and solution related to infrastructure problems. Efforts have been made in this project work to identify and plan some of the below facilities for sustainable development of village and to meet need of future population. Vishwakarma Yojana is one of the initiatives towards Rurbanisation that is village development by the government of Gujarat, which was allotted as a real time situation type project provides to GTU.

It is one of the strategies to reduce urban city pressure and lower the migration rate by developing village with a “rural soul” but with all urban amenities that a city may have. In this project the students meet the relevant citizens of village and survey the existing facilities. Then design of the sustainable infrastructure which is to be modified is carried out for the village. This includes implementation of engineering skills to prepare detailed project reports for village as a part of the final year project work. By this project certain experiences recreates a real work and need of application of an individual technical knowledge on any existing problems. Based on survey we tried to give design of basic facilities to fulfill their needs. By providing these basic facilities to village for reduce urban city pressure and decrease migration rate, which is ultimate aim of Vishwakarma Yojana.

After annalise whole village we seen many lake awareness of villagers needful facilities, some cleanly and smartness of village we decide to provide some facilities like Public Library, Community Hall, Garden, Water Tank, Solid Waste Collection, Public Toilets, Godown, Rain Water Harvesting, Bank, Play Ground, Biogas Plant, Chabutaro etc. all of this facility we create a design and estimate with sarpanch and nodal officer permission.

Chapter -13

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

13.1 Design Proposals

Community hall

community halls are public locations where members of a community tend to gather for group activities, social support, public information, and other purposes. They may sometimes be open for the whole community or for a specialized group within the greater community. Community centres can be religious in nature, such as Christian, Islamic, or Jewish community centres, or can be secular, such as youth clubs.

Solid waste collection

Waste collection is a part of the process of waste management. It is the transfer of solid waste from the point of use and disposal to the point of treatment or landfill.

Library

A library is a collection of materials or media that are accessible for use and not just for display. It provides physical or digital access to material, and may be a physical location or a virtual space, or both.

Internal road

They pass through rural areas connecting the village to one another and to the nearest road of higher category viz. District Roads, State Highways and National.

Recreational center

Recreation is an activity of leisure, leisure being discretionary time. The "need to do something for recreation" is an essential element of human biology and psychology. Recreational activities are often done for enjoyment, amusement, or pleasure and are considered to be "fun".

Police station

A police station (sometimes called a "station house") is a building which serves to accommodate police officers and other members of staff. These buildings often contain offices and accommodation for personnel and vehicles, along with locker rooms, temporary holding cells and interview/interrogation rooms.

13.1.1 Civil Design 1(community hall) (Figure is at the end of the document)

At present there is no any place for common gathering of people and for organizing the various festival, marriage function and seminar in Isra village, so we decide to provide community hall design for Isra village.

ESTIMATION FOR COMMUNITY HALL

Sr no.	Description of item	no	length	breadth	Height	Qty (m^3)	Total qty
1	**EXCAVATION FOR FOUNDATION**						
	Lw1 = 3.9+0.9	3	4.8	0.9	1.5	19.44	**127.46 m^3**
	Lw2 =7.2+0.9	2	8.1	0.9	1.5	22.14	
	Lw3 = 4.3+0.9	5	5.2	0.9	1.5	35.1	
	Sw1= 10.3-0.9	4	9.4	0.9	1.5	50.78	
2	**P.C.C.**						
	Lw1 = 3.9+0.9	3	4.8	0.9	0.3	3.88	**2.17 m^3**
	Lw2 =7.2+0.9	2	8.1	0.9	0.3	4.374	
	Lw3 = 4.3+0.9	5	5.2	0.9	0.3	7.02	
	Sw1= 10.3-0.9	4	9.4	0.9	0.3	10.15	
3	**BRICKWORK UP TO PLINTH**						
	STEP1						
	Lw1 = 3.9+0.6	3	4.5	0.6	0.2	1.62	**11.68 m^3**
	Lw2 =7.2+0.6	2	7.8	0.6	0.2	1.87	
	Lw3 = 4.3+0.6	5	4.9	0.6	0.2	2.94	
	Sw1= 10.3-0.6	4	9.7	0.6	0.2	4.65	
	STEP2						
	Lw1 = 3.9+0.5	3	4.4	0.5	0.2	1.32	**9.17 m^3**
	Lw2 =7.2+0.5	2	7.7	0.5	0.2	1.54	
	Lw3 = 4.3+0.5	5	4.8	0.5	0.2	2.4	
	Sw1= 10.3-0.5	4	9.8	0.5	0.2	3.92	
	STEP3						
	Lw1 = 3.9+0.4	3	4.3	0.4	0.2	1.03	**6.26 m^3**
	Lw2 =7.2+0.4	2	7.6	0.4	0.2	1.19	
	Lw3 = 4.3+0.4	5	4.7	0.4	0.2	1.88	
	Sw1= 10.3-0.4	4	9.9	0.4	0.2	3.16	
	STEP4						
	Lw1 = 3.9+0.3	3	4.2	0.3	0.2	4.53	**32.73**
	Lw2 =7.2+0.3	2	7.5	0.3	0.2	5.54	

	Lw3 = 4.3+0.3	5	4.6	0.3	0.2	8.28	**m^3**
	Sw1= 10.3-0.3	4	10	0.3	0.2	14.4	
	TOTAL BRICKWORK UP TO PLINTH =59.84 m^3						
4	**BRICK MASONRY FOR SUPERSTRUCTURE**						

	Lw1=3.9+0.3	**3**	**4.2**	**0.3**	**3**	**11.34**	**81.9 M^3**
	Lw2=7.2+0.3	2	7.5	0.3	3	13.82	
	Lw3=4.3+0.3	5	4.6	0.3	3	20.7	
	Sw1=10.3-0.3	4	10	0.3	3	1436	
	DEDUCTION FOR DOORS AND WINDOW						
	D1	1	1.5	0.3	2.1	2.85	10.734 M^3
	D2	4	1.2	0.3	2.1	3.024	
	D3	1	2	0.3	2.1	1.26	
	D4	1	1	0.3	2.1	0.63	
	W1	2	1.5	0.3	1.2	1.08	
	W2	3	1	0.3	1.2	1.08	
	V	1	0.6	0.3	0.45	0.81	
	DEDUCTION FOR LINTEL						
	D1	1	1.8	0.3	0.1	0.054	0.567 M^3
	D2	4	1.5	0.3	0.1	0.18	
	D3	1	2.3	0.3	0.1	0.069	
	D4	1	1.3	0.3	0.1	0.039	
	W1	2	1.8	0.3	0.1	0.108	
	W2	3	1.3	0.3	0.1	0.117	
	TOTAL =81.9-10.734-0.567=70.60M^3						
5	RCC SLAB, LINTEL & CHAJJA						
	SLAB	1	15.6	10.6	0.12	26.32	
	CHAJJA						
	D1	1	1.5	0.6	0.15	1.35	2.646 M^3
	D2	4	1.2	0.6	0.15	0.432	
	D3	1	2	0.6	0.15	0.18	
	D4	1	1	0.6	0.15	0.09	
	W1	2	1.5	0.6	0.15	0.27	
	W2	3	1	0.6	0.15	0.27	
	V	1	0.6	0.6	0.15	0.054	
	LINTEL =0.567M^3						
	TOTAL RCC=0.567+2.646+26.32=29.533 M^3						
6	SMOOTH PLASTERING						
	ROOM						
	LW	2	3.6	-	3	21.6	45.6 M^2
	SW	2	4	-	3	24	

	HALL						
	LW	2	7	-	3	42	
	SW	2	10.6	-	3	60	102
	KITCHEN						
	LW	2	3.6	-	3	21.6	56.4 M^2
	SW	2	5.8	-	3	34.8	
	TOILET						
	LW	4	4	-	3	48	84 M^2
	SW	4	3	-	3	36	
	PASSAGE						
	LW	2	4	-	3	24	33 M^2
	SW	2	1.5	-	3	9	
	OFFICE						
	LW	2	4	-	3	24	36.6 M^2
	SW	2	2.1	-	3	12.6	
	CEILING						
	ROOM	1	3.6	4	-	14.4	142.88 M^2
	KITCHEN	1	3.6	5.8	-	20.88	
	HALL	1	7	10	-	70	
	M TOILET	1	4	3	-	12	
	F TOILET	1	4	2.8	-	11.12	
	PASSAGE	1	4	1.5	-	6	
	OFFICE	1	4	2.1	-	8.4	
	TOTAL SURFACE PLASTER=499.28M^2						
7	THICK FLOORING						
	ROOM	1	3.6	4	-	14.4	142.88 M^2
	KITCHEN	1	3.6	5.8	-	20.88	
	HALL	1	7	10	-	70	
	M TOILET	1	4	3	-	12	
	F TOILET	1	4	1.5	-	6	
	PASSAGE	1	4	2.8	-	11.2	
	OFFICE	1	4	2.1	-	8.4	
8	EARTH FILLING PLINTH						
	ROOM	1	3.6	4	0.45	6.91	38.33 M^3
	KITCHEN	1	3.6	5.8	0.45	10.02	
	HALL	1	7	10	0.45	3.36	
	M TOILET	1	4	3	0.45	5.76	
	F TOILET	1	4	1.5	0.45	2.88	
	PASSAGE	1	4	2.8	0.45	5.37	
	OFFICE	1	4	2.1	0.45	4.03	

(Table-35 Measurment sheet of community hall)

ABSTRACT OF COMMUNITY HALL

Item no.	Particulars of item	Quantity	per	Rate	Amount (Rs.)
1	**Excavation for foundation**	127.46 m^3	m^3	85	**10834.1**
2	**P.C.C.**	2.17 m^3	m^3	3200	**6944**
3	**Brick masonry for foundation**	59.84 m^3	m^3	3200	**191488**
4	**Brickwork in superstructure**	70.6m^3	m^3	3500	**247100**
5	**R.C.C for slab, lintel, chajja**	29.533m^3	m^3	8800	**259890.4**
6	**Smooth plaster**	499.28m^2	m^2	150	**74892**
7	**Flooring**	142.88m^2	m^2	500	**71440**
8	**Earth filling in plinth**	38.33m^3	m^3	50	**19165**
					Total Rs.881753.5

(Table-36 abstract sheet of community hall)

(R & B 2015-16 SOR USE FOR THIS DESIGN)

Add 3%contingencies Rs. = 26452.60
Add 2% work charge Rs. = 17635.07
Grand total = 925841.17Rs

13.1.2 Civil Design (solid waste collection)

Waste collection is a part of the process of waste management. It is the transfer of solid waste from the point of use and disposal to the point of treatment or landfill.

(Fig-40 design of solid waste collection)

Need of the design: We have studied entire village but we found the lack of basic domestic waste disposal facilities.

Current village is using steel oil can as dustbin. We have estimated approximately 25 location equal distance with each others. Which can be increased further.

Total no. of dustbin required = 25 for wet waste bins + 25 for dry waste bins= 50 dustbins

Total 25 set of dustbins required, Approximate cost of one set of dustbins is Rs. 2000

Total cost of dustbins = 25 × 2000 = 50000

Considering extra cost of establishing = 10000 Total

Cost for Solid waste collection is Rs. 60000 excluding daily maintenance.

(R & B 2015-16 SOR USE FOR THIS DESIGN)

13.1.3 Civil Design(library) (Figure is at the end of the document)

A library is a collection of materials or media that are accessible for use and not just for display. It provides physical or digital access to material, and may be a physical location or a virtual space, or both.

Measurement Sheet of public library

Item No	Item description	No	Length M	Breadth M	Height M	Quantity
1.	Excavation for foundation in ordinary soil Total centerline length =27.5m No of junction=1	1	27.35	0.9	1.10	27.08
2.	B.B.C.C for foundation (1:4:8) or P.C.C(1:4:8)	1	27.35	0.9	0.2	4.923
3.	Brick masonary up to plinth in C.M 1:6					
	First step	1	27.35	0.5	0.3	4.09
	Second step	1	27.3	0.4	0.3	3.28
	Third step	1	27.35	0.3	0.8	6.56
	Steps					
	First step	1	1.5	0.9	0.15	0.2025
	Second step	1	1.5	0.6	0.15	0.135
	Third step	1	1.5	0.3	0.15	0.0675
						Total =14.335
4.	Brick masonary above plinth up to slab level in C:M 1:6					
	L	1	27.35	0.3	3.3	28.08
	Door	1	1.5	0.3	2.1	0.945
	Window	4	1	0.3	1	1.2
	Deduction for lintel above door and window with 15cm bearing at both end					
	Door	1	1.8	0.3	0.15	0.081
	Window	4	1.3	0.3	0.15	0.234
						Total =24.62
5.	Smooth plaster the rooms and ceiling in C:M 1:3					
	Plaster for long wall 1	2	6.7	-	3.3	44.22
	Plaster for long wall 2	2	6.7	-	3.3	44.22
	Short wall	4	4.7	-	3.3	62.04
	Ceiling plaster	2	4.7	6.7	-	31.49
	Plaster for patrician wall	2	5	-	3.3	33
	Deduction for door and window					
	Door	0.5	1.5	-	2.1	1.575
	Window	1	1	-	1	1
	In long wall 1	-	-	-	-	41.65
	In long wall 2	-	-	-	-	43.22
	In short wall	-	-	-	-	61.04

6.	Earth filing in plinth level	1	6.7	4.7	0.5	15.75
7.	R.C.C work in slab,chajja and lintel					
	R.C.C slab	1	7	5	0.15	5.25
	R.C.C for chajja					
	Door	1	1.8	0.6	0.10	0.108
	Window	4	1.3	0.6	0.10	0.312
	R.C.C lintel	-	-	-	-	0.315
8.	Parapet wall brick work	1	24	0.2	1	4.8
	Plaster work of parapet wall	2	24	-	1	48

(Table-37 measurment sheet of library)

ABSTRACT SHEET OF PUBLIC LIBRARY

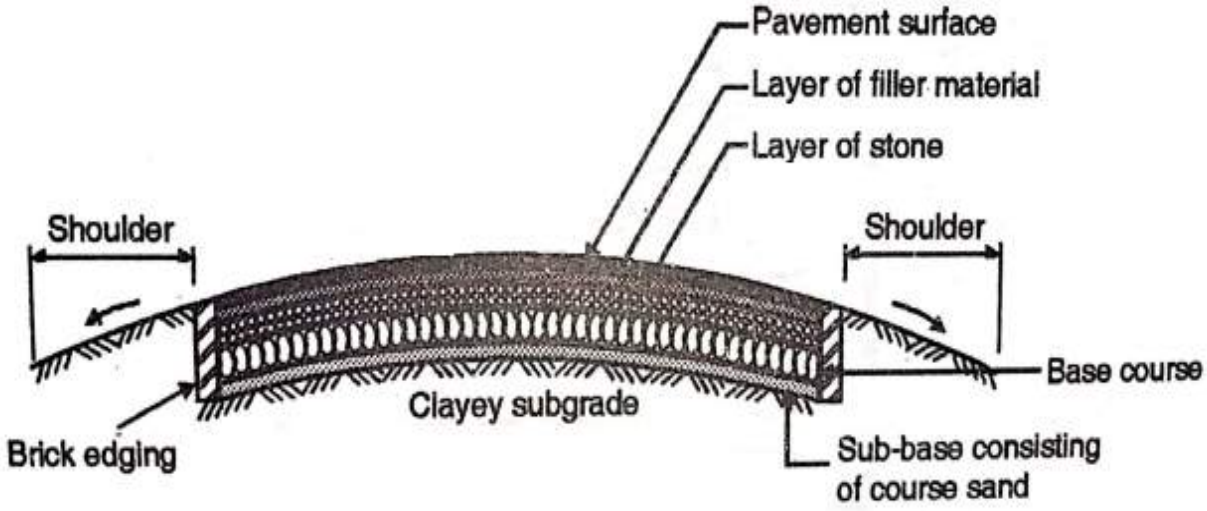
No.	Item description	Quantity	Rate	percentage	Amount Rs
1	Excavation work for foundation	27.08	85	M^3	2302
2	Plain cement concrete(1:3:6)	4.923	3200	M^3	15754
3	Brick work in foundation (1:6)	14.34	3200	M^3	45888
4	Brick masonary in super structure	24.62	3500		86170
5	Plaster work C:M 1:3	227	150		34050
6	R.C.C work in slab, chajja and lintel	6	8800		52800
7	Earth filling in plinth level	15.75	50		788
8	Brick work for parapet wall	4.8	3500		16800
				Total	**2,54,552**

(Table-38abstract sheet of library)

(R & B 2015-16 SOR USE FOR THIS DESIGN)

13.1.4 Civil Design (Internal road)

They pass through rural areas connecting the village to one another and to the nearest road of higher category viz. District Roads, State Highways and National.



(fig-41 design of WBM road)

MEASUREMENT SHEET FOR W.B.M. ROAD

Item No.	Description	No	Length	Width	Height	Qty
1	Construction of Sub Granular Sub base(Grade-i)150 mm thick by providing coarse graded materials spreading in uniform layers with mortar graders on preparing surface, mixing by mix in place method with rotavator at O.M.C. and compacting with vibratory roller to achieve the desired density complete as per clause - 401[using crushed metal, 53 to 26.50mm @ 35%,26.50 to 4.75mm @ 45%,and 2.36 mm below(sand) @ 20%] (R.A.)	1	1500	3.50	0.15	**787.5 m^3**
2	Providing and laying 250mm thick W.B.M. of Grading-I, B.T.M.C. metal of size 40mm to 63mm in layers including 13% stone screening 13.2mm size and 7% stone dust as filler, including spreading, watering	1	1500	3.50	0.10	**525 m^3**

	and consolidation by vibratory roller as per MoRTH specifications etc. complete as directed by Engineer-in-charge.					
3	Providing and Laying 150mm thick W.B.M. of Grading - II, in two layers each of 75mm using B.T.M.C. metal	1	1500	3.50	0.15	**787.5 m^3**
4	**Supplying Stacking Spreading Rolling Watering Hard Murrum as Directed for side Shoulder as directed with 5km lead. (R.A.)**	**1**	**1500**	**1.375**	**0.15**	**309.375 M^3**

(Table-39measurement sheet of WBM road)

ABSTRACT SHEET FOR W.B.M. ROAD

Item NO.	Quantity	Description	Rate	Rate + 1% L.C.	Per	Amount
1	787.5 m^3	Construction of Sub Granular Sub base(Grade-i)150 mm thick by providing coarse graded materials spreading in uniform layers with mortar graders on preparing surface, mixing by mix in place method with rotavator at O.M.C. and compacting with vibratory roller to achieve the desired density complete as per clause - 401[using crushed metal, 53 to 26.50mm @ 35%,26.50 to 4.75mm @ 45%,and 2.36 mm below(sand) @ 20%] (R.A.)	920/-	929.2 /-	m^3	**7,31,745 /-**
2	525 m^3	Providing and laying 250mm thick W.B.M. of Grading-I, B.T.M.C. metal of size 40mm to 63mm in layers including 13% stone screening 13.2mm size and 7% stone dust as filler, including spreading, watering and consolidation by vibratory roller as per MoRTH specifications etc. complete as directed by Engineer-in-charge.	1000/-	1010/-	m^3	**5,30,250 /-**

3	787.5 m^3	Providing and Laying 150mm thick W.B.M. ofGrading - II, in two layers each of 75mm using B.T.M.C. metal of size 53mm to 22.4mm in layers including 13% stone screening 11.2mm size and 7% stone dust as filler, including spreading, watering and consolidation by vibratory roller as per MoRTH specifications etc. complete as directed by Engineer-in-charge.	980/-	989.8 /-	m^3	**7,79,467.5/-**
4	309.375 m^3	Supplying Stacking Spreading Rolling Watering Hard Murrum as Directed for side Shoulder as directed with 5km lead. (R.A.)	215/-	217.15/-	m^3	**67,180.78 /-**
Total cost						**Rs. 21,08,645/-**
10% contractor charges						**Rs. 2,10,864.5/-**
5 % extra charges like painters, mixer, transport & labour charges						**Rs. 1,05,432.25/-**
Overall cost						**Rs. 24,24,941.75/-**

(Table-40Abstract sheet of WBM road)

(R & B 2015-16 SOR USE FOR THIS DESIGN)

13.1.5 Civil Design (Recreational center)(Figure is at the end of the document)

Recreation is an activity of leisure, leisure being discretionary time. The "need to do something for recreation" is an essential element of human biology and psychology. Recreational activities are often done for enjoyment, amusement, or pleasure and are considered to be "fun".

Following Points should be noted regarding design proposal:

- This design is done only for study purposes actual planning should be done by experts/Capable authority.
- Planner can change dimensions and size, for instance, width and length can be reduced to situation.
- During execution accurate earthworks quantity should be calculated. It is the most critical work and can largely affects the overall cost.
- Quality of every work must be maintained with reference to Indian standard codes, otherwise, it might cost very large loss of lives and structure.
- To achieve economy in concrete work ceramic waste which is locally available can be used, it can reduce 30 to 40 cost of concrete.
- Actual construction work can be done in stages like first 150 to 200 m portion constructed and further construction can be done after some years to maintain financial decisions making.
- Funding can be done by government/local body or PPP model can be adopted.

