DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
VARNAMA Village

VADODARA District

PREPARED BY

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YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda,Ahmedabad – 382424 Gujarat

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Chandkheda, Ahmedabad – 382424 Gujarat

CERTIFICATE

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

Detail Project Report for,

VILLAGE VARNAMA

DISTRICT VADODARA
Under

Vishwakarma Yojana: Phase-VIII

in partial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA

during the academic year 2020-21.

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

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College Stamp:	

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ABSTRACT

"My vision for the country is to urbanize rural area. what is available in the cities must be available in the villagers."

The Government of Gujarat has launched "Vishwakarma Yojana: An Approach towards Urbanization" for development of villages which is implemented by "Gujarat technological University". Vishwakarma Yojana would provide "Design to Delivery" solution for development of villages in 'City' areas. In this Project, we describe the ecosystem for a village and then map out an integrated design procedure for building an Ideal Village. We define an Ideal Village as a bundle of services which are delivered to its residents and businesses in an effective and efficient manner. Computing, communication and information technologies play a major role in design, delivery and monitoring of the services. The selected village is surveyed, data has been analyzed for the village and an Infrastructure facility has been found out by this Yojana with the help of UDPFI guidelines.

We select the village Varnama as part of Vishwakarma yojana which is located in Vadodara taluka in Vadodara district. The Varnama village is 18km from Vadodara. Total population of Varnama as per census 2011 is 4251 and total families 951. The area of Varnama village is hectare is (approx.) 1761.79. Village consists of primary for class 1 to 8, lack of medical facilities and hospitals. Most of villages are occupied in agricultural activity for their livelihood. A pre-school is the basic necessity for a child to grow up and they have primary school but that is not in good condition. In this village they have good roads at some place but them. They all have sanitation facility but there is not so cleanness in Varnama village. Old gram panchayat in bad condition. Varnama has 24 hours electric facility.

Houses have toilet facilities which are good for the health of people but here in this village it is not having the public toilets also which is dangerous for the village. In case of medical emergencies people of this village are abide to go some nearest hospital or public unit because there is no public health unit in this village.

The design is to be providing in this village. There are two designs to be providing in village. Design of public toilet for their health and sanitization. Gram panchayat for their local use and it is need for villages, data has been analyzed for the village and an found out by this Yojana with the help of UDPFI guidelines.

Key Words:
Public toilet, Post office, Bank, Animal hospital, Primary school, Aaganwadi

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 Ahmadabad** 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 **Dr. Nipa Desai** Principal, faculties of our colleges for their encouragement and support to complete this project work.

An act of gratitude is expressed to our internal guide / Evaluator / Nodal Officer,
Prof. Piyush Prajapati (Neotech Institute of Technology, Virod, Vadodara from college 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, Vishwakarma 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.

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ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
PHC	Public health Centre
TDO	Taluka Developer Officer
DDO	District Developer Officer
PPP	Public Private Partnership
NGO	Non-government organization
PURA	Provision of Urban Amenities in Rural
DRDA	District Rural Development Agency
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
PMGSY	Pradhan Mantri Gram Sadak Yojana
NRUM	National Rurban Mission
WBM	Water bound macadam
CDHO	Chief District Health Officer
MoRTH	Ministry of Road Transport and Highways
RTO	Road Transport Offices

Chapter-1 Ideal village visit from your District of Gujarat State

1.1 BACKGROUND

The Virod village is located near Vadodara city. The village is located on national highway's NH48. The major district Vadodara is located around 9 kms.

The village's major problem is open drainage in the village also dumping area is not available near by the village and sometimes the dirty water is supply in the village. The village has good approach road made of bitumen and c.c. both. The village is fulfilled with the agriculture activities. The transportation facilities are able. And the regularly trip made by local rickshaw and jeep to transport major city.

The village consist 90,000 overhead tanks &30,000-liter capacity of underground sump. And handpumps are available in the village. The village has 1 health center. There are no private hospitals. The village has no a facility of ambulance (108) services. The village has one primary school and one higher secondary school. The village has three Aaganwadi.

1.2 CONCEPT: IDEAL VILLAGE

Fig 1.1 Ideal village plan

1.2.1 OBJECTIVE: -

- "Creation of infrastructure - connectivity, civic and social infrastructure along with provision of alternative Economy generation is the key pillars that the concept hinges on."
- Basic physical infrastructure – Water supply, Transport, Sewerage & Solid management should be the priority focus and be provided.

- Basic Social infrastructure – Health & Education facilities should be provided and ensure proper delivery of facilities to village dwellers.
- Promote integrated development of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure.
- Reduce migration from rural to urban areas due to lack of basic service and sufficient economic activities in rural areas.
- Internal roads within village settlement, Efficient mass transportation system to improve connectivity between urban and rural areas, public transportation facilities that need to be developed like bus stops, transported protect.
- Magnification of sanitation facilities that need improvement – sewerage and drainage line for household connection, door to door solid waste connection& dumping facilities.
- Electricity connections like street lighting that is energy efficient &eco-friendly refurbishing of village lakes, water tanks and wells, construction of rain water harvesting structure for sustainable Development.

1.2.2 EXAMPLE/ LIVE CASES STUDIES OF IDEAL VILLAGE OF INDIA/GUJARAT

1) Hiware-Bazaar, Maharashtra

This is a village located in the rain shadow region of the Sahyadri mountain range in Maharashtra's Ahmednagar district. Till the 1980s, farming in the village was largely rain fed, and farmers were forced to migrate seasonally to surrounding areas for work.

From the 1990s onwards, things began to change. The village Panchayat adopted a holistic focus on a variety of activities, with community groups responsible for various aspects of the village economy and social development. Women thrift groups, Milk Dairy Society and Youth Clubs are examples of such community-based organizations. The village Panchayat also focused on family planning and reforestation, for which awareness programs and drives have frequently been organized in the village. The village Gram Sabha also launched a watershed development programmed, and an annual water audit is being conducted in the village since 2004 for more efficient and equitable management of water resources. It has also contributed to greater agricultural productivity.

Today, the village is considered a model for community-led, multi- sectoral growth of rural parts of the country.

2) Kumbalangi village, Kerala – a model for eco-tourism

Kumbalangi is essentially a fishing hamlet which has been developed as a unique rural tourist destination in Kerala's Ernakulam district. The Kumbalangi Integrated Tourism Village Project was launched in 2004, with a focus on ecotourism, while offering tourists a glimpse of the rich and rustic life of the Indian countryside. The important attractions in Kumbalangi include organic farm produce used to prepare meals for tourists, toddy tapping and crab farming. To keep the village clean and serve its energy needs, households are also provided subsidies for setting up mini biogas plants in their households.

1.2.3 THE IDEA OF MODEL / SMART VILLAGE

The smart village is made by providing dumping area facilities, covered drainage system, sewer line, drinking water treatment plant, 24 hours electricity, proper village road, bank and ATM facilities, bio gas plants, rain water harvesting, canal water for agriculture purpose and proper town planning.

Objectives

- "Creation of infrastructure-connectivity, civic and social infrastructure long with provision of alternative Economy generation is the key pillars that the concept hinge son."
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- Electricity connections like street lighting that is energy efficient &eco- friendly refurbishing of village lakes, water tank sand wells, construction of rainwater harvesting structure for sustainable Development.

Key elements of a model village

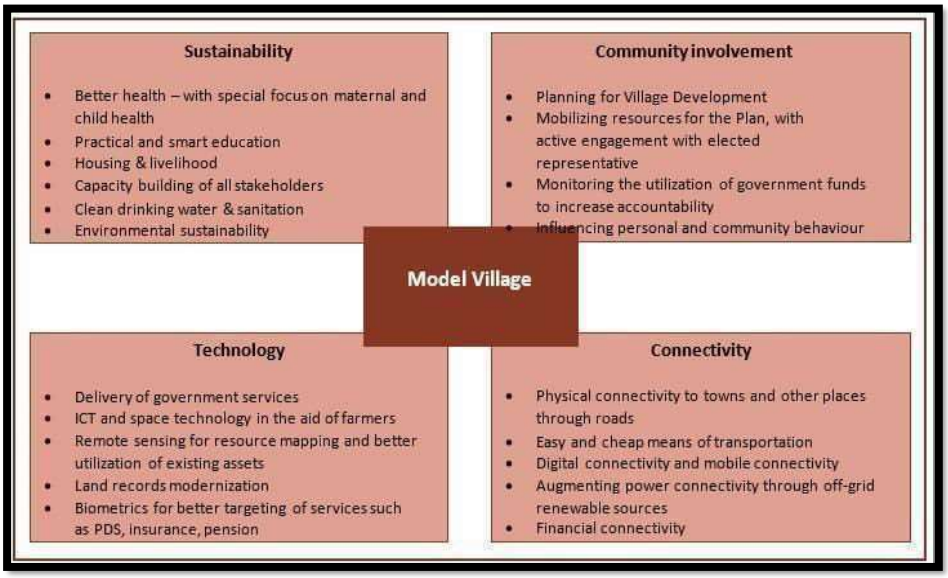


Fig.1.2 key elements of model village

- An intervention under one of these areas could have an effect across other areas as well. For example, technology could be used to improve the quality and delivery of other services such as health and education, which in turn contributes to sustainable development. Similarly, the use of renewable energy, apart from meeting energy needs, also contributes towards environmental sustainability. Village tree plantation drives could encourage community participation, benefit the environment, prevent soil erosion and benefit agriculture, conserve water, and finally contribute to the aesthetics of the village. A number of these initiatives have already been taken in different parts of the country, but most of them have been attempted in isolation. The urgent need is to bring about a convergence of all such initiatives, for which 2 things would be essential – a) grassroots level planning; and b) mobilization of resources.

Resources

1] Water facilities	2] Electricity services
• from overhead tank • Underground sump • By lift irrigation	• From GEB(Gujarat Electric Board) • In some farms the electricity is generated by the solar panel inform.

No.	CENSUS	POPULATION	MALE	FEMALE
1	2001	2128	1067	**1010**
2	**2011**	**2461**	**1289**	**1172**

Table 1.0: population calculation

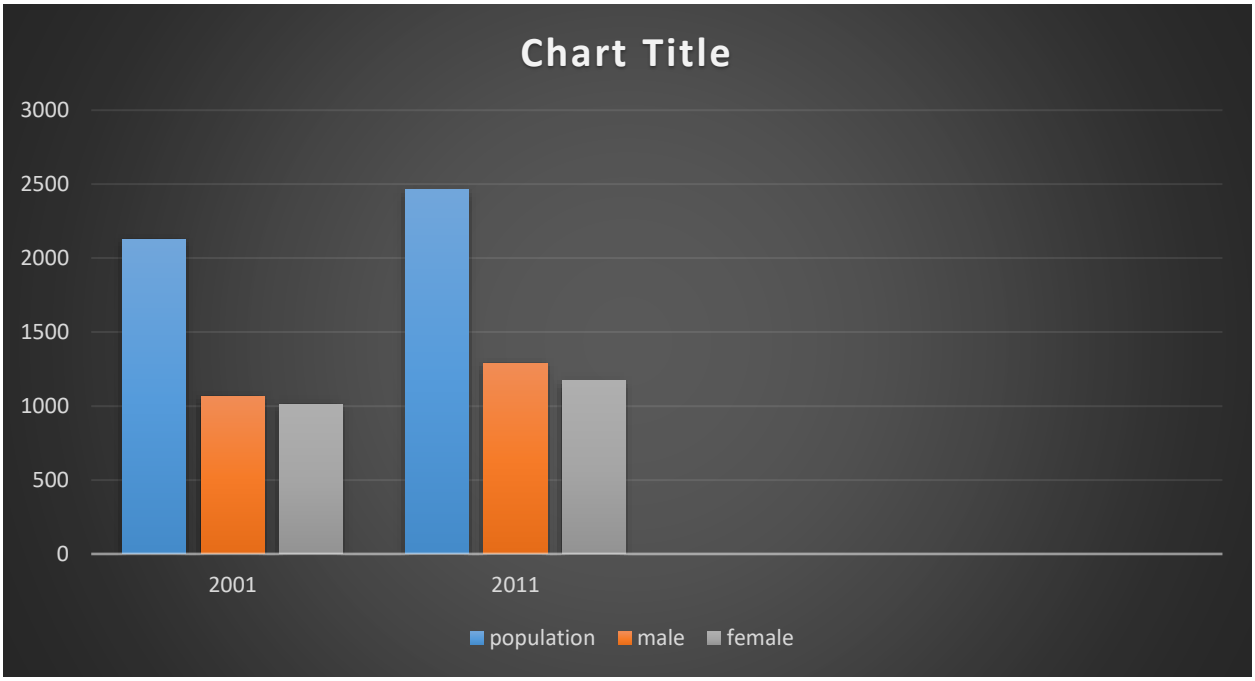


Fig 1.3 Graph

Major population are associated to fertilizer company and agricultural activities largely based on monsoon season and also animal husbandry is popular. Most families have cow and buffalos and Dairy Industry is present in village.

Mainly the occupation of villagers is:

1) Most of the people are farmer.
2) Most of the peoples are doing Jobs in industries. And peoples are doing labour works.

- In village three should be covered drainage system is apply
- The dumping area should be made near the village.
- Door to door service of the solid waste management is applied.
- The sewerage system is made in the village for liquid waste management.

Resources

3) Water facilities

- from overhead tank

- Underground sump
- By lift irrigation

4) Electricity services

- From GEB (Gujarat Electric Board)
- In some farms the electricity is generated by the solar panel in farm.

5) Irrigation Facilities
6) Health facilities
7) Education Facilities
8) Bank
9) Oil Petrol Pump
10) 24/7 electricity and water supply
11) E-panchayat (self-developed and designed)

1.2.4 ANCIENT HISTORY CIVIL CONCEPT ABOUT INDIAN VILLAGE / OTHER COUNTRIES PERSPECTIVE ABOUT AND ITS NEW DEVLOPMENT

Fig 1.4 Mohenjo-Daro

Mohenjo-Daro has a planned layout with rectilinear buildings arranged on a grid plan. Most were built of fired and mortared brick; some in corporate sun-dried mud-brick and wooden superstructures. The covered area of Mohenjo-Daro is estimated at 300 hectares. The Oxford Handbook of Cities in World History offers a "weak" estimate of a peak population of around 40,000The sheer size of the city, and its provision of public buildings and facilities, suggests a high level of social organization. The city is divided into two parts, the so-called Citadel and the Lower City. The Citadel – a mud-brick mound around 12 metres (39 ft) high – is known to have supported public baths, a large residential structure designed to house about 5,000 citizens, and two large assembly halls. The city had a central marketplace, with a large central well. Individual households or groups of households obtained their water from smaller wells. Waste water was channelled to covered drains that lined the major streets. Some houses, presumably those of more prestigious inhabitants, include rooms that appear to have been set aside for bathing, and one building had an underground furnace (known as a hypocaust), possibly for

heated bathing. Most houses had inner courtyards, with doors that opened onto side-lanes. Some buildings had two stories.

Major buildings

Fig 1.5 major buildings

In 1950, Sir Mortimer Wheeler identified one large building in Mohenjo-Daro as a "Great Granary". Certain wall-`massive wooden superstructure appeared to be grain storage-bays, complete with air-ducts to dry the grain. According to Wheeler, carts would have brought grain from the countryside and unloaded them directly into the bays. However, Jonathan Mark Kenoyer noted the complete lack of evidence for grain at the "granary", which, he argued, might therefore be better termed a "Great Hall" of uncertain function. Close to the "Great Granary" is a large and elaborate public bath, sometimes called the Great Bath. From a colonnaded courtyard, steps lead down to the brick-built pool, which was waterproofed by a lining of bitumen. The pool measures 12 metres (39 ft) long, 7 metres (23 ft) wide and 2.4 metres (7.9 ft) deep. It may have been used for religious purification. Other large buildings include a "Pillared Hall", thought to be an assembly hall of some kind, and the so-called "College Hall", a complex of buildings comprising 78 rooms, thought to have been a priestly residence.

Fortifications

Fig 1.6 fortifications

Mohenjo-Daro had no series of city walls, but was fortified with guard towers to the west of the main settlement, and defensive fortifications to the south. Considering these fortifications and the structure of other major Indus valley cities like Harappa. it is postulated that Mohenjo-Daro was an administrative centre. Both Harappa and Mohenjo-Daro share relatively the same architectural layout, and were generally not heavily fortified like other Indus Valley sites. It is obvious from the identical city

layouts of all Indus sites that there was some kind of political or administrative centrality, but the extent and functioning of an administrative centre remains unclear.

Water supply and wells

The location of Mohenjo-Daro was built in a relatively short period of time, with the water supply system and wells being some of the first planned constructions. With the excavations done so far, over 700 wells are present at Mohenjo-Daro, alongside drainage and bathing systems.

Fig 1.7 water supply & wells

This number is unheard of when compared to other civilizations at the time, such as Egypt or Mesopotamia, and the quantity of wells transcribes as one well for every three houses. Because the large number of wells, it is believed that the inhabitants relied solely on annual rainfall, as well as the Indus River's course remaining close to the site, alongside the wells providing water for long periods of time in the case of the city coming under siege. Due to the period in which these wells were built and used, it is likely that the circular brick well design used at this and many other Harappan sites are an invention that should be credited to the Indus civilization, as there is no existing evidence of this design from Mesopotamia or Egypt at this time, and even later. Sewage and waste water for buildings at the site were disposed of via a centralized drainage system that ran alongside the site's streets. These drains that ran alongside the road were effective at allowing most human waste and sewage to be disposed of as the drains most likely took the waste toward the Indus River.

Flooding and rebuilding

The city also had large platforms perhaps intended as defence against flooding. According to a theory first advanced by Wheeler, the city could have been flooded and silted over, perhaps six times, and later rebuilt in the same location. For some archaeologists, it was believed that a final flood that helped engulf the city in a sea of mud brought about the abandonment of the site. Gregory Possehl was the first to theorize that the floods were caused by overuse and expansion upon the land, and that the mud flood was not the reason the site was abandoned. Instead of a mud flood wiping part of the city out in one fell swoop, Possehl coined the possibility of constant mini-floods throughout the year, paired with the land being worn out by crops, pastures, and resources for bricks and pottery spelled the downfall of the site.

1.3 DETAIL STUDY

1) Physical & demographical growth

- As being ideal village, this village have physical needs as a social community need share also satisfied, there is Door to door water supply was provided which were used for daily uses. They also provide a drinking water once in a day by regular time and handpump system. Their street roads were made of R.C.C. material, paver block and bituminous pavement road and it was reached at their home.
- They were using dumping area to collect all waste or garbage. They have no plant of solid waste treatment plant so; they throw the solid waste at a dumping zone which was nearby their village.
- They have also provided open and underground drainage system which connected by drainage stream. They have no plant of sewage treatment plant

2) Social scenario

According to census2011, the male population of village is 1289 and female population is 1172. Major number of students are studying in Vadodara city. The student is studying in collage as well as in higher secondary incite.

3) Infrastructure facilities

Under described structures facilities are available in village.

4) Social infrastructure facilities

- Public health center
- Anganvadi
- primary school
- Public library

5) Other facilities

- Post office
- General Market
- Panchayat building
- Banks &ATMs

Physical infrastructures facilities

- Treated water.
- Manual Handpump.
- Tube well.

- Covered well.
- Overhead water tank.
- Uncovered drainage system.
- Interior street road is made of RCC.
- Village road is made of bitumen.
- Street road is made of RCC.
- Transport facilities.

6) Photographs of ideal village

Fig 1.8 school

Fig 1.9 hospital

Fig 1.10 panchayat

Fig 1.11 road

1.4 SWOT ANALYSIS OF IDEALVILLAGE

1) Analysis is a strategic planning method used to evaluate the Strengths, Weaknesses, Opportunities, and Threats involved in a project or in a business venture.
2) It involves specifying the objective of the business venture or project and identifying the internal and external factors that are favorable and unfavorable to achieving that objective.
3) SWOT analysis provides a framework for visioning by helping the planners to identify and priorities the organization's GOAL Sand to further identifies the strategies of achieving them.
4) SWOT analysis is a technique to analyze the Strengths, Weakness, Opportunity and Threats of a decision, problem and placed.
5) In community development or urban planning SWOT is often used at community meeting to structure conversations about projects carrying out this analysis often illuminates what need stopped one and puts problems into prospective.
6) A tool that identifies the Strengths, Weaknesses, Opportunities and Threats of an organization.
7) Specifically, SWOT is a basic, straight forward model that assesses what an organization can and cannot do as well as its potential opportunities and threats.
8) The method of SWOT analysis is to take the information from an environmental analysis and separate it into internal (strengths and weaknesses) and external issues (opportunities and threats).
9) Once this is completed, SWOT analysis determines what may assist the firm in accomplishing its objectives, and what obstacles must be overcome or minimized to achieve desired results

1.5 FUTURE PROSPECTS OFVILLAGE

- For planning them village as green villages.
- Audio visual interfaces for all applications
- Equipment that can withstand harsh environments.
- More Increasing Renewable Energy in villages
- Provide More Smart System with their own soul of village facilities like religion social, physical and sustainable facilities.