Measurment sheet of recreational center							
Sr.no.	**DESCRIPTION**	**No**	**L**	**B**	**D**	**Quantity**	**Total Quantity**
1	Retaining wall	1	500	1.68		840 cu.m	**840 cu.m**
	Stem area= (0.3+0.5)×1.7/2 =0.68 sq.m						
	Base slab area= 2.5×0.3=0.75						
	Shear key= 0.5×0.5= 0.25						
	Total area= 0.68+0.75+0.25 sq.m =1.68 sq.m						
2	Walkway road	1	500	3.5	0.15	262.50 cu.m	
3	Downside road	1	500	3.5	0.15	262.50 cu.m	**525 cu.m**
4	Masonry wall 1m high	1	500	0.3	1	150 cu.m	**150 cu.m**
5	Plaster in wall	1	500	2.3		1150sq.m	**1150 sq.m**
6	Railing to the pond side	1	500			500 m	**500 m**
7	Concrete in yoga ground	1	20	35	0.10	70 cu.m	**70 cu.m**
	Entry gate	1	13	1	0.5	6.5 cu.m	**6.5 cu.m**
	L =5+4+4m =13m						

(Table-41 measurment sheet of recreational center)

No	Discription	Quantity	Rate	Per	Total amount
1	Entry gate and retaining wall RCC work with varying coat, curing, rough finishing etc. complete in the proportion of 1:1:2	846.5	13000	Cu.m	1,10,04,500
2	Ceramic waste Concreting work of walkway, down side road and yoga ground	595	2000	Cu.m	11,90,000
3	Brick Masonry work in Cement Mortar 1:6	150	4200	Cu.m	6,30,000

4	Smooth Cement Plaster 12 mm thick using Cement Mortar in proportion 1:3 with Finishing curing, etc. complete	1150	182	Sq.m	2,09,300
5	Railing to the pond side	500	150	R.m	75,000
	1m high corrosion proof metal				
				Cost	1,31,08,800 RS
				Adding 1.5% water charges	1,96,632
				Adding 5% contingency charges	6,55,440
				Adding 10% contractor's profit	13,10,880
				Total cost	1,52,71,752 RS

(Table no-42 abstract sheet of recreational center)

(R & B 2015-16 SOR USE FOR THIS DESIGN)

13.1.6 Civil Design (police station) (Figure is at the end of the document)

A police station (sometimes called a "station house") is a building which serves to accommodate police officers and other members of staff. These buildings often contain offices and accommodation for personnel and vehicles, along with locker rooms, temporary holding cells and interview/interrogation rooms

Measurement sheet for police station

1	**Excavation in foundation L= 64.8 - 8×0.45 = 61.2m**	**1**	**61.2**	**0.9**	**1**	**55.08**	**55.08 cu.m**
2	PCC work in foundation	1	61.2	0.9	0.2	11.02	**11.02 cu.m**
3	Masonry work						
	Upto Plinth						
	0.6m wide L= 64.8 - 8×0.3= 62.4m	1	62.4	0.6	0.15	5.62	
	0.5m wide L= 64.8- 8×0.25= 62.8m	1	62.8	0.5	0.15	4.71	
	0.4m wide L= 64.8 -8×0.20= 63.2m	1	63.2	0.4	0.15	3.79	
	0.3m wide L= 64.8-8×0.15 = 63.6m	1	63.6	0.3	0.35	6.68	

	Superstructure L= 63.6m	1	63.6	0.3	4.5	85.86cu.m	
	Steps						
	0.15h	1	3.6	0.3	0.15	0.16	
	0.30h	1	3.6	0.3	0.3	0.32	
	Total					107.14 cu.m	
	Deduction						
	G= 1.5×2.2m	1	1.5	2.2	0.3	0.99	
	D= 0.9×2.2m	3	0.9	2.2	0.3	1.78	
	W= 1.0×1.4m	3	1.0	0.3	1.4	1.26	
						4.03 cu.m	
	Total masonry work						**103.11 cu.m**
4	RCC work						
	Lintel with chhaja	3	1.3	0.135		0.53	
	Main lintel	1	4.0	0.20		0.78	
	Door lintel	3	1.2	0.15	2.2	1.18	
	Slab	1	12.7	7.9	0.15	15.05	
	Total RCC						**17.55 cu.m**
5	Plaster work						
	Inside	4	4.5	3.3		59.4	
		3	3.5	3.3		34.65	
		4	4.0	3.3		52.8	
		4	3.5	3.3		46.2	
		2	3.0	3.3		19.8	
		2	7.3	3.3		48.18	
	Celling					261.03	
	Outside plaster	**2**	**12.7**	**4.64**		**118.11**	

		2	**7.9**	**4.65**		**73.47**	
	Parapet wall	1	1.2	12.84		15.40	
						558.61 sq.m	
	Deduction						
	W	3	1	1.4		4.2	
	D	3	0.9		2.2	5.94	
	G	0.5	1.5		2.2	1.65	
	Jail grill	0.5	3		3.3	4.95	
						31.55	

	Total net plaster work						**527.06 sq.m**
6	Colour work	Same of plaster area					**527.06sq.m**
7	Flooring work						**59.5 sq.m**

(Table no-43 measurment sheet of police station)

Abstract sheet for police station

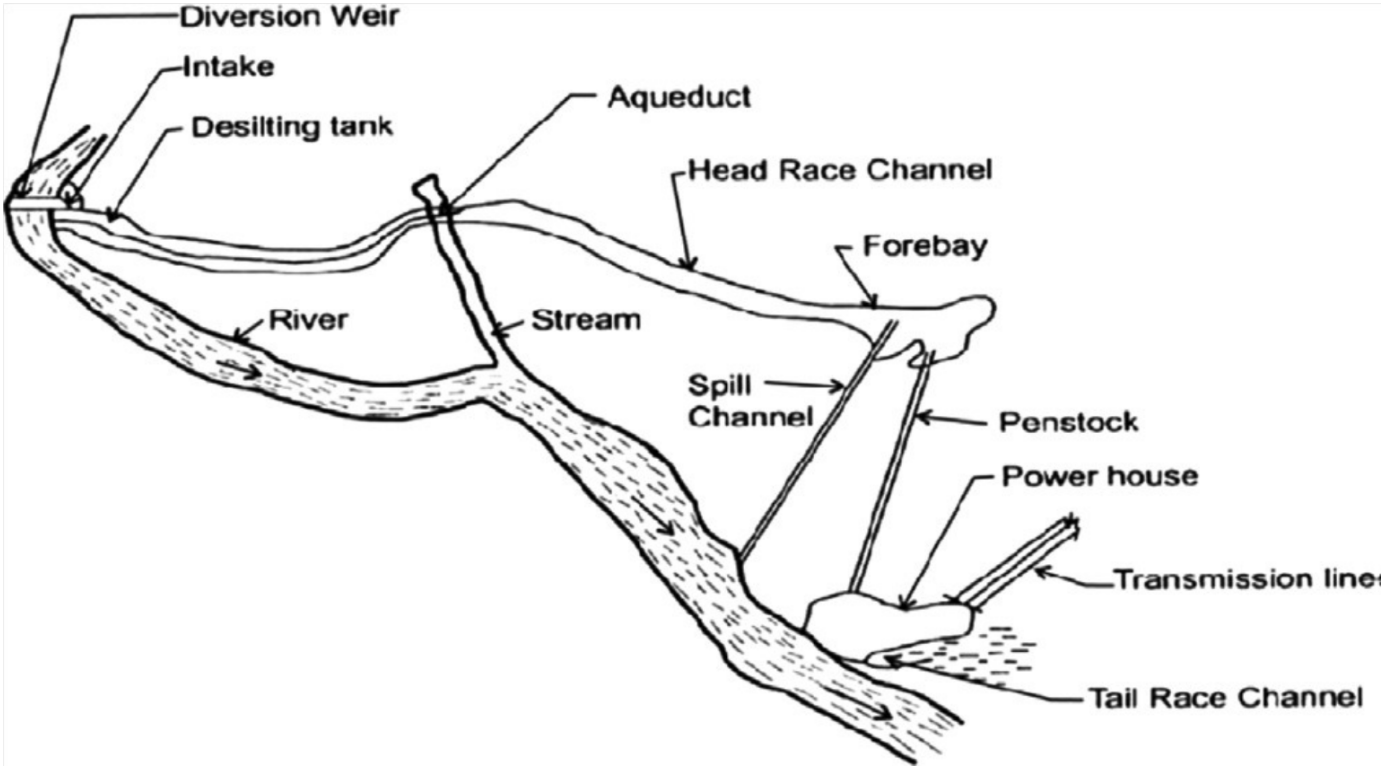
No	Discription	Quantity	Rate	Per	Total amount
1	Excavation of Foundation in Hard Murrum including lifting and laying in 90 mtr. lead area.	55.08	103.5	Cu.m	**5700**
2	Foundation filling with CC work in proportion of 1:4:8 including Raming, Curing etc.	11.02	3197	Cu.m	**35,230**
3	Brick Masonry work in Cement Mortar 1:6	103.11	4200	Cu.m	**4,33,062**
4	Smooth Cement Plaster 12 mm thick using Cement Mortar in proportion 1:3 with Finishing curing, etc. complete	527.06	182	Sq.m	**95,925**
5	White Wash Work	527.06	11	Sq.m	**5798**
6	Plastic Imulsion Paint (Two coats) (Asian Paint, ICI, Dulux, Nerolac, Berger etc. of approved type	527.06	91	Sq.m	**47,962**
7	DPC of bituminous	63.6	70	Rn.m	**4452**
8	Supply & Fixing of Glazed tiles (1st Quality) of required	59.5	426	Sq.m	**25,347**
				Cost	**6,53,476RS**
				Adding 1.5percentge water charge	**9802**
				Adding 5% contingency charge	**32674**
				Adding 10% contractor's profit	**65348**
				Adding 4% total for drainage works	**26140**
				Adding 4 % total for water supply works	**26140**

Adding 6% of total for electrification works	**39210**
Adding 2% of total for doors and windows	**13070**
Total cost	**8,65,860RS**

(table no-44 abstract sheet of police station)
(R & B 2015-16 SOR USE FOR THIS DESIGN)

13.1.7 Electrical Design 1(small hydroelectric power plant)

important to narrow down the shortage. In order to diversify the country's power generation mix, the Government of India, has issued several national policies to promote their further development [3,4]. Among the renewable energy source, small hydro power contributes 13% of the total grid-connected power generation, thereby constituting second largest grid-connected system after wind power, as per the report by Ministry of New and Renewable Energy. India is endowed with a vast and viable hydro potential for cleaner power generation. Due to its abundant availability, it can be utilized effectively to reduce the gap between the energy demand and supply. Development of small hydro power plants rapidly is one of the important assignment in the policy announced by the Ministry of Power.



(fig -42 design of small hydro electric power plant)

components are weir, desilting tank, penstock, turbine, generator and controls [22]. Water from the river is diverted through an intake at the weir, which also controls the water flow. Water then enters a desilting tank where, if any impurities are removed in it. A forebay tank is located between the intake and penstock, to store water. Water from the forebay tank is transported to a turbine through a pipe termed as penstock. The turbine converts the potential energy of the water into mechanical energy. The mechanical energy is then converted into electrical energy with the

help of a generator. The power produced at the turbine shaft is determined using the following relation

$P = \rho \square g Q H$

Where

g - acceleration due to gravity (m/s2)

H - head (m)

P - power (W)

Q - discharge (m3/s)

ρ - density of water (kg/m3)

□- overall efficiency of turbine, generator and gear box (80 to 90%)

Domestic load On preliminary survey with the local people and authorities, for 120 houses; the domestic load considered as 2 numbers of 11 W CFLs, 1 number of 50-120 W fan and a mobile charger load of 10 W. CFLs: 2 x 11 x 120= 2640 W or 2.64 kW Fan Load: 1 x 50 x 120=6000 W or 6 kW Mobile Charger Load: 1 x 10 x 120=1200 W or 1.2 kW

Total = 2.64 + 6 + 1.2 = 9.84 kW

Public lighting load
Number of lights = 20
Type of load = 18 W
CFL Lighting hours = 4
Total load = 18 x 20 W = 0.36 kW

The total project cost is estimated as Rs.60 lakhs; out of which Rs.35 lakhs for civil works, Rs.12 lakhs for electro mechanical works, Rs.5 lakhs for transmission and distribution and Rs.8 lakhs for other expenses. The cost of installation is Rs.4 lakhs/kW and the cost of generation is Rs.8.06/kW and Rs.12.04/kW at a load factor of 90% and 60% respectively as inferred from Table

COST OF SMALL HYDRO POWER PLANT		
SR NO.	ITEM DESCRIPTION	COST (RS LAKHS)
1	Total project cost	60.00
2	Annual working expenses	2.31
3	Intrest @ 12% on total project cost	7.20
4	Total annual expenses	9.51
5	Annual generation at power house(lakh units) 1)@90% load factor 2)@ 60% load factor	 1.16 0.79
6	Cost of generation per KWH 1)@90% load factor 2)@60% load factor	 8.06 12.04
	Total cost	6000000/-

(Table no-45 cost sheet of small hydro plant)

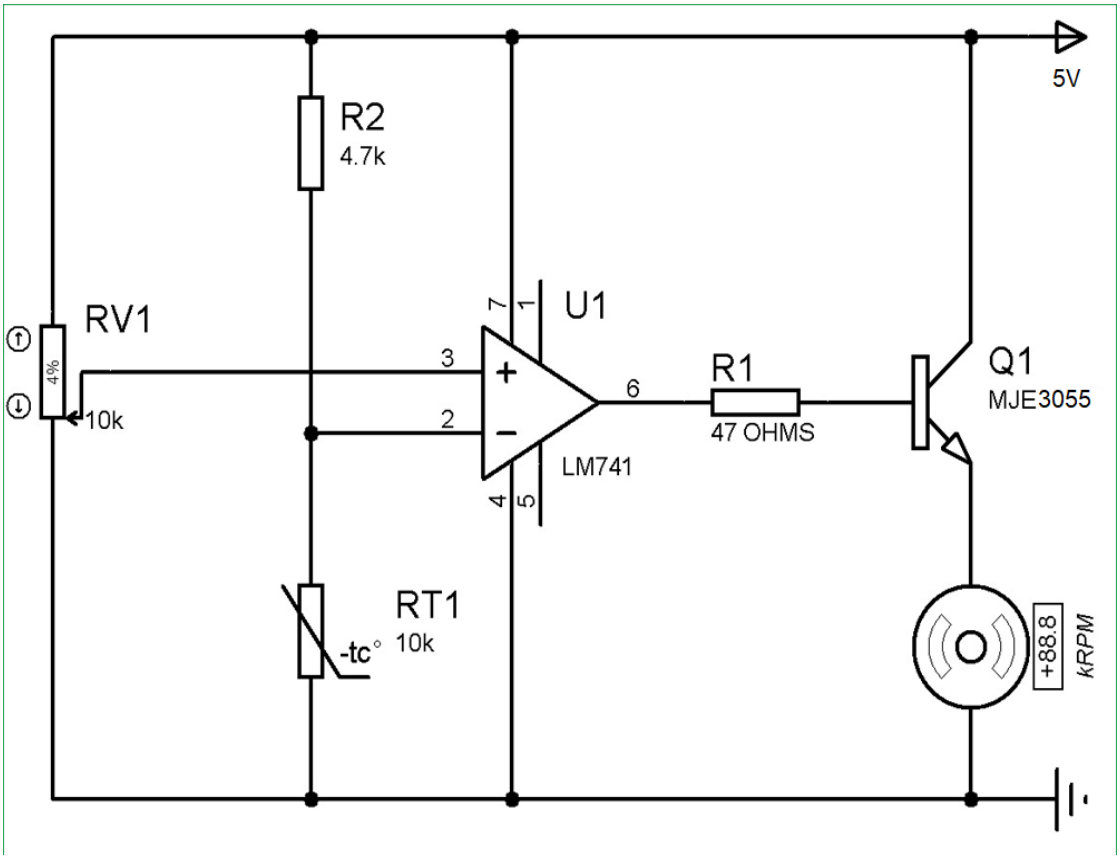
13.1.8 Electrical Design (TEMPERATURE CONTROL FAN)

"Automation is good, so long as you know exactly where to put the machine", In this tutorial we are making a **Temperature controlled DC fan using Thermistor**, as it starts above the preset level of temperature and stops when the temperature return to normal condition. This whole process is done automatically.

Required Components :**Below components are required for this Automatic Fan Controller using Thermistor**

- Op amp IC LM741
- NPN Transistor MJE3055
- NTC Thermistor - 10k
- Potentiometer – 10k
- Resistors - 47 Ohm, 4.7k
- DC Fan (Motor)
- Power supply-5v
- Breadboard and connecting wires

Circuit Diagram



(fig-43 circuit diagram temperature control fan)

COST SHEET OF TEAMPERATURE CONTROL FAN		
SR NO.	**ITEM DESCRIPTION**	**COST**
1	LM 35 SENSOR	100
2	AT MEGA 328 P	200
3	16 X 2 LCD DISPLAY	200
4	MOTOR FAN	4000
5	ROUND CIRCUIT	1000
	EXTRA	500
	TOTAL	**6000 RS**

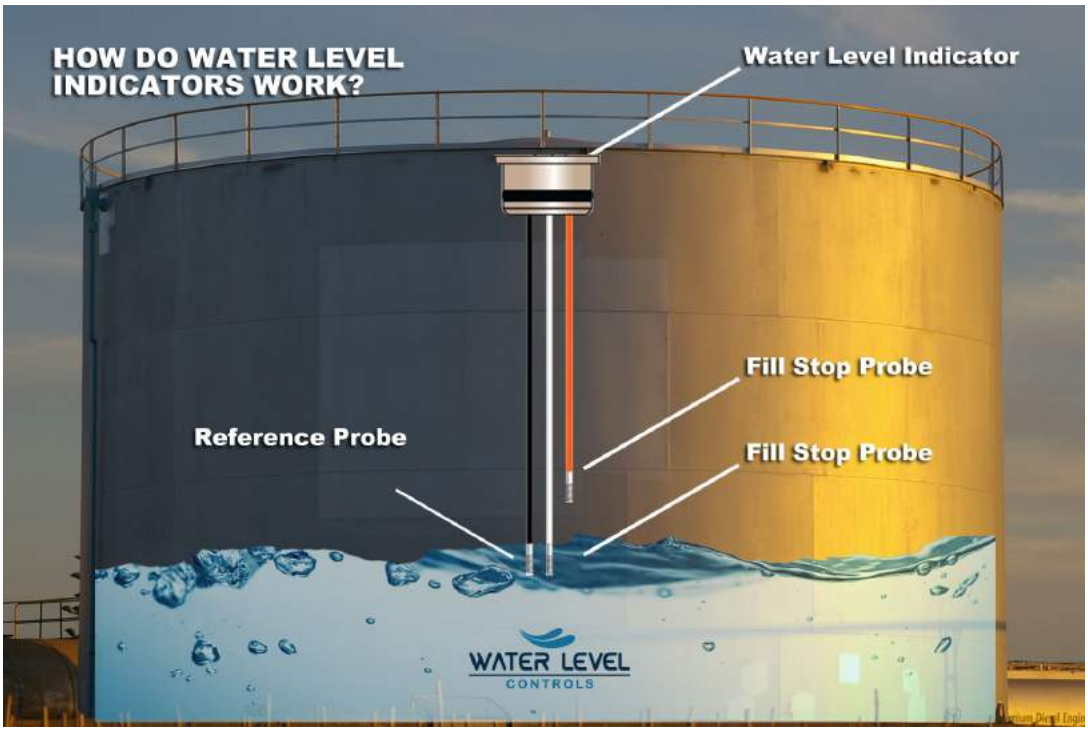
(Table no -46 cost sheet of temperature control fan)

13.1.9 Electrical Design (TANK WATER LEVEL INDICATOR)

The Water level indicator uses a simple mechanism to detect and indicate the water level in an overhead tank or any water container. Sensing is done using 2 Probes placed at 2 different levels on tank or container walls. Level 2 to at topmost end and Level 1 at empty or lowest position.

Water Level Indicator Sensor

A water level indicator sensor, also known as a probe sensor, is what tells the control panel that corrective action is needed. A combination of high and low sensors are used to tell the control panel when water levels are too high or too low. The control panel will then automatically turn the pump on or off depending on the corrective action needed.



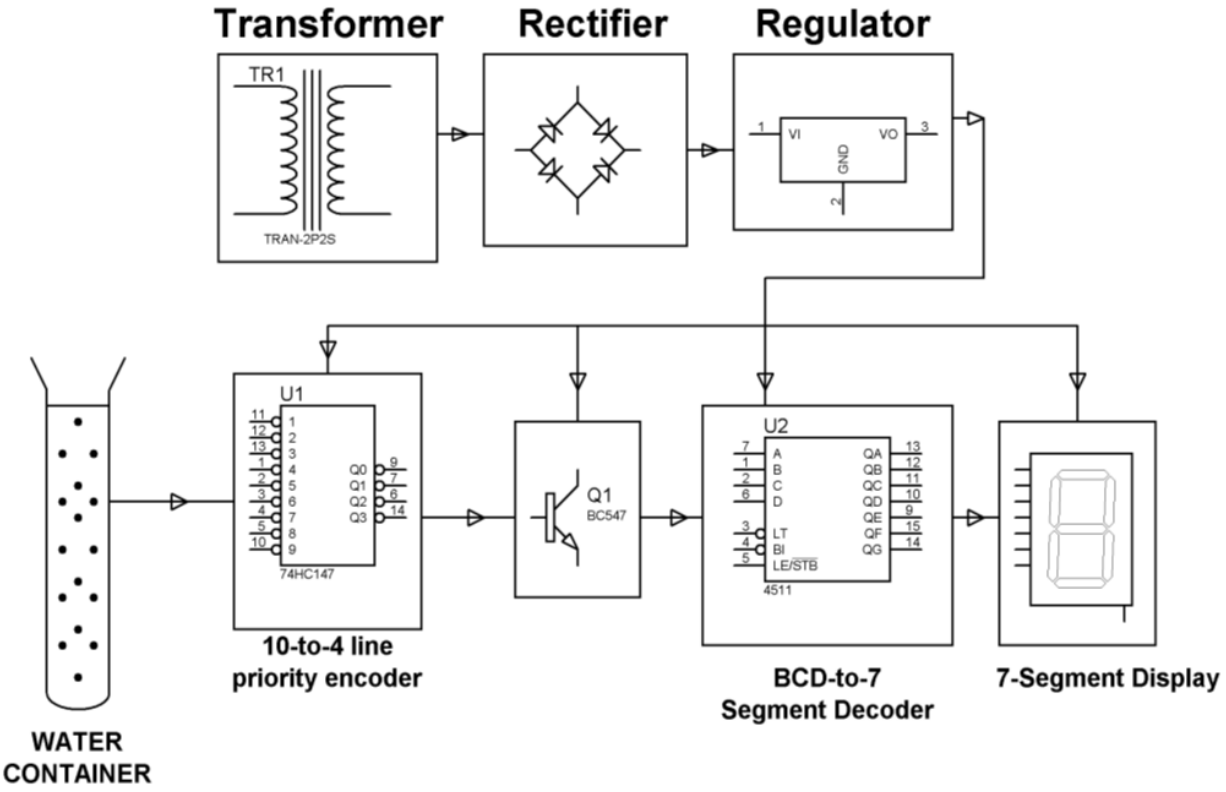
(fig -44 water level indicator)

The working principle of a water level indicator is actually quite simple. Water level indicators work by **using sensor probes** to indicate water levels in a storage tank. These probes send

information back to the control panel to trigger an alarm or indicator. As mentioned above, the control panel can be programmed to automatically turn on your pump to refill the water again.