1.6 BENEFITS OF THE VISITS OF IDEAL VILLAGE

- Provided Proper response from the gram Panchayat and did the very healthy convection about the Ideal village feature.
- Can able to know different types of the facilities infrastructure likes Physical social; social cultural sustainable and repair and maintain ace related and also know about the basic facilities about the village which have to provide for every poor villages.
- With solid and liquid waste management system with proper treatment method provide proper solution such as recycle of recycling processes of waste management.
- More renewable energy source and providing village own sustainable infrastructure.

1.7 CIVIL ASPECTS REQUIRED IN IDEAL VILLAGE / SMART VILLAGE

1) The village development is having facilities like Physical infrastructure, Educational infrastructure, health center, etc.
2) The roads are required to maintain and repairs.
3) Water supply facilities are good.
4) Physical development of peoples of village.
5) Awareness against irrigation development, yojana's, etc.

Fig 1.12 civil aspects

Chapter 2: Literature review

2.1 INTRODUCTION: URBAN &RURAL

1) **URBAN:**

Fig 2.1 urban

The term urban is related to town or cities. Unlike in rural areas here majority of the employed inhabitants are engaged in non-agricultural activities and it is endowed with large nucleated settlements and industries. Urban areas may be defined by national governments based on their own criteria for example size, population density, occupation of people and type of local government. The multi-dimensional character of urban areas posed hindrance in giving a precise definition for them. The census of India until 1951 defined an urban settlement based on municipalities and the population of area. The 1961 census adopted a strict definition which is modified in 1971 census to treat all places satisfying the following conditions as towns: -

- All municipal corporations, municipal boards, cantonments and notified areas.
- All localities though not in themselves local bodies but forming part of a city or town agglomeration.
- Other places satisfying all three following conditions. Population exceeds 5,000.
- At least 75 per cent of the male working population engages in non-agricultural pursuits.
- The density of population exceeds 400 persons per square.

In 1981 census some minor changes were incorporated whereby livestock, forestry, fishing, hunting, plantations, orchard etc. were treated as agricultural activity and places having distinct urban characteristic sand physical amenities like industrial area, special project area, large housing colonies, places of two pristine rest, railway colonies, etc. could breaded stow sat the discretion of the Director of Census operations in consultation with the concerned state governments.

All towns and urban agglomerations, so identified, are grouped into following six classes according to population size:

Class I: population of 100,000 and above

Class II: population of 50,000 to 99,999

Class III: population of 20,000 to 49,999

Class IV: population of 10,000 to 19,999

Class V: population of 5,000 to 9,999

Class VI: population less than 5,000

2) RURAL:

Fig 2.2 rural

Rural areas are also known as the 'countryside' or a 'village' in India. It has a very low population density. In rural areas, agriculture is the chief source of livelihood along with fishing, cottage industries, pottery etc. The quest to discover the real rural India still continues in great earnest. Almost every economic agency today has a definition of rural India. Here are a few definitions: According to the Planning Commission, a town with a maximum population of 15,000 is considered rural in nature. In these areas the panchayat makes all the decisions. There are five persons in the panchayat. The National Sample Survey Organization (NSSO) defines 'rural' as follows:

a) An area with a population density of up to 400 per square kilometer,
b) Villages with clear surveyed boundaries but no municipal board,
c) A minimum of 75% of male working population involved in agriculture and allied activities RBI defines rural areas as those areas with a population of less than 49,000 (tier -3 to tier-6 cities).

It is generally said that the rural areas house up to 70% of India's population. Rural India contributes a large chunk to India's GDP by way of agriculture, self-employment, services, construction etc. As per a strict measure used by the National Sample Survey in its 63rd round, called monthly per capita expenditure, rural expenditure accounts for 55% of total national monthly expenditure. The rural population currently accounts for one-third of the total Indian FMCG sales.

2.2. IMPORTANCE OF THE RURAL DEVELOPMENT

Rural development is important not only for the majority of the population residing in a rural area but the growth of rural activities is necessary to stimulate the speed of overall economic expansion of the nation.

Rural development is pretended to be noticeable importance in the country today than in the olden days in the process of the evolution of the nation. It is a strategy trying to obtain improved rural creation and productivity, higher socio-economic equality, and ambition, stability in social and economic development.

The primitive task is to decrease the famine roughly about 70 percent of the rural population, implement sufficient and healthy food. Later, serve fair equipment of clothing and footwear, a clean environment and house, medical attention, recreational provision, education, transport, and communication.

2.3 ANCIENT VILLAGES/ DIFFERENT DEFINATION OF: RURAL URBAN VILLAGE

Infrastructure facilities

Infrastructure facilities is a basic physical organizational structure needs for the operating of a society or the services and facilities necessary for an economy to function.

Fringe Village

A fringe is an attractive border or edging of hanging cords, strips, regulation attached to a separate band. It can also refer to those methods of a set or political party that holds incase views.

Develop villages

To develop a village people must take the initiative to learn read and write. This initiative will make than become one professional after becoming. We automatically take stepwise go out and proceed our life.

Physical infrastructure

Physical infrastructure is used to refer to a very wide array of systems and infrastructure that makes it possible for goods, services and profile to be transferred from any geographical place to another. This term is also used in reference to system that facilities provision of services.

Social infrastructure facilities

Social infrastructure facilities are a term that means the facilities that accommodation social services. They include health facilities, education facilities and public amenities which are aspects that focus on community.

Sustainable infrastructure facilities

Sustainable infrastructure facilities are the design of new infrastructure and re-design, rehabilitation, reuse or optimization of existing infrastructure which is consistent with the principle of urban sustainability and global sustainable development.

2.4 SCENARIO: RURAL/ URBAN INDIA POPULATION GROWTH 2011

Percentage Share of Total Population by Residence

INDIA PROFILE

`	Population 2011			Percentage Decadal Growth (Persons) 2001 2011		
	Total	Rural	urban	total	rural	**urban**
India	1,210,193,422	833,087,6623	377,105,760	17.64	12.18	**31.80**
Gujarat	**60,383,628**	**34,670,817**	**25,712,811 1**	**19.17**	**9.23**	**35.83**

Table 2.1 Population in India & Gujrat

Population and Decadal Growth Rate by Residence- Males

India/Gujarat	Population 2011			Percentage Decadal Growth (Persons) 2001 2011		
	Total	Rural	Urban	Total	Rural	**Urban**
India	623,724,248	427,917,052	195,807,196	17.19	12.12	**30.06**
Gujarat	**31,482,282**	**17,802,975**	**13,679,307**	**19.32**	**9.10**	**35.87**

Table 2.2 Population and Decadal Growth Rate by Residence- Males

Population and Decadal Growth Rate by Residence- Females

India/Gujarat	Population 2011			Percentage Decadal Growth (Persons) 2001 2011		
	Total	Rural	Urban	Total	Rural	**Urban**
India	586,469,174	405,170,610	181,298,564	18.12	12.25	**33.73**
Gujarat	**28,901,346**	**16,867,842**	**12,033,504**	**19.01**	**9.37**	**35.78**

Table 2.3 Population and Decadal Growth Rate by Residence- Females

India/Gujarat	Population 2011		Percentage Decadal Growth (Persons) 2001 2011	
	Rural	Urban	Rural	**Urban**
India	72.19	27.81	68.84	**31.16**
Gujarat	**62.64**	**37.36**	**57.42**	**42.58**

Table 2.4 Percentage Share of Total Population by Residence

Sex Ratio by Residence

India/ Gujarat	Population 2011			Percentage Decadal Growth (Persons) 2001 2011		
	Total	Rural	Urban	Total	Rural	**Urban**
India	933	946	900	940	947	**926**
Gujarat	**920**	**945**	**880**	**918**	**947**	**880**

Table 2.5 Sex Ratio by Residence

2.5 SCENARIO: RURAL/ URBAN GUJARAT POPULATION GROWTH 2011

DESCRIPTION	2011	2021
MALE	31,491,260	-
FEMALE	28,948,432	-
POPULATION GROWTH	19.28%	-
TOTAL POPULATION	60,439,692	71,536,564

table 2.6 rural/ urban Gujarat population growth 2011

2.6 RURAL DEVELOPMENT ISSUES-CONCEMS-MEASURES

- The village road is narrow and big vehicles cannot enter into the village.
- The village has not dumping area.
- The village's post office and the bus stand are not in good condition.
- The primary schools are very old in structure and not in good condition.

Concerns:

- Clean the covered drainage an and clear the nala which is filled with dump.
- Broad the village road, in this situation fire brigade or bus cannot go to backside of the village.
- Renovate the primary school. The school is almost closed at working days.
- The post office is need to be built in the village.

MEASURES

Under described factors are affecting to developing of rural area,

- The village has good facilities of transport, police service in area, post office service etc. Are essentials.
- The village has the service of door-to-door service for the solid waste management.
- The village should facilities of covered drain age and sewerage line of liquid waste management.
- The village should be less with communication and inter net services. And 24 hours electricity supply in the village.
- The village should be less with hospital and good education system.
- The village is need to application sustainable resources like bio gas plant, rainwater harvesting system.

2.7 VARIOUS INFRASTRUCTURE & GUIDELINES/ NORMS FOR VILLAGES FORTHE PROVISIONS OF DIFFERENT INFRASTRUCTURE FACILITES

1. Physical Facilities:

- Road facilities: - An ideal village must have good road facilities that the people can easily move from one place to other. The roads linking with national highway.

• Dwelling Houses: - The dwelling-house in an ideal village are very neat and clean. The dwellers of these houses look to the house sanitation and house-drainage. The houses have sufficient windows to let in light and air. All the houses are roofed by good tiles at least.

• Electricity: - The electricity should be supplied 24 hours. The village should have good facilities of electricity because most of the work nowadays depend on electricity.

2. Social Facilities:

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

• Drinking Water: - An ideal village should have good supply of drinking water. In this village water supply in morning & evening.

• Agriculture and Industry: - People of an ideal village are good farmers and good artisans. They grow food crops, commercial crops and oil-seeds. They take up improved method of farming.

• Educational Facilities: There are Primary schools, High schools and craft schools in an ideal village. Primary education is free and compulsory.

• Clinical Facilities: In an ideal village, there are clinical facilities for peoples.

Fig 2.3 Infrastructure facilities

Various guidelines/Norms for Villages for the provisions of different Infrastructure facilities.

Facilities	Planning Commission/UDPFI Norms	Required as per Norms
Education		
Anganwadi	Each or Per 2500 population	**1**
Primary School	Each Per 2500 population	**1**
Secondary School	Per 7,500 population	**0**
Higher Secondary School	Per 15,000 Population	**0**
College	Per 125,000 Population	**0**
Tech. Training Institute	Per 100000 Population	**0**
Agriculture Research Centre	Per 100000 Population	**0**
Skill Development Center	Per 100000 Population	**0**
Health Facility		
Govt/Panchyat Dispensary or Sub PHC or Health	Each village center	**0**
Primary Health & Child Health Center	Per 20,000 population	**0**
Child Welfare and Maternity Home	Per 10,000 population	**0**
Multispecialty Hospital	Per 100000 Population	**0**
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & Kutcha house)	**1**
Pucca Village Approach Road Each village	Each village	**NO NEEDED**
Bus/Auto Stand provision All Villages connected by PT (ST Bus or Auto)	All Villages connected by PT (ST Bus or Auto)	**NO NEEDED**

Drinking Water (Minimum 70 lpcd)		
Over Head Tank	1/3 of Total Demand	**1**
U/G Sump	2/3 of Total Demand	**0**
Drainage Network - Open		**0**
Drainage Network - Cover		**0**
Waste Management System		**0**
Socio- Cultural Infrastructure Facilities		**0**
community hall and Public Library	Per 15000 Population	**0**
Cremation Ground	Per 20,000 population	**0**
Post Office	Per 10,000 population	**1**
Gram Panchayat Building	Each individual/group panchayat	**0**
APMC	Per 100000 Population	**0**
Fire Station	Per 100000 Population	**1**
Public Garden	Per village	**1**
Police post	Per 40,000 Population	**1**
Shopping Mall		**1**

Table 2.7 Various guidelines/Norms for Villages for the provisions of different Infrastructure facilities.

2.9 OTHER PROJECTS/SCHEME

S**radhan Mantri Adarsh Gram Sadak Yojana (PMAGSY**): It focuses on integrated development of 100 villages with a 50 per cent population of SCs.

1. **Bharat Nirman Yojana:** It was launched in 2005 for building infrastructure and basic amenities in rural areas. It comprises of six components—rural housing, irrigation, drinking water, rural roads, electrification and rural telephony.

2. **Indira Awas Yojana:** It is one of the six components so Bharat Nirman Yojana. It was introduced in 1985-86. It aims to help built or upgrade the households of people living under BPL.
3. **Jawaharlal Nehru National Urban Renewal Mission (JNNURM):** It was launched on 3rd December, 2005. The main objective of this scheme was fast track development of cities across the country. It was focused special Lyon developing efficient urban infrastructure service delivery mechanism, community participation and accountability of urban local bodies and other agencies toward citizen.
4. **Rajiv Awas Yojana (RAY):** This programmed was announced in June 2009 with an objective to make the country slum-free.
5. **National Rural Health Mission:** It was launched to make basic health care facilities accessible to the rural people.
6. **National Rural Livelihood Mission:** It is meant to eradicate povertyby2014-15.
7. **National Food Security Scheme:** On the pattern of MNREGS, the central government is trying hard to bring a bill in the monsoon session (2013) to provide guarantee for food to the poor people, although it has already issued an ordinance in this regard.

Sansad Adarsh Gram Yojana Gram Panchayat

Sanad Adarsh Gram Yojana is a rural development programmed broadly focusing upon the development in the villages which includes social development, cultural development and spread motivation among the people on social mobilization of the village community. The programmed was launched by the Prime Minister of India, Narendra Modi on the birth anniversary of Jayaprakash Narayan, on 11 October2014.

The plan

Sanad Adarsh Gram Yojana was initiated to bring the member of parliament of all the political parties under the same umbrella while taking the responsibility of developing physical and institutional infrastructure in villages and turn them into model villages. Under this scheme, each member of parliament needs to choose one village each from the constituency that they represent, except their own village or their in-law's village and fix parameters and make it a model village by 2019.

Thereafter, they can take on two or three more villages and do the same by the time the next general elections come along in 2019, and thereafter, set themselves ten-year-long village or rural improvement projects

Chapter-3 Smart (cities/village) concept as per your idea and its visit

3.1 CONCEPTS, DEFINATIONS AND PRACTICES

Solutions relating to water management, clean and renewable energies, smart grid, intelligent traffic control, electronic government, urban mobility, wireless internet Accessibility and waste management are just a few examples that can be highlighted in a long list of problems- oriented proposed solutions.

The challenge is not technology per se but how to design and use technology for the real benefit of citizen's well-being. Due to the radical changes, we are facing, competitiveness and welfare are already highly in fluence by our cities eco system. The right balance between economic, social and environmental sustainability is one of the critical Success Factors.

A full citizen-centered approach in urban project supports by a deep engagement of the civil society can foster economic growth and contribute to mitigating the social gap. Access over ownership and full inclusion over welfares are key governance principles for managing cities in the near future.

Definitions

Fig 3.1 smart village concept

A city well performing in a forward looking way in economy, people governance, mobility, environment, and living, builds on the smart combination of endowment and activities of self- decisive, independent and aware citizens.

3.2 VISION GOALS, STANDARDS AND PERFORMANCE MEASUREMENT INDICATORS

Goals: Determine which technologies, strategies, applications, and institutional arrangements demonstrate the most potential to address and mitigate, if not solve, transportation challenges identified within a city.

Vision: Mobility on Demand (MOD) is an emerging concept built on shared use approaches and a shift in mass transit. It augments public transportation and

supports the efficient movement of people. A major component includes advanced traveler information systems that provide real time traffic, transit, parking, and other transportation-related information to travellers.

Activities:

- Smart Finance
- Smart City Profiles
- Demo Smart
- Cooperation models
- Integrated smart city mobility and energy platform - The Project
- Scientific Evaluation of the Smart-Cities-Initiative

Bench Marks:

- **Structural Planning**: At least 2% of all residential units to be occupied by economically weaker sections in each Transit Oriented Development Zone 500m from Transit Stations. 98% of residences should have daily needs retail, parks, primary schools and recreational areas accessible within 1km walking distance.
- **Transport**: Maximum travel time of 30 minutes in small & medium size cities and 45 minutes in metropolitan areas. High quality and high frequency mass transport within 800 m (5-10-minute walking distance) of all residences in areas over 175persons / ha of built area.
- **Solid management:** 100% households are covered by daily door-step Collection system. 100% collection of municipal solid waste. 100% segregation of waste at source, i.e., biodegradable and non-degradable waste 100% recycling of solid waste
- **Electricity:**100% households have electricity connection 24 x 7 supply of electricity. 100% metering of electricity supply.

3.3TECHNOLOGICAL OPTIONS`

Smart city has no longer wave in the future. Now they are continuously growing as the internet of growing expand and impact municipal grown around the globe.
They are key technologies that make smart cite up to the mark they are as follow:

1) **Smart Energy**

Both residential and commercial in the smart cities are more efficient using and the energy used is Basically analyzed and data should be collected and therefore building get monitor their energy us a grand report this data to utilities and reduce the cost

Smart grid solution play important role in making smart cities. from prepaid application to advanced metering there are several factors that is to enhance.

Fig 3.2 smart energy

2) Smart Transportation

Its considered smart parking, smart traffic light and smart multi transportation by making parking smarter, people spend less time looking for parking spots and circling city blocks and convent life. traffic lights are particular based on the bus schedules so that less traffic and more freely during rush hours.

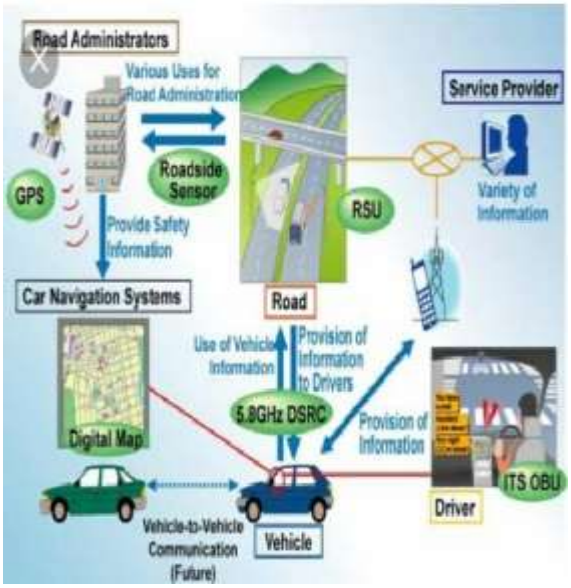


Fig 3.3 smart transportation

3) Smart Infrastructure

The city has good infrastructure may move forward with other technologies and make meaningful changes in future city plan.

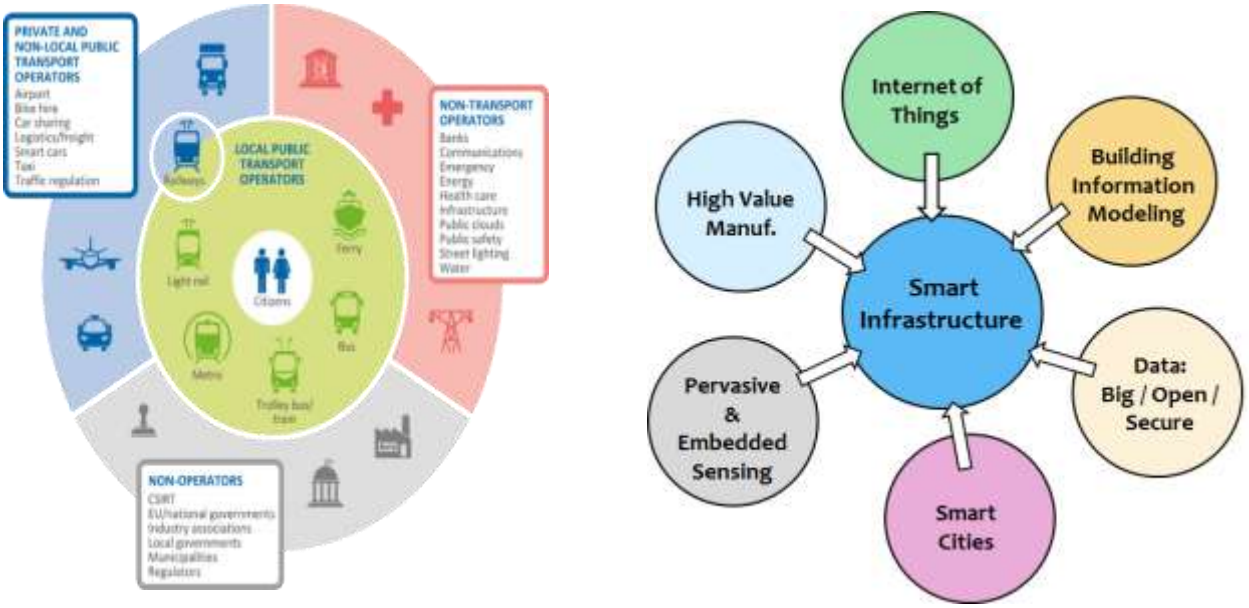


Fig 3.4 smart infrastructure

4) Smart Mobility

It indicates both data and technology which travel across the technology needs more interoperable and perform to great expectations regardless of who made it or when it was made.

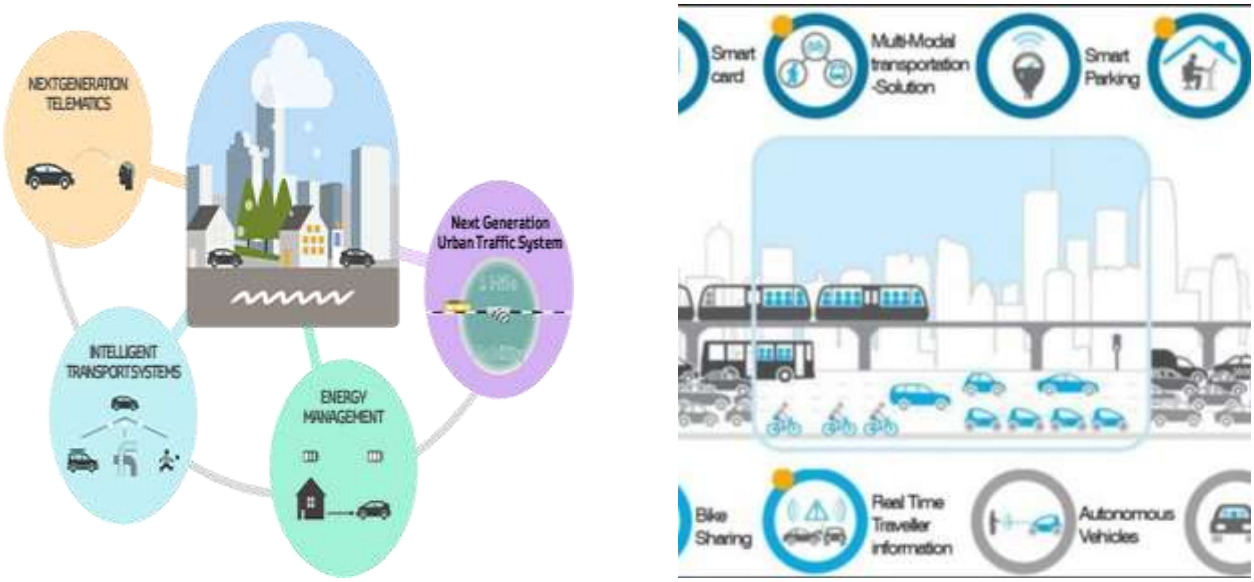


Fig 3.5 smart mobility

3.4 ROAD MAP AND SAFEGUARDS

A smart city roadmap consists of four/three (the first is a preliminary check) major components:

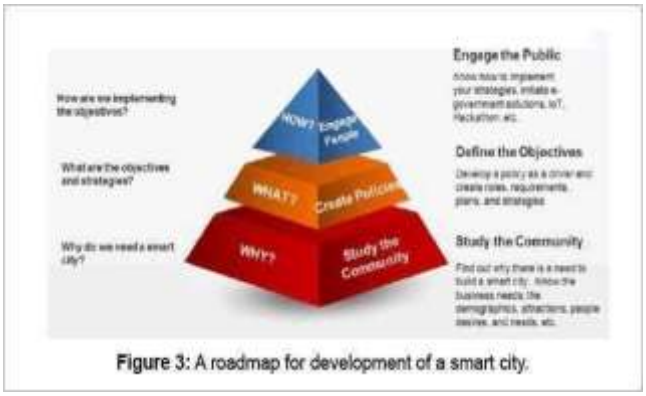


Figure 3: A roadmap for development of a smart city.

To describe exactly what is the community: maybe that definition can condition what you are doing in the subsequent steps; it relates to geography, links between cities and flows of people between them; that in some Countries the definition of City community that is stated does not correspondence respectively in life.

Fig 3.6 development smart city

I. Study Community: Before deciding to build a smart city, first we need to know that. This can be done by determining the benefits of such an initiative. Study the community to know the citizens, the business's needs – know the citizens and the community's unique attributes, such as the age of the citizens, their education, hobbies, and attractions of the city.

II. Develop a Smart City Policy: Develop a policy to drive the initiatives, where roles, responsibilities, objective, and goals, can be defined. Create plans and strategies on how the goals will be achieved.

III. Engage the Citizens: This can be done by engaging the citizens through the use of government initiatives, open data, sport events, etc.

IV. People, Processes, and Technology (PPT) are the three principles of the success of a smart city initiative. Cities must study their citizens, know the processes, business drivers, create policies, and objectives to meet the citizens' needs. Then, technology can be implemented to meet the citizens' need, in order to improve the quality of life and create real economic opportunities.

3.5 ISSUES AND CHALLENGES

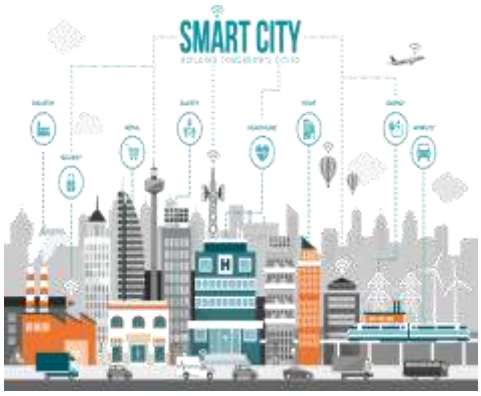
1) **Retrofitting existing legacy city infrastructure to make it smart:** There are a number of latent issues to consider when reviewing a smart city strategy. The most important is to determine the existing city's weak areas that need utmost

consideration, e.g., 100-per-cent distribution of water supply and sanitation. The integration of formerly isolated legacy systems to achieve citywide efficiencies can be a significant challenge.

2) **Financing smart cities:** The High-Power Expert Committee (HPEC) on Investment Estimates in Urban Infrastructure has assessed a per-capital investment cost (PCIC) of Rs 43,386 for a 20year period. Using an average figure of 1 million people in each of the 100 smart cities, the total estimate of investment requirements for the smart city comes to Rs 7 lakh crore over 20 years (with an annual escalation of 10 per cent from 2009-20 to 2014-15). This translates into an annual requirement of Rs 35,000 crore. One needs to see how these projects will be financed as the majority of project need would move through complete private investment or through PPPs (public-private partnership).
3) **Availability of master plan or city development plan:** Most of our cities don't have master plans or a city development plan, which is the key to smart city planning and implementation and encapsulates all a city needs to improve and provide better opportunities to its citizens. Unfortunately, 70-80 per cent of Indian cities don't have one.
4) **Financial sustainability of ULBs:** Most ULBs are not financially self-sustainable and tariff levels fixed by the ULBs for providing services often do not mirror the cost of supplying the same. Even if additional investments are recovered in a phased manner, inadequate cost recovery will lead to continued financial losses.
5) **Technical constraints of ULBs:** Most ULBs have limited technical capacity to ensure timely and cost-effective implementation and subsequent operations and maintenance owing to limited recruitment over a number of years along with inability of the ULBs to attract best of talent at market competitive compensation rates.
6) **Three-tier governance:** Successful implementation of smart city solutions needs effective horizontal and vertical coordination between various institutions providing various municipal amenities as well as effective coordination between central government (MOUD), state government and local government agencies on various issues related to financing and sharing of best practices and service delivery processes.

7) **Providing clearances in a timely manner:** For timely completion of the project, all clearances should use online processes and be cleared in a time-bound manner. A regulatory body should be set up for all utility services so that a level playing field is made available to the private sector and tariffs are set in a manner that balances financial sustainability with quality.

3.6 SMART INFRASTRUCTURE



Smart infrastructure is the facilities and system serving a country city and other area. It typically characteristic technical structures such as roads, bridges, tunnels, water supply, sewers, electrical grids, telecommunications, and so forth, and can bedefinedas “the physical components of in retreated systems providing commodities and services essential to enable, sustain, or enhance living conditions.

Fig 3.7 smart city

The installations that form the basis for any operation or system". Smart infrastructure is classifying into highways, streets, roads, and bridges; mass transit; airports and airways; water supply and water resources; wastewater management; solid- waste treatment and disposal.

3.7 CYBER SECURITY

The last 30 to 40 years have fostered an era of rapid automation and ingenuity to create technology that makes our lives easier and operations simpler. Today, technology is interwoven into our everyday lives with interconnected smart devices that respond to seemingly everything around us. These advances, which are frequently used by consumers and commercial enterprises, are now being leveraged within our nation’s critical infrastructure, creating new concerns about the network integrity and vulnerability of the nation’s mission critical operations.

The introduction of automation to our nation’s critical infrastructure for electricity, transportation and security drives the need for a stronger, more robust means of cyber security. Our cities are becoming increasingly smarter due to the implementation of autonomous monitoring and control technologies. However, these technologies, when not connected to secure networks, are extremely

susceptible to cyber threats - many of which have become far more advanced since the original PC-based malware, "Charlie," which surfaced over 30 years ago.

3.8 RETROFITING-REDEVELOPMENT-GREENFIELD DEVELOPMENT DISTRICT COOLING

- **RETROFITTING: -**

Retrofitting is one of the strategic components which when will be introduce planning in an existing built-up area, will help us to achieve several objectives for smart city like making the existing area more efficient and liveable along with others. In this method, generally an area more than 500 acres will be identified by the city in consultation with citizens. After identification and observation of the current situation of infrastructure services in the identified area and the vision of the residents, the cities will prepare a strategy to become smart. Since existing structures are largely to remain intact in this model, it is expected that more intensive infrastructure service levels and a large number of smart applications will be packed into the retrofitted smart city. The whole process of retrofitting must be completed in a shorter time frame, as it will lead to help and assistance in other part of city or another city of similar condition. SMART-RETROFITS are projects to mitigate major issues affecting urban resilience; are catalytic in nature, effective, requires policy initiatives &some investments for pre-take-off. Now days, one of the most commonly method used for the retrofitting for any buildings are Green retrofitting.

- **REDEVELOPMENT: -**

Redevelopment causes the tremendous development in infrastructure by using the mixed land use patterns and also increasing the density at the same time. When the area is more than 50 acres, then for the sake of concerns of citizens redevelopment is adopted. For example, by implementing high ground coverage, mixed land use is done by preparing new layout for the area. Vacant land represents both significant problem and an attractive opportunity for many central cities. Vacant land and abandoned structures impose both economic and social costs on cities and the neighbourhoods or districts in which they are located. On the economic side, such properties lower neighbouring property values and tax revenues even as they create pressure to raise taxes to maintain service levels. Addressing the issue of vacant and abandoned land and structures, state governments play an important role as well. In

many cases, the ability to overcome the problems associated with vacant properties and convert them to productive use requires legislative powers that are found only at the state level. Even when demand for new or restored land uses is sufficient for redevelopment to occur, the path to success is troubled by the displacement of previous residents and the elimination of their neighbourhoods. Displacement can occur directly through property clearance and conversion to new uses, or indirectly through gentrification when land prices and rents are bid-up to a level unaffordable to the neighbourhood's long-term residents.

The redevelopment process can create winners and losers, with the losers too often racial and ethnic minorities and the economically disadvantaged. Physical and economic redevelopment are virtual imperatives for cities, but paths to redevelopment that minimize displacement and offset its negative consequences are unsure. Redevelopment has created new, vibrant central city areas. Historic buildings have been restored to physical and economic vitality. At the same time, affordable housing has filtered upward in price and economic class. Historic buildings have been lost. Residences and neighbourhoods have been destroyed. People have been displaced. Two examples of the redevelopment model are the Saifee Burhani Upliftment Project in Mumbai (also called the Bhendi Bazaar Project) and the redevelopment of East Kidwai Nagar in New Delhi being undertaken by the National Building Construction Corporation.

- **GREEN FIELD DEVELOPMENT: -**

Greenfield development will introduce most of the Smart Solutions in a previously vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision for affordable housing, especially for the poor. Greenfield developments are required around cities in order to address the needs of the expanding population. from a legal perspective, the challenges in obtaining timely, effective, and affordable approvals for Greenfield residential development. In particular, we focus on the constraints on Greenfield developments (not all green fields are equal); the need to integrate land

use planning with the provision of infrastructure; and the opportunities provided by the Special Housing Area legislation. Greenfield areas are seen as the low hanging fruit in terms of providing land for urban expansion, however the reality is quite different. There will be no perfect sites where the conversion of land for urban use will have no effects; all areas will be constrained, and the conversion of any area will need to occur in the context of compromises HAVING been made. One of the

most important issues with Greenfield developments is to ensure that the development area can be appropriately served with infrastructure. New areas (Greenfield) will be developed around cities in order to accommodate the expanding population in urban areas.

Application of Smart Solutions will enable cities to use technology, information and data to improve infrastructure and services that includes physical as well as social infrastructure. One well known example is the GIFT City in Gujarat. For Bhubaneswar, the constituent proposal comprises.

- **DISTRICT COOLING: -**

District cooling is the cooling equivalent of district heating. Working on broadly similar principles to district heating, district cooling delivers chilled water to buildings like offices and factories needing cooling. In winter, the source for the cooling can often be sea water, so it is a cheaper resource than using electricity to run compressors for cooling. Alternatively, District Cooling can be provided by a Heat Sharing Network which enables each building on the circuit to use a heat pump to reject heat to an ambient ground temperature circuit.

3.9 STRATEGIC OPTIONS FOR FAST DEVELOPMENT

The strategic components of area-based development in the Smart Cities Mission are city improvement, city renewal and city extension plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city. Below are given the of the three models of Area-based smart city development they are as follows:

1) Retrofitting will introduce planning in an existing built-up area to achieve smart city objectives, along with other objectives, to make the existing area more efficient and live able in Retro fitting, an area consisting of more than 500 acres will be identified by the city in consultation with citizens.

2) Redevelopment will affect a replacement of the existing built-up environment and enable co- creation of a new layout with enhanced infrastructure using mixed land use and increased density. Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies in consultation with citizens.

3) Greenfield developments could be located either within the limits of the ULB or within the limits of the local Urban Development Authority.

3.10 INDIA'S URBAN WATER AND SANITATION AND ROLE OF INDIGENOUS TECHNOLGIES

More than 90% of the population has access to drinking and 60 %of the population has access basic sanitation. And the challenges faced by India urban water and sanitation areas Follow:

- Creating consensus on sector governance and institutional arrangements.
- Developing and testing service provider models that have characteristics of well-Run public companies for different market segments Is the main challenges faced by India urban and sanitation.
- Improving financial sustainability of providers.
- Moderating the WS Sector.
- The first is that the data bank for people seeking to information.
- The documentation can be used for communities or individuals for payment for the transfer of technology.
- Data bank will serve an important function of establishing community knowledge firmly in the public domain.

3.11 INITIATIVES IN VILLAGE DEVELOMENT BY LOCAL SELF GOVERNMENT

Gram Panchayat / Taluka Panchayat/ Zilla Panchayat are gross root level institutions, basically these PRIs monitors and plans schemes, there is a well-developed strong network.

Adequate and specific budget provisions need to be created under the provisions of the KPR Act, 2003 for various energy conservation initiatives, PRIs can make their own byelaws also.

Case study discussions on BARC indigenous water technologies already being used and dissemination of the technologies in Indian market

To achieve the target of cleanliness, the technologies to treat the waste material should also be developed along with creating awareness. There are many technologies that are used to treat waste material. They are usually very costly, very complex to be understood and viable only for large size units. At the same time, indigenous technologies are low-cost capital and easy to use and they can also be used by different size units. In India, they are particularly suitable for the small and medium units. In this regard, a National workshop on Indigenous water, Wastewater and Solid Waste Treatment Technologies was organized by the Department of Atomic Energy (DAE) in January, 2015 at Gujarat Technological University (GTU)

in Ahmadabad. The objective of the workshop was to disseminate indigenous technologies of water, wastewater and solid waste treatment developed by the Bhabha Atomic Research Centre (BARC) under "Swachh Bharat Abhiyan" and to bridge gap between the research at the research center and the practical application of the technologies. The BARC is playing a pivotal role in the development of these technologies. Some of these technologies are as follows:

Indigenous water purification technologies: These technologies can improve the: drinking water quality of smaller villages as well as larger cities. It uses the Pressure Driven Membrane Processes. These are suitable for all capacity units e.g.; they are adaptable from house hold level unit to ReCommunity level unit to large scale unit. Water purification technologies make use of the nuclear energy and solar energy also.

Environment friendly Plasma technologies: Solid waste dumping sites or landfill sites: need more amount of land which is not available in urban areas. Incineration of solid waste pollutes the environment if the incinerators are not designed or operated properly. Thermal Plasma Technology is ideally suited for waste treatment. By plasma technology Hazardous & toxic compounds are broken down to elemental constituents at high temperatures; Inorganic materials are converted to Vitrified Mass; and Organic materials are Pyrolyzed or Gasified, converted to flue gases (H2 & CO) & Lower hydrocarbon gases when operated at low temperature (500 – 600OC). Disposal of carcass is also being thought of using plasma pyrolysis.

Unique Multi Stage Biological Treatment Solution: Multi Stage Biological Treatment Solution (MSBT) can be implemented on existing STP which is not able to process Sewage to optimum efficiency. MSBT can be implemented as a modular or container on the banks of rivers on Drains/Nalas which discharge waste water to the river. It canals so be implanted in small urban societies and housing complex for better water management. Benefits of MSBT are: No Surplus of Organic Sludge, No Odor problem, drastic reduction of Electrical Power usage which minimizes operating costs, no need for return sludge pumping (minimizing electromechanical component which ultimately reduces operating cost).

Role of environmental isotope techniques in the water resources development and management: There are two type of isotopes, stable isotopes and radioactive isotopes. Isotope techniques are used to find out the type of contamination in surface water and ground water, the sources and origin of contamination, pollutant dispersion in surface water bodies, to assess the ground water salinity, to assess the changes due to long-term exploitation of groundwater, for hydro-chemical investigation and to carry out geochemical evolution of groundwater.

3.12 SMART INITIATIVES BY DISTRICT MUNICIPALCORPORATION

- To devise a system of storage of waste and segregation of recyclable waste at source.
- To improve system of primary collection of waste.
- To devise more efficient system of day-to-day cleaning, conventionally and mechanically.
- To devise system to eliminate practices of throwing garbage on the road causing nuisance& health threat.
- To modernize the system of community waste storage & synchronize the system of primary collection as well as transportation of waste.
- To eliminate manual handling of waste and open transportation vehicles.
- To improve the system of transportation of waste by ensuring "handling waste only once".
- To construct four more semi close body transfer station to strengthen the existing primary collection-transportation and secondary transportation system.
- To reduce quantity of waste going to landfill site by adopting suitable technology.
- Land to be acquired for another landfill disposal site.
- To derive income from the processing of waste.
- To ensure safe disposal of waste including bio-medical wastes.

3.13 ANY PROJECTS CONTRIBUTED WORKING BY GOVERNMENT/ NGO/ OTHER DIGITAL COUNTRY CONCEPT

Atal Pension Yojana: This scheme is related to Social Sector Scheme pertaining to Pension Sector. In Atal Pension Yojana, for every contribution made to the pension fund, The Central Government would also co-contribute 50% of the total contribution or ₹1,000(US$16) perinea, whichever is lower, teach eligible subscriber account, for a period of 5 years. The minimum age of joining APY is 18 years and maximum age is 40 years. The age of exit and start of pension would be 60 years. Therefore, minimum period of contribution by the subscriber under APY would be 20 years or more.