1. The water level is full – Nothing happens
2. Water level drops to the reference probe – Alarm is triggered
3. Fill start is triggered automatically turning on the water to fill the tank
4. Once the water is full, fill stop is triggered and the system automatically stops the pump
5. The system resets and waits for water levels to drop again

CIRCUIT DIAGRAM OF WATER LEVEL INDICATOR



COST OF WATER LEVEL INDICATOR

SR NO .	ITEM DESCRIPTION	COST
1	TRANSFORMER TRAN 2F26	1000
2	RECTIFIER	200
3	REGULATOR	500
4	10 TO 4 LINE PRIORITY ENCODER	1500
5	Q1 ICMT TRANSISTOR	100
6	BCD 7 SEGMENT DECODER	100
7	7 SAGMENT DISPLAY	100
	EXTRA	500

		TOTAL	4000RS

(Table no-47 cost sheet of water level indicator)

13.2 Reason for Students Recommending this Design

- In village for Internal, stress road particular structure is not good condition. We are design flexible pavement in village.
- In village for public toilet, (Common toilet) particular structure is not available. We are planning public toilet in village.
- In village for bus station not properly good condition. We are deciding renovation bus stand in village.
- In village for community hall is not available. We are planning community hall in village.
- The agriculture Co-operative so is not available in village or nearby any village.
- Recreational centre is not available in village for local people.
- In village maximum cow & buffalo are available, we are planning drinking water tank for animals.
- In village for post office, not properly structure (Old Structure). We are deciding renovation post office in village.

13.3 About designs Suggestions / Benefit of the villagers

At last of this Techno Economic Survey after going through all the facilities and data it can be concluded that sudden improvements are required in some of the facilities provided and some facilities are still required to be provided.

- The internal stress road is very useful & road connecting very better in daily life.
- The public toilet is very useful component in our life. The biggest benefits of public toilet are sanitation in village, cleanness of village.
- The bus station is very useful component in our daily life because now days better safety local transportation.
- The community hall is useful in many function like marriage in village, Important meeting in village.
- The smart village design of recreational center is to build in village because the village people no any facilities to enjoy and relax your self.

Chapter-14.Technical Options with Case Studies (EXPLAIN ALL TOPIC AND FOR MINIMUM ONE TOPIC EXPLAIN NEW CONCEPT, DESIGN, PROTOTYPE MODEL WITH ACTUAL COST ESTIMATION)

14.1Civil Engineering

Case study-Bandra-Worli sea link

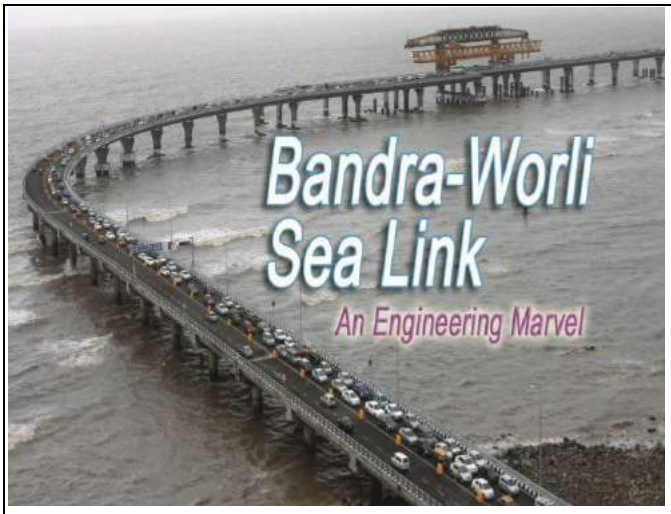
Introduction:-

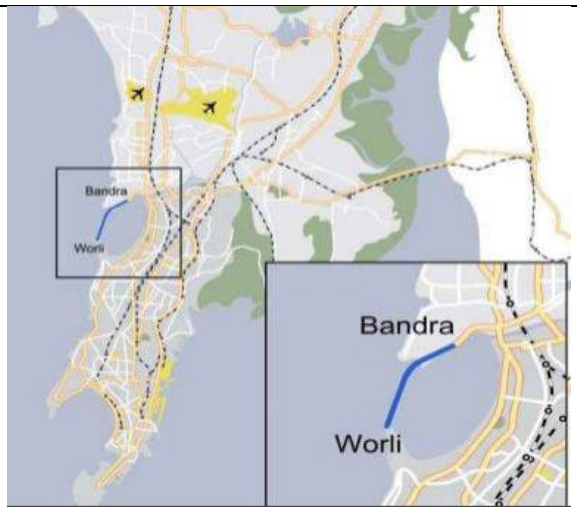
It is gigantic. It is majestic. It is an engineering marvel and an architectural wonder too. The first of its kind in India(first bridge to be constructed in open sea conditions.),the 5.6 km long, eight-lane approximately Rs 1,600-crore Bandra-worli Sea link, which has now been renamed as the Rajiv Gandhi sea link, is an engineering marvel that aims to ease traffic in Mumbai, India's commercial capital.

The construction is miracle on the Arabian sea that has an imposing presence on the western horizon of Munbai. One can imagine the strength and might of the bridge given fact that it weighs nearly 50,000 African elephants

People behind the bridge:-

A total of 2850 workers and 150 engineers were employed to work on the project and over a span of eight years. This project has started in 2001 and finished in 2009.





(fig -45 bandra warli bridge location)

Several country's involved:-

These includes professionals from China, Egypt, Canada, Switzerland, Thailand, Hong Kong, Britain, Indonesia, Philippines.

Objectives

- To connect two points in Mumbai namely Bandra and Worli through sea.
- To reduce the traffic flow along the corridor of Mumbai.
- To reduce the travel time between Bandra and Worli .
- Reduction in Carbon Monoxide and Nitrogen Oxide Levels in Mahim, Dadar, Prabhadevi and Worli along existing roads 16.

Highlights

- India's first bridge in open sea conditions.Use of M60 grade concrete.
- An intelligent bridge management system (IBS) provides traffic information, survilleance ,monitoring and control systems.
- Partners involved were ultratech ,TATA steel, VSL Singapore, SPCC etc

Basic information

Official name	Rajiv Gandhi setu
Carries	8 lane of traffic
Owner	MSRDC
Design	Cable-stayed, concrete-steel, precast viaducts
Total length	5.6km(3.5miles)
Width	2x20m(66ft)
Foundation type	Pile foundation
Longest span	2x250m(820ft)
Vertical clearance	20m(below bridge for transportation)
Toll system	Automated 16-lane toll plaza

(Table no -48 basic information about bandra warli sea link)

Project

- Package-I: Construction of flyover over Love Grove Junction at Worli.
- Package-II: Construction of cloverleaf interchange at Mahim intersection
- Package- III: Construction of solid approach road from the Mahim intersection up to the start of the Toll Plaza on the Bandra side and a public promenade.
- Package-IV: Construction of cable stayed Bridges at Bandra and Worli together with viaduct approaches extending from Worli up to Toll Plaza, Intelligent Bridge System.
- Package-V: Improvement to KAGK Road has not been taken up by the Company (August 2007)

Design

- The 20,000 tonne Bandra-end span of the bridge deck is supported by stay cables within a very close tolerance of deviations in plan and elevation.

- Bandra–Worli Sea Link was the first infrastructure project in Mumbai to use seismic arresters. These will enable it to withstand earthquakes measuring up to 7.0 on the Richter scale.
- Foundations for the BWSL's cable-stayed bridges consist of 120 reinforced concrete piles of 2,000 millimeters.
- The bridge consist of large pylons of diamond shaped of 128 metres high concrete tower.

(fig-46 bandra warli bridge design)

How the sea-link helps

- Additional connectivity from city to suburbs.
- Reduces travel time from 1 hour+ to only 20 minutes.
- Decongests mahim causeway-125,000 vehicles a day.
- Avoids 29 traffic lights.
- Save rs100 crore a year in vehicle operating cost.

Bridge management

- **POWER SUPPLY & LIGHTING** : The bridge has a reliable power supply, backed up by diesel generators and auto mains failure panels for critical loads.
- **SURVEILLANCE & SECURITY** : An intelligent bridge management system (IBS) provides traffic information, surveillance, monitoring and control systems.
- **TOLL COLLECTON** : The toll plaza is equipped with an electronic toll collection system.Total 16 toll plaza at bandra end.
- **SURVEILLANCE & SECURITY** : An intelligent bridge management system (IBS) provides traffic information, surveillance, monitoring and control systems.
- **TOLL COLLECTON** : The toll plaza is equipped with an electronic toll collection system.Total 16 toll plaza at bandra end.

Challenges encountered

- Challenges encountered.

- The maritime Board does not allow marine traffic in monsoon season
- Highly uneven and variable foundation bed even for plan area of one pile.
- Delay due to change in design of stray cable.

Problems perceived

- Major traffic snarls at Worli , no solution Figured out.
- Additional congestion on SV Road and across Lilavati Hospital.
- Toll proposed –Rs 50 oneway ,may dissuade a few.

REFERENCES

- https://www.msrdc.org
- https://www.wikipedia.org
- Coordinates: A monthly magazine on positioning, navigation and beyond.

14.1.1Advanced Earthquake Resistant

INTRODUCTION

Disasters are sudden occurrences which have unfavorably affected humans as the advent of our survival. In response to such occurrences, there have been challenges to mitigate destructive effects of these disasters. Many people have lost their lives owing to the collapse of houses during earthquakes in the past few decades, millions of moneys of financial losses have also been prolonged. Building liability usually results from a shortage of awareness of engineering science and inadequate implementation of building codes. The challenge is most difficult in emerging countries where peoples are increasing, cities and towns are enlarging, and buildings are more subjected to damage. An Earthquake is the cause of an unexpected discharge of energy in the earth's crust that generates seismic waves. Earthquakes are dignified by with seismometers. Earthquakes are so far away unpredictable and unpreventable; the only alternative is to construct and build the building structures which by earthquake resistant. There are so many techniques to withstand earthquake, but they are costly are not used by ordinary people. Here a variety of beneficial small cost techniques to resist earthquake effects. This is sustained by negligible damage devoid of loss of life when relative to severe earthquake attacks developed countries, whereas still a moderate earthquake cause wide-ranging spread destruction in emerging countries as has been observed in recent earthquakes. Earthquake, which is not kills the people, but it is the hazardous in buildings which is at fault for the widespread devastation the present paper sketches the building typologies confronted in the Indian subcontinent and their accomplishment during earlier earthquakes incidents. In addition to efficient and effective seismic design philosophies, it is essential to make sure strict code-compliant construction practices and structural design. The professionals elaborate in the Enterprise/construction of such structures are civil/ structural engineers, who are liable for building earthquake resistant structures and possess the buildings in a safe environment.

Understanding of Earthquake and Basic Terminology

Earthquake is well-defined as an unexpected ground shaking produced by the release of massive stored strain energy at the interface of the tectonic plates. Focus:-It is the point in the earth from point at the seismic waves originate. Focal Depth:-It is the vertical distance between Focus and

epicenter. Epicenter:-It is the point on surface of the earth from vertically above the origin of an earthquake.

MODERN-DAY CONSTRUCTION METHODS FOR EARTHQUAKE RESISTANT BUILDINGS

The Pre-stressed concrete components in seismic risk resistant construction which ensures proper relationship between different elements of a structure. But this methodology have been generally implemented in New Zealand.

Shape-memory alloys

This demonstrate exceptional characteristics desirable in a seismic risk resistant building. They have a capability to disintegrate considerable energy without permanent deformation or considerable destruction. Generally common shape memory alloys are makeup of metal blends comprising, nickel titanium, copper-aluminium-nickel and copper-zinc-aluminium-nickel. This is more suitable for extensive applications.

Seismic Dampers

In Seismic Dampers are the diagonal braces in a moment resisting frame which is used for efficient lateral load resisting scheme. In modern area the structural seismic retort to control have taken the lead to the alternative of these bracings with seismic dampers. These dampers behaves similar to the hydraulic shock absorbers in cars considerably in case the sudden jerks are engaged in the hydraulic fluids and only small is transferred to the chassis of the car. In this case the seismic energy is conveyed through it and dampers is absorbed a small part of it and decrease the magnitude of the force which is acting on a structure. Generally used types of seismic dampers are included the friction dampers (energy is fascinated by surfaces within the friction between them rubbing beside each other), viscous dampers and yielding dampers. The friction dampers were delivered in an 18-story RC frame structure in Gurgaon, India.

Steel Plate Shear walls

Shear walls are deemed as an important component of a lateral load resisting systems and steel is known for its flexible behaviour. Merging these two attractive properties, an efficient load resisting system was established and has noticed wide applications in North America and Japan. These walls are intended and also, they turn as a bend as an alternative of buckling below the action of lateral loads. The walls are substantially lighter and thinner; thus, they reduce the building weight. So, these walls not needed to be cured and consequently, it leads to increase the speed of the construction process.

Carbon Fibbers

The tensile features and the constant nature of a spider web was studied by many researchers in Japan. This is the world's first seismic reinforcement structure made of carbon fibre material. A seismic risk Resistant Building Rendered with Carbon Fabric and it is redolent of a giant spider web has been erected in Nomi City of Ishikawa Prefecture in Japan.

Ecological ductile cementations composite (EDCC) spray

A many researcher from the University of British Columbia has established a new extreme method to make up the buildings resist against seismic risks. EDCC blends the fly ash, cement

with polymer-based fibres, and other extracts in making it ecological and has been provided the molecular level to be malleable and strong at the same time. This material when utilized as a slim coating (10mm), was noticed to have enhanced seismic resistance of the structure by enduring a seismic risk of intensity 9 to 9.1 on Richter scale. So this method has been proposed for retrofitting of the vacant structures such as an uncomplicated school building in Vancouver.

Blue mussels

It is found sea decks and clinging to rocks all laterally the coast of New England. They are affixed in place by a gristly outcrop of cabling that occurs from among their twin shells. Generally the most ferocious of high tides can't pry them very loose. To remain affixed to their precarious perches, mussels secrete sticky fibres well known as byssal threads. These threads are inflexible and stiff while others are flexible and elastic. Researchers are annoying to combine this particular element into structures in order to make up the building endure the seismic risks.

Seismic Invisibility Cloak

A sequence of the borehole is mined about the periphery of the structure that needs to be endangered. These boreholes seem to work as a seismic cloak‖ that could hide a building or possibly a complete city from an earthquake's deadly waves. This makes the use of dampers, isolators, and also other vibration response control devices obsolete.

CONCLUSION

Seismic Invisibility Cloak – A series of the borehole is dug around the periphery of the structure that needs to be protected. These boreholes appear to work as a seismic cloak that possibly will hide a building or perhaps a whole city starting an earthquake's deadly waves. This makes the use of isolators, dampers, and other vibration response control devices obsolete.

14.1.2 Seismic Retrofitting of Buildings

Introduction

Seismic Retrofitting Techniques are required for concrete constructions 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.

Introduction to Seismic Retrofitting Techniques:

⇒ Earthquake creates great devastation in terms of life, money and failures of structures.

⇒ Upgrading of certain building systems (existing structures) to make them more resistant to seismic activity (earthquake resistance) is really of more importance.

⇒ Structures can be (a) Earthquake damaged, (b) Earthquake vulnerable

⇒ Retrofitting proves to be a better economic consideration and immediate shelter to problems rather than replacement of building.

Seismic Retrofitting of Concrete Structures:

Definition:

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

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 buildings must be strengthened whose services are assumed to be essential just after an earthquake like hospitals.

Problems faced by Structural Engineers are:

Lack of standards for retrofitting methods – Effectiveness of each methods varies a lot depending upon parameters like type of structures, material condition, amount of damage etc.,

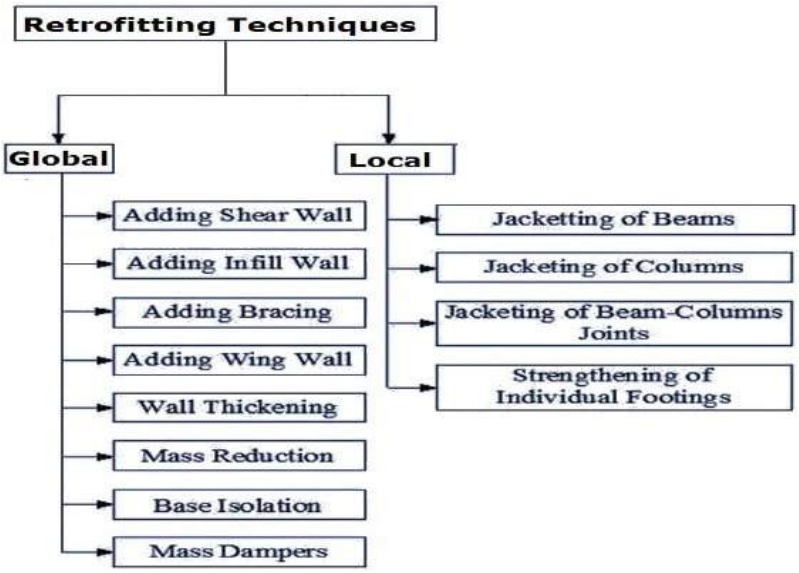
Basic Concept of Retrofitting:

⇒ Upgradation of lateral strength of the structure

⇒ Increase in the ductility of the structure

⇒ Increase in strength and ductility

Classification of Retrofitting Techniques:



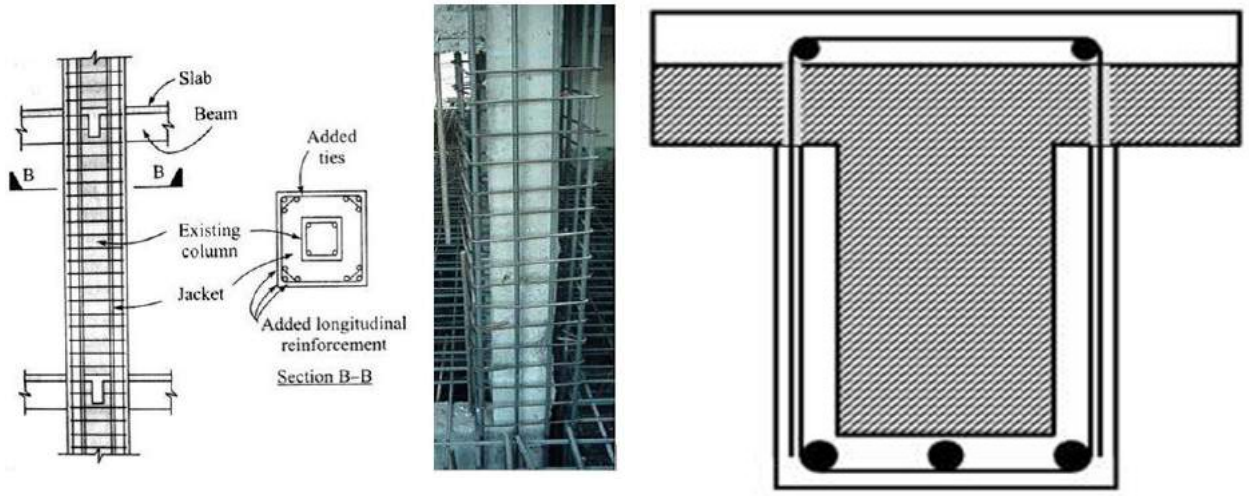
Adding New Shear Walls:

- Frequently used for retrofitting of non-ductile reinforced concrete frame buildings.
- The added elements can be either cast? In? Place or precast concrete elements.

- New elements preferably be placed at the exterior of the building.
- Not preferred in the interior of the structure to avoid interior moldings.

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.



(Fig -47 steel bracing design)

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.

(fig -48 base isolation)

Advantages of Base Isolation

- Isolates Building from ground motion – Lesser seismic loads, hence lesser damage to the structure, -Minimal repair of superstructure.
- Building can remain serviceable throughout construction.

- Does not involve major intrusion upon existing superstructure

Disadvantages of Base Isolation
- Expensive
- Cannot be applied partially to structures unlike other retrofitting
- Challenging to implement in an efficient manner

Mass Reduction Technique of Retrofitting:
This may be achieved, for instance, by removal of one or more story's as shown in Figure. 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.

Wall Thickening 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 increases 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.

Indian Standard Codes for Earthquake Design of Structures:
- IS: 1893-2002 (part-1) Criteria for Earthquake Resistant Design of Structures (Part 1 : General Provision and Buildings) – Code of Practice
- IS: 4326-1993 Earthquake Resistant Design and Construction of Buildings – Code of Practice
- IS: 13920-1993 Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces – Code of Practice
- IS: 13935-1993 Repair and Seismic Strengthening of Buildings – Guidelines
- IS: 13828-1993 Improving Earthquake Resistance of Low Strength Masonry Buildings – Guidelines
- IS: 13827-1993 Improving Earthquake Resistance of Earthen Buildings – Guidelines

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.

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

Morden Materials
Self–compacting Concrete (SCC)

SCC was developed by the Japanese initially as a Quality Assurance measure, but now is being widely used for concrete structures worldwide. In India, one of the earliest uses of SCC was for some components of structures at Kaiga Atomic Power Project. Many components of the structures were very heavily reinforced and the field engineers found it difficult to place and compact normal concrete without honeycombs and weaker concrete. SCC was successfully used. SCC leaving the batching plant is in a semi-fluid state and is placed into the formwork without the use of vibrators. Due to its fluidity, SCC is able to find its way into the formwork and in between the reinforcement and gets self-compacted in the process. SCC is particularly useful for components of structures which are heavily reinforced. The fluidity is realized by modifying the normal mix components. In addition to cement, coarse and fine aggregates, water, special new generation polymer based admixtures are used to increase the fluidity of the concrete without increasing the water content.

Due to its high fluidity, the traditional method of measuring workability by slump does not work. The fluidity is such that any concrete fed to the slump cone falls flat on raising the slump cone; the diameter of the spread of concrete is measured as an indication of workability of SCC. This is called Slump Flow and is in the range of 600 – 800 mm.

Apart from the use of superior grade chemical admixtures, the physical composition of the concrete for SCC has undergone changes. The concrete is required to have more of fine aggregates and compulsorily any of the mineral admixtures – fly ash, ground granulated blast furnace slag (GGBFS), silica fume, metakaolin, rice husk ash etc. Fly ash is abundantly available as a waste product at all the thermal power stations and the Government has encouraged use of fly ash by offering them practically free at the thermal power stations. GGBFS is again a by-product of the steel mills. During the production of steel, a molten steel is poured from blast furnaces and travels in special channels, leaving the impurities on top of the stream. The waste material, being lighter moves on top and easily diverted away from the usable steel.

The diverted slag is quenched and forms small nodules. These nodules are crushed and granulated into very fine product, with particle size smaller than that of cement. The product is marketed in 50 kg bags and available economically in the regions around steel mills with blast furnaces. In other regions, additional transport cost of this bulk material is involved but its use is justified because of contribution to durability of concrete. For the concrete components of the structure for Bandra and Worli sewage outfalls in Mumbai, the German prime contractor insisted on compulsory use of GGBFS for the M40 concrete in order to improve the durability of concrete. GGBFS had to be transported from Vizag in the eastern part of India, in spite of heavy transportation cost. Since then GGBFS is finding widespread use in different parts of India for ensuring durable concrete.