Digital India Program: Digital India is a campaign launched by the Government of India to ensure that Government services are made available to citizens electronically by improved online infrastructure and by increasing Internet connectivity or by making the country digitally empowered in field of technology.

PradhanMantriAwasYojna: Pradhan Mantri Gramin Awaas Yojana (PMGAY), previously Indira Awaas Yojana **(IAY)**, is a social welfare flagship programmed, created by the Indian Government, to provide housing for the rural poor in India.
A similar scheme for urban poor was launched in 2015as Housing for All by 2022.

Indira Awaas Yojana was launched by Rajiv Gandhi, the then Prime Minister of India, as one of the major flagship programs of the Ministry of Rural Development to construct houses for BPL population in the villages. Under the scheme, financial assistance worth ₹70,000 (US$1,100) in plain areas and ₹75,000 (US$1,200) in difficult areas (high land area) is provided for construction of houses. The houses are allotted engagement of contractors is strictly prohibited. Sanitary latrine and smokeless challah are required to be constructed along with each IAY house for which additional financial assistance is provided from" Total Sanitation Campaign" and "Rajiv Gandhi Grameen Vidyutikaran Yojana" respectively. This scheme, operating since 1985, provides subsidies and cash- assistance to people in villages to construct their houses, themselves.

Pradhan Mantriujjwala yojana: Launched to provide free LPG connections to women from below poverty line families.

AntyodayaAnnaYojana: Under the scheme 1 crore of the poorest among the (Below Poverty Line) BPL families covered under the targeted public distribution system are identified. IssueofRation Cards Following the recognition of Antyodaya families, unique quota card strobe recognized an "Antyodaya Ration Card" must be given to the Antyodaya families by the chosen power.

The scheme has been further expanded twice by additional 50 lakh BPL families each in June 2003 and in August 2004, thus covering 2 crore families under the AAY scheme.

Chapter 4: About Varnama village

4.1 INTRODUCTION

Fig 4.1 Varnama village plan

4.1.1 INDRODUCTION ABOUT VARNAMA VILLAGE

The Varnama village is located near Vadodara district. The village is consisting very good facilities. Major road is in good condition in village. But the problem is the roads are every congested so heavy vehicle is facing problems. Over all the condition of the village is pretty good. The village major occupation is agriculture activities.

4.1.2 JUSTIFICATION/ NEED OF THE STUDY

Need of development of village have been arisen due to migration of people from rural to urban areas. Due to lack of physical & social infrastructural facilities, employment needs, people used to carry out migration. Therefore, developing such facilities would help to avoid migration & decrease rate of degeneration of villages.

4.1.3 STUDY AREA (broadly define)

Study area includes Gujarat and its districts. We have taken study of Vadodara district and in that Varnama village. The Vishwakarma Yojana is aimed to Urban development of the village.

For that purpose, study area is decided for taking detail information of the village. The study area includes education, social life, basic needs of the person, economic growth of village, transport facilities etc. explained below.

Education:

Anganwadi Primary School Secondary School Higher Secondary School College

Medical Facility:

Govt/Panchayat Dispensary or Sub PHC or Health Centre PHG & CHC Primary School Child Welfare and Maternity Hospital

Transportation:

Pucca Village Approach Road us/Auto Stand Provision Railway

Drinking Water:

Water Facilities Overhead Tank Underground Sump Cremation Ground Gram Panchayat Building, Fire Station, Police Station, Community Hall, Post Office.

4.1.4 OBJECTIVE OF STUDY

- "Creation of infrastructure - connectivity, civic and social infrastructure along with Provision of alternative Economy generation is the key pillars that the concept hinges on."
- Basic physical infrastructure – Water Supply, Transport, Sewerage and Solid Waste Management should be the priority focus and be provided.
- Basic Social infrastructure –Health and Education facilities should be provided and ensure proper delivery of facilities to village dwellers.
- Promote integrated development of rural areas with provision of quality housing, better connectivity, employment opportunities and supporting physical and social infrastructure.
- Reduce migration from rural to urban areas due to lack of basic services and sufficient economic activities in rural areas.
- Internal roads within village settlement, Efficient Mass Transportation systems to improve connectivity between urban and rural areas, public transportation facilities that need to be developed like bus stops, transported protect.

- Identification of sanitation facilities that need improvement – sewerage and drainage interhousehold connection, door to door solid waste collection & dumping facilities.
- Electricity connections like street lighting that is energy efficient and eco-friendly Refurbishing of village lakes, water tanks and wells, construction of rain water harvesting structures for sustainable Development.

4.1.5 SCOPE OF THE STUDY

The study will focus the development trend, in tensity of growth of the village, and find out the problems related to the physical development of the area and infrastructure services of the village. Project proposal and sustainability aspect not consider in micro level, it is only guide way. The study focused to only following Village Varnama.

4.1.6 METHODOLOGY FRAME WORK FOR DEVELOPMENT OF YOUR VILLAGE

- The study frame work of our village divided in three phases, Preliminary survey, analysis, design.
- In preliminary survey there are two approaches one is direct and second is indirect.
- We first done indirect study of village through using various online sources and official websites of Gandhinagar district.
- Then we visit the village on primary bases and to collect the data as per techno economic survey form prescribed by university.
- Then we come at the second phase of project, the analysis. We analyze the information collected and come to decide the road map of development of village.
- Then we again contact the Gram Panchayat member to inform about our future scope of project and get the further data for designing various facilities.
- And at third phase of project, we design the various facility in village like library, pick up stand, biogas plant, construction of paver block road and solid waste collection facility.
- In this way we approach our phase I project.

4.1.7 LIST OF OBJECTS AVAILABLE RELATED TO CIVIL METHODOLOGY

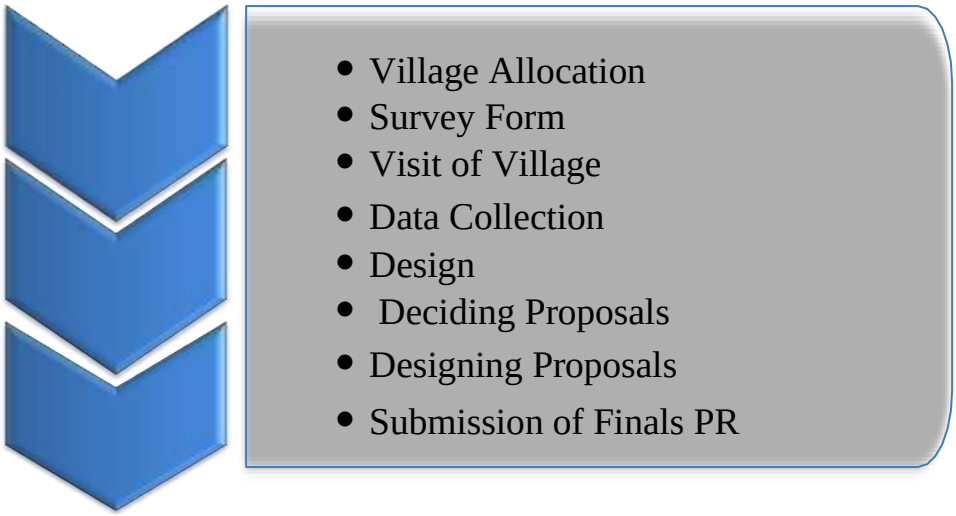


Table 4.1 methodology

4.2 VARNAMA VILLAGE STUDY AREA PROFILE

4.2.1 STUDY AREA LOCATION WITH BRIEF HISTROY LAND USE DETAILS

The Varnama Village located in Vadodara Taluka, 4251 People are living in this Village, 2228 are males and 2023 are females as per 2011 census. Expected Varnama population 2020/2021 is between 4,123 and 5,186. Literate people are 3370 out of 1827 are male and 1543 are female.

Fig 4.2 location

People living in Varnama depend on multiple skills, total workers are 1827 out of which men are 1398 and women are 429. Total 227 Cultivators are depended on agriculture farming out of 189 are cultivated by men and 38 are women. 354 people works in agricultural land as a labour in Varnama, men are 269 and 85 are women.

VILLAGE NAME	Varnama
TALUKA	Vadodara
DISTRICT	Vadodara
STATE	Gujarat
PINCODE	391243
COORDINATES	22°11'18.5", 73°11'15.4"
LANGUAGE	Gujarati, Hindi, Marathi, English
ELEVATION / ALTITUDE	36 mt

Table 4.2 village details

4.2.2 BASE LOCATION MAP

Fig 4.3 base map

4.2.3 PHYSICAL AND DEMOGRAPHICALGROWTH

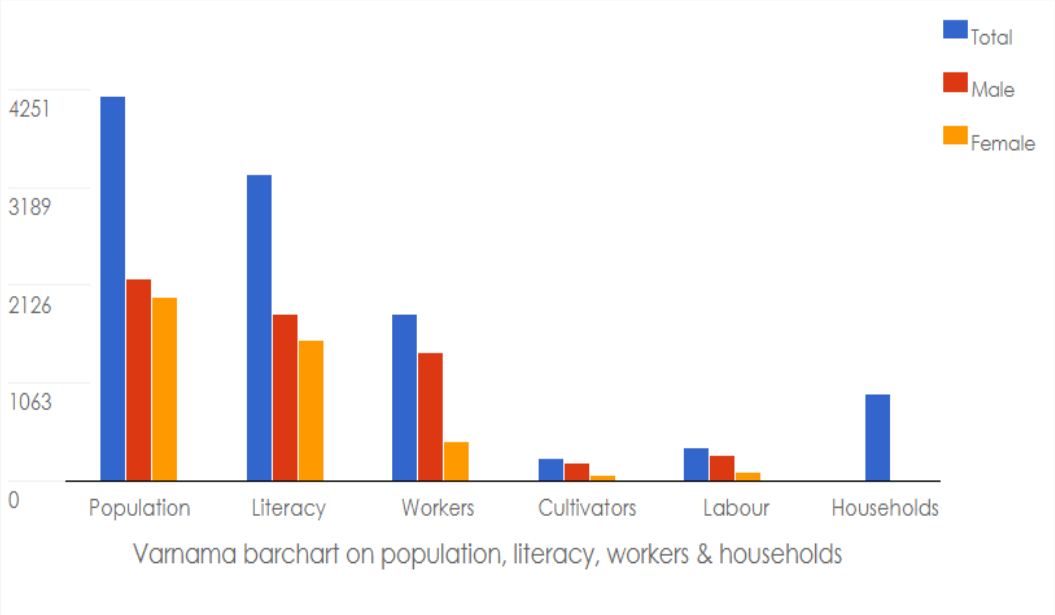


Fig 4.4 Graph

Sr.no	Census	Population	Male	Female	Total house holds
1	2011	4251	2228	2023	951

TABLE 4.3 population

4.2.4 ECONOMICALPROFILE/BANKS

Name of Three Major Occupation groups in Village:

1. Agriculture work.
2. Employers.
3. Animal Husbandry

The village doesn't have any better facilities regarding infrastructure but has good electrification system which distributed 24*7 hours for domestic use and 8 hours for agricultural use. Village does not have good drainage system because there is blocked drainage and most people use soak pit system other then it.

4.2.5 ACTUAL PROBLEM FACED BY VILLAGERS AND SMART SOLUTION

Varnama village, no facility of animal excreta due to this night urinal the foul gases and dirtiness are created in the road of village. during rainy season these excreta are flow through the village and create a various decease. for that problem we conclude a solution of bio gas plant and small-scale natural fertilizer storage.

4.2.6 SOCIAL SCENARIO

Varnama village, people are not knowing about that basic facility provide by government. Also, in the village basic crop are grown are 'cotton', 'tuvar' and Arenda. Village people are not that much connected with technology and digitalization. People basic income is connected with their agriculture product value and on dairy product. People are also connected with another village and stay connected with culture.

4.2.7 MIGRATION REASONS/TRENDS

Because the varnama village is far from city area so the people can effort the transportation, facilities like city, that's the reason of people migration.

4.3 DATA COLLECTION

4.3.1 METHODS FOR DATA COLLECTION

Base line survey is a benchmark for any intervention during and post implementation of any development program. A detailed baseline survey was under taken which involved household census survey, Bio-physical survey, infrastructure survey and Village level data collection from Sarpanch.

Household's survey is giving the actual number of how many peoples are carrying own house and how many does not this survey is giving the details of the demographic profile of the village, the literacy percentage, SC/ST population, number of BPL household, cattle population and net consumption rate in the village. In bio-physical, average milk production of the cattle and various schemes running and their benefits Bio-physical survey was undertaken to identify various natural resources available in the village. It included the soil typology, well in the area, crop taken in the field, cropping pattern, fertilizer used and various sources of irrigation in the field. The infrastructure survey is showing the data of how many structural facilities are available in village.

4.3.2 PRIMARY SURVEY DETAILS

For undertaking the data, the techno-economic form is given by the Vishwakarma yojana.

Collect the information of respective DDO, TDO, Sarpanch/ Talati of your district / Village. Information of DDO, TDO & other details are available on respective District Panchayat's website. And also, the village has own booklet of whole data include in booklet. The booklet is known as village profile. And also, the other the smart village form is given to filled.

We had filled the form with help of village profile booklet, sarpanch, talati, government hospital in charge doctor, teacher of government school, and some data are filled with the help of the local people of village. We also note the suggestion and requirement of the village.

Then we locate all the infrastructure facilities available in village and analyze the situation and condition of the particular structure. While visiting the village we took the photographs of all the infrastructure facilities/Amenities such as water tank, Drainage network, dumping site of garbage, Road.

4.3.3AVERAGE SIZE OF HOUSES/ GEO-TAGGING OF HOUSE

Varnama village is situated near NH 8. The village is near 2km near to the main village. The village's total area is 614 Hectors. The village is 18 km far away from main city Vadodara. The village's latitude is 22.1836256 and longitude is 73.1856941.

4.3.4 NO OF HUMAN BEING IN ONE HOUSE

The average human being in village is around 4.5 human in a particular house.

4.3.5 MATERIAL AVAILABLE LOCALLY IN THE VILLAGE AND MATERIAL OUT SOURCED BY THE VILLAGERS

Which Material used locally

FOR CONSTRUCTION PURPOSE
Brick
House made with animal mud and clay
Sand and with some gasket available

Table 4.4 Which Material used locally

Out sourced material

Materials available in village	Materials imported in village
Brick	Cement
Clay	Sand
Animal mud etc.	Aggregates etc.

Table 4.5 Out sourced material

Labor work doing

Labour work doing in farm	354
Labour work doing in small industries and sites	903

Table 4.6 labour work doing

Any Costing

Sr no	Type of costing	Material	Per	Cost
1	Construction materials cost	Cement	Bag	**375/-**
		Sand	Meter cube	**3000 /-**
		Aggregate	Meter cube	**1500/-**
2	Labor cost	Mason	Day	**600 /-**
		Unskilled	**Day**	**300 /-**

Table 4.7 any costing

4.3.6 GEOGRAPHICAL DETAILS

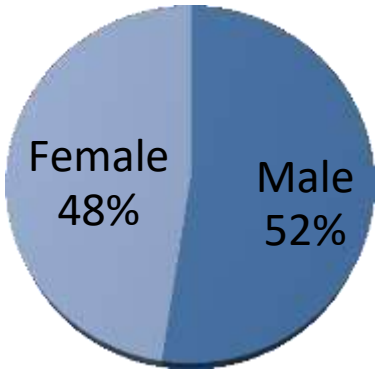
Total land in village's area	173 hect.
Forest area	**0 hect.**
Permanent pasture ground	**2 hect.**
Total agriculture land	**161 hect.**

Table 4.8 geographical details

4.3.7 DEMOGRAPHICAL DETAILS

Sr no	Census	Population	Male	Female	Total house holds
1	**2011**	**4251**	**2228**	**2023**	**951**

Table 4.9 Population 2011



4.3.8 OCCUPATIONAL DETAILS

Three major Occupation groups in village	Agriculture work Farm labour Animal activities

Occupational wise details

Worker (Among total population)	Main Worker (Among workers)	Marginal Worker (Among workers)	Non Worker (Among total population)
Total 43%	35.9%	7.1%	**57%**
Male 62.7%	57.7%	5.1%	**37.3%**
Female 21.2%	**11.8%**	**9.4%**	**78.8%**

Table 4.10 Occupational wise details

4.3.9AGRICULTURE DETAILS/ORGANIC FARMING/FISHERY

Agriculture details and organic farming

Total land used in agriculture works	161 hect.
Total people include with agriculture works	584
Total organic land in village	161hect.

Table 4.11 Agriculture details and organic farming

Fishery

There fishery activities are not in that area because there is not very big pond, river and any type of lake. But the highway side small garage and ware houses are available.

4.3.10 PHYSICALINFRASTRUCTUREFACILITIES-MANUFACTURING HUB/ WARE HOUSE

Water supply:

There is 24 hours water supply in the village. The water is distributed by the local water treatment plant which is located in ajwa.

Banks:

There are 1 Government banks in Varnama village.

Fig 4.5 Bank

Post Office:

There is also a post office and telephone exchange.

Fig 4.6 Post office

Manufacturing HUB/ Warehouses

- There are not very big industries located near the village.
- But the highway side small garage and ware houses are available.

4.4 INFRASTRUCTURE FACILITIES

4.4.1 DRINKING WATER FACILITES

It is drinking faculties available in this village lick Hand pumps, bore hole, Tap water and river. It is sufficient as per village demand but in monsoon season the quality of drinking water varieties because of solid particles as the due to rainfall hindrance of solid particles in water comes under the consideration in the media of main source for overhead tanks. Overhead water tank is condition very good lick.

Fig 4.7 Overhead water tank

There are 2 overhead tanks Capacity of 1.5 lakh liter. There are Total 4 handpumps in village and other source of water is underground sump available in village.

4.4.2 DRAINAGE NETWORK

There is underground type drainage in village. But the condition of the drainage is not well. The drainage pipelines are blocked and water is leaked in nala. And all solid wastage of village is dump around the nala of the drainage.

Fig 4.8 Nala

There is not separate space available for Dumping wastage. So, in village the maintenance of the drainage system is needed and find some suitable space for dumping area. 980 Houses of villages are connected with drainage system.

Fig 4.9 Dumping area

4.4.3 TRANSPOTATION & ROAD NETWORK

Road network

- In village the approach road is made with WBM.
- The internal roads are made with C.C and paver blocks.
- All roads are very nicely made and maintain.
- But the major problem of village is the roads are very narrow so the big vehicles are not entering Backside of the village. In fire situation at back side of village, to enter the fire brigade very difficulties are facing to enter such types of vehicles in village.

Transportation

In village the bus services, local rickshaw service, Rail services, etc. are available in village.

Fig 4.10 Road Network

4.4.4 HOUSING CONDITION

In village around 65% of house are pucca. Rest of 35% of house are kutcha type in village

Fig 4.11 House Condition

4.4.5 SOCIAL INFRASTRUCTURE FACILITIES

Health facilities

- In village there is a primary health center available in village.
- There are also Rural health Training Center is available in village.
- The government hospitals contain special room for I.C.U, General ward, Patient bed and other facilities are available in village. And also, some privet clinics are available in village.

Fig 4.12 Health facilities

Education Facilities

- There is one Girls school in village.
- Two schools are primary and other one is higher secondary.
- The ONGC company is made a training school in village.
- There are two Anganvadi in village.

The village nearby the BITS educational campus for collage studies is available.

Fig 4.13 Education facilities

Community Hall

- There is a community hall available in village.
- The community hall is located on the 2nd floor of the Gram Panchayat building.
- The community hall is in good condition. But the separate structure is not available in village.

Fig 4.14 Community Hall

Public library

In village the public library is available. The public library is surprisingly in very good condition.

The public library is located on the next floor of the Milk Co-operative society

4.4.6 EXISTING CONDITION OF PUBLIC BUILDING

- The post office building condition is not well.
- The Panchayat building's condition is not very bad and not good.
- The community hall's structure is not available in village. All meeting and get to gather will arrange on 2nd floor of panchayat building.
- The Public library a Milk Co-operative Society is in good condition in village.
- The primary school and Anganvadi condition are not well, the primary school is generally empty in working days.
- The primary health center in in good conditions.

Maintenance of existing Public Infrastructures

The Primary school, the Secondary school should need maintenance of structure.