The Use of Mineral Admixtures

After realization of the need for durable concrete structures, the composition of concrete has undergone changes. From being a product made of three or four materials (cement, aggregates, water), today a typical durable concrete consists of six or more materials. The use of low water cement ratio enables a reduction in the volume and size of capillary voids in concrete; this alone is not sufficient to reduce the cement based content of concrete which is the source of micro-cracking from thermal shrinkage and drying shrinkage. To reduce the cement based content, both

the water content and cement content must be reduced as much as possible. Concrete mixes with fewer micro cracks can be produced by blending the cement with mineral admixtures either in the batching plant or in the cement plant. This enhances the service life of concrete structures in a cost-effective manner.

Fly Ash

Thermal power stations are left with an undesirable by-product, fly ash, in large quantities which is not able to effectively utilize or dispose of. Currently, (2009) more than 120 million tonne of fly ash are generated annually and the storage and disposal has been costing the power stations substantial unproductive expenditure. Unfortunately, all the fly ash available at the power stations is not fit for use as mineral admixture directly. Fly ash as a mineral admixture should conform to IS: 3812. Such a material is available in the finer streams of Electro Static Precipitators fitted to the power generation system.

The coarser materials are required to be processed (generally with the help of Cyclones) before being considered for use as mineral admixture for concrete. There are only a few processing units in India, including the one as Nashik Thermal Power Station. As per the Euro Code for Concrete, only processed fly ash can be permitted as mineral admixture in concrete. The code limits the use of fly ash. About 35% of cement may be replaced by fly ash; the actual percentage replacement depending on the outcome of trial mixes.

High Volume Fly Ash Concrete (HVFA)

The high volume fly ash concrete (HVFA) 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 cementitious 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 projects 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-Laning of Satara – Kolhapur National Highway.

Ground Granulated Blast Furnace Slag (GGBFS)

The problems associated with the quality of fly ash do not exist in the case of Ground Granulated Blast Furnace Slag GGBFS, as the produce is necessarily the outcome of grinding to the required particle size. Thus the use of GGBFS as a mineral admixture should be preferred, despite long leads for end users in certain parts of India far from the steel plants. GGBFS sold in India is of uniform quality and particle size gradation. For many landmark structures such as the Burj Dubai (the tallest building in the world in 2009) GGBFS has been extensively used as a mineral admixture, even though the material is imported from other countries, resulting in the landed cost being more than that of cement. This was a conscious decision with a view to obtaining a more durable concrete structure.

In India the use of GGBFS has been fairly limited, in spite of all the technical advantages. The Indian Concrete Code permits up to 70% of cement replacement where GGBFS is used.

Technically, the use of GGBFS is more effective only at replacement levels of 50% or more. For a number of structures in a port in Andhra Pradesh, typically the M40 concrete mix contained 100 kg of cement and 300 kg of GGBFS. Portland Slag Cement (PSC) is also available and useful for ensuring durability of concrete structures. Due to the proximity to steel mills, PSC is generally produced in locations close to steel plants. Here again due to the bulky nature of the product, the transportation cost predominate. Another issue concerning quality of the PSC is the actual percentage replacement while making PSC; this information is not normally displayed on the bags, leaving the user at a disadvantage. In developed countries, information regarding the percentage of slag utilized in making PSC is generally printed on each bag of cement.

Condensed Silica Fume (CSF)

CSF is a by-product of Ferro-Silicon industry and at 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.

Ternary Blends

Ternary blends of mineral admixtures are now recommended for improving the durability of important concrete structures. An outstanding example is the Reconstruction of the New I-35 W St. Anthony Falls Bridge crossing the Mississippi River in Minneapolis, US. The new bridge has been opened to traffic in September 2008, less than 14 months after the collapse. HPC has been used for reconstruction with a target 100 year life span. High Performance Concrete containing silica fume and fly ash was used for low permeability.

Two gleaming white concrete sculptures tower 9 m high at each end of the bridge. The sculptures were pre-cast using an SCC mix that included photo-catalytic cement with self-cleaning and pollution reducing characteristics. The photo-catalytic cement is one of the new developments in the construction materials industry. The SCC concrete resulted in a marble-like, smooth white finish to the concrete surface. With a low water cementitious material ratio (w/cm), air entrainment and a rapid chloride permeability test (RCPT) value of less than 1500 coulombs at 28 days, the monument will also be a durable feature in the severe environment adjacent to the I-35 W Roadway. For the drilled shaft foundations of the I-35 Bridge, SCC was used. To control temperature during curing, fly ash and slag were incorporated as the majority of the cementitious material. This reduced the heat of hydration by approximately 50%. The concrete mixes for the footings and piers were proportioned for mass concrete and durability through the use of fly ash and slag. As the components were massive in size, concrete mixes were modified by cementitious materials, chilled water and cooled aggregates, use of form insulation and internal cooling pipes.

Hydrophobic Concrete Waterproofing System

A typical patented product uses three materials to achieve a water-tight concrete structure, a super-plasticizer which reduces batching water requirements, thus limiting the volume of the capillary pour network in the concrete; a reactive hydrophobic pour blocking concrete admixture and product specific water stop protection at construction dams.

Other accessory products include an operation retardant, curing compound, water stops and polypropylene fiber reinforcement. The patented product is typically added while concrete mix is being prepared to assist waterproofing. One product is applied at the rate of 5 liter per of concrete. Typically the manufacturer provides a warranty period of 10 years. The performance warranty provides for repairing water leakage through industry accepted and approved means for a period of 10 years. The product however has some negative impact on the rate of gain of strength of concrete. As a rough indication, the specified characteristic 28-day strength of concrete will not be achieved at 28 days but at 56 days or more.

The cementitious content of concrete using the integral waterproofing compound shall not be less than 325 k g / c u m with up to 50% fly ash or slag replacement. The water cement ratio shall be adjusted to compensate for the water in the waterproofing compound and super-plasticizer and maintain the required workability. The water cement ratio shall not exceed 0.42. The product is of American origin, represented by an Indian company which provides the necessary technical expertise.

Photo-catalytic Cement

This is a patented Portland cement developed by Italcementi Group. The photo-catalytic components use the energy from ultra-violet rays to oxidize most organic and some inorganic compounds. Air pollutants that would normally result in discoloration of exposed surfaces are removed from the atmosphere by the components, and the residues are washed off by rain. This cement can be used to produce concrete and plaster products that save on maintenance cost while they ensure a cleaner environment. In addition to Portland cement binders, the product contains photo-catalytic titanium dioxide particles. The cement is already being used for sound barriers, concrete paver blocks and façade elements. Other applications include pre-cast and architectural planners, pavements, concrete masonry units, cement tiles etc.

Exterior Self–levelling Concrete Topping

This is a Portland cement based product for fast track resurfacing and smoothing of concrete. It produces a smooth flat hard surface and dries quickly without shrinking, cracking or spalling. Pourable or pump-able when mixed with water, it installs 6 to 20 mm thick in one application and up to 50 mm thick with the addition of aggregate. It is pourable or pump-able when mixed with water. It can be used on, above or below grade and it makes spalled or damaged concrete look like new. Once sealed it creates an excellent wearing surface.

Carbon Dioxide (CO2)

As part of a future global atmospheric stabilization strategy, industrialized countries may lead to use large amounts of carbon dioxide. CO2 may be used for curing pre-cast concrete units. Manufacturers of concrete masonry units could use CO2 to reduce energy consumption. Steam curing which is conventionally used is energy intensive. Although CO2 curing provides slower strength development than steam curing, the performance can be improved if the blocks are

properly pre-conditioned before CO2 curing. It has also been noted that the water absorption of CO2 cured blocks is lower than that of steam cured blocks.

Self–curing, Shrinkage-free concrete

Italian researchers have produced a concrete by the combined use of

a. A water reducing admixture based on poly-carboxylate in order to reduce both the mixing water and cement.

b. a shrinkage reducing admixture

c. An expansive agent based on a special calcium oxide.

The combined use of an expansive agent and a PC based water reducing super-plasticizer results in a shrinkage-free concrete even in the absence of any wet curing. Due to the water reduction caused by the PC based super-plasticizer at a given w/c, there is a reduction in the volume of cement paste and a corresponding increase in the amount of aggregates. Both are responsible for significant reduction in the drying shrinkage

Application of Nano Technology

Reducing particle size of a material to Nano–scale often imparts new properties or enhances existing ones. This is typical of Nano particles of titanium dioxide, which maintains its photocatalytic activity even when mixed with cement. External cement based surfaces become strongly photocatalytic, leading to a much better appearance and a significant reduction in concentration of pollutants in the surrounding air.

The photoactive titanium dioxide was found to be a more powerful photocatalytic agent when its particle size decreased to non-size. This makes it an ideal vehicle for application in construction. A cement binder containing about 5% of active titanium dioxide produces concrete with a smooth surface and also converts the pollutants, removes them from the surrounding air. In a typical application on a building in France completed in 2000, the quality of concrete surface have remained unchanged till date. The structure looked as if it were freshly built.

Advanced Techniques in Construction

Modern construction methods (MMC) are methods that are developed in construction industry with proper planning and design so that each project reduces the construction time, cost and maintain overall sustainability. There are many methods followed and constructed in the present scenario widespread. Most famous and highly applied methods of modern construction are listed and explained below.

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

14.1.4 Engineering Aspects Of Soil mechanics - Environmental Impact Assessment

Integration of geotechnical/ geological aspects in EIA

Several authors conducted a study in integrating hydro geotechnical aspects in EIA. One such case is in Delta State, Nigeria, wherein although EIA is used, the authors argued that an expanded study is necessary, providing relevant hydro-geotechnical information (e.g. groundwater flow directions) for an effective EIA. By integrating hydro geotechnical information, the authors 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. The authors posit that since 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-structures are essential components of all infrastructures. The failure of these structures will undoubtedly pose threat and danger on the surrounding environment. In reference to the result of the case study in Ogorode, Sapele, Delta State, Nigeria, it was revealed that 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 Mining Industry

Another necessary integration of hydrogeological aspects 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. There are several methods performed in the environmental assessment of mining projects. A research study identified the Folchi method coupled with the Takagi-Sugeno fuzzy neural network (TSFNN) to have been used in conducting EIA for mining projects. Another method is an improved Analytic Hierarchy Process (AHP), also used for EIA in mining projects. Their study shows that the impact on the geological environment is the primary factor that needs to be considered in the EIA. A study in Ghana examined the coverage and inadequacies of hydrogeology guidelines in the EIA report by mining sites. The authors have found out that in Ghana, there is a strict requirement for the submission of EIA before mining lease concessions are awarded to mining companies. Mining companies are to conduct a sequential exploration model in the development of their mining sites. However, hydrogeological report guidelines are not adequately comprehensive in terms of inspection. There are EIA reports that contain no or little hydrogeological information. Oftentimes, the hydrogeological aspects were neglected in the report. The conduct of the sequential exploration model for mining sites involves seven phases which include: Desk studies, Regional reconnaissance, detailed survey, exploration drilling, outline drilling, evaluation drilling, and feasibility study. Though there was a robust implementation of EIA in mining sites in Ghana, there are many EIA reports that do not have the necessary groundwater information because essential data for assessment are not collected. Similarly, the study revealed the conduct of exploration for mining entails a significant or high expenditure for the project. The author argues that if the scope of EIA is expanded, valuable benefits can be derived. As an example, the movement and quality of aquifers can be determined

and water-rock interactions can be predicted. Considering also the study of land subsidence in a mining area requires a thorough understanding of the geological, geotechnical and hydrogeological setting so that a proper plan of action could be implemented to mitigate the phenomenon. Cost-wise, the aftermath of groundwater contamination will entail a more serious budget expenditure and environmental problem.

Conclusion

The inclusion of hydrological, geotechnical and geological aspects of susceptible areas in EIA studies is important. Hydro-geotechnical/ geological considerations will provide useful subsurface information that can be beneficial during the pre-construction and post-construction stages of geo-hazard prone project sites, providing invaluable insights into the decision making process. By incorporating hydrological, geotechnical and geological considerations in the EIA process, precautionary measures, appropriate environmental remediation, and protection can be integrated and implemented at an earlier stage, thereby minimizing ground disturbances and possible loss of life and property, resulting to sustainable use of natural resources. The implementation of engineering projects will not bring adverse impacts to the environment if there is a well-planned and systematic construction methodology that will be followed throughout the course of the project's construction and operational lifetime. Similarly, strict implementation and compliance of the policies and regulations of relevant authorities will help in saving the environment. Incorporating geological/ geotechnical aspects in EIA studies would almost certainly entail an additional cost to the project. Cost-wise, however, the repercussion of an environmental disaster that could come up due to inadvertent neglect of geological/geotechnical considerations in the EIA of a project will result in a more serious budget expenditure and environmental problem. For studies focusing on landfills, some aspects were not explained completely in the EIA report/s. This could be attributed to public resistance to the landfill construction. Landfill projects are, by nature, highly environmentally sensitive, oftentimes entailing multiple environmental and technical problems which include the geological/geotechnical hazards. For studies focusing on mining exploration, the review shows that geological problem is the dominant factor in the conduct of the EIA. The review also revealed that generally, the common method employed in the EIA methodology in mining was the Analytical Hierarchy Process (AHP). Geological considerations are commonly considered in EIAs of mining projects. Among the literature that has been reviewed, the lack of integration of geological aspects in flood structures and for oil and gas projects in their EIAs is obvious. Over-all, there are very few journals or published papers that deal with the integration of geotechnical and geological aspects for areas susceptible to geo-hazards in EIA. There is a gap in the literature, and perhaps in the compliance of EIA practitioners, in the incorporation of geological and geotechnical considerations in EIAs of projects relevant to EGGA.

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

What is water sustainability?

Sustainable water management means the ability to meet the water needs of the present without compromising the ability of future generations to do the same. Achieving sustainable water management requires a multidisciplinary and holistic approach in which technical, environmental, economic, landscape aesthetic, societal and cultural issues are addressed.

Sustainable water solutions: the basics

Sustainable water systems should provide adequate water quantity and appropriate water quality for a given need, without compromising the future ability to provide this capacity and quality, according to the IWA. The association states: Water systems in the realm of sustainable development may not literally include the use of water, but include systems where the use of water has traditionally been required. Examples include waterless toilets and waterless car washes, whose use helps to alleviate water stress and secure sustainable water supply

Sustainable water management strategies: three examples

Sustainable water strategies will be devised by the regional and national governments and will vary depending on a variety of factors: maturity of water infrastructure, impact and risks from climate change, level of governmental ambition, regulation and access to finance, among others. According to the IWA, sustainability is as much an outcome as a goal. The conceptual framework for Sustainable Water Resources Management considers water as a renewable, but finite resource with global and regional constraints. This should integrate ecological, economic, and social considerations through institutional and legal/regulatory constructs to move toward sustainable water resources. There are multiple case studies where government-led sustainable water management strategies have been developed, taking into account national regulations. Below we have listed three very different examples, from city to state and country wide in scope

Country-wide sustainable water: A long-term water strategy for Northern Ireland

This wide-ranging strategy focuses on the sustainable management of water in rivers, lakes, loughs and aquifers used for domestic, agricultural and industrial cases. The document proposes how excess rainwater can be managed sustainably locally to reduce the impact of flooding on communities. It also examines how we can reduce the amount of energy needed to move and treat drinking water and wastewater.

State-wide: sustainable water strategies for Victoria, Australia

In a statuary process for state-wide water resource planning in the Australian state of Australia, there are four regional water strategies. Driven by The Water Act 1989, these sustainable water strategies have to be reviewed at least every 10 years. The review of the Central Region Sustainable Water Strategy started in 2016 and is now complete. The five-year assessments of the Western Region and Gippsland Region sustainable water strategies began in 2017 and are also complete. The review of the Northern Region Sustainable Water Strategy is expected to start in late 2019.

City-wide: Rotterdam – leading the way in urban resilience

The Dutch city of Rotterdam topped the Arcadis' Sustainable Cities Water Index list. The city has been innovative and proactive in its approach to water management, including heavy investment into its reservoir catchment system. Rotterdam has become a showcase in urban resilience that directly leads to sustainable water supply: the city is among the highest in the world in terms of water reserves.

Sustainability Assessment of Sewerage Infrastructure

METHODOLOGY

A comprehensive review of the literature and reports collected from Bahrain (e.g., the National Master Plan for Sanitary Engineering Services, operations and maintenance reports, quality assurance reports, and procedure manuals) related to sewerage assets gave the following steps:
1) Reviewing the project management life cycle and the sustainability assessment research on sewerage infrastructure projects
2) Identifying the sustainability element of the sewerage failure
3) Determining the sustainability issues in the sewerage infrastructure projects, and
4) Defining the links to the sustainability development of the wastewater collection system. Based on these four steps, the preliminary sustainability assessment framework for sewerage infrastructure projects was developed.

SUSTAINABILITY ASSESSMENT FRAMEWORK FOR SEWERAGE INFRASTRUCTURE PROJECTS

The proposed framework aims to assess sewerage infrastructure projects throughout their life cycle. The reduction of the risk of sewerage failure and the contribution to the sustainable development of wastewater collection systems are considered in this framework. The preliminary sustainability assessment framework for sewerage infrastructure projects throughout their life cycle is presented in Fig. The framework contains six stages: the current sewerage system; contextualizing the project; planning, designing, and implementation; operation and maintenance; periodic assessment; and rehabilitation/upgrading with major considerations and expected outputs in every stage.

Stage 1: Sewerage System

Identifying and understanding the existing sewerage network are crucial to apply the framework. The two main aspects that should be considered are the hydraulic and the physical conditions of the network. The hydraulic condition should be assessed using the hydraulic model software to measure the system capacity. The hydraulic model needs to be calibrated frequently to reflect the actual condition of the pipelines and pumping stations. The physical condition should also be assessed by inspecting the pumping stations and the closed-circuit television of the pipelines. The network should have an inventory of the physical and hydraulic conditions of the network, so that future studies can be performed on the network. At this stage, sustainability issues need to be clearly identified to ensure all risks are considered in the engineering solutions.

Stage 2: Contextualizing the Project

At this stage, the scope of work of the proposed sewerage project is developed by entering the proposed scenarios into the hydraulic model and analyzing the outputs. This stage involves defining the budget that needs to be allocated as part of the Ministry of Works' program for design, supervision, and construction. The proposed project can require the allocation of land for the proposed pumping stations. The process of allocating lands for public services needs to be initiated. Furthermore, the state's sustainable development policy should be considered, and the project should be rejected if it does not comply with that policy [51]. Moreover, the sewerage infrastructure project should be categorized into one of the four types of projects: newly developed area projects, extension projects, rehabilitation projects, and upgrade projects. Based on this choice, indicators are selected while accounting for the sustainable development plans and policies. Moreover, the criteria and indicators for the sustainability assessment should be

stratified under two objectives: reducing the risk of sewerage failure and contributing to the sustainable development of wastewater disposal systems.

Stage 3: Planning, Designing, and Implementing the Project

After selecting the type of project with the proper indicators, the second stage covers the planning, designing, and construction. Based on the type of project, various alternatives and scenarios can be compared, as there are four possible sewerage projects: 1) newly developed area projects this project features more flexibility in the possible scenarios, and it can include a newly developed area that is not connected to the current network. This project usually involves a treatment plant. The process used is similar to that in another study. However, the indicators are different because each one is compared to provide a better decision-making process based on the sustainability criteria. 2) Extension projects linked to the network the alternatives are limited in this kind of Project, and the 3) Rehabilitation projects Rehabilitation technologies are assessed to suit the type of damage in the pipes. Some rehabilitation technologies, such as curing the pipes in place, can slightly reduce the pipe size and thus decrease the pipe capacity. Therefore, a hydraulic assessment needs to be completed to ensure that the project does not cause any interruptions in the service. 4) Network upgrades in this project, various scenarios are compared to find the most sustainable one. The process is the same as that in another study, although the indicators are different. After defining the type of project, the next phases are conducted using the specified project type. Planning and Designing Phase generally, in the planning and designing stage of the project, the availably of construction technologies in Bahrain must be considered. For example, deep gravity sewer projects require specialized contractors to perform micro-tunneling.

This technology may not be available in Bahrain when construction works are scheduled, as contractors from nearby countries provide it and no local contractors are available. Further, ensuring the availably of contractors requires attracting contractors from nearby countries. This step requires prior advertisement and invitations to participate in the tender of the project. As some projects require specialized staff to engage in the design and construction processes, ensuring that the required expertise is available within the Ministry of Works is important. A comprehensive feasibility study needs to be performed on the proposed options and scenarios. The project funding becomes clear as the design progresses. Cost analysis of the project's financial requirements, starting from the design up to the operation and maintenance, must be performed to control the expenditures as the project progresses.

CONCLUSION

Sewerage infrastructure projects face a variety of challenges and threats to their sustained performance throughout their life cycle. These challenges lead to the enhanced risks of failure, for example, sewer leakage, overflow, and odor. Such issues can have serious impacts on the environment, public health and safety, the economy, and the service lives of assets. Limited research, if any, has been conducted on the sustainability assessment throughout the entire life cycle of a sewerage asset with consideration of all aspects of sustainability. Thus, this research proposed a framework to assess the sustainability of the Kingdom of Bahrain's sewerage infrastructure projects to ensure the long-term sustainability of these projects. This sustainability assessment framework intends to support the decision-making process throughout the life cycle of assets. It provides greater transparency for stakeholders and contributes to the sustainable

development of wastewater management. This work-in-progress, with results forthcoming from the second segment of the research as a mixed methods approach, will be utilized to further enhance the framework. A qualitative study followed by a quantitative study is conducted. In the qualitative phase, semi-structured interviews will be conducted with experts to verify the framework. Then, a quantitative study will be performed using a questionnaire design to statistically test the framework. Once the final research framework is developed, it will be applied to selected cases in Bahrain by utilizing the case study methodology.

14.2Electrical Engineering

14.2.1 Design of Power Electronics converter

As the technology for the power semiconductor devices and integrated circuit develops, the potential for applications of power electronics become wider. There are already many power semiconductor devices that are commercially available, however, the development in this direction is continuing.

The power semiconductor devices or power electronic converter fall generally into six categories:-

- Diode Rectifier (Uncontrolled Rectifier)
- DC to AC Converter (Inverter)
- DC to DC Converter (DC Chopper)
- AC to DC Converter (Controlled Rectifier)
- AC to AC Converter (AC voltage regulator)
- Static Switches

The design of power electronics converter circuits requires design the power and control circuits. The voltage and current harmonics that are generated by the power converters can be reduced or minimized with a proper choice of the control strategy.

- **Diode Rectifiers:** A diode rectifier circuit converts AC voltage into a fixed DC voltage. The input voltage to rectifier could be either single phase or three phases.

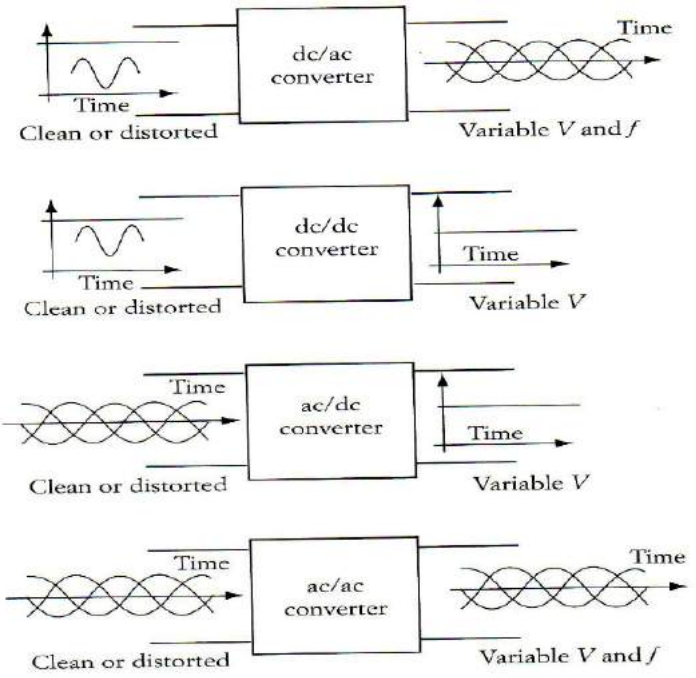
- **DC to AC Converter:** DC to AC converter circuit can convert DC voltage into an AC voltage. The AC output voltage can be controlled by varying the firing angle of the thyristors. The AC output voltage could be a single phase or three phases.

- **DC to DC Converter:** These converters can converter a fixed DC input voltage into variable DC voltage or vice versa. The DC output voltage is controlled by varying of duty cycle.

AC to DC Converter: An AC to DC converter circuit can convert AC voltage into a DC voltage. The DC output voltage can be controlled by varying the firing angle of the thyristors. The AC input voltage could be a single phase or three phases.

AC to DC Converter: An AC to DC converter circuit can convert AC voltage into a DC voltage. The DC output voltage can be controlled by varying the firing angle of the thyristors. The AC input voltage could be a single phase or three phases.

AC to AC Converter: This converter can convert from a fixed ac input voltage into variable AC output voltage. The output voltage is controlled by varying firing angle of TRIAC. These type converters are known as AC voltage regulator.



(fig -49 converter)

Static Switches: The power devices can be operated as static switches or contactors, the supply to these switches could be either AC or DC and the switches are called as AC static switches or DC static switches.

Power Electronics Application:
Power Electronics defined as the application of solid-state (devices) electronics for the control and conversion of electric power. Power electronics have already found an important place in modern technology and are now used in a great variety of high- power product, including heat controls, light controls, electric motor control, power supplies, vehicle propulsion system and high voltage direct current (HVDC) systems.

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

A Soft Starter is a device that starts motors with reduced power supplied at start-up. Reducing the power reduces potentially damaging electrical and mechanical shocks on the system. Soft Starters are a combination of a controller and overload protection.
CONTROLLERS - Turns electric current to the motor on and off. A contactor is a controller that is controlled by an electromagnet.

OVERLOAD PROTECTION - Protects a motor from drawing too much current and "burning out" from overheating. The overload relay is the motor overload protection used in soft starters. It limits the time the overload current is drawn and protects the motor from overheating. Soft Starters place a device called a reduced voltage starter, or soft starter, between the motor and the incoming utility line to regulate the amount of current fed to the motor. Soft Starters enable the AC induction motor to speed up in smaller, resulting in less current drawn than with a traditional motor starter. Due to decreased voltage, torque is also reduced resulting in a soft, or easy start.

Soft Starters are used on all types of AC and DC motors. They are most commonly used with the AC squirrel cage induction motor because of its simplicity, ruggedness and reliability.

Why Soft Starters are needed?
1. To avoid overloading the power distribution system.
2. To avoid unnecessary wear and tear on equipment by reducing starting torque.

Types of Soft Starters:
1. Primary Resistor
2. Auto Transformer
3. Part Winding
4. Wye Delta
5. Solid State

1) Primary Resistor:
Developed in the early 1900's, this simple unit is one of the first soft starters placed into operation. That there is a resistor for each of the three phases of current. Resistors resist the flow of current. When the motor is started, the resistors resist the current flow resulting in a voltage drop. Approximately 70% of the line voltage is sent to the motor terminals at startup. A timer closes a set of contacts after the motor has accelerated to a pre-determined point. This removes the resistors from the circuit and lets full power through to the motor. Primary resistors starters are known for their smooth starts. They offer two-point acceleration, or one step of resistance. For extra-smooth starting, add additional stages of resistors and contactors.

2) Auto Transformer:
Auto transformer starting is one of the most effective methods of soft starting. It is preferred over primary resistor starting when the starting current is drawn from the line must be held to a minimum, yet the maximum starting torque per line amp is required. Instead of using resistors, this starter uses taps on transformer windings to control the power input to the motor. Taps are usually set up to provide 80%, 65% and 50% of the line voltage, respectively.
These taps provide built-in flexibility. Activating any one of three taps on the windings allows different amounts of current to the motor. In Fig. 6, the motor is receiving voltage through the second of the three taps. This type of starter can supply more current to the motor than other soft starters, while keeping voltage low. The transformer steps up the current making it greater than the line current input during startup.

3) Part Winding:
The part winding method requires dividing the motor windings into two, or more, separate sets. These identical winding sets are intended for parallel operation. At startup, power is applied to only one set of windings. As the motor comes up to speed, power is applied to the other winding set for normal running. When windings are energized in this manner, they produce reduced starting current and reduced starting torque. Most dual voltage (230V/460V) motors are compatible with the part winding starter at 230 volts.

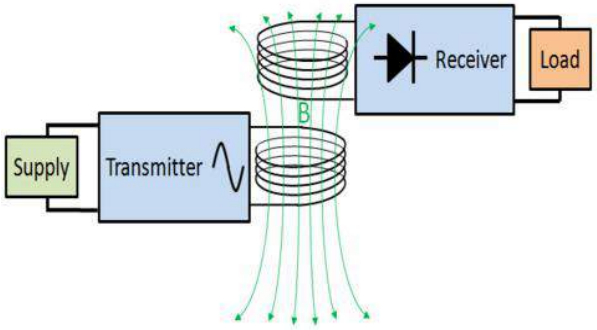
4) Wye Delta:

Wye Delta starting requires the motor have connection points to each of the three coil windings. These are specially wound with six leads for Delta and Wye connections. Illustrates the winding configurations as they are connected at startup. It is called the Wye Configuration because it is shaped like the letter "Y". This connection results in line voltage applied to an electrically larger winding, reducing the line current. It provides 33% of the normal starting torque and 58% of the normal starting voltage.

After a pre-determined time, the starter electrically switches the windings over to a Delta Configuration. This configuration resembles the Greek letter "delta". The windings are connected in their normal run configuration with every winding receiving full voltage. An important consideration with this starter is at the transition point, where the starter switches from Wye to Delta, the motor MUST disconnect and reconnect. This type of Wye Delta starter is known as Open Transition and can have a momentary hitch in operation, allowing a momentary current inrush. Closed Transition is another type of Wye Delta starter. It uses an extra contactor and set of resistors to keep the motor on-line during the transition. It eliminates the inrush concern and the cost is slightly higher than the open transition version.

5) Solid State:

The newest soft start method is the solid-state type. It replaces mechanical components with electrical components. The key is the Silicon Control Rectifier or SCR. During motor acceleration, this device controls motor voltage, current and torque. How the solid-state soft starter controls the current draw and the starting torque. The SCR has the ability to rapidly switch heavy currents. This allows the soft starter to provide smooth steeples acceleration - the smoothest of any of the soft start methods.



(fig -50 solid state)

14.2.3 Advanced Wireless Power Transfer System

One of the major problems in power system is the losses occurring during the transmission of electrical power. The loss of percentage during the transmission is approximated as 26%. The main cause for power loss during transmission is the resistance of wires used in the grid. According to WRI (world resource institute), the electricity grid of India has the highest percentage (27-40%) of power transmission losses in the world. For this reason, Telsa has proposed methods of electricity transmission using an electromagnetic induction method.

The Serbian scientist “Nikola Telsa” was the first one to research and propose the concept of wireless power transfer in the year 1899, since then many scientists have been working to make his vision a reality. In the same year he has continued research on wireless power transmission in Colorado Springs and writes, the inferiority of the induction method would come into view immense as compared with the distributed charge of ground and air method. In the year 1961, William C. Brown publishes an article exploring possibilities of microwave power transmission. In the year 2009, Sony shows a wireless electrodynamics induction powered TV set.

Wireless power can be defined as the transmission of electrical energy from a power source to an electrical load without connecting wires. It is reliable, efficient, fast, low maintenance cost, and it can be used for short range or long range. The basic working principle of wireless power transfer is, two objects having similar resonant frequency and in magnetic resonance at powerfully coupled rule tends to exchange the energy, while dissipating relatively little energy to the extraneous off-resonant objects.

Moreover, this method can be involved in a variety of applications, like to charge mobile phones, laptops wirelessly. And also this kind of charging gives a far lower risk of electrical shock as it would be galvanic ally isolated. This is an emerging technology, and further, the distance of power transfer can be improved as the study across the world is still going on.

Hardware Requirements of Wireless Power Transfer

The hardware requirements of wireless power transfer include HF-Transformer, HF-diodes, rectifier, basic Transistors, two air filled inductor coils, Voltage regulator and BLDC fan.

HF-Transformer:

High frequency (HF) transformers transfer electric power and physical size are reliant on the power to be transformed as well as the operating frequency. The emf equation of universal transformer indicates that at a higher frequency, the core flux density will be lower for a given voltage. This implies that a core can have a smaller cross-sectional area.

Voltage regulator:

A voltage regulator is an electrical regulator, designed to maintain a constant level voltage automatically. There are three terminal positive voltage regulators are available in many packages and also with several o/p voltages, making them useful in a wide range of applications. Output current up to 1A and o/p voltages is 12. Thermal overload and short circuit protection. Output transistor safe operating area protection.

Coil:

An electromagnetic coil is formed when a conductor is wound around a core. Primarily used to transfer energy from one electrical circuit to another by magnetic coupling. Common types of electrical coils are Tesla, barker, choke, Maxwell coil, etc.

1N4007 Diode:

This diode is used as full wave bridge rectifier circuit in this project. Maximum reverse bias voltage capacity of 50V and max forward current capacity of 1Amp.

Project Working:

The main concept of this project is to design a device for the concept of wireless power transfer to eliminate the use conventional copper cables and also current carrying wires. This project is built upon a circuit which converts AC 230V 50Hz to AC 12V, High frequency (HF). The output is fed to a tuned coil shaping as main of an air core transformer. The minor coil develops a voltage of HF 12volt.

Thus the power can be done by the primary to the secondary that is divided with 3cm distance. So the transfer could be seen as the primary transmits and the secondary receives the power to run a load. In addition, this method can be used in several applications, like to charge gadgets like mobile phone, laptop battery, iPod, propeller clock wirelessly. And also this type of charging offers a far lower risk of electrical shock as it would be galvanic ally isolated. This is an emerging technology, and in future, the distance of power transfer can be improved as the study across the world is still going on.

Wireless Power Transfer Advantages:
1. Simple design
2. Lower frequency operation
3. Low cost
4. Practical for short distance

Wireless Power Transfer Disadvantages:
1. High power loss
2. Non-directionality
3. Inefficient for longer distances

Wireless Power Transfer Applications:
1. Consumer electronics
2. Transport
3. Heating and ventilation
4. Industrial engineering
5. Model engineering

14.2.4 Industrial Temperature Controller

We can literally say that a Temperature Control System is a device or set of devices that manage, command, direct or regulate the behavior of other devices or systems in order to influence the degree of hotness or coldness of a body or an environment. A Temperature Control System is a more like a programmable thermostat that can keep the environment (home or office) at a desired temperature regardless of fluctuating exterior weather conditions. The advantage of having a temperature control system over a common thermostat is that it saves energy and money by automatically maintaining different temperatures at different times of the day and night. It is usually a feedback system having a control loop, including sensors, control algorithms and actuators/effectors, and is arranged in such a fashion as to try to regulate a variable at a set point or reference value. An example of this may increase the fuel supply to a furnace when a measured temperature drops.

IN THE INDUSTRIES: Many Industries (especially Manufacturing and Pharmaceutical Industries) have growing concerns for the need to store certain production materials within a specific temperature range. Some of these materials could be highly inflammable or explosive at certain extreme temperatures. This necessitates the need for a Temperature Control system.

BASIC COMPONENTS OF A TEMPERATURE CONTROL SYSTEM:

Power Supply Unit: This Unit provides the Temperature Control System with the Electrical Energy that drives it. In this case, the Power Supply Unit consists of a Step- down transformer which works based on the principle of induction. The transformer steps down the voltage received from the power outlet from the national rating of 230V to 15V, which is all the voltage needed to drive the system. This voltage is further rectified (using a bridge rectifier) and filtered (using a power capacitor) to give a perfect and undistorted voltage to the system. Of this 15V input voltage, about 5V drives the microcontroller. The rest are needed to drive the other units of the circuit.

Sensor Unit: This Module consists of devices (thermometers in traditional systems) that detect the current temperature status. These devices sense the current room/surface temperature, and provide its result to be used as input in the Control unit and in the Display Unit.

LCD/Display Unit: This displays the current temperature status of the environment as received from the Sensor Unit. In this case it consists of a 7-bit graphic large-digit display device that reveals the results/reading of the temperature sensor to the external user.

Control Unit: The Control unit houses the Controller and related devices (thermostats in automatic systems) that process information to produce effects/action by the system. In this case, this unit houses the microcontroller (and control program/algorithm) that stores the set-point temperature. The control program receives temperature status from the sensor unit and ensures that it doesn't compromise the set-point by initiating the appropriate sequence of action.

Menu/Function Unit: This unit consists of input buttons that are used to give commands to the control program and also to program the set-point for the system. In this case, a variable resistor which changes the set-point temperature when its resistance is varied.

Alarm Unit: This unit consists of an alarm system that alerts the inhabitants of the environment of a temperature breach. This is an optional component of Temperature Control Systems. It comes mostly with those systems that are built to specifications (custom systems). Most commercial Temperature Control Systems prefer to maintain a silent profile in the environment where they function. There are three types of Controller / Control Algorithms for use in the construction and design of most Temperature Control Systems:

On/Off Control:

An on/off controller is the simplest form of temperature control device. The output from the device is either on or off, with no middle state. An on-off controller will switch the output only when the temperature crosses the set-point. For heating control, the output is on when the temperature is below the set-point and off above the set-point. Since the temperature crosses the set-point to change the output state, the process temperature will be cycling continually, going from below the set- point to above, and back below. In cases where this cycling occurs rapidly, and to prevent damage to contactors and valves, and on-off differential, or "hysteresis" is added to the controller operations. This differential requires that the temperature exceed the set-point by a certain amount before the output will turn off or on again. On-off differential prevents the output from "chattering" or making fast, continual switches if the cycling above and below the set-point occurs very rapidly. On-off control is usually used where a precise control is not

necessary such as in systems which cannot handle having the energy turned on and off frequently, where the mass of the system is so great that temperatures change extremely slowly, or for a temperature alarm. One special type of on-off control used for alarm is a limit controller. This controller uses a latching relay, which can be manually reset, and is used to shut down a process when a certain temperature is reached.

Proportional Control:
Proportional controls are designed to eliminate the cycling associated with the on/off control. A proportional controller decreases the average power supplied to the effector as the temperature approaches the set-point. This has the effect of slowing down the heater/cooler so that it will not overshoot the set-point, but will approach the set-point and maintain a stable temperature. This proportioning action can be accomplished by turning the effectors on/off for short time intervals. This "time proportioning" varies the ratio of "on" to "off" time to control the temperature. The proportioning action occurs within a "proportional band" around the set-point temperature. Outside this band, the controller functions as an on-off unit, with the output either fully on (below the band) or fully off (above the band). However, within the band, the output is turned on and off in the ratio of the measurement difference from the set-point. At the set-point (the midpoint of the proportional band), the output on: off ratio is 1:1; that is, the on-time and the off-time are equal. If the temperature is further from the set-point, the on-and-off times vary in proportion to the temperature difference. However, if the temperature is below the set- point, the output will be on longer; if the temperature is too high, the output will be off longer.

PID Control (proportional–integral–derivative controller):
The third controller type provides proportional with integral and derivative control, or PID. This controller combines proportional control with two additional adjustments, which helps the unit to automatically compensate for changes in the system. These adjustments, integral and derivative, are expressed in time-based units; they are also referred to by their reciprocals, RESET and RATE, respectively. The proportional, integral and derivative terms must be individually adjusted or "tuned" to a particular system using trial and error. It provides the most accurate and stable control of the three controller types, and is best used in systems which have a relatively small mass, those which react quickly to changes in the energy added to the process. It is recommended in systems where the load changes often and the controller is expected to compensate automatically due to frequent changes in the set-point, the amount of energy available, or the mass to be controlled. Some other controllers exist which are designed to automatically tune themselves. These are known as auto-tune controllers.

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

Vehicle Accident Detection, Prevention and Tracking System:
The presented paper is based on IOT. This framework is utilized to detect the location of the vehicle and prevent the vehicle from an accident by the use of an alarm. The person needs to introduce the application in their cell phone and register by giving the immediate contact numbers to which the alarm message would be sent. For e.g., if the driver feels sluggish while driving and the vehicle is going to be smashed, the alarm buzzes, which makes the driver mindful of his status. This application uses GPS for locating the position of the vehicle. Through

this it is additionally conceivable to compute the distance traveled by the vehicle in 'X' seconds by means of its coordinates. To begin sending location to the server, the user has to first login to the application on his phone via the credentials used during the registration.

- **Process Flow:-**

IoT Device:

The device comprises of different sensors which are Ultra sonic sensor, Accelerometer, Temperature sensor, GSM module and GPS module. All these sensors and modules are combined and connected to each other through Arduino board, which is the Microcontroller.

Accident Detection:

The main advantage of this system is that along with the detection of an accident it is also capable of preventing it. The Ultra sonic sensors situated at all the 4 sides of the vehicle will prevent the car from being too close from any object. If in case car meets an accident or small-scale collision, the device will detect the accident.

Ultra-Sonic:

Ultra-sonic will compute the distance between your vehicle and the surroundings. If any object or vehicle draws close to the set limit, it will buzz an alarm which will only turn off if you maintain the specified distance.

Accelerometer:

Accelerometer will trace the X, Y and Z coordinates of the vehicle. These coordinates will help in detecting whether the vehicle is left, right or top tilted. This will also help in detecting the amount of damage during the accident.

GPS Module:

GPS module will trace the location of the vehicle after every 30 seconds by satellite so that if vehicle is fully damaged and all the sensors including the car is destroyed, at least the recent location is tracked.

GSM Module:

GSM module is used to send a message with the current location. When the accident is detected, it will send an alert message to respective people, nearby police station and hospital.

Message Sent:

All the data from the sensors, the message sent and the location are stored in Cloud storage. The alert message will be sent to the people whose mobile numbers would be listed during the time of registration.

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

DESIGN IMPACT ON SOCIETY				
DESIGN NAME	**ESTIMATED CONSTRUCTION TIME**	**ESTIMATED COST IN RS**	**TIME WILL BENEFIT**	**FUNDING SOURCES**
PART-1 DESIGN				
CIVIL ENGINEERING DESIGN				
Biogas plant	1 TO 2 MONTH	43,381	The advantage of all designs is that they are available immediately after completion	Local government
Garden	5 TO 6 MONTH	1,56,995		Local government
Public toilet	6 TO 8 MONTH	2,70,399		District panchayat
Post office	1 YEAR	5,85,367		State government
Water harvesting	5 TO 6 MONTH	10,811		Local government
Waste water treatment plant	4 TO 5 MONTH	73,000		District panchayat
ELECTRIC ENGINEERING DESIGN				
Solar panel fitting	1 TO 2 MONTH	90,800	Same as Above	Local government
Solar street light	2 TO 3 MONTH	34,000		Local government
CCTV	1 TO 2 MONTH	1,00,000		Local government
PART-2 DESIGN				
CIVIL ENGINEERING DESIGN				
Community hall	1 YEAR	9,25,841		District panchayat
Solid waste collection	1 TO 2 MONTH	60,000	The advantage of all designs is that they are available immediately after completion	Local government
Library	1 YEAR	2,54,552		State government
Internal road	8 TO 10 MONTH	24,24,941		District panchayat
Recreational	1 TO 2 YEAR	1,52,71,752		State

center				government
Police station	1 YEAR	8,65,860		District panchayat
ELECTRIC ENGINEERING DESIGN				
Small hydropower generation	10 TO 12 MONTH	60,00000	SAME AS ABOVE	State government
Temperature control fan	1 TO 2 MONTH	6,000		Local government
Water level indicates	1 TO 2 MONTH	4,000		Local government

(Table no -49 smart feature of ch 8 to 13 design)

Chapter -16
Survey By Interviewing With Talati And/Or Sarpanch

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Survey with Interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

CHAPTER- 16

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?		Farming
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?		
5	Are village people getting agricultural help?	Yes	
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	sub centar.
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?	No	
12	Is water scarcity in village? How many days per year?		
13	Is village under any debt?	Yes	
14	Is any serious issue due to debt from bank or any person happened in village?	No	
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	No	
16	Is any death of patient occurred due to unavailability of medical facility in village?	No	
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	yes	10 people
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	flood
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	

Nodal officer and students can add more questions. This is a sample. Having Minimum requirement.

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

11

Chapter-17
Irrigation / Agriculture Activites And Agro Industry, Altenate Technics And Solution

Irrigation system

a system of supplying (land) with water by means of artificial canals, ditches, etc, esp. to promote the growth of food crops. a sophisticated irrigation system. 2. a system used to clean the stool out of the colon.

Irrigation activates

Irrigation helps to grow agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of less than average rainfall. Irrigation also has other uses in crop production, including frost protection, suppressing weed growth in grain fields and preventing soil consolidation

Five types of irrigation system

- Surface irrigation. Running or impounding water over the surface and allowing it to saturate the soil to some depth.
- Sprinkle irrigation. Spraying water into the air and allowing it to fall on to plants and soil as simulated rainfall.
- Drip irrigation.
- Subsurface eluders.
- Sub irrigation.