4.4.7 TECHNOLOGY MOBILE / WIFI / INTERNET USAGE DETAILS

Mobile Used in village	95%
WIFI connection in village (approx.)	20%
Internet Usage in village (approx.)	85%

Table 4.12 mobile use in village

4.4.8 SPORTS ACTIVITES AS GRAM PANCHYAT

Fig 4.15 Sports area

4.4.9 SOCIO-CULTURAL FACILIES, PUBLIC GARDAN / PARK / PLAYGROUND / POND / OTHER RECREATION FACILITIES

Public garden/park/playground

In village Public garden and Play ground in school is available. The public garden is not in good condition.

Fig 4.16 Play Ground and lake

Village Pond/lake

In village the pond is available in village. The pond is little bit dirty.

4.4.10 OTHER FACILITES

In table described Other facilities are available in village.

Post office
General market
Shops
Panchayat building
Milk co-operative Society
Bank & ATM services

Table 4.13 other facilites

Post office and Panchayat building

Fig 4.17 Panchayat Building and Post office

Fig 4.18 Bank and milk co-operative society

General market and shops

Fig 4.19 Market

4.4.11 ANY OTHER DETAILS

The village has facilities of Police station and Railway station.

Fig 4.20 Railway station

4.6 EXISTING INSTITUTION LIKE - VILLAGE ADMINISTRATION – DETAIL PROFILE

4.6.2 Dudh Mandali

In village the Dhudh mandali or Milk Co-Operative Society is available in village.

1. The milk co-operative soc is very important role in village. Majorly people of village are financial depend upon Agriculture work and Milk production.

2. In Varnama village the milk Co-operative Society is established in 27th November 1965.

Fig 4.21 Dhudh mandali

Chapter 5: - Sustainable Technical Options with Case Studies of the Existing Village

5. CONCEPT (Civil)

5.1.1 ADVANCE CONSTRCTION TECHNIQUES

- **France Officially Unveils World's First Solar Panel Road**

Using the millions of miles of roadways throughout the world to also create power seems like a no brainer, the asphalt and concrete we're using now aren't really accomplishing anything more than handling the traffic on the road. But, there's also a very strong reason why those products are used: they're strong, reliable, and relatively durable.

Fig 5.1 solar panel road

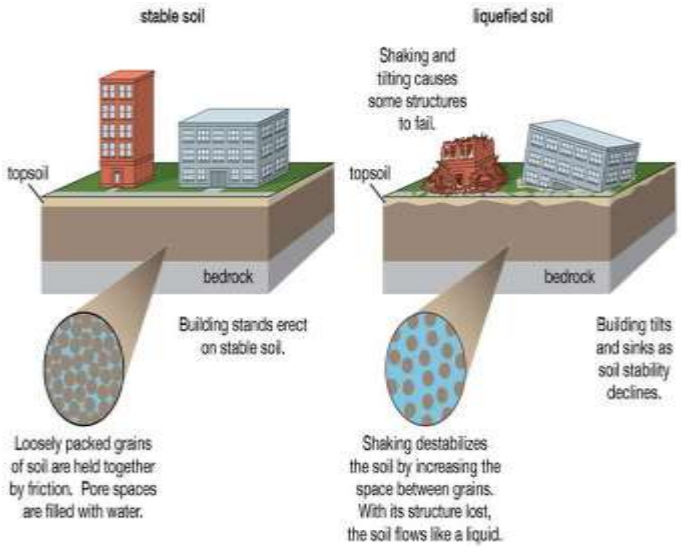
Still, many researchers believe there is a lot of unharnessed potential for roads and the world now has a very strong test subject for the future of solar roadways in Tourouvre-au-Perche, France.

Wattay, a photovoltaic road pavement system, has been in development stages for the past 5 years. Colas, a worldwide infrastructure company, and INES, the National Institute for Solar Energy, joined forces to create what they think is the future of roads. Unlike other solar road systems, Wattay uses existing roads as the base and the solar panels adhere directly on top. The material, which is less than an inch thick, allows for both the thermal expansion of the material beneath, as well as the ability to handle the load from vehicles driving on it, according to the company.

Last year, a small village in France, named Tourouvre-au-Perche, became the first to have the system installed on its roads and the first in the world to have a solar road of any kind. A 0.6-mile (1km) road in the village has been covered by over 30,000 square feet (2,800 square meters) of solar panels, according to The Guardian. The road, which is expected to handle around 2,000 vehicles a day cost over $5.3 million (€5m) to complete. The panels will undergo a test period of 2 years in order to determine their true durability and figure out how much energy they can actually generate. Initial tests have indicated that it will take 215 square feet of panels to

power the average French household, as panels that lay horizontal have proven to be much less efficient than those that are tilted.

5.1.2 SOIL LIQUEFACTION



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

Fig 5.2 soil liquefaction

Although earthquake shock is the best-known cause of liquefaction, certain construction practices, including blasting and soil compaction and vibroflotation (which uses a vibrating probe to change the grain structure of the surrounding soil), produce this phenomenon intentionally. Poorly drained fine-grained soils such as sandy, silty, and gravelly soils are the most susceptible to liquefaction.

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

Buildings constructed on loose soil pitch and tilt easily when liquefaction occurs, since the soil no longer supports the structures' foundations. In contrast, structures

anchored to bedrock or stiff soils in earthquake-prone areas suffer less damage, because less vibration is transmitted through the foundation to the structure above. In addition, buildings anchored to bedrock have a reduced risk of pitching and tilting.

5.1.3 SUTAINABLE SANITATION

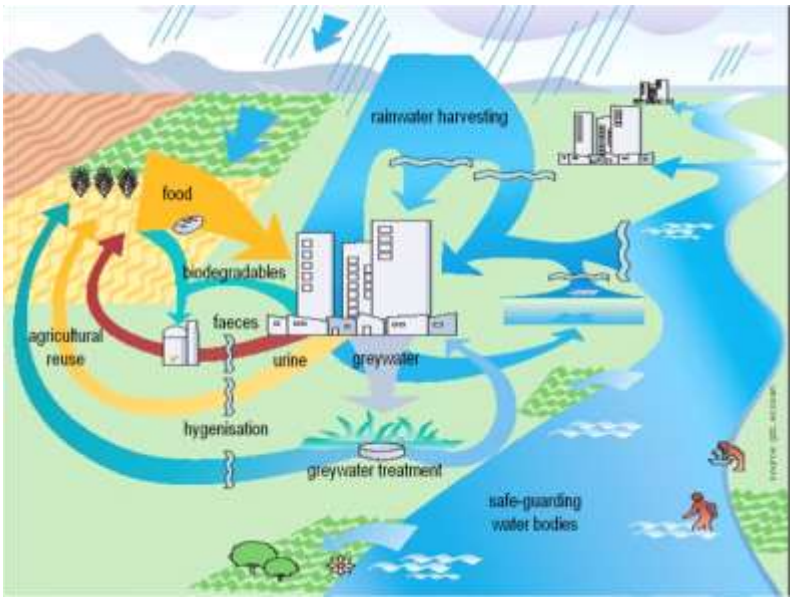


Fig 5.3 sustainable sanitation

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

It recognizes that human excreta and wastewater are not waste product, but valuable resources. This view is based on the fact that wastewater and excreta contain significant amount of energy plant nutrients and also water that can be recycled and reused, thus protecting natural resources.

The main objective of a sanitation system is to protect and promote human health by providing a clean environment and breaking the cycle of disease. In order to be sustainable, a sanitation system has to be not only economically viable, socially acceptable, and technically and institutionally appropriate, it should also protect the environment and the natural resources.

Today, the need for sustainability means that resource saving and protection of the environment are vital and there is a need for innovation and rethinking. This cannot be achieved by conventional methods. Also, in our emerging consumer and chemical societies it will not be enough that residents pay for sanitation and water services – they have to be partners to make sanitation sustainable.

Sustainable sanitation is a simple approach: the most basic principle is that is considers wastewater and excreta not as a waste, but as resources, that sanitation has to be socially acceptable and should be as economically viable as possible. There is no one- fit-all approach much rather, the most adequate solution has to be found from case to case, considering climate and water availability, agricultural practices, socio-cultural preferences, affordability, safety and technical prerequisites – just to name a few.
When improving an existing and/or designing a new sanitation system, sustainability criteria related to the following aspects should be considered:

• **Health and hygiene:** include the risk of exposure to pathogens and hazardous substances that could affect public health at all points of the sanitation system from the toilet via the collection and treatment system to the point of reuse or disposal and downstream populations. This topic also covers aspects such as hygiene, nutrition and improvement of livelihood achieved by the application of a certain sanitation system, as well as downstream effects.

• **Environment and natural resources:** involve the required energy, water and other natural resources for construction, operation and maintenance of the system, as well as the potential emissions to the environment resulting from its use. It also includes the degree of recycling and reuse practiced and the effects of these (e.g., reusing wastewater, returning nutrients and organic material to agriculture), and the protection of other non-renewable resources, e.g., through the production of renewable energies (such as biogas).

• **Technology and operation:** incorporate the functionality and the ease with which the entire system including the collection, transport, treatment and reuse and/or final disposal can be constructed, operated and monitored by the local community and/or the technical teams of the local utilities. Furthermore, the robustness of the system, its vulnerability towards power cuts, water shortages, floods, earthquakes etc. and the flexibility and adaptability of its technical elements to the existing infrastructure and to demographic and socio-economic developments are important aspects.

• **Financial and economic issues:** relate to the capacity of households and communities to pay for sanitation, including the construction, operation, maintenance and necessary reinvestments in the system. Besides the evaluation of these direct costs also direct benefits e.g., from recycled products (soil conditioner, fertiliser, energy and reclaimed water) and external costs and benefits have to be taken into account. Such external costs are e.g., environmental pollution and health

hazards, while benefits include increased agricultural productivity and subsistence economy, employment creation, improved health and reduced environmental risks

• **Sociocultural and institutional aspects:** the criteria in this category refer to the socio-cultural acceptance and appropriateness of the system, convenience, system perceptions, gender issues and impacts on human dignity, the contribution to food security, compliance with the legal framework and stable and efficient institutional settings.

5.1.4 transport infrastructure

Asset management in transport infrastructure, financial viability of transport engineering projects/ Life cycle Cost Analysis, Life-Cycle Assessment and Sustainability Assessment of transport infrastructure/ Infrastructures financing and pricing with equity appraisal, operation optimization and energy management/ Low-Volume roads:

Fig 5.4 transport infrastructure

planning, maintenance, operations, environmental and social issues/ Public-Private Partnership (PPP) experience in transport infrastructure in different countries and economic conditions/ Airport Pavement Management Systems, runway design and maintenance/ Port maintenance and development issues, technology relating to cargo handling, landside access, cruise operations/ Infrastructure Building Information Modelling (I-BIM) / Pavement design and innovative bituminous materials/ Recycling and re-use in road pavements, environmentally sustainable technologies/ Stone pavements, ancient roads and historic railways/ Cementitious stabilization of materials used in the rehabilitation of transportation infrastructure.

5.1.5 VERTICAL FARMING

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

Some common choices of structures to house vertical farming systems include buildings, shipping containers, tunnels, and abandoned my shafts. As of 2020, there is the equivalent of about 30 ha (74 acres) of operational vertical farmland in the world. The modern concept of vertical farming was proposed in 1999 by Dickson Despoiler, professor of Public and Environmental Health at Columbia University.

Fig 5.5 vertical framing

Despoiler and his students came up with a design of a skyscraper farm that could feed 50,000 people. Although the design has not yet been built, it successfully popularized the idea of vertical farming. Current applications of vertical farming coupled with other state-of-the-art technologies, such as specialized LED lights, have resulted in over 10 times the crop yield than would receive through traditional farming methods.

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

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

5.1.6 CORROSION MECHANISM, PREVENTION & REPAIR MESURES OF RRC STRUCTURE

It is a matter of serious concern of us the civil Engineers, that in some countries, the repair activities of structure done today account for nearly half the total annual expenditure on total construction activities. Such a state of affairs is of great concern mainly for two reasons. Firstly, concrete is, in essence a proven, durable & mostly maintenance free material. This is exemplified by a large number of structures constructed properly more than half a century back & is still in good stead today. Secondly, the know-how of making concrete, which does not need major repair/rehabilitation, is already well documented and is known to us. In spite of all these, the trend of early deterioration of concrete structure continues unabated. At present there is neither any established existing procedure, mandatory or otherwise, for periodical inspection of buildings/ structures and recording the structural defects and symptoms, like cracks, spalling, corrosion, and deflection of structure, in a logical manner nor any record of structural repairs/rehabilitations carried out, is maintained properly even for public buildings.

We have barged into a repair activity without adequate preparation. Persons involved in repair/rehabilitation need to be better civil engineers. In fact, repair/rehabilitation/retrofitting activity is a much more advanced application of science and technology involved in civil engineering, which is the most difficult challenge to engineers. We need to opt for new techniques and materials to resolve these difficulties. We have enough options to select from various construction chemicals, minerals, methods for repairs/rehabilitations, the economics etc.

to set right the damage. These all are to be considered in totality before deciding upon the repair/rehabilitation/retrofitting strategy and hence required enough background preparation. Replacement of damaged materials is the trend for repair/rehabilitation. Mass scale replacements are convenient repair strategies, which were being followed mostly in developing country like India, as these offer fast turn-over & are more profitable. This is normally a cosmetic strategy, restricted to the facade and offers a sense of safety due to the impressive new looks. The really needed repairs i.e., Structural repairs to the actual load-bearing structural members are often missed. Rather structural distress is camouflaged and buried beneath finishes.

5.1.7 SEWAGE TREATMENT PLANT

It includes physical, biological and sometimes chemical processes to remove pollutants. Its aim is to produce an environmentally safe sewage water, called effluent, and a solid waste, called sludge or biosolids, suitable for disposal or reuse. Reuse is often for agricultural purposes, but more recently, sludge is being used as a fuel source.

Fig 5.6 treatment plant

Water from the mains, used by manufacturing, farming, houses (toilets, baths, showers, kitchens, sinks), hospitals, commercial and industrial sites, is reduced in quality as a result of the introduction of contaminating constituents. Organic wastes, suspended solids, bacteria, nitrates, and phosphates are pollutants that must be removed. To make wastewater acceptable for reuse or for returning to the environment, the concentration of contaminants must be reduced to a safe level, usually a standard set by the Environment Agency.

Sewage can be treated close to where it is created (in septic tanks and their associated drain fields or sewage treatment plants), or collected and transported via a network of pipes and pump stations to a municipal treatment plant. The former system is gaining popularity for many new ECO towns, as 60% of the cost of mains sewerage is in the pipework to transport it to a central location and it is not sustainable. It is called 'Decentralisation' of sewage treatment systems.

The job of designing and constructing sewage works falls to environmental engineers. They use a variety of engineered and natural systems to meet the required treatment level, using physical, chemical, biological, and sludge treatment methods. The result is cleaned sewage water and sludge, both of which should be suitable for discharge or reuse back into the environment. Sludge, however, is often inadvertently contaminated with many toxic organic and inorganic compounds and diseases and the debate is raging over the safety issues. Some pathogens, for example, 'Prion' diseases (CJD or 'Mad Cow Disease is a Prion disease) cannot be destroyed by the treatment process.

The features of wastewater treatment systems are determined by:

1. The nature of the municipal and industrial wastes that are conveyed to them by the sewers.
2. The amount of treatment required to keep the quality of the receiving streams and rivers.

Discharges from treatment plants are usually diluted in rivers, lakes, or estuaries. They also may, after sterilization, be used for certain types of irrigation (such as golf courses), transported to lagoons where they are evaporated, or discharged through underground outfalls into the sea. However, sewage water outflows from treatment works must meet effluent standards set by the Environment Agency to avoid polluting the waters that receive them.
Sewage treatment plant processes fall into two basic types:

Anaerobic Sewage Treatment

Sewage is partly decomposed by anaerobic bacteria in a tank without the introduction of air, containing oxygen. This leads to a reduction of Organic Matter into Methane, Hydrogen Sulphide, Carbon Dioxide etc. It is widely used to treat wastewater sludge and organic waste because it provides volume and mass reduction of the input material to a large extent. The methane produced by large-scale municipal anaerobic sludge treatment is currently being examined for use in homes and industry, for heating purposes. Septic tanks are an example of an anaerobic process, but the amount of methane produced by a septic tank (it is only the SLUDGE at the bottom that produces methane) serving less than 100 people is miniscule. In addition to this, septic tank effluent still contains about 70% of the original pollutants and the process smells very badly, due to the Hydrogen Sulphide, if not vented correctly. The effluent produced by this process is highly polluting and cannot be discharged to any watercourse. It must be discharged into the Aerobic layer of the soil (within the top metre of the ground) for the aerobic soil bacteria to continue the sewage treatment via the aerobic process below.

Aerobic Sewage Treatment

In this process, aerobic bacteria digest the pollutants. To establish an aerobic bacterial colony, you must provide air for the bacteria to breathe. In a sewage treatment plant, air is continuously supplied to the Biozone either by direct Surface Aeration using Impellers propelled by pumps which whisk the surface of the liquid with air, or by Submerged Diffused Aeration using blowers for air supply through bubble diffusers at the bottom of the tank. (The most modern aerobic sewage

systems use natural air currents and do not require electricity, though these are only used for small scale sewage systems at the moment. Once again, the general public leads the way!) Aerobic conditions lead to an aerobic bacterial colony being established. These achieve almost complete oxidation and digestion of organic matter and organic pollutants to Carbon Dioxide, Water and Nitrogen, thus eliminating the odour and pollution problem above.

The effluent produced by this process is non-polluting and can be discharged to a watercourse Conventional sewage water treatment involves either two or three stages, called primary, secondary and tertiary treatment. Before these treatments, preliminary removal of rags, cloths, sanitary items, etc. is also carried out at municipal sewage works.

CASE STUDIES

The Design and Implementation of Smart TrashBin

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❖ **ABSTRACT: -**

This paper presents a cost-effective design of an intelligent waste container for small-scale cases. This system is based on Arduino Nano board and an ultrasonic sensor to monitor the fullness level of the container and give SMS alerts using a GSM module. The system is powered by lithium battery power bank supported by solar cell panel. The system provides an option of charging external portable devices using the power bank. Moreover, the system will store usage events, recorded by PIR sensor, and fullness events on a memory card, which is also used to play audio message using a speaker, when the bin is being used. Finally, the system is implemented successfully with an acceptable overall cost for the intended application. The system performance was found satisfactory according to the obtained test results.

KEYWORDS: Smart Device, Trash Bin, Waste Container, Microcontroller, GSM, Ultrasonic Sensor.

1. INTRODUCTION

Environmental problems are raised by modern cities for waste collection and disposal [1]. Therefore, smart waste management systems became essential for cities that aim to reduce cost and manage resources and time [2]. Currently, the trend is shifting towards smart devices and internet of things (IoT) solutions to overcome common problems such as waste management issues [3]. Optimizing the process of trash collection is the main purpose of the smart solutions provided by industry. However, the cost of applying such solutions is still relatively high [4]. The purpose of this work is to present a cost-effective smart trash bin for localized and small-scale cases, such as small parks, university campus and hospitals. The literature of this paper will present a literature review of past related papers and commercial solutions. Then methodology and methods section will explain the work of the system and all the hardware and software used in this work, besides the design of the smart trash bin. Finally, the results of tests will be discussed followed by conclusions and future work.

Academic Journal of Nawroz University (AJNU) Volume 6, No 3(2017), 8 pages
Received 1 May 2017; Accepted 16 August 2017 Regular research paper: Published 30 August 2017
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2. Literature Review

2.1 Research Papers

The most current related work is done by Zavare and his colleagues [5] on sensor nodes connected to an Arduino board-based control station, that uses a GSM module to send the sensor nodes data by SMS to the garbage collecting vehicle and to a server hosting web application by a Wi-Fi connection. The sensor nodes of the smart bins rely on the ultrasonic sensor to sense the fullness percentage according to pre-calculated bin depth. Moreover, a GPS module is used to get the bin location. The GPS module and the ultrasonic sensor are controlled by Amica R2 NodeMCU microcontroller board which has a built-in Wi-Fi module, that is used to connect to the control station.

Another work on wireless sensor network is done by Singh, Mahajan and Bagai[6]. The bins in his work are equipped with an accelerometer sensor to sense the opening and closing of the bin lid, a temperature and humidity sensor to check the present organic

waste, and an ultrasonic sensor to sense the fullness status of the bin. All these sensors are controlled by Zigbee Pro microcontroller board, which has a built-in Wi-Fi module that is used to send the sensors data to a gateway. This paper also used the same type of microcontroller board in the gateway to receive the bins data and send it to a control station, that contains a server, over GPRS. The server in the control station relies on Caspio database management system with a web-based user interface.