Major problem in irrigation activates

Two of the most common problems with farm irrigation systems have to do with irrigation scheduling. Likewise, starting an irrigation cycle too late or not running the system for a long enough period of time is considered under watering and can cause reduced yields and poor crop quality which can affect price

Solution of irrigation activates problem

Water run-off and pooling. You can also adjust the valves and nozzles to deliver water at slower rates to allow adequate time for the water to soak into the soil. In some instances, adrip irrigation system may be the best solution

Agro Industry

An agro-industry is an enterprise that processes bio-mass, i.e. agricultural raw materials, which include ground and tree crops as well as livestock and fisheries, to create edible or usable forms, improve storage and shelf life, create easily transportable forms, enhance nutritive value, and extract chemicals.

Chapter -18
Social Activities – Any Activates Planned By Students

We have planned many activities in Isra village but all activities postponed due to covid pandemic.

Our planned activities list given below with description.

1 tree plantation:-

We planned for around 200 tree pant in Khorana village. For this activity we see the place outside of Khorana village. In this plantation we use neem, mango, Banyan, Ficus religiosa low water need tree, long life tree, etc. in this activity we have get planed for help by some NGO of Rajkot.

2 Awareness camp:-

We also planned for small 100 to 200 people awareness camp for villager.tin this camp we give information about, agriculture, unbelief , government schema, and many more .

3 children camp:-

We planned small camp for children this camp we planed give basic knowledge of computer, how to write proper exam, information about E- learning platform, etc. We planned all activity during the project but due to this pandemic not possible any one.

Chapter -19
Isra village SAGY Questionnaire Survey form

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: ISHRA Gram Panchayat: ISHRA Ward No. ____

Block: ____ District: RAJKOT

State: Gujarat L S Constituency: ____

1. Family Identity and Size

Name of Head of Household	Vijay P Rupapara							Male/ Female	M
SECC Survey ID:		Family Size	3	Over 18	2	6 to 18	-	Under 6	1

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		
PDS (If NFSA is implemented)	Annapurna	Antyodaya	Priority	Other	member of an SHG? Yes / No ✓		

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]
Vijay P Rupapara	33	M	No	-	7	Y	Y	
Savitri V Rupapara	32	F	No	-	6	Y	N	

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N

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
Mohit V Rupapara	5	M	No	N	Y		Y	27

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4
[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011)
[3] Marital Status: Not Married – 1, Married – 2, Widowed – 3, Divorced/Separated – 4
[4] Level of Education: Not Literate – 01, Literate – 02, Completed Class 5 - 03, Class 8th – 04, Class 10th-05, Class 12th-06, ITI Diploma-07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)
[5] No Pension – 0, Old Age Pension – 1, Widow Pension – 2, Disability Pension – 3, Other Pension – 4 (mention)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

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

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

7. Do members take Regular Physical Exercise

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

8. Consumption of Tobacco

	Smoking	Chewing
Adults	NO	YES
Children	NO	NO

9. House & Homestead Data

Own House: ~~Yes~~ / No	No. of Rooms: 3
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~~	0
Community Water Tap	Yes / ~~No~~	1
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	5	2. Cultivable Area	5
3. Irrigated Area		4. Uncultivable Area	

13. Principal Occupations in the Household

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

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

15. Agriculture Inputs

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

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

Name	Unit	Quantity
Cotton		
ground nut		
Corn		

17. Livestock Numbers

Cows: 0	Bullocks: 2	Calves: 0
Female Buffalo: 0	Male Buffalo: 0	Buffalo Calves: 0
Goats/ Sheep: 0	Poultry/ Ducks: 0	Pigs: 0
Any other: Type _____		No. _____
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): _____		

18. What games do Children Play
Cricket

19. Do children play musical instrument (mention)
NO

Schedule Filled By:
Principal Respondent:
Date of Survey: 29-5-21

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

I. Basic Information

a. Gram Panchayat: ISRA

b. Block: _____

c. District: Rajkot

d. State: GUJARAT

e. Lok Sabha Constituency: _____

f. Number of Wards in the Gram Panchayat: _____

g. Number of Villages in the Gram Panchayat: 1

h. Names of Villages: ISRA

Demographic Information

Number of Households 457 Total Population 2164 Male 1124 Female 1040

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

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

IV. Sports Facilities in the Gram Panchayat

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

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 2

b. Number of villages without Angan Wadi Centres 0

Names of such villages: –

c. Schools (Number)

Primary Private: 0 Primary Govt.: 1

Middle Private: 0 Middle Govt.: 1

Secondary Private: 0 Secondary Govt.: 0

Higher Secondary Private: 0 Higher Secondary Govt: 0

VI. Public Distribution System

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

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

VII. Coverage of Villages under different Facilities & Services

	Parameter	Villages Status[1]	Names of Villages Covered	Names of Villages not Covered
a.	Piped Water Supply Coverage to Villages	Covered Not Covered	ISRA -	-
b.	Hand Pump Coverage in Villages:	Covered Not Covered	- ISRA	ISRA
c.	Coverage under Covered Drains:	Covered Not Covered	ISRA -	-
d.	Coverage under Open Drains:	Covered Not Covered	- -	-
e.	Villages with Household Electricity Connection (Numbers)	Connected Not Connected	ISRA(457) -	-

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	1665	d.	Pasture / Grazing Land	0	g.	Check Dam	3
b.	Irrigated Land	1665	e.	Forests/ Plantations	201	h.	Wells/Bore Wells	1
c.	Un-irrigated Land	-	f.	Other Common Land	0	i	Tanks /Ponds	2

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

3

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	45
b)	Number of Households receiving pension (old age, widow, disability)	45
c)	Number of eligible Households who are not receiving pension	0
d)	Number of Households eligible for Ration Card	457
e)	Number of eligible HHs having ration cards	
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	0
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	
h)	Number of active Job Card holders under MGNREGA	0
i)	Number of Job Card holders who completed 100 days of work during 2013-14	0
j)	Number of shops selling alcohol	0
k)	Number of BPL families	70
l)	Number of landless households	65
m)	Number of IAY beneficiaries	60
n)	Number of FRA[2] beneficiaries	0
o)	Number of Community Sanitary Complexes	0
p)	Number of Households headed by single women	5
q)	Number of Households headed by physically handicapped persons	0
r)	Total number of Persons with Disability in the village	12
s)	Number of SHGs	0
t)	Number of active SHGs	0
u)	Number of SHG Federations	0
v)	Number of Youth Clubs	0
w)	Number of Bharat Nirman Volunteers	0

Name and Signature of Surveyor and Respondent'

Vadi Nirmal D Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	29-5-21 Date of Survey

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

4

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

This questionnaire should be filled for each of the villages in the selected Gram Panchayat[1]

I. Basic Information

a. Village: ISRA
b. Ward Number: _____
c. Gram Panchayat: ISRA
d. Block: _____
e. District: RAJKOT
f. State: GUJARAT
g. Lok Sabha Constituency: _____
h. Number of Habitations / Hamlets in the Gram Panchayat: _____
i. Names of Habitations / Hamlets:

Demographic Information

Number of Households 457 Total Population 2164 Male 1124 Female 1040

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	village
b.	Nearest Middle School	Y	village
c.	Nearest Secondary School	N	–
d.	Kisan Seva Kendra	N	–
e.	Milk Cooperative /Collection Centre	Y	village
g.	Health Sub Centre	Y	village
h.	Bank	Y	upleta
i.	ATM	Y	upleta
j.	Bus Stop	Y	village
k.	Railway Station	N	–

[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	
m	Common Service Centre	N	
n	Veterinary Care Centre	N	

ii. Road Connectivity

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

If 3 mention the name of the habitations where not available: 1 -All

iii. Drinking Water Facilities

a.Piped Water Supply Coverage to Habitations: 01 (*1-All 2-None 3-Some*)

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

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

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

b. Coverage under Open Drains: 2 (*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: 2

v. Coverage of Habitations under Electrification

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

If 3 mention the name of the habitations not covered: 1

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

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

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): NO

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

vii. Education, ICDS

a. Number of Anganwadi Centres: 2

c. Schools (Number)

Primary Private: 0 Primary Govt.: 01

Middle Private: 0 Middle Govt.: 01

Secondary Private: 0 Secondary Govt.: 0

Higher Secondary Private: 0 Higher Secondary Govt: 0

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	1165	d.	Pasture / Grazing Land	0	g.	Check Dam	3
b.	Irrigated Land	1165	e.	Forests/ Plnatations	201	h.	Wells/Bore Wells	1
c.	Un-irrigated Land	-	f.	Other Common Land	0	I	Tanks /Ponds	2

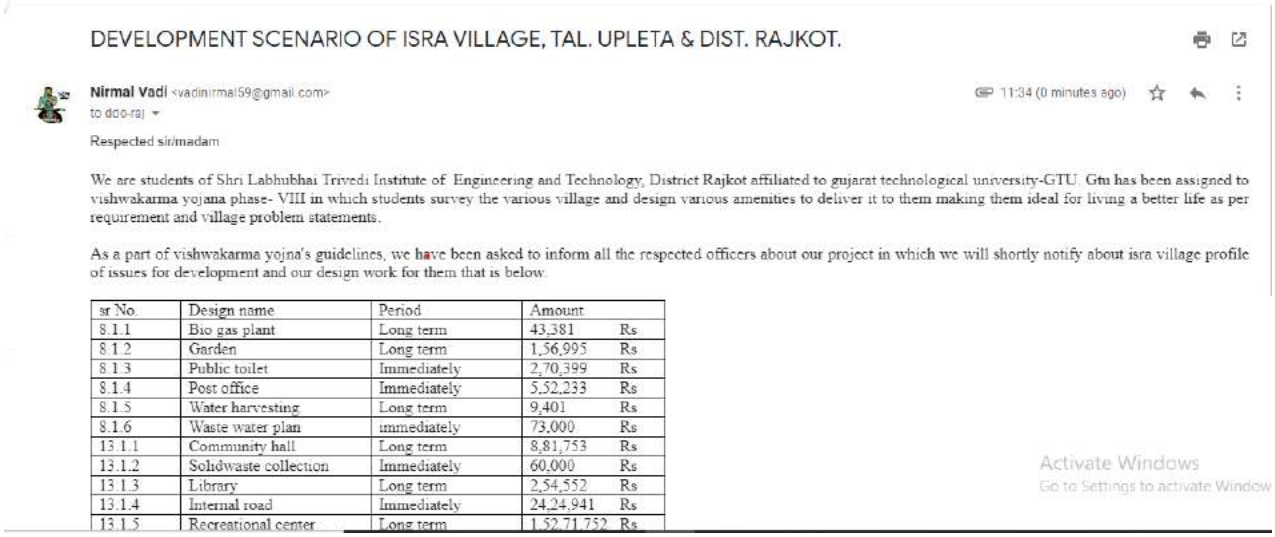
ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	0
2	Number of active Job Card holders who have completed 100 days of work	0
3	Number of shops selling alcohol	0
4	Number of BPL families	70
5	Number of landless households	65
6	Number of IAY beneficiaries	60
7	Number of FRA beneficiaries	0
8	Number of common sanitation complexes	0
9	Number of SHGs	0
10	Number of active SHGs	0
11	Existence of SHG Federation in the Village (Yes / No)	NO
12	Number of Youth Clubs	0
13	Number of Bharat Nirman Volunteers	0

Name and Signature of Surveyor and Respondent'

Vaidi Nirmal D			
Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	29-5-21 Date of Survey

3

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



DEVELOPMENT SCENARIO OF ISRA VILLAGE, TAL. UPLETA & DIST. RAJKOT.

Nirmal Vadi <vadinirmal59@gmail.com> 11:34 (0 minutes ago)
to ddo-raj

Respected sir/madam

We are students of Shri Labhubhai Trivedi Institute of Engineering and Technology, District Rajkot affiliated to gujarat technological university-GTU. Gtu has been assigned to vishwakarma yojana phase- VIII in which students survey the various village and design various amenities to deliver it to them making them ideal for living a better life as per requirement and village problem statements.

As a part of vishwakarma yojna's guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about isra village profile of issues for development and our design work for them that is below.

sr No.	Design name	Period	Amount	
8.1.1	Bio gas plant	Long term	43,381	Rs
8.1.2	Garden	Long term	1,56,995	Rs
8.1.3	Public toilet	Immediately	2,70,399	Rs
8.1.4	Post office	Immediately	5,52,233	Rs
8.1.5	Water harvesting	Long term	9,401	Rs
8.1.6	Waste water plan	immediately	73,000	Rs
13.1.1	Community hall	Long term	8,81,753	Rs
13.1.2	Solidwaste collection	Immediately	60,000	Rs
13.1.3	Library	Long term	2,54,552	Rs
13.1.4	Internal road	Immediately	24,24,941	Rs
13.1.5	Recreational center	Long term	1,52,71,752	Rs

Activate Windows
Go to Settings to activate Window

Chapter -21
Comprehensive report for the entire village

We study ideal village and smart village concept through different source. We study some case study for ideal village and smart village development, identify new techniques and learn about sustainable development techniques. Smart Villages access to sustainable energy services acts as a catalyst for development - enabling the provision of good education and healthcare, access to clean water, sanitation and nutrition, the growth of productive enterprises to boost incomes, and enhanced security, gender equality and democratic engagement. It can be help to develop the other village as increase basic amenities and after that smart amenities on any country with the help Smart (Ideal) Village visit and solid and liquid waste water management system Survey and Analysis. And it's also help to increase GDP Of state And Also increase country image in front of world as Good infrastructure; Good Economic Profile and Good Employment Solution; Good (Ideal Example) Smart Example of New infrastructure with Uses Of renewable energy Solution Country.

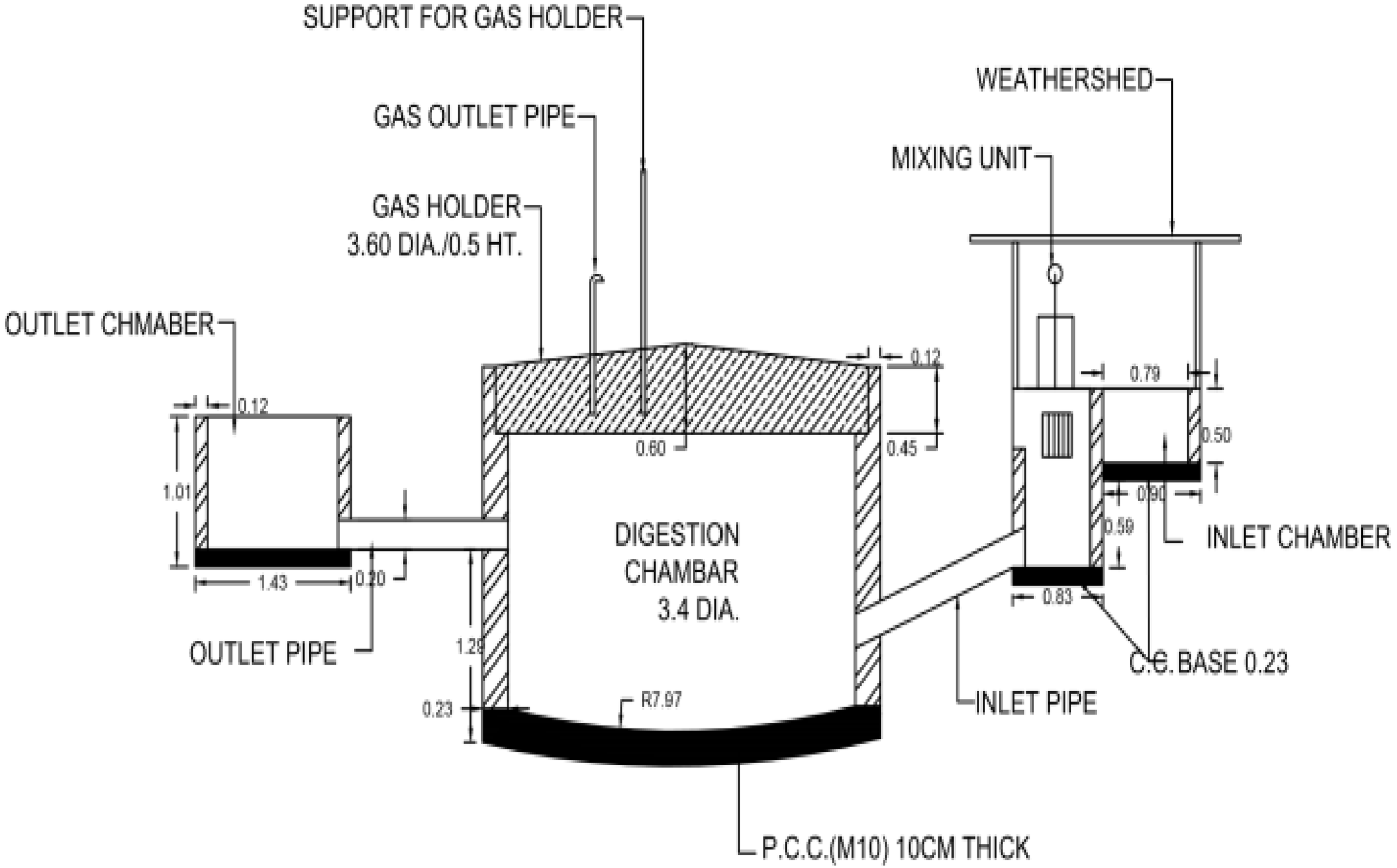
We visit ideal village and smart village for study and know the existing situation of village. We see all facilities in village and see their condition. Major facilities are in good and workable condition. Over all village condition is good. We interact with both village serpanch and talatikam mantri. We discuss village condition with them and ask for necessary data for our survey. Also they say about dome facilities May not in workable condition in their respective village. They also say about some of its facilities may require maintenance.

After visiting ideal village and smart village we visit our allocated village Isra. We visit village interact with sarpanch and talatikam mantri and a few of villagers. We see all the existing facilities of village take some good photograph of them we seem some lack of facilities in village and talk about that with serpanch. Sarpench told us about their condition. Majority of facilities are need some maintenance and some of them are in very good condition. Likewise, panchayat building is newly constructed. High school and primary school are at good condition. Water storage facilities need some maintenance.

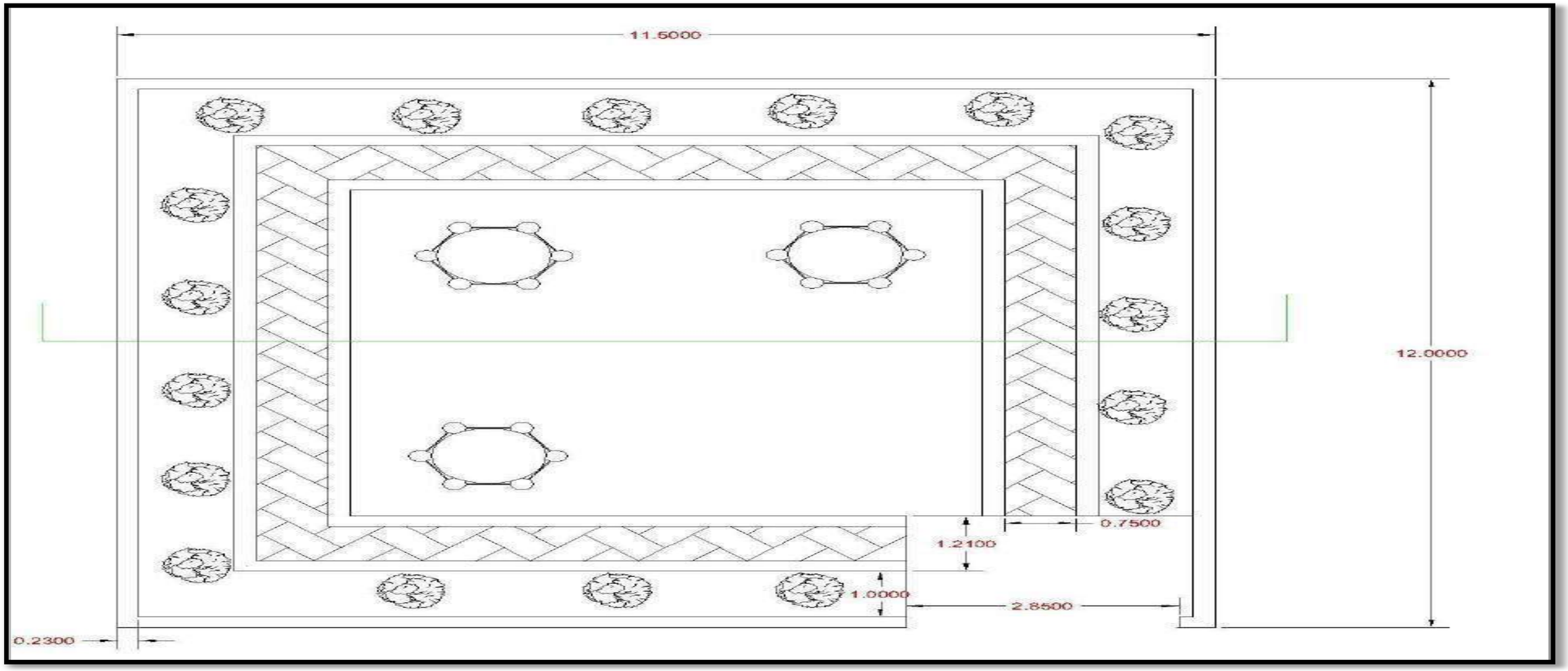
After study the village and facilities at village we do gap analysis and then we identify some facilities that are not at village. We short list 6 design that are most important and we gave their plane elevation and section. We also give 3 electrical design. We also give another 6 electric designs in pahse-2 and also give 3 new designs in electrical. We try to give design as per norms. We make sure that, which design we gave is maintain time by time and for that we give some method, recommended and new material introduce to serpanch and talalti.

We study and identify problems related with electrical and try to solve them with knowledge and new technique. Over village have 24/7 electricity so no major problem is faced. We gave sustainable or can say one time investment for electrical designs.

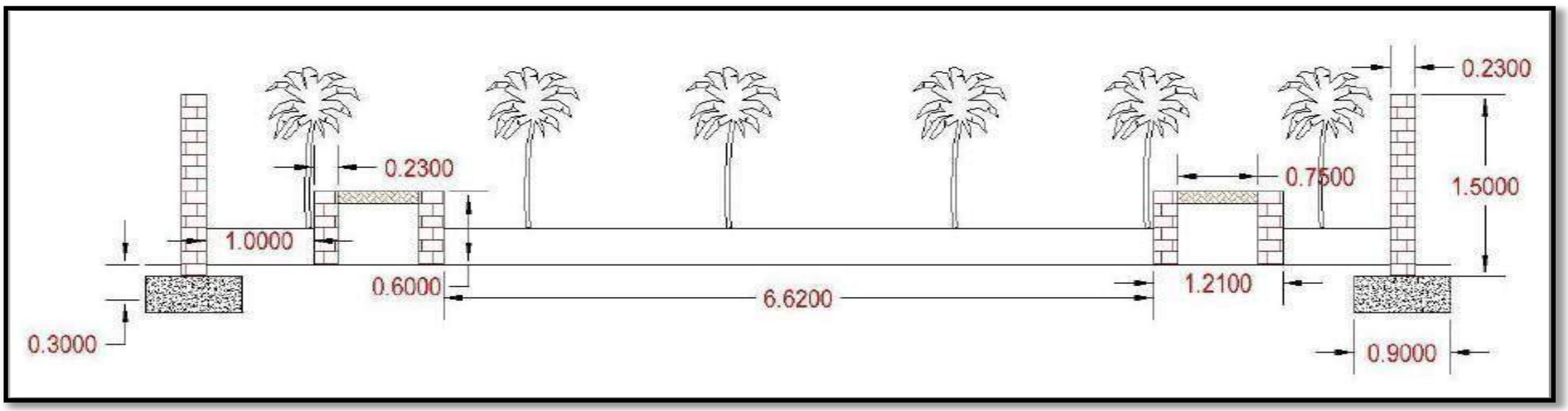
We try our best to full fill our project moto which is "Developing village with a 'rural soul' but with all urban amenities that a city may have" and we also learn new thing and we seeing forward to develop our village under Vishwakarma Yojana.

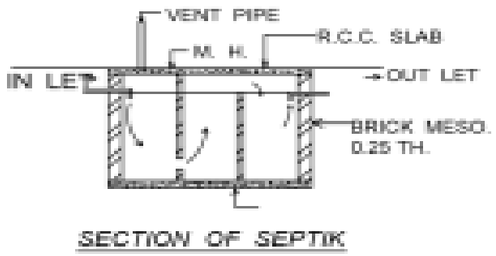


Bio Gas plant

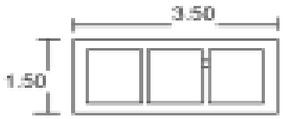

11.5000
12.0000
0.7500
1.2100
1.0000
2.8500
0.2300

Garden

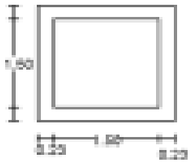

0.2300
0.2300
0.7500
1.5000
1.0000
0.6000
6.6200
1.2100
0.3000
0.9000



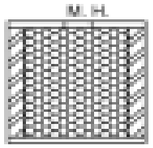
SECTION OF SEPTIK



PLAN OF SEPTIK



PLAN OF S.P.

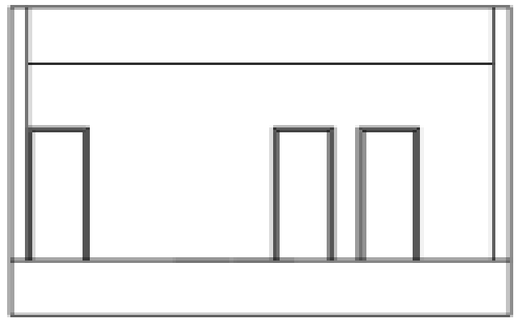


SECTION

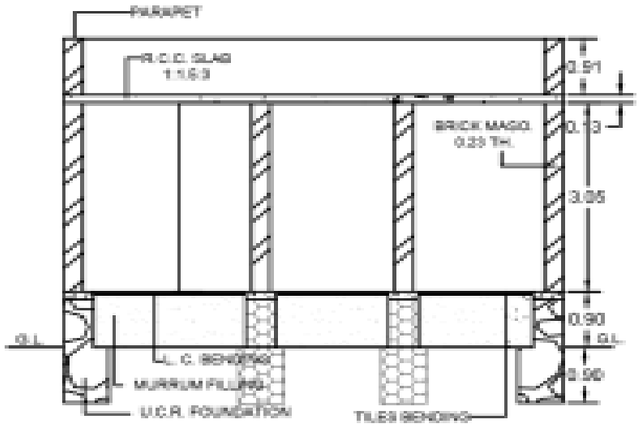
ALL DIMENSION IN MT.

PLOT AREA :- 46.38.00 SQ.MT.

FLOOR	MAX.PER. GROUND COV.AREA	GROUND COVERAGE AREA	OPEN AREA	ACTUAL BUILT UP F.S.I.
	A	B	C	D
G.F.	46.38	30.39	2.40	30.39
TOTAL AREA	46.38	30.39		30.39



ELEVATION



SECTION :- "A - A"

SCHEDULE :-

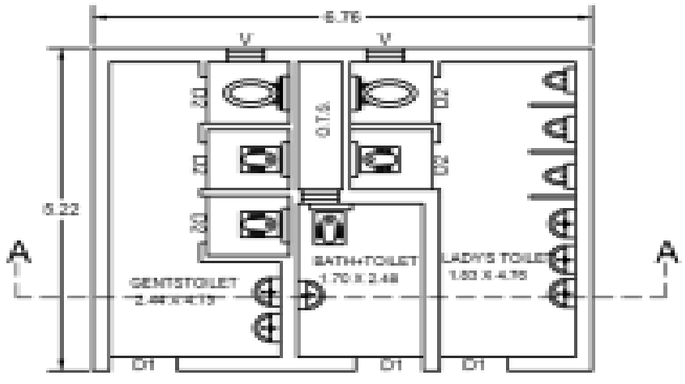
ITEM	SYM.	SIZE
DOOR	D	1.05X2.0
DOOR	D1	0.90X2.0
DOOR	D2	0.75X2.0
WINDOW	W1	1.50X1.20
WINDOW	W2	0.90X1.20
WINDOW	W3	0.90X0.90
VENTILATOR	V	0.60X0.45

R.C.C.STAIR

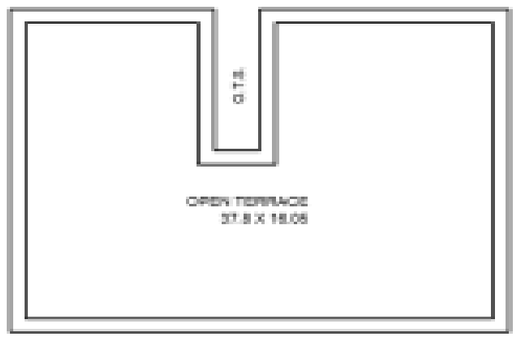
WIDTH = 1.22
RISER = 0.18
TRADE = 0.23

LEGEND :-

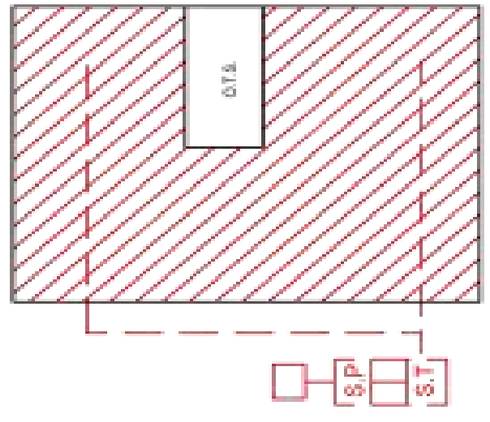
PROP. CONST.
PLOT BOUNDARY
SANITATION LINE



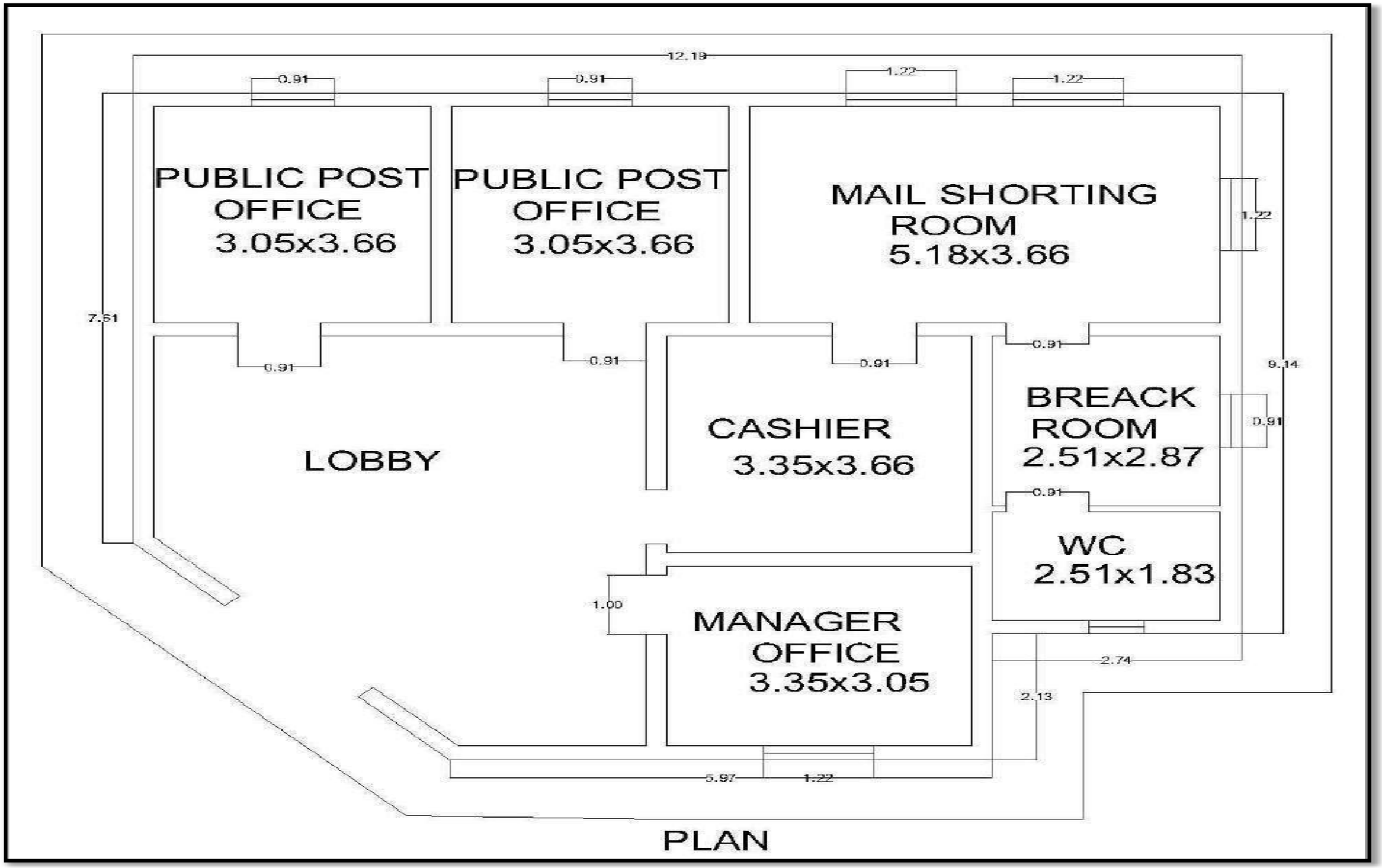
G.F. PLAN
SCALE :- 1:100



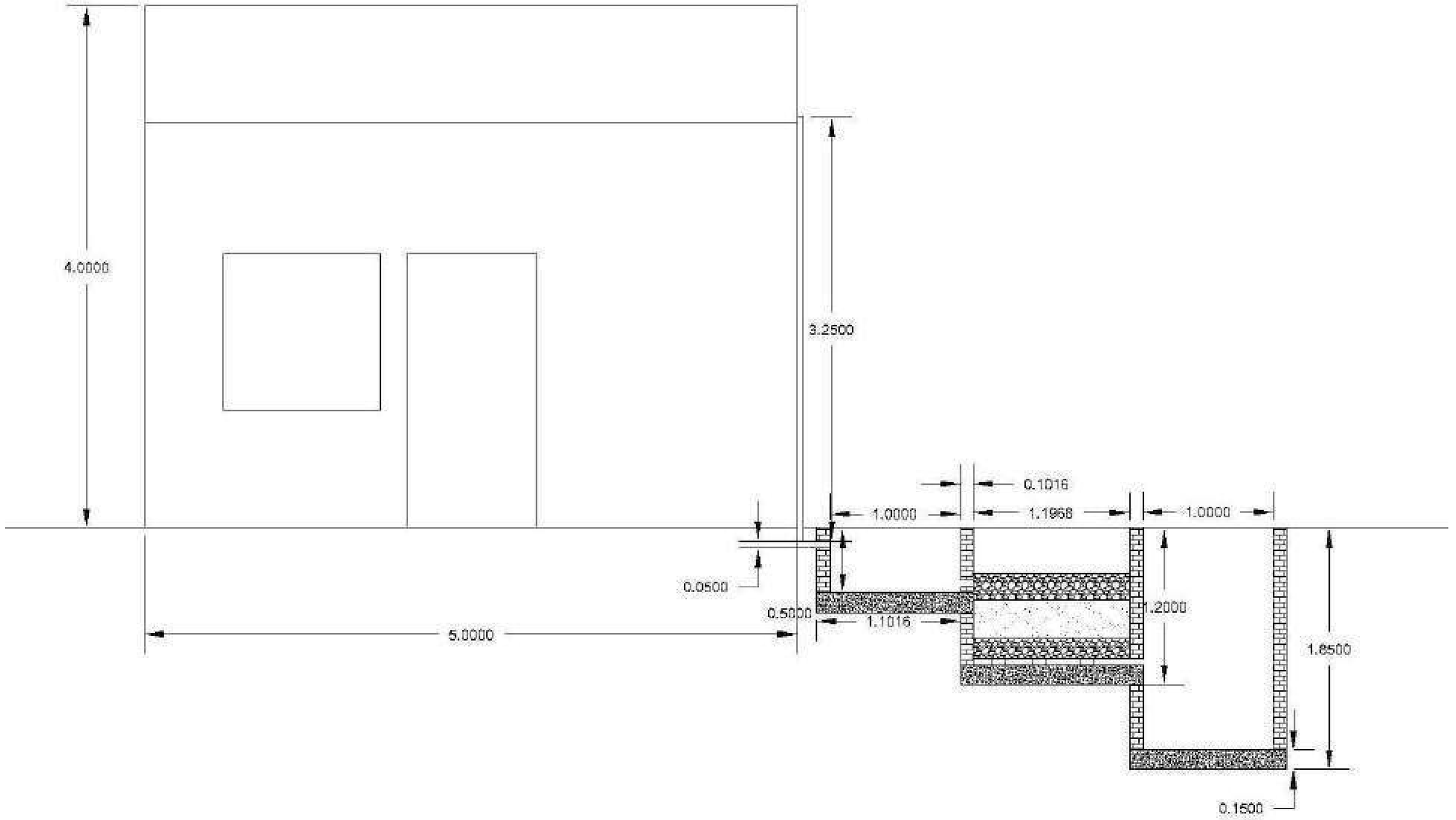
TERRACE. PLAN
SCALE :- 1:100



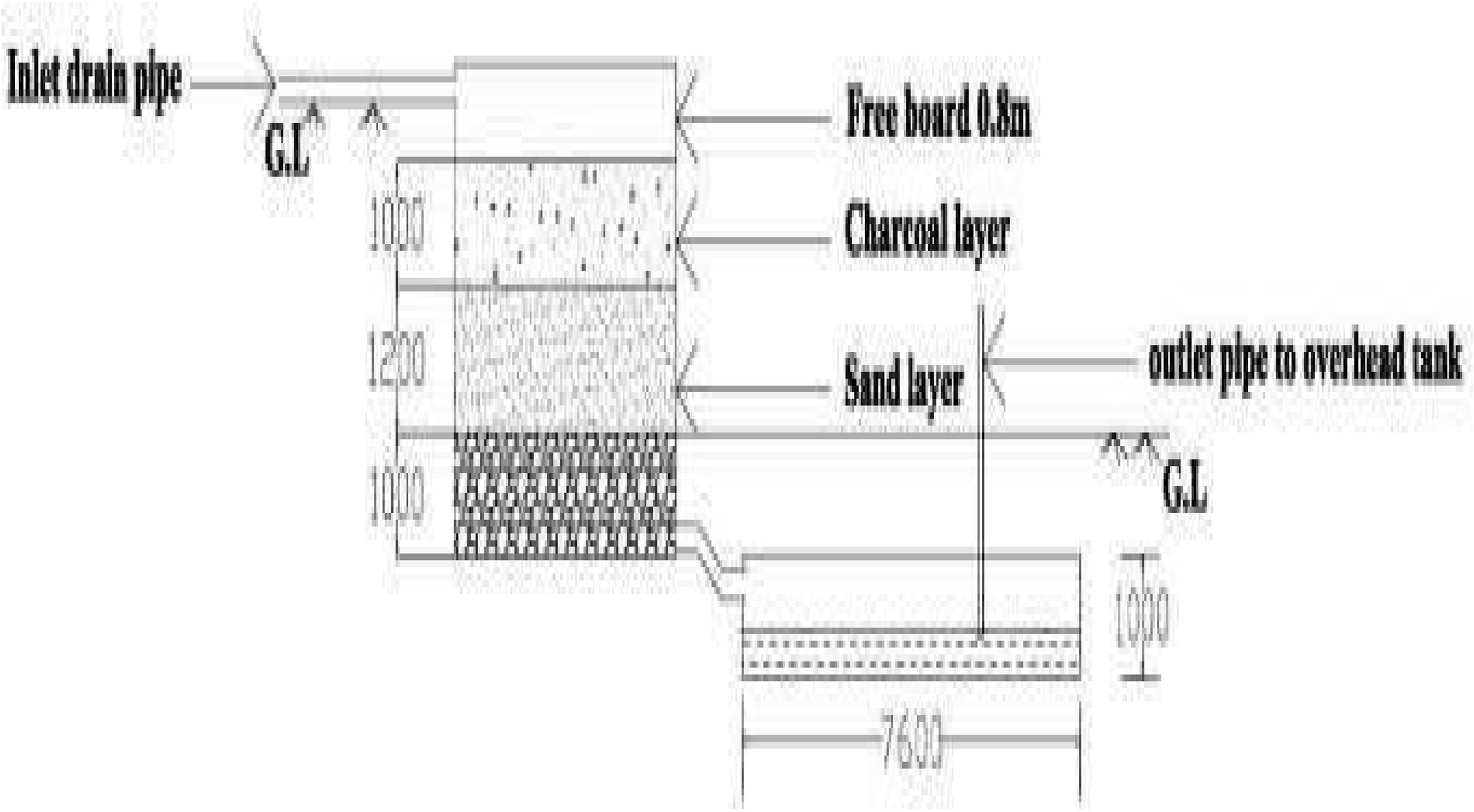
Public Toilet


12.19
0.91
0.91
1.22
1.22
PUBLIC POST OFFICE 3.05x3.66
PUBLIC POST OFFICE 3.05x3.66
MAIL SHORTING ROOM 5.18x3.66
1.22
7.61
0.91
0.91
0.91
0.91
9.14
LOBBY
CASHIER 3.35x3.66
BREACK ROOM 2.51x2.87
0.91
0.91
WC 2.51x1.83
1.00
MANAGER OFFICE 3.35x3.05
2.74
2.13
5.97
1.22
PLAN