A paper by Navghane, Killedar and Rohokale[7] examined the use of weight sensor and three IR sensors to check the fullness status of the smart bin and send the sensors data to a web page over Wi-Fi network to a mobile phone. The microcontroller board used in this paper was ARM LPC2148.

A report was done by students of California Polytechnic State University [8], thoroughly exploited the economic and power consumption aspects of converting a conventional outdoor trash bin into a smart one. According to the literature, the project is based on u-blox C027-U20 microcontroller board, which has built-in GPS module and cellular module. The board is used to control HC-SR04 ultrasonic sensor, that measures the bin's fullness-level, and a temperature sensor for monitoring weather conditions and fire alerts. The setup is contained by 2×4×6 plastic box and powered by a 12V rechargeable lead-acid battery. The report mentioned that the system generates an HTTP POST request using the data from the sensors and send it to a web application, which is built using Python and Flask framework on top of an SQLite database. The web application receives the HTTP request and check if the bin is full then send SMS message using Twilio service. Moreover, Leaflet JavaScript library is used to virtualize the collected data on a map. In summary, most of the papers above did not focus on covering the overall cost and power consumption of the system, which are the main issues tackled by this paper.

2.2 Commercial and Industrial Solutions

There are several companies offer smart trash bins managed by a web-based application. ECUBE labs [9] and Bigbelly[10] offer smart trash compactor bins, which powered by solar cell panel and battery. Clean CUBE bin uses ultrasonic sensor and Bigbelly smart trash bin uses laser sensor to measure fullness status [9][10]. Moreover, most companies offer IoT sensors, which can be easily installed on available trash bins. ECUBE labs [9], ENEVO [11] and SMARTBIN [12] offer battery powered versions of these ultrasonic IoT sensors. Moreover, CUBE labs offer solar powered one. However, COMPOLOGY [13] offers IoT sensor that uses a camera to detect the fullness status of large industrial trash containers. Most of these IoT sensors and smart bins integrate temperature, tilt and acceleration sensors to

detect vandalism, fire, trash collecting and usage events. All these solutions make use of cellular networks to send data from the IoT sensors and bins to their cloud hosted web-application portal over the internet. These web-applications monitor fullness level, energy usage, fire alerts, and give real-time readings and historical reports in addition to schedules and routes for optimized trash collection. Finally, contrary to the mentioned solutions, this paper aims to reduce cost by sending fullness alert without the need for internet connection and web-applications.

3. Methodology and Methods

This work will put a design for the smart trash bin, then explain the used hardware parts and how it is connected together. The software is then explained and illustrated as a flowchart. Figure 1 shows the basic operation of the system. The fullness status of the bin is determined by calculating the distance between the lid of the bin and the trash by using a sensor. A distance threshold will be set according to the bin dimensions. When the distance measuring sensor indicates that the bin is full, then a microcontroller board will control a GSM module to send SMS alert, that contains bin ID and alert message, to a predefined phone number. The location of the bin is predefined by a sanitary worker who will identify the filled bin by its ID, which received by the SMS alert. The system will return to default operation when the bin is emptied by the sanitary worker. An LED will keep blinking until the bin emptied from trash. A memory card will register all the usage and fullness alerts for later analyses. Moreover, a motion sensor will be used to detect the usage event to play a thanking audio message stored on the memory card using a speaker to encourage the bin user. A block diagram of the system is shown in Figure 2.

Fig 5.7: Basic operation of the system

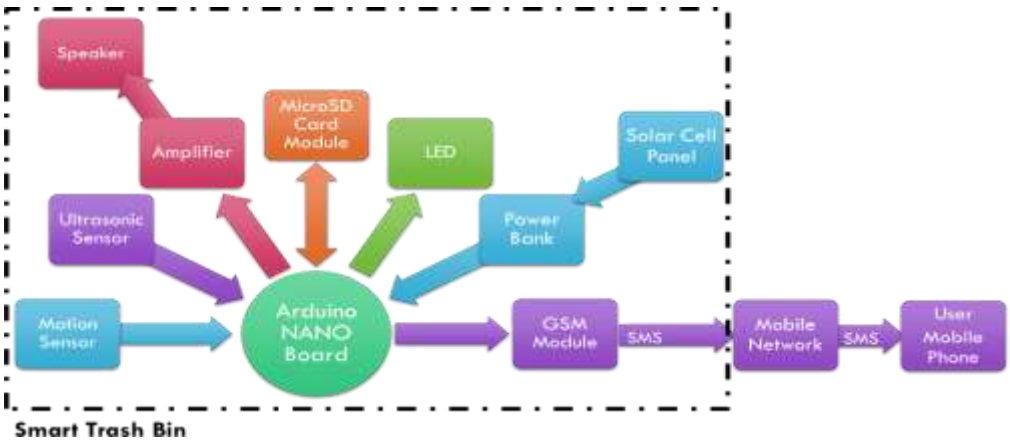

Fig 5.8: System Block Diagram

3.1 Design

The system design tries to be cost-effective and user-friendly. Figure 3 shows an outdoor trash bin after and before applying the metal work. The design relied on a commonly used outdoor trash bin, which is redesigned to append an extension arm to hold the solar cell panel. The metal work also included adding an 18cm × 22cm tray for holding any electronic device during charging from the USB port, height of the bin from the ground to the end of solar cell which will be attached to the extension arm. The panel is 155cm. The trash container has a cylindrical shape of 30cm diameter and 46cm height. However, the height from the bottom of the bin opening is 27cm, which gives a volume of 76341cm^3. Moreover, all the electronic parts will be mentioned in the next section are held inside (110×180×77mm) plastic electric junction box, which held underneath the bin lid. This design is applicable to almost any standard outdoor trash bin.

Fig.5.9 The design of smart trash bin, before (right) and after (left) the metal work

3.2 Hardware

integrated 5V voltage regulator and can provide serial The system structure relies on Arduino Nano board. According to the datasheet, it is based on ATmega328 microcontroller which has a 16MHz clock speed, 32 KB flash memory, 2KB SRAMand 1KB EEPROM. Arduino Nano is a microcontroller breadboard with communication over USB with a computer for programming. It also has 14 digital I/O pins; 6 of them can provide PWM output and 2 external interrupt pins. This microcontroller supports SPI and I2C communications. Moreover, it also has 8 analog I/O pins. All these pins candeliver or accept a maximum of 40 mA and has an internal pull-up resistor 20-50 kΩ. All the above comes in a small package of 18 x 45 mm and weighs 4g. This microcontroller breadboard was chosen for its size, weight, functionality and its programming flexibility. Figure 4 and Figure 5 shows the system schematic of the circuit board and how the following electronic parts are connected inside the electric junction box. Ultrasonic ranging module sensor (HC-SR04) is used to detect the fullness level of the trash bin. According to the datasheet, this sensor can detect a 0.5m2 object from a range of 20- 400cm with a 15-degree measuring angle. Moreover, it can detect liquid and solid objects, and also immune to almost any outdoor interference sources. This sensor returns Time of Flight (ToF) which is the time interval that ultrasonic wave takes to cross back and forward between the wave source and the material boundary[14]. $Distance = ToF \times Speed\ of\ Sound$ 2 The system depends on GSM module (sim900a mini v3.8.2) to send SMS fullness alerts. according to the datasheet, the module can be controlled by sending AT commands over its 5V serial port. The Rx pin of GSM module is connected to analog pin A3 on the Arduino Nano, and the Tx pin of the module is connected to A4 pin of the Arduino board. A3 and A4 pins will be turned into Tx/Rx pins using a software library, because of the GSM module relies on serial communication and Arduino Nano has no extra serial port. An LED, with a 1kΩ resistor, is used to give a visual alert when the bin is full. Moreover, a PIR motion detector (HC-SR501) is used to sense when the trash bin is being used. According to the datasheet, this sensor has a sensing range of 120 degrees within 7 meters. Therefore, the sensor is installed to the side of the plastic box and partially covered to sense only user hand entering the bin. The usage event is triggered by the PIR sensor. This sensor will interrupt the microcontroller work using pin 3 to play a WAV file stored on a MicroSD card, which is connected to the setup by an adapter from Waveshare. The audio message is played over 3W/4Ω speaker driven by an HXJ8002 audio amplifier. The MicroSD card is also used to log the fullness and usage events inside CSV files for further analyses. Finally, the setup of the system is powered by off-the-shelf 12000mAh power bank, which will also be used to

charge any electronic device provided by bin user. The power bank is backed up by 13W/5V solar cell panel which can supply current up to 2.6A.

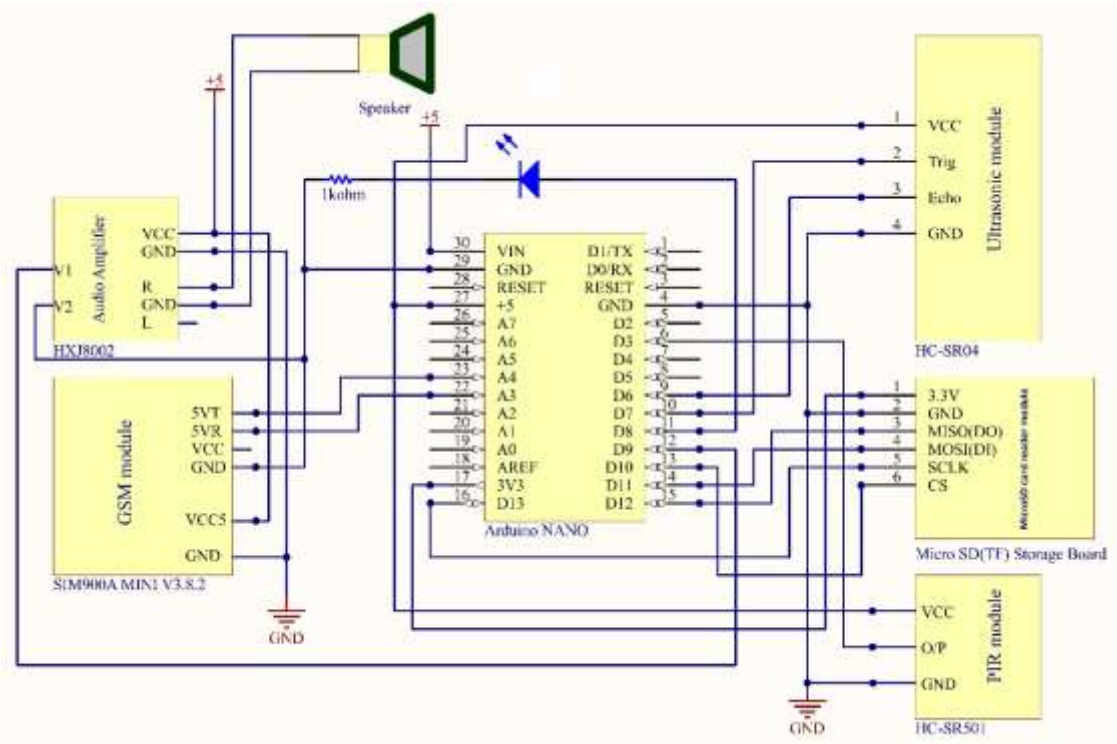

Fig 5.10: Circuit board schematic

Fig 5.11: Hardware setup

3.3 software

The whole program is done using Arduino IDE. Figure 6 shows a flow chart of the Arduino program. Four libraries were used to facilities communicating with the modules. Software Serial library is used to communicate with the GSM module and send AT commands to it. This library is used because of Arduino Nano does not have an additional serial port, which the GSM module rely on for communication with the microcontroller. This library transforms A3 and A4 pins into extra Tx and Rx pins to connect the Tx/Rx pins of the GSM module. SPI library is used for communicating with the MicroSD module which depends on Serial Peripheral Interface (SPI) data protocol. SdFat library is used to manage data and read/write files on the MicroSD card. The last library is TMRpcm, which is used to output the WAV file, stored on the MicroSD, as PWM signal to digital pin 9 that connected to the speaker. The Setup function of the Arduino program first defines the used pins as outputs or inputs, then sends AT commands to the GSM module to enable text mode, enable local time/date stamp and store current settings on the GSM module memory. The time/date stamp will be stored on CSV files during logging events on. This function is also used to get the phone number and SMS alert text, which will be sent to that number in case of fullness event, from text files on the MicroSD card. This step is done to simplify changing these parameters without altering the program. The final step of Setup function is initializing digital pin 3 as an interrupt pin to connect the output pin of the PIR module to it. When the voltage rises on the output pin of the PIR module, the work of the microcontroller will be interrupted to play the WAV file on the speaker and log the usage event with the current time/date stamp on the CSV file. The Loop function is used to measure the distance between the ultrasonic module and the trash every 15 minutes. This time period can be changed hereafter to correspond with real life operating cases. A while loop will iterate while the measured distance is smaller than a threshold, which is measured 10cm according to the bin dimensions. The LED will blink for 5 seconds before a second measuring is taken inside the while loop to check if the measured value still satisfies the condition and no SMS alert has been sent. After that, the SMS alert message will be sent and the fullness event will be logged in the CSV file. Finally, as bookkeeping measure, the balance of the used SIM card is added to the SMS text before sending it. The balance is obtained by sending Unstructured Supplementary Service Data (USSD) code to the mobile network using AT command, which is executed by the GSM module.

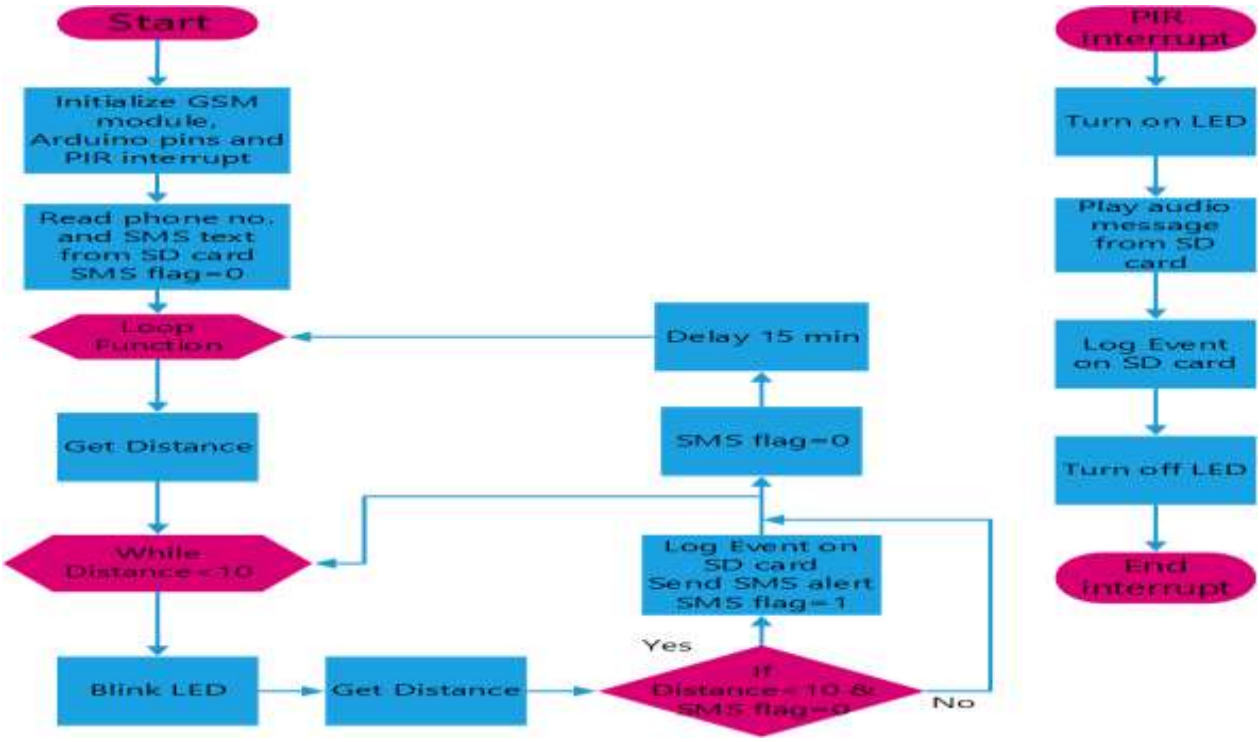

Fig 5.12: Software flow chart

4. Results and Discussion

The smart bin was tested first indoor without charging the power bank by the solar cell panel. The system worked as intended for it to do. Then the bin was installed outdoor in the main square of Nawroz University campus for a period of seven days. During this period, the solar cell panel managed successfully to charge the power bank and kept the system running. However, after examining the CSV files on the MicroSD card, the realization was that the PIR sensor kept going off and interrupt the Arduino board to play the audio message. The main reasons behind this behaviour are heat exposure and reflected sunlight from objects inside or around the bin, even though the PIR sensor datasheet points that the operating temperature of the sensor is between -30O C to +70O C. The data sheet also noted that light and wind flow can be considered as interference sources. Therefore, a second outdoor test was done for another seven days with the PIR sensor is disabled. Despite that, the bin did not get full during this period but the system sent SMS fullness message every time fullness status simulated by putting an obstacle in front of the ultrasonic sensor. In terms of power consumption, the measured current drawn by the whole system was 400mA, despite that the GSM module has a power rate of 2W/5V. According to the measured current, the power bank will last for 30 hours and the solar cell panel will require another 30 hours to fully charge the power bank. This is

can be feasible during summer long days, as shown in the first test. However, the GSM module has a sleep mode which reduces the current consumption of the module to 1.5mA during the idle period. This mode could not be implemented because of the power bank is designed to be automatically turned off when the power consumption is too low. In terms of cost, the mobile network subscription was found satisfactory for giving 100 SMS message per 5000IQD credit. However, most mobile network companies put a 90-day expiration period on the credit. Table 1 shows the overall cost of the system without the cost of the bin itself, because of the system can be applied to almost any type of trash bin. If the PIR sensor and speaker were considered as an accessory, the bare minimum cost for the system will be $160. Finally, the solution provided by this system can be effective in managing large numbers of trash bins over a small-scale location, due to the no need for internet connectivity and computer to track the status of the bins. However, keeping aware of the bins locations according to their IDs, which are sent by the fullness SMS message, is required for a successful trash collection.

Component	Fixed cost	Periodic cost
Metal work and paint	**Rs.1884.5**	
Solar panel	**Rs.2562.92**	
Power bank	**Rs.2261.4**	
Electric junction box	**Rs.301.52**	
Arduino Nano	**Rs.904.56**	
GSM module	**Rs.2261.4**	
Ultrasonic sensor	**Rs.603.04**	
PIR sensor	**Rs.452.28**	
MicroSD card module	**Rs.376.9**	
Other parts and soldering	**Rs.753.8**	
GSM network credit		**5000IQD ≈ rs301.52**
Total	**Rs.12663.84**	

Table 5.1: Overall cost of the system

2. Conclusion and Future Work

Most of the past work on this subject focused on utilizing cellular network to connect to the internet for sending the sensor's data to a server. On the contrary, this paper considered using the cellular network to send fullness SMS alert directly to the user. Therefore, the work in this paper can be considered as a smart device, not as IoT solution. This system does not offer all the facilities that provided by the web applications of IoT products and papers mentioned above. However, the reduction in cost offered by this paper is noticeable, if compared with the cost of commercial products and the work in [8] due to opting out the presence of an online server. The results of the indoor test indicate that the setup worked perfectly under normal conditions.

Moreover, the outdoor tests showed that solar cell panel performed adequately in charging the power bank and keeping the system running. In terms of mobile network subscription expiration period, the system can make use of postpaid plan to overcome this issue. Moreover, a custom-built power bank is recommended, with the use of USB DC-DC step- up module, Li-Ion battery charging module and 3.7V Li- Ion rechargeable batteries, to overcome the issue of the automatic shutdown of the power bank.

This will also reduce the cost of the system by $20. The option of charging any electronic device for the bin user can be omitted to reduce cost and receive a better performance from the power bank. Moreover, can make use of the concept of gateway or control station that mentioned in [5] and [6] to further reduce the overall cost. However, a number of bins connected to a single control station and range limitation of the Wi-Fi module must be taken into consideration.

In terms of security, the author considers it is unpractical to add accelerometer sensor to send an alert in case of vandalizing and GPS module to track the bin location in case of theft. Accelerometer sensor cannot differentiate between an animal, a person or extreme weather shaking the bin. Moreover, the first thing a thief would do is disconnecting the power from the system, thus the GPS module will be useless in tracking the bin location. However, a temperature or smoke sensor can be added to the system to send an alert in case of fire. The advantages and disadvantages of this work are illustrated in the table below

Advantages	Disadvantages
Low building cost.	**Requires manual recharging of mobile network subscription.**
Low operating cost.	**Requires pre-knowledge of the bins' locations.**
Can work outdoors and indoors.	**Security measures depend on build quality and fixed installation of the bin.**
Can run for a long time.	**Don't send an alert in case of fire.**
Low maintenance requirements.	
User-friendly design.	
It has an AUX USB port to charge external electronic devices.	