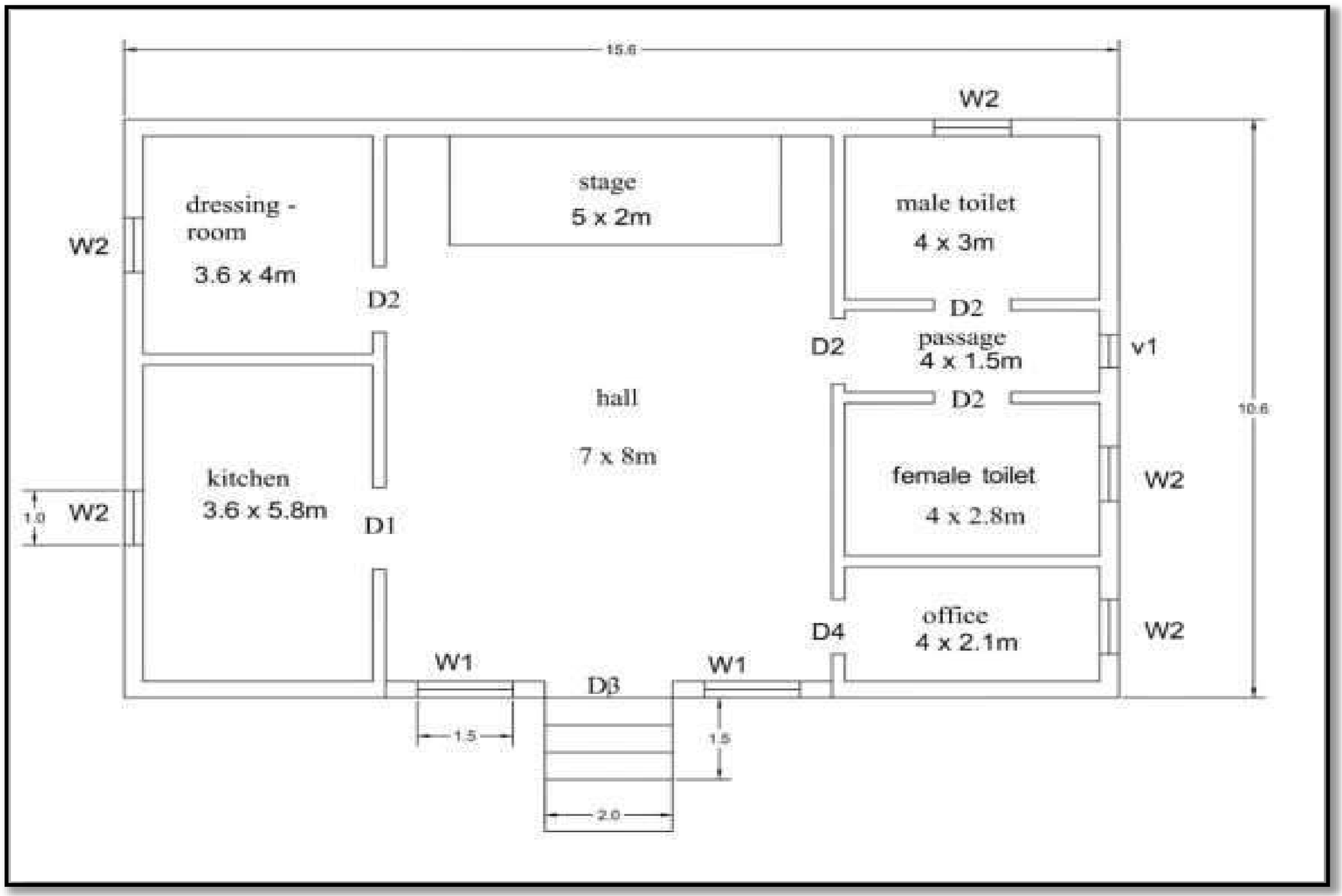
Post Office



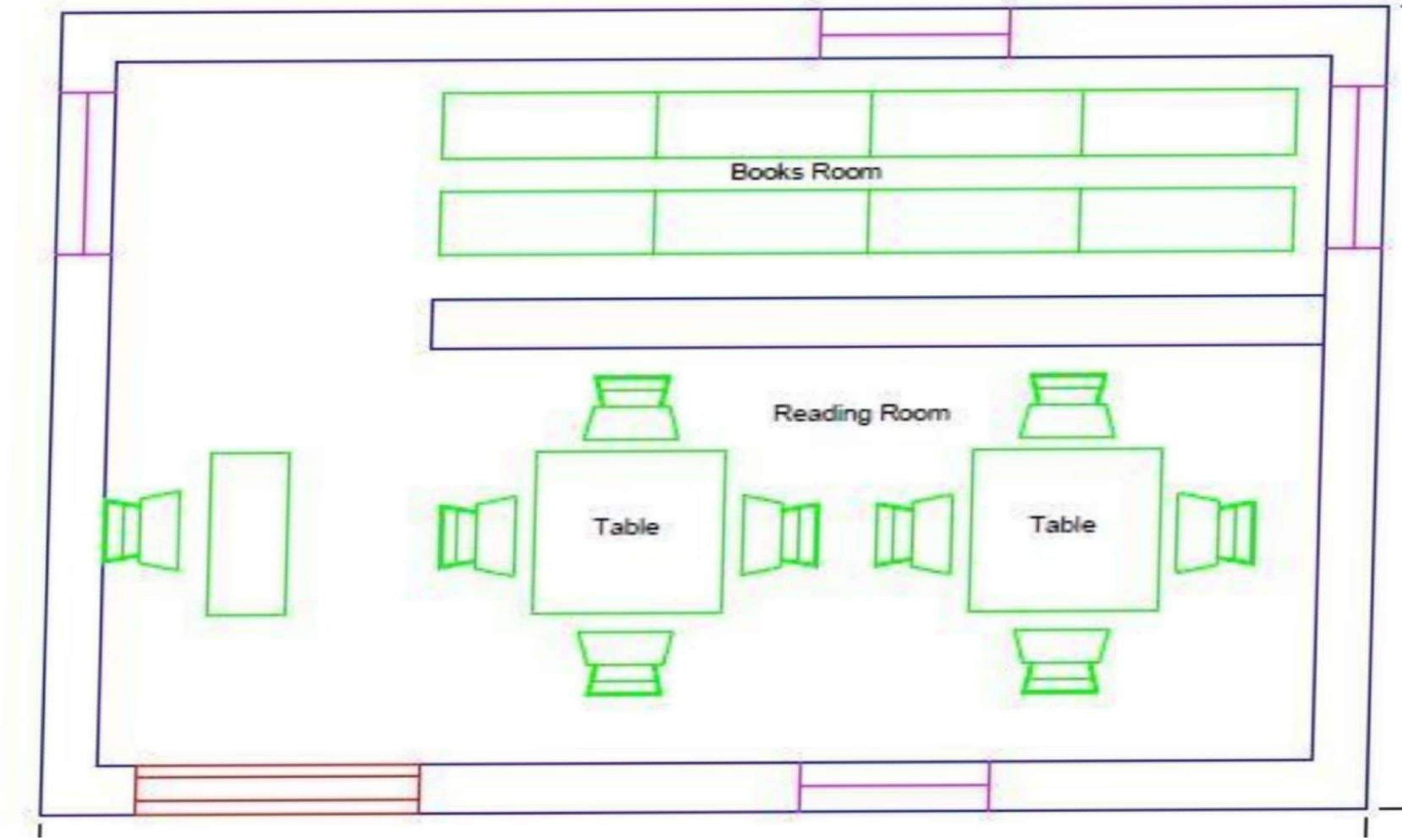
Water Harvesting System



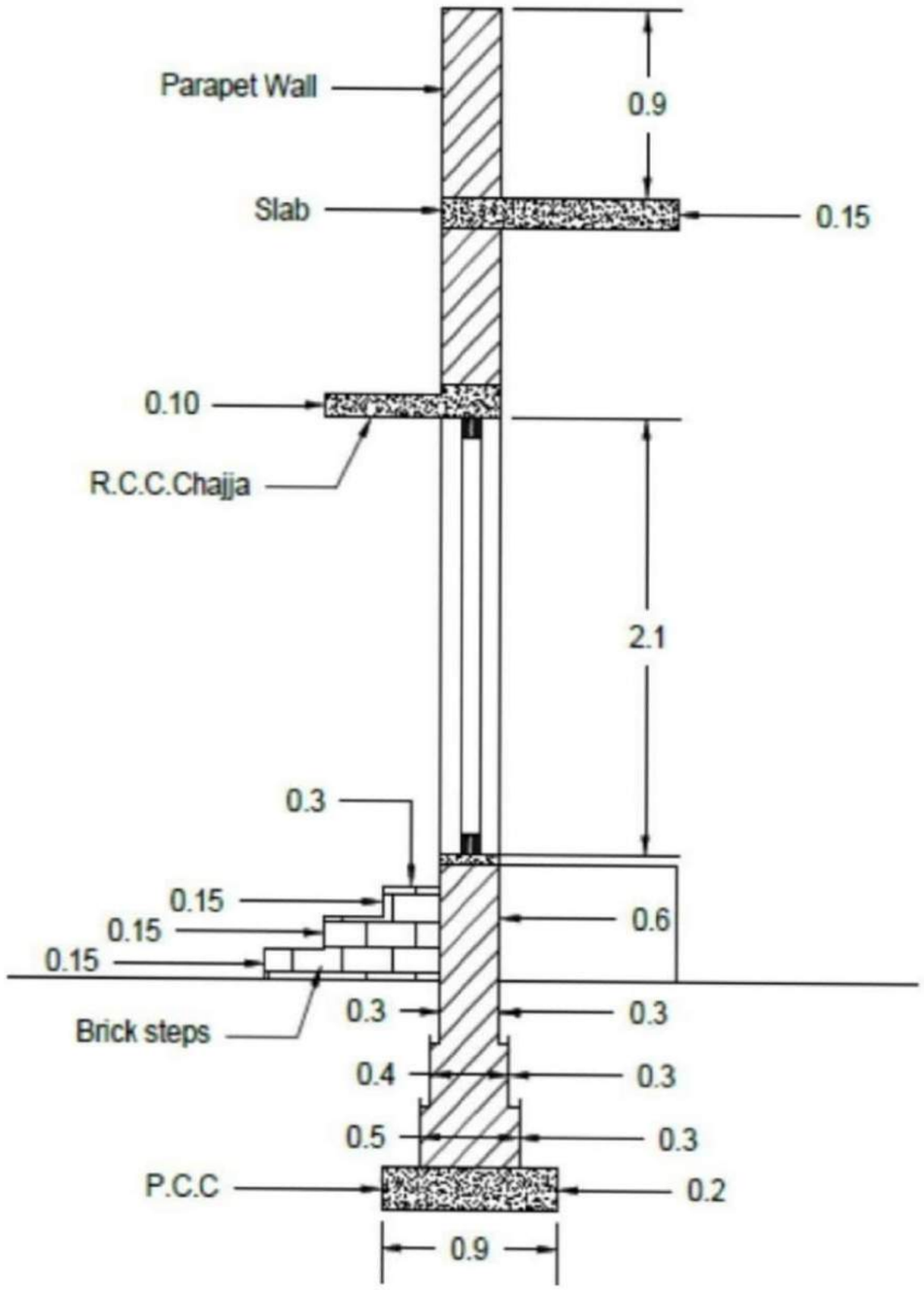
waste water treatment plant with charcoal

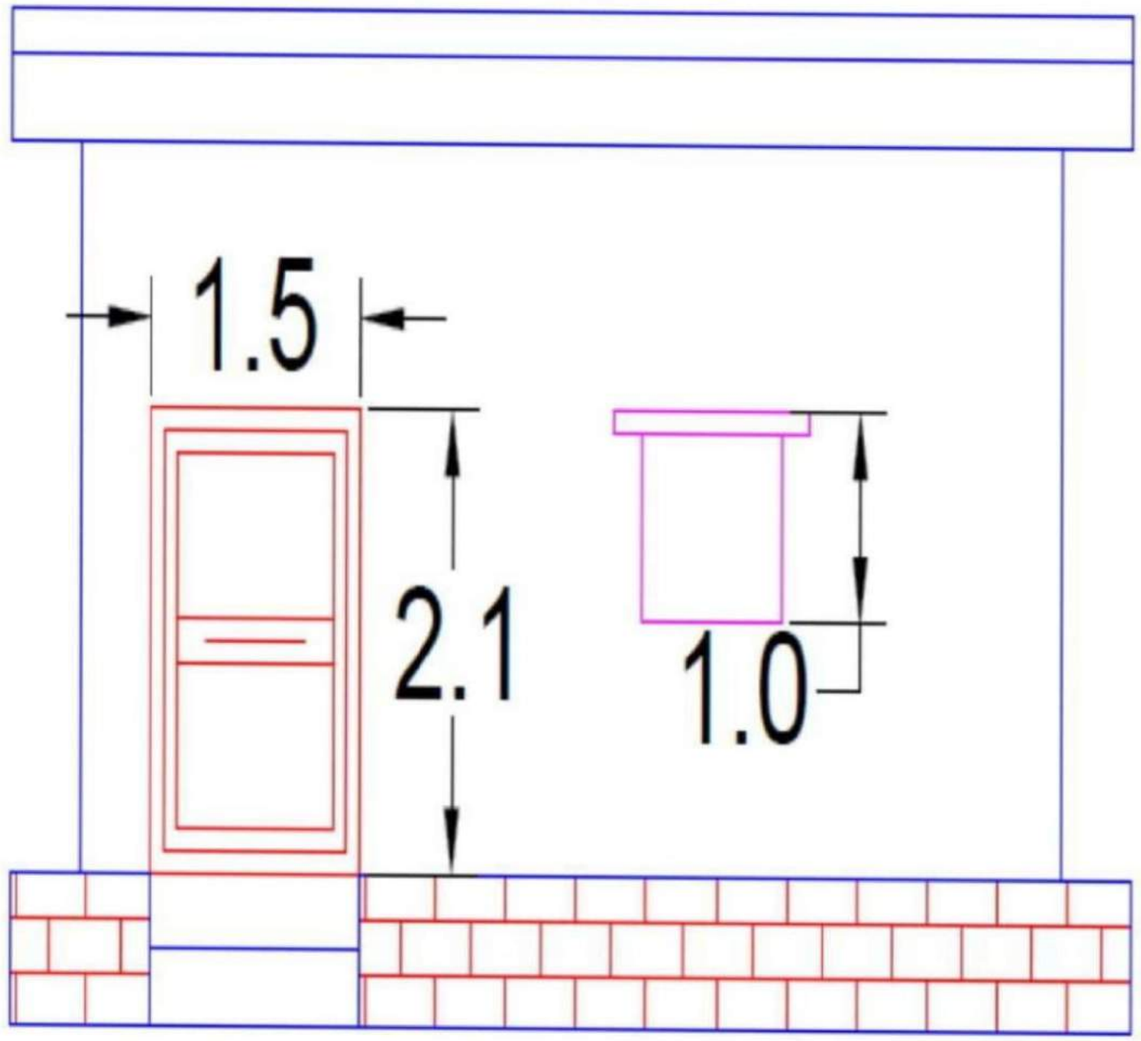


Community hall

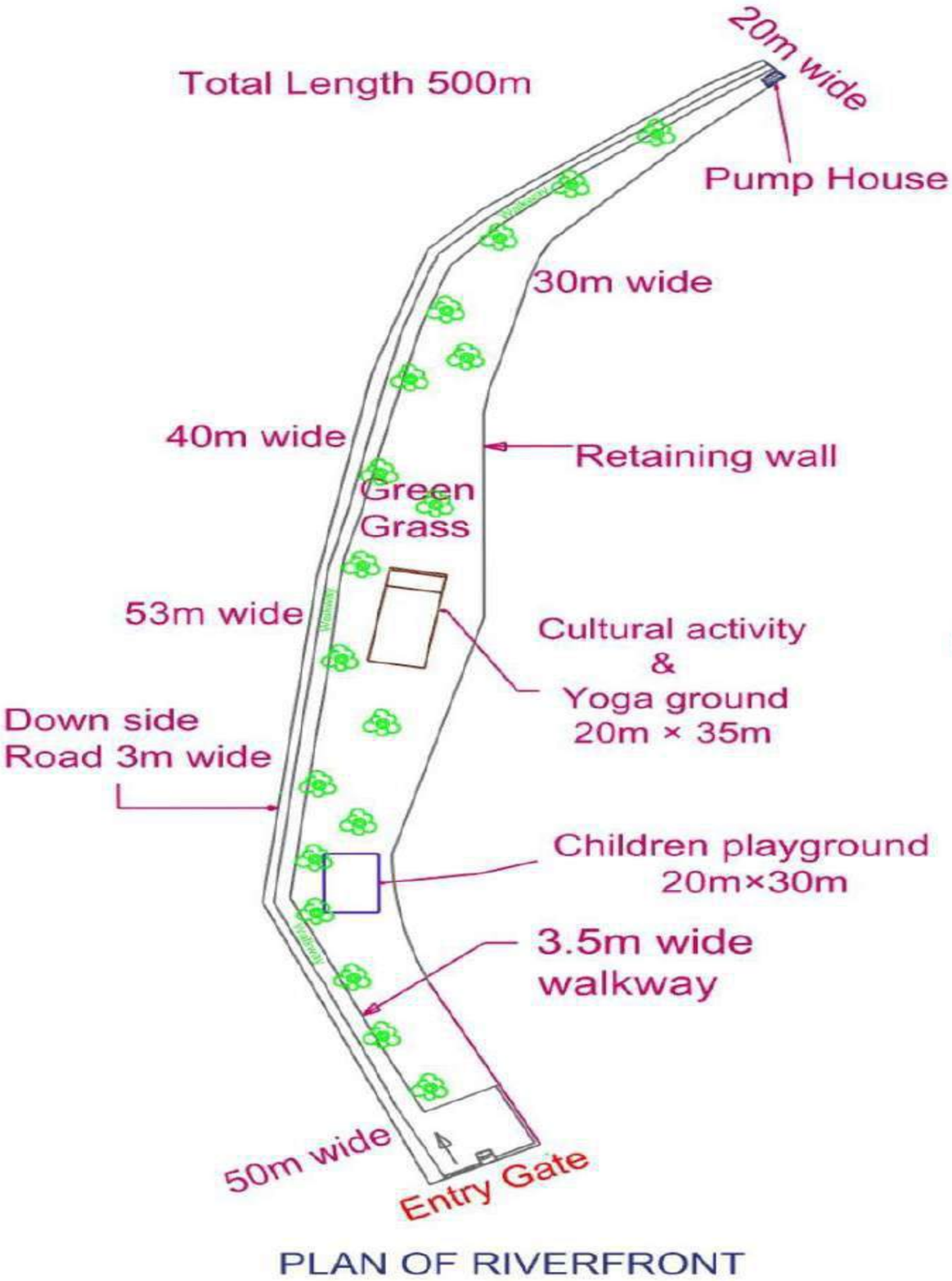


plan of library

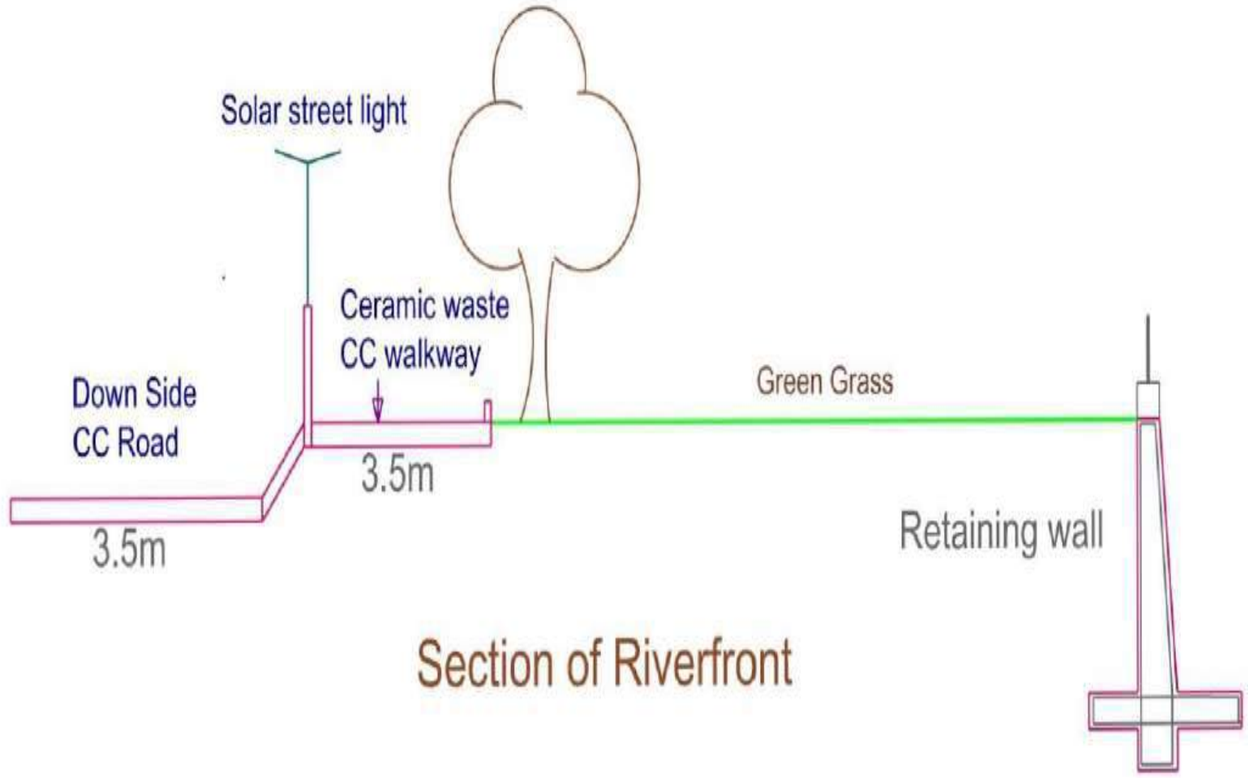




Elevation of library

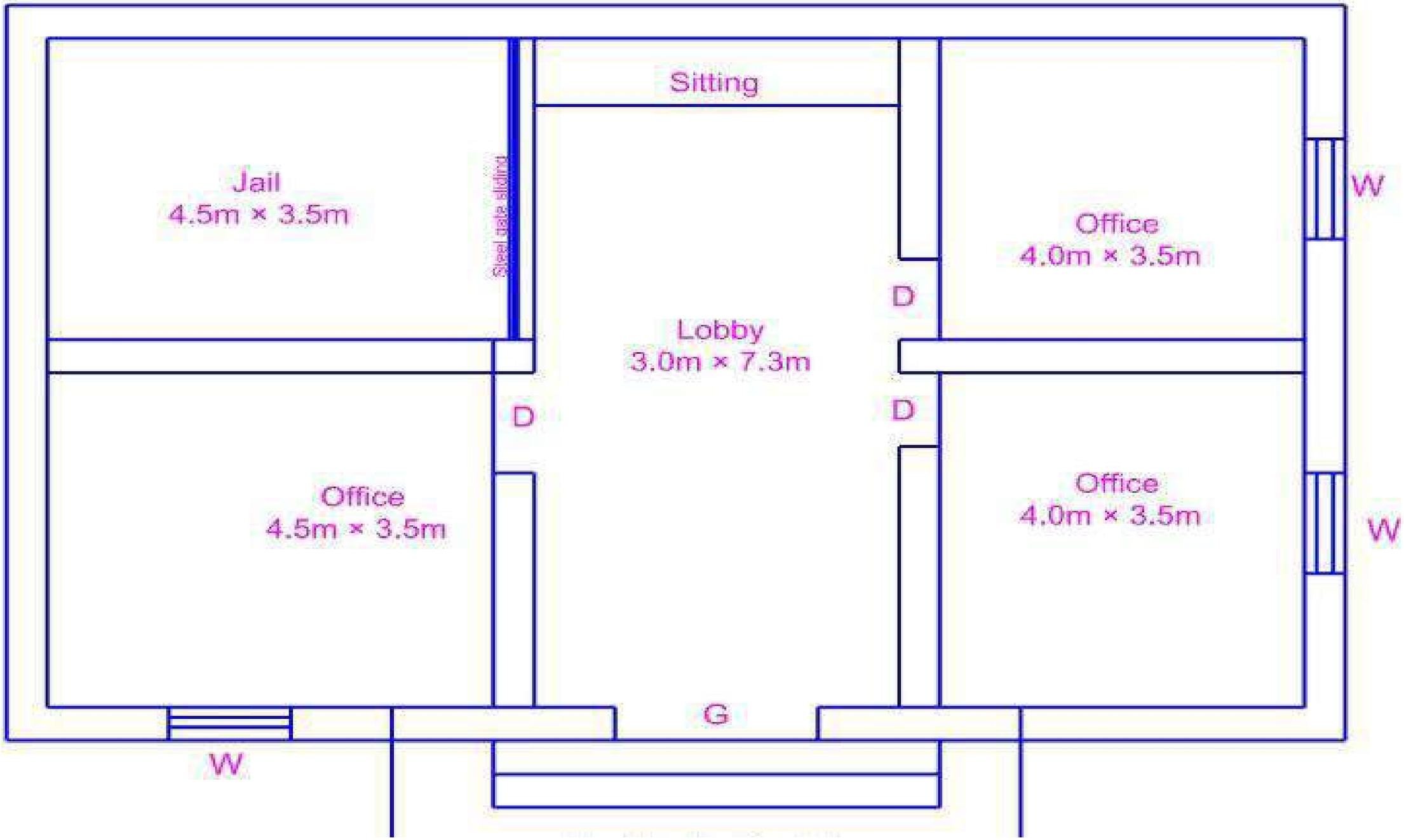


PLAN OF RIVERFRONT



Section of Riverfront

Recreational center



police station