Table 5.2: advantages & disadvantages

Finally, this paper managed to present a cost-effective and user-friendly smart waste container for small-scale cases, comparing to the past work mentioned above. As a future work, the overall cost can be further reduced if the GSM module is replaced by Wi-Fi module, which connects to an intranet WLAN to send the fullness alert to the user mobile phone. This will remove the periodic cost of mobile network subscription and reduce the power consumption of the system.

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Chapter-6 Swatchh Bharat abhiyan (clean India)

6.1 SWATCHHTA NEEDED IN VARNAMA VILLAGE – EXISTING SITUATION WITH PHOTOGRAPH

Fig 6.1 Situation

6.2 GUIDELINES - IMPLEMENTTION IN VARNAMA VILLAGE WITH PHOTOGRAPH

FIG 6.2 waste

The past two and a half years has witnessed a historical journey for India along the path of 'swachhata'. With the launch of the Swacthh Bharat Mission (Urban), the issue of urban sanitation was for the first time brought to the forefront of the Central government's developmental agenda. Implementation of SBM (G) requires large scale social mobilization and monitoring. A 5- Tier implementation mechanism should be set up at the National/State/District/Block/Village level as given below:

The Swacthh Bharat Mission will be set up at the Ministry of Drinking Water and Sanitation. Secretary DWS will be the Mission Director, to be assisted by Additional Secretaries, Joint Secretaries, Directors, Deputy Secretaries and Technical advisors as is decided by the Government of India from time to time**.**

The Mission will have a Monitoring and Evaluation Cell which shall be responsible for carrying out relevant and suitable annual or biannual Monitoring exercises of the implementation of the SBM(G) in States, in consultation with other agencies like NSSO and Registrar General of India. The Cell shall be responsible for coordination with States and Districts on Monitoring. The Cell shall also monitor the reports and publications being brought out by various agencies and organizations regarding the changing sanitation situation in the country. The Cell will also have the responsibility of monitoring the activities of all other Ministries of Government of India and individual States / UTs with respect to the Swacthh Bharat Mission. The Cell will work towards developing the SBM (G)-MIS of the Ministry in coordination with the NIC.

The Mission will have a Communication Cell that shall prepare and implement the Annual and long-term Communication plan of the Swacthh Bharat Mission (Gramin)of the MDWS. The Cell will coordinate with the Ministry of I & B, DAVP, DD, AIR, NFDC and other communication agencies on the plan. The cell will also monitor the Communication plan and activities of states to ensure commonality of focus and purpose.

The National Resource Centre (NRC), a group of experts in various aspects of sanitation and water supply, situated within the MDWS shall be a technical assistance unit to the Swacthh Bharat Mission.

Action for making your village Clean

Simple, but important steps should be taken by us to keep our village clean: -

- Keep paper bags with yourself to store wet waste and throw them in dustbin only.
- Avoid spitting on roads (as it can be the reason of viral disease).
- Avoid chewing Pan-Masala, Gutkaand Tobacco.
- Avoid use of plastic bags.
- Follow government's rules and regulations, if someone is breaking the rule then make them aware of it.

6.3 ACTIVITIES DONE BY STUDENTS FOR ALLOCATED VILLAGE WITH PHOTOGRAPH

Our allocated village has already neat and clean so we had not done any activity regarding swatch Bharat abhiyan.

Chapter 7: Village condition due to Covid-19

7.1 TAKEN STEPS IN VARNAMA VILLAGE RELATED TO EXISTING SITUATION WITH PHOTOGRAPH

- All schools, shops, collage, temple, bank, railway station, etc. remains closed till government guidelines to open.
- all steps taken for sanitization of public transport vehicles and terminals. This is to ensure sanitation of seats, handles, and bars at all bus terminals are disinfected.
- The municipal corporation to plan sterilizes and sanitize schools and colleges.
- The hospitals added the extra beds and extra body kits and spraying machines, etc. for present to covid situation.
- The corporation has ordered to cancellation of all weekly markets, with an immediate effect.
- The person who travelled abroad in the last 14 days to self-isolate for at least 2 weeks
- The persons should compulsorily wear the mask and maintain social distancing to each other.

FIG 7.1 photographs

7.2 Activities Done by Students for allocated village with Photograph

FIG 7.2 Covid -19 photograph

7.3 ANY OTHER STEPS TAKEN BY THE STUDENTS / VILLAGERS

In this corona-times the safety is very necessary for peoples of village. Because at this times the village peoples are not know about their safety and health protection there selves. So we decided to awake the peoples about health safety so we distributed the mask to the villagers and known them the benefits about mask.

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

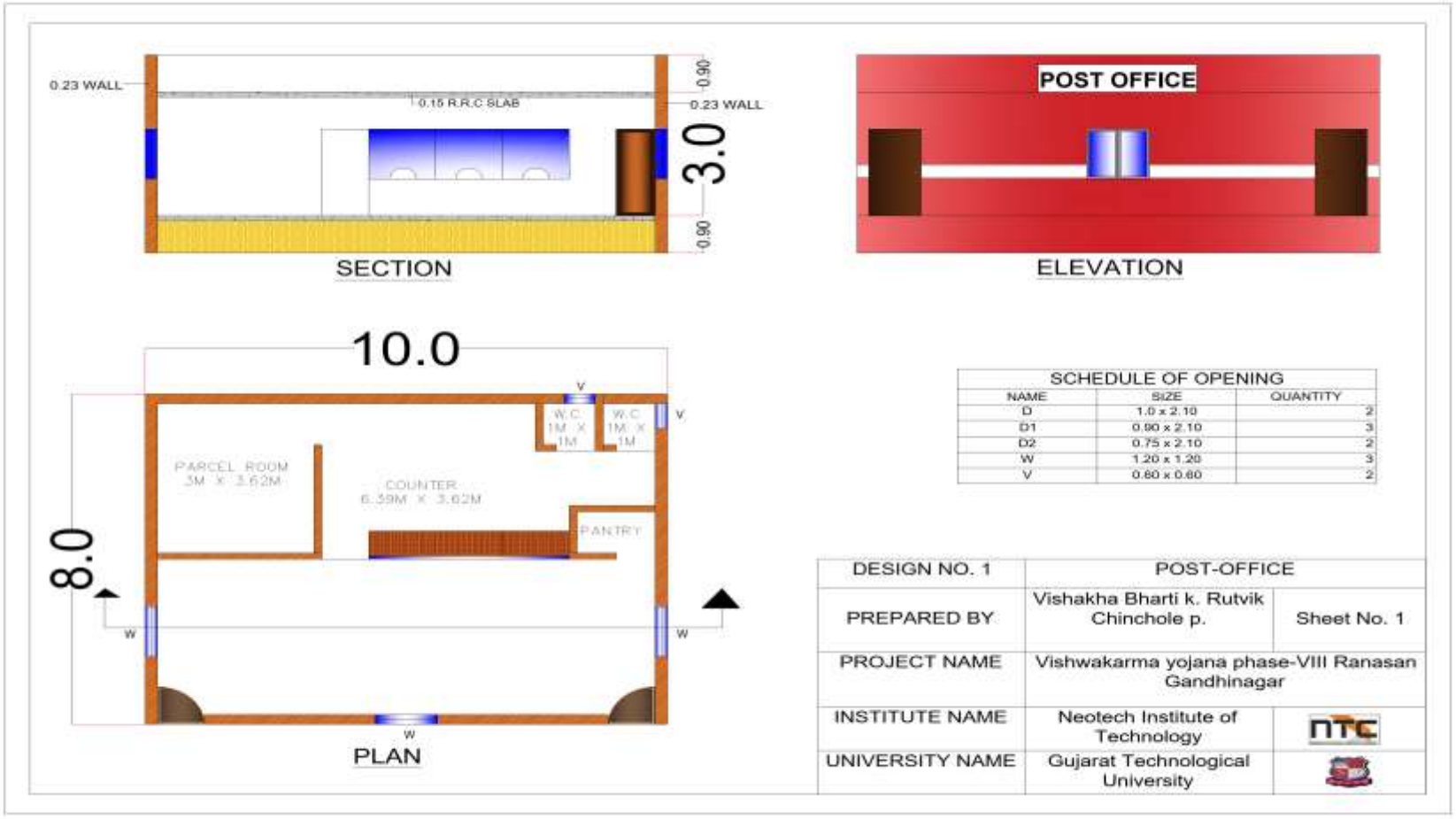
8.0 OBSERVATION AND BRIEF WRITE UP ABOUT THE EXISTING DESIGN

- We visit the village under this project. First of all, we meet the T.D.O of the village and collect the data of the village. And doing their analysis. After more visit of T.D.O, Sarpanch, and Talati we take much information about the village. And also analyze the data which we collect. Also, we visit the village with villager sand Talati and observe the present condition of the village. Which we saw that the village condition is good. But it's required to develop at some extent.
- The post office, Primary school, the village pond is not in good condition in village.
- In the Physical infrastructure facility, we observed Main Source of Drinking Water, Water tank facility, Drainage facility, types of drainage, Road networks, Transportation facility, Electrical Distribution, Sanitation facility, irrigation facility and housing condition etc.
- In village we observed that the sustainable infrastructure facilities like post office no in good condition. The Post office is situated in in house. There was not separately structure is not dedicated to post office. The drainage system is not in good condition. And many other facilities like, Public garden, Public toilet is noting good condition or not available in village.

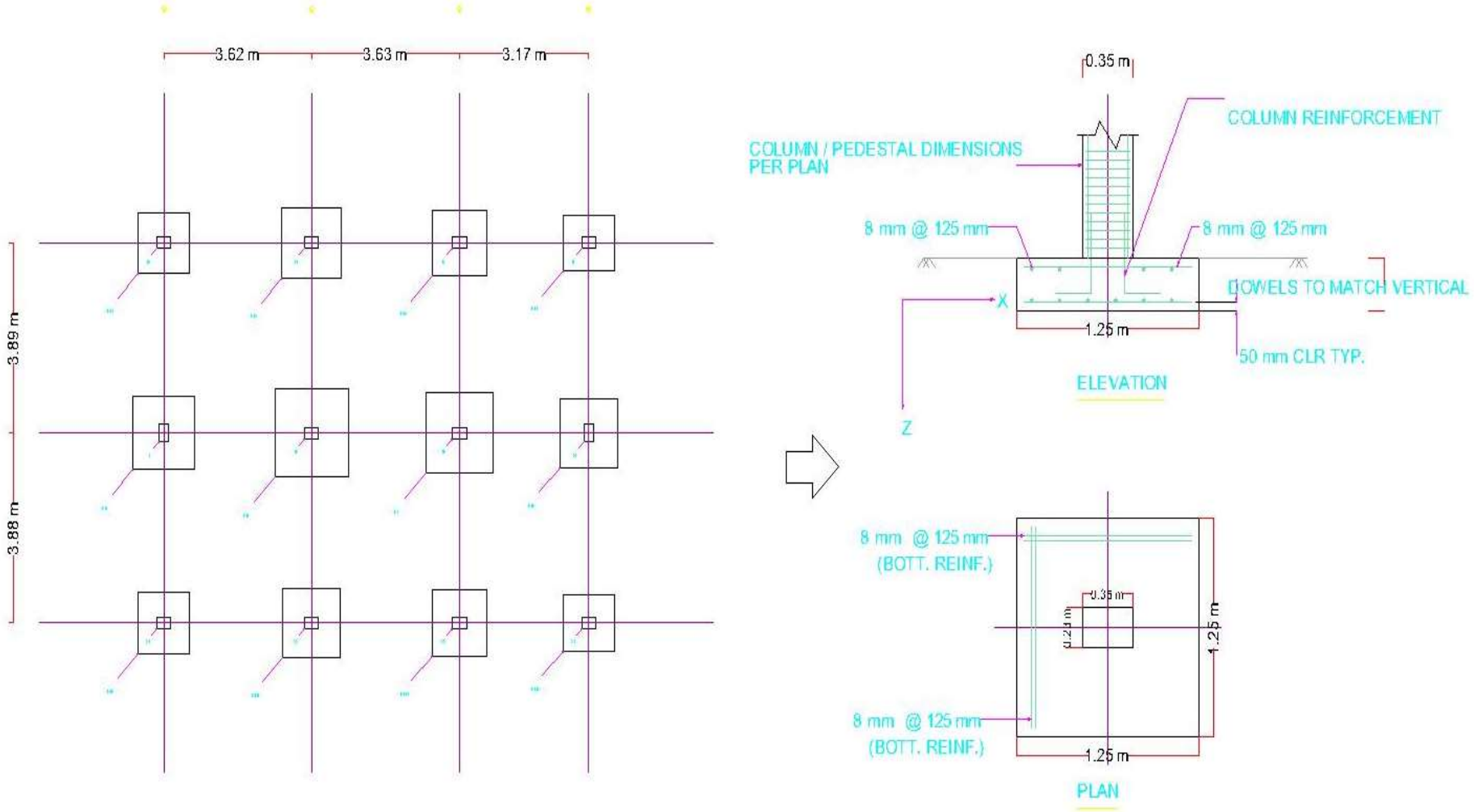
8.1 DESIGN PROPOSALS

- In village for post office Particular structure is not available. So, the people recommendation cannot complete with existing post office.
- In village bank is very small & area is so congested so, new bank will be provided in village.
- Public toilet block is not available in village.
- The primary school is not better condition so, we will provide the new primary school in village and help for student's activities.
- Public garden is not available in village for local people.

8.1.1 Planning proposal of Post Office: - (AREA= 80 sq.m)



FOOTING PLAN: -



❖ **Measurement table: -**

Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	Earthwork in Excavation in Foundation						
	Footing(1.25*1.25)	4	1.25	1.25	1.5	9.38	
	Footing(1.45*1.45)	3	1.45	1.45	1.5	9.46	
	Footing(1.35*1.35)	2	1.35	1.35	1.5	5.47	
	Footing(1.40*1.40)	1	1.4	1.4	1.5	2.94	
	Footing(1.7*1.7)	1	1.7	1.7	1.5	4.34	
	Footing(1.65*1.65)	1	1.65	1.65	1.5	4.08	
							35.7
2	P.P.C. in Foundation						
	Thickness=.10						
	Footing(1.25*1.25)	4	1.75	1.75	0.1	1.23	
	Footing(1.45*1.45)	3	1.95	1.95	0.1	1.14	
	Footing(1.35*1.35)	2	1.85	1.85	0.1	0.68	
	Footing(1.40*1.40)	1	1.9	1.9	0.1	0.36	
	Footing(1.70*1.70)	1	2.25	2.25	0.1	0.51	
	Footing(1.65*1.65)	1	2.15	2.15	0.1	0.46	
							4.4
3	Column						
	Base:-						
	Thickness=0.305						
	Footing(1.25*1.25)	4	1.25	1.25	0.305	1.91	
	Footing(1.45*1.45)	3	1.45	1.45	0.305	1.92	
	Footing(1.35*1.35)	2	1.35	1.35	0.305	1.11	
	Footing(1.40*1.40)	1	1.4	1.4	0.305	0.60	
	Footing(1.7*1.7)	1	1.7	1.7	0.305	0.88	

	Footing(1.65*1.65)	1	1.65	1.65	0.305	0.83	
						7.25	
	Stem(0.23*0.30):-						
	Height=1.5+0.85= 2.35m						

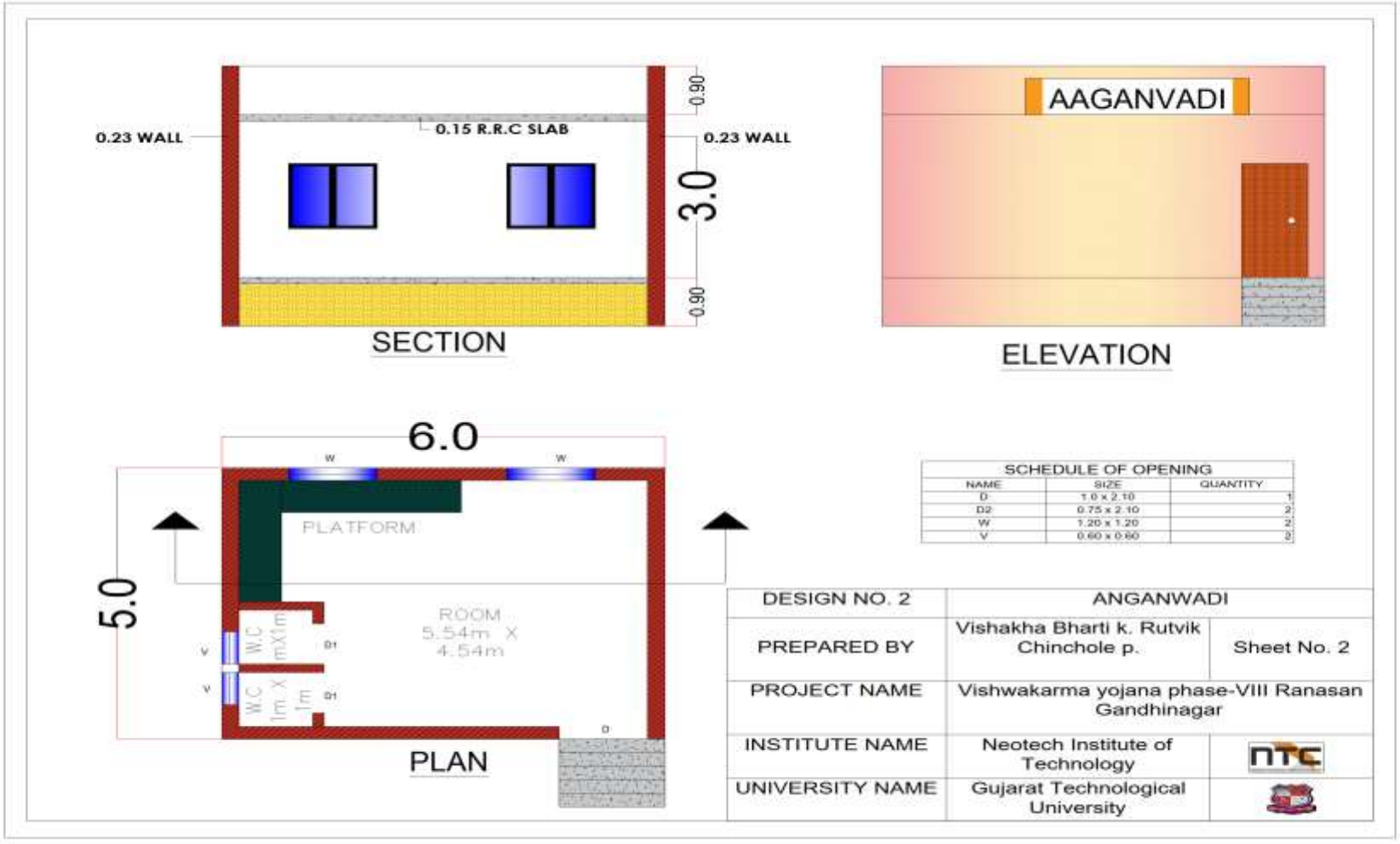
	Footing(1.25*1.25)	4	1.25	1.25	2.35	14.69	
	Footing(1.45*1.45)	3	1.45	1.45	2.35	14.82	
	Footing(1.35*1.35)	2	1.35	1.35	2.35	8.57	
	Footing(1.40*1.40)	1	1.4	1.4	2.35	4.61	
	Footing(1.7*1.7)	1	1.7	1.7	2.35	6.79	
	Footing(1.65*1.65)	1	1.65	1.65	2.35	6.40	
						55.87	
						Total	63.1
4	**Plinth Beam:-**						
	BEAM 1	3	3.19	0.23	0.35	0.77	
	BEAM2	3	4.24	0.23	0.35	1.02	
	BEAM3	3	2.34	0.23	0.35	0.57	
	BEAM4	4	3.81	0.23	0.35	1.23	
	BEAM5	4	3.96	0.23	0.35	1.28	
						total	4.9
5	**Earth Filling in Plinth:-**						
	Passage Room (9.54m*3.77m)	1	9.54	3.77	0.45	16.18	
	W/C (1m*2.34m)	1	1	2.34	0.45	1.05	
	Parcel Room(3m*3.62m)	1	3	3.62	0.45	4.89	
	Counter Room(6.39m*3.77m)	1	6.39	3.77	0.45	10.84	
						Total	33.0
6	**Damp proof course(DPC):-**						
	36-((0.3/2)*0)						
	36	1	36	0.3			10.8

7	**Brick Work in Super Structure: -**						
	36-((0.3/2) *0)						
	36	1	36	0.3	3		32.4
	Partition Wall:-						
	w1= (L=1m) ,(B=0.115m)	1	1	0.115	3	0.35	
	w2=(L=0.84m),(B=0.115m)	1	0.84	0.115	3	0.29	

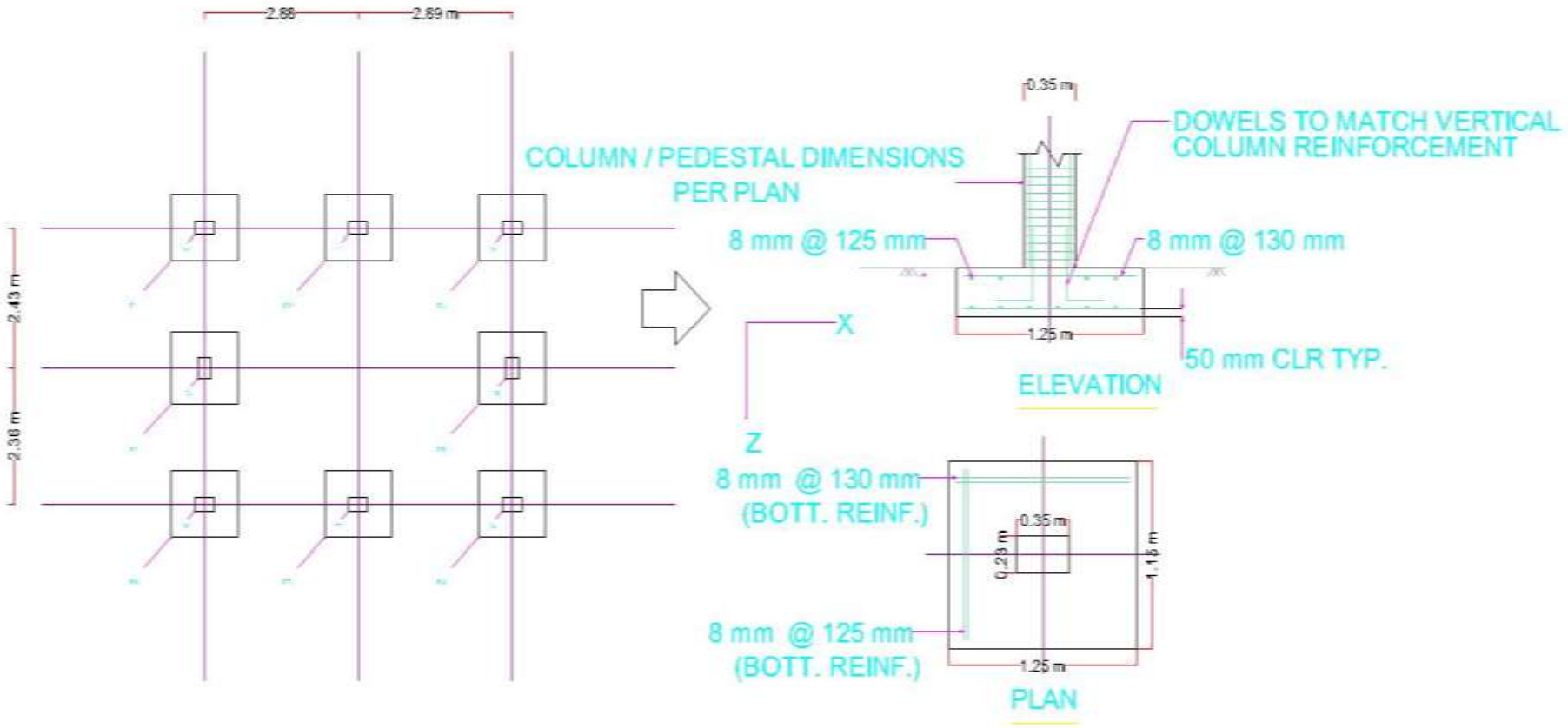
❖ Abstract sheet: -

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	440	BAGS	300	132000
2	SAND	15.4	M.T.	700	10780
3	AGGREGATES	30.4	M.T.	900	27360
4	STEEL	2420	KG	48	116160
5	BINDING WIRE	25	KG	61	1525
6	PLASTER	2155	sq. Ft	30	64650
7	EXCAVATION WORK	36	m3	130	4680
8	BRICK (RAHI)	65000	NOS.	5.5	357500
				TOTAL	714655
				1.5% WATER	10719.82
				10% CONT.PROFIT	71465.5
				Total amount	796840.32

8.1.2 Planning proposal of Anganvadi: - (AREA= 30 sq.m)



FOOTING PLAN: -



❖ **Measurement table: -**

Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	Earthwork in Excavation in Foundation						
	Footing(1.25*1.50)	4	1.25	1.5	1.5	11.25	
	Footing(1.25*1.25)	2	1.25	1.25	1.5	4.6875	
	Footing(1.30*1.30)	2	1.3	1.3	1.5	5.07	
							21.01
2	P.P.C. in Foundation						
	Thickness=.10						
	Footing(1.25*1.50)	4	1.75	2	0.1	1.4	
	Footing(1.25*1.25)	2	1.75	1.75	0.1	0.6125	
	Footing(1.30*1.30)	2	1.8	1.8	0.1	0.648	
							2.6605
3	Column						
	Base:-						
	Thickness=0.305						
	Footing(1.25*1.50)	4	1.25	1.5	0.305	2.2875	
	Footing(1.25*1.25)	2	1.25	1.25	0.305	0.953125	
	Footing(1.30*1.30)	2	1.3	1.3	0.305	1.0309	
						4.271525	
	Stem(0.23*0.30):-						
	Height=1.5+0.85= 2.35m						
	Footing(1.25*1.50)	4	1.25	1.5	2.35	17.625	
	Footing(1.25*1.25)	2	1.25	1.25	2.35	7.34375	
	Footing(1.30*1.30)	2	1.3	1.3	2.35	7.943	
						32.91175	
						Total	37.183275

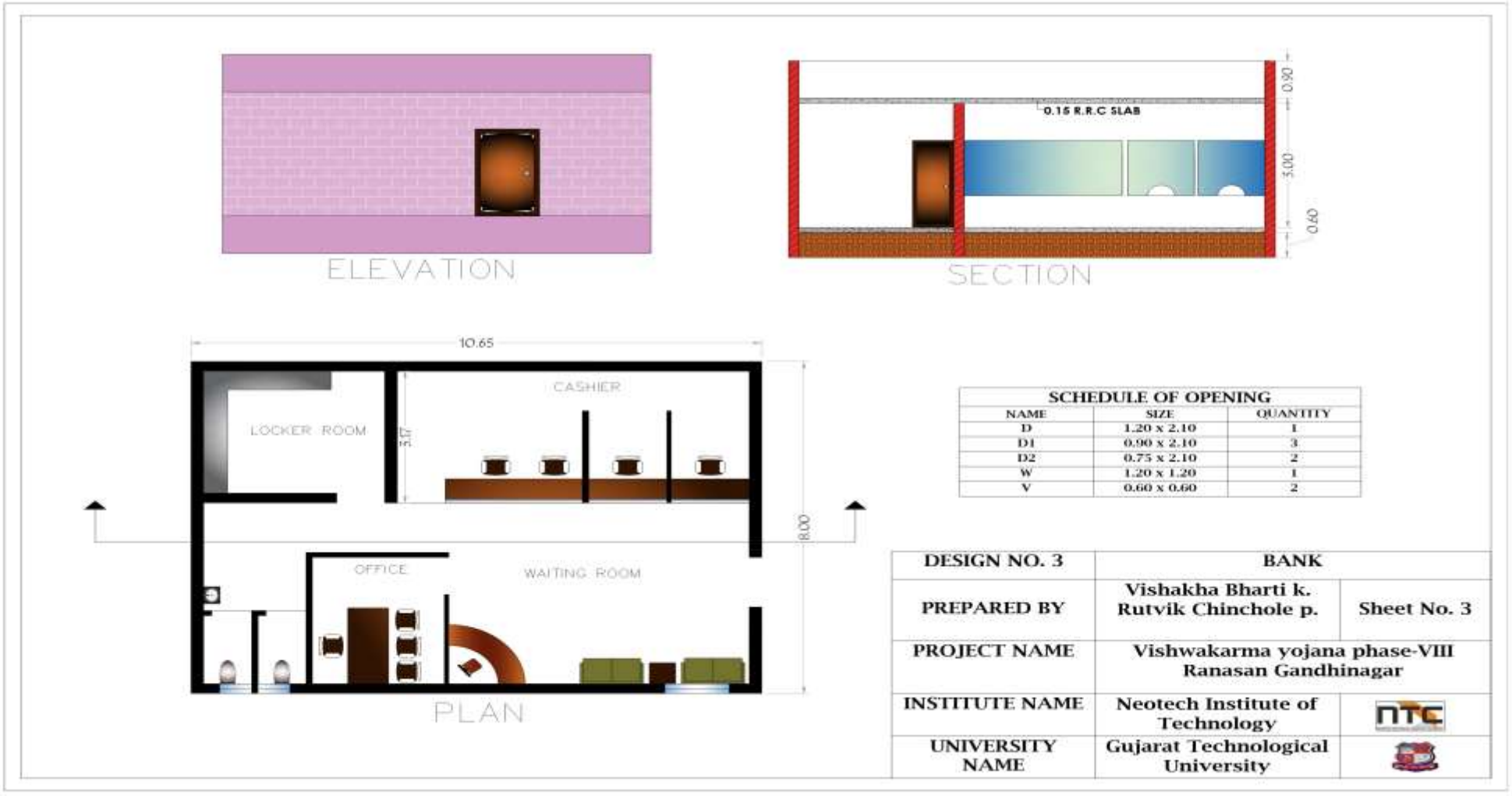
4	Plinth Beam:-						
	BEAM 1	6	2.88	0.23	0.3	1.19232	
	BEAM2	6	2.89	0.23	0.3	1.19646	
	BEAM3	6	2.43	0.23	0.3	1.00602	
	BEAM4	6	2.36	0.23	0.3	0.97704	
						total	4.37184
5	Earth Filling in Plinth:-						
	Class room (5.54m*4.54m)	1	5.54	4.54	0.45	11.31822	
	W/C (1m*2.15m)	1	1	2.15	0.45	0.9675	
						Total	12.28572
6	Damp proof course(DPC):-						
	21.12-((0.3/2)*0)						
	21.12	1	21.12	0.3			6.336
` 7	Brick Work in Super Structure:-						
	21.12-((0.3/2)*0)						
	21.12	1	21.12	0.3	3		19.008
	Partition Wall:-						
	w1= (L=1m) ,(B=0.115m)	1	1	0.115	3	0.345	
	w2=(L=0.65m),(B=0.115m)	1	0.65	0.115	3	0.22425	
						Total	19.57725
	Deduction:-						
	Door (1.20*2.10)	1	1.2	0.3	2.1	0.756	
	Door (0.75*2.10)	2	0.75	0.115	2.1	0.36225	
	Windows(1.20*1.20)	4	1.2	0.3	1.2	1.728	
	Ventilation(0.60*0.60)	2	0.6	0.3	0.6	0.216	
							3.06225
	Lintel:-						
	Door (1.20*2.10)	1	1.5	0.3	0.15	0.0675	

	Door (0.75*2.10)	2	1.05	0.115	0.15	0.036225	
	Windows(1.20*1.20)	4	1.5	0.3	0.15	0.27	
	Ventilation(0.60*0.60)	2	0.9	0.3	0.15	0.081	
							0.454725
	TotalBrickwork AferDeduction:-					Total	16.060275
8	brick work						
	area:- ((2*2.70*5)+(2*2.70*6))=59.4 (59.4/0.19*0.9*0.9)=38596.49 nos.						39,000 NOS. of brick
9	Plaster						
	60.6						
	double plater = (2*60.6)=121.2m2						
	125m2						
10	Slab						
	L=6						
	B=5						
	H=0.15	1	6	5	0.15		4.5

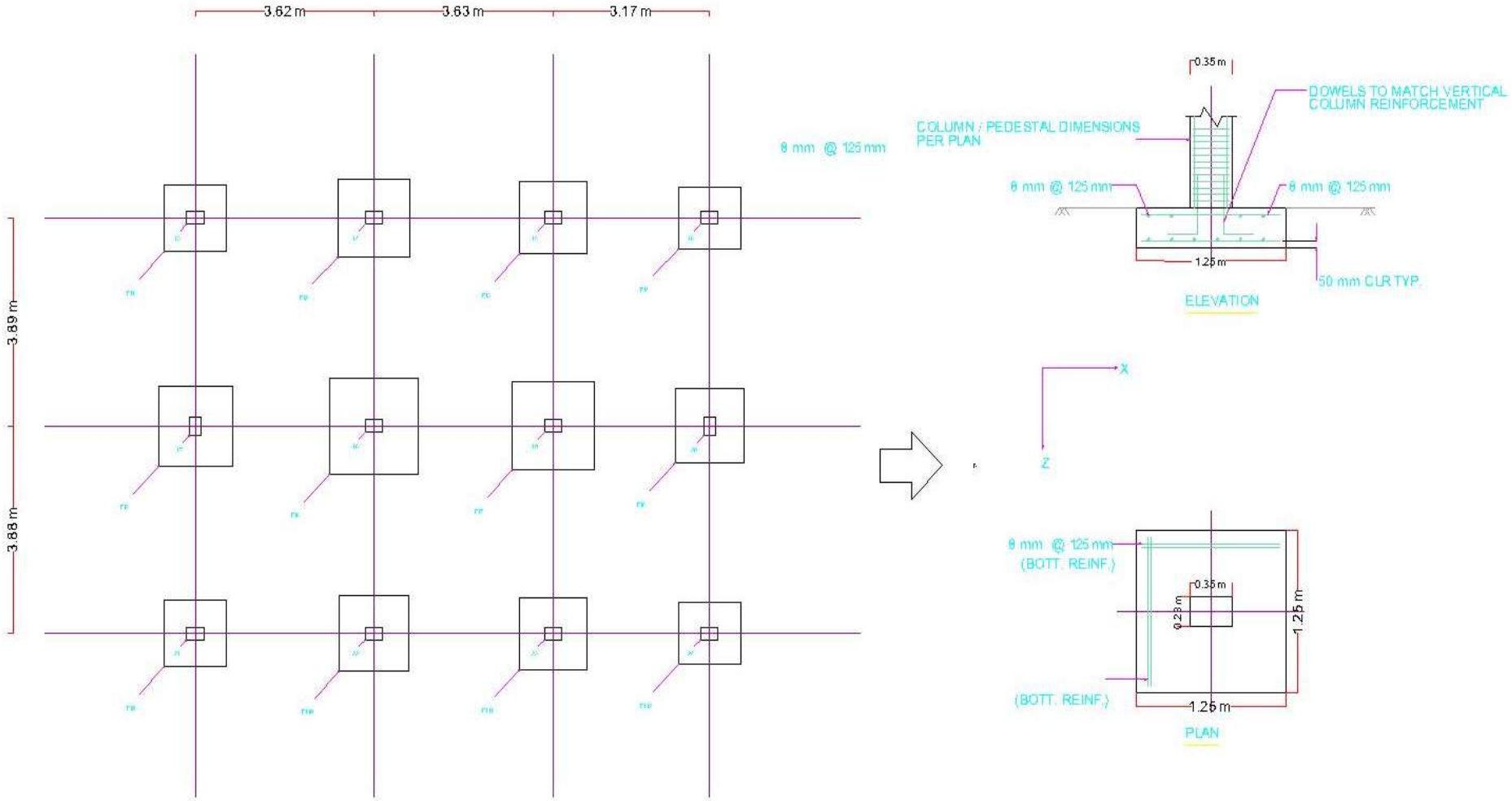
❖ Abstract sheet: -

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	200	BAGS	300	60000
2	SAND	7	M.T.	700	4900
3	AGGREGATES	14	M.T.	900	12600
4	STEEL	1875.4	KG	48	90019.2
5	BINDING WIRE	19	KG	61	1159
6	PLASTER	640	sq. Ft	30	19200
7	EXCAVATION WORK	22	m3	130	2860
8	BRICK (RAHI)	39000	NOS.	5.5	214500
				TOTAL	405238.2
				1.5% WATER	6078.57
				10% CONT.PROFIT	40523.82
				Total amount	451840.59

8.1.3 Planning proposal of Bank: - (AREA= 85.21 sq.m)



FOOTING PLAN: -



❖ Measurement table: -

Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	Earthwork in Excavation in Foundation						
	Footing(1.45*1.45)	4	1.45	1.45	1.5	12.615	
	Footing(1.25*1.25)	2	1.25	1.25	1.5	4.6875	
	Footing(1.35*1.35)	2	1.35	1.35	1.5	5.4675	
	Footing(1.25*1.15)	2	1.25	1.15	1.5	4.3125	
	Footing(1.40*1.40)	2	1.4	1.4	1.5	5.88	
	Footing(1.50*1.50)	1	1.5	1.5	1.5	3.375	
	Footing(1.80*1.80)	1	1.8	1.8	1.5	4.86	
	Footing(1.65*1.65)	1	1.65	1.65	1.5	4.08375	
							45.28
2	P.P.C. in Foundation						
	Thickness=.10						
	Footing(1.45*1.45)	4	2	2	0.1	1.6	
	Footing(1.25*1.25)	2	1.75	1.75	0.1	0.6125	
	Footing(1.35*1.35)	2	1.85	1.85	0.1	0.6845	
	Footing(1.25*1.15)	2	1.8	1.7	0.1	0.612	
	Footing(1.40*1.40)	2	1.9	1.9	0.1	0.722	
	Footing(1.50*1.50)	1	2	2	0.1	0.4	
	Footing(1.80*1.80)	1	2.3	2.3	0.1	0.529	
	Footing(1.65*1.65)	1	2.15	2.15	0.1	0.46225	
							5.62225
3	Column						
	Base:-						
	Thickness=0.305						
	Footing(1.45*1.45)	4	1.45	1.45	0.305	2.57	
	Footing(1.25*1.25)	2	1.25	1.25	0.305	0.95	
	Footing(1.35*1.35)	2	1.35	1.35	0.305	1.11	

	Footing(1.25*1.15)	2	1.25	1.15	0.305	0.88	
	Footing(1.40*1.40)	2	1.4	1.4	0.305	1.20	
	Footing(1.50*1.50)	1	1.5	1.5	0.305	0.69	
	Footing(1.80*1.80)	1	1.8	1.8	0.305	0.99	
	Footing(1.65*1.65)	1	1.65	1.65	0.305	0.83	
						9.2071875	
	Stem(0.23*0.30):-						
	Height=1.5+0.85= 2.35m						
	Footing(1.45*1.45)	4	1.45	1.45	2.35	19.76	
	Footing(1.25*1.25)	2	1.25	1.25	2.35	7.34	
	Footing(1.35*1.35)	2	1.35	1.35	2.35	8.57	
	Footing(1.25*1.15)	2	1.25	1.15	2.35	6.76	
	Footing(1.40*1.40)	2	1.4	1.4	2.35	9.21	
	Footing(1.50*1.50)	1	1.5	1.5	2.35	5.29	
	Footing(1.80*1.80)	1	1.8	1.8	2.35	7.61	
	Footing(1.65*1.65)	1	1.65	1.65	2.35	6.40	
						70.94	
`						Total	80.15
4	**Plinth Beam:-**						
	BEAM 1	6	3.62	0.23	0.35	1.74846	
	BEAM2	6	3.63	0.23	0.35	1.75329	
	BEAM3	6	3.17	0.23	0.35	1.53111	
	BEAM4	8	3.89	0.23	0.35	2.50516	
	BEAM5	8	3.88	0.23	0.35	2.49872	
						total	10.03674
5	**Earth Filling in Plinth:-**						
	Locker Room(3.39m*2.94m)	1	3.39	2.94	0.45	4.48497	
	W/C (0.90m*1.66m)	1	0.9	1.66	0.45	0.6723	
	Casher Room(6.58m*3.17m)	1	6.58	3.17	0.45	9.38637	
	Office-Room(2.47*3.05)	1	2.47	3.05	0.45	3.390075	
	Passage(5.62m*4.37m)	1	5.62	4.37	0.45	11.05173	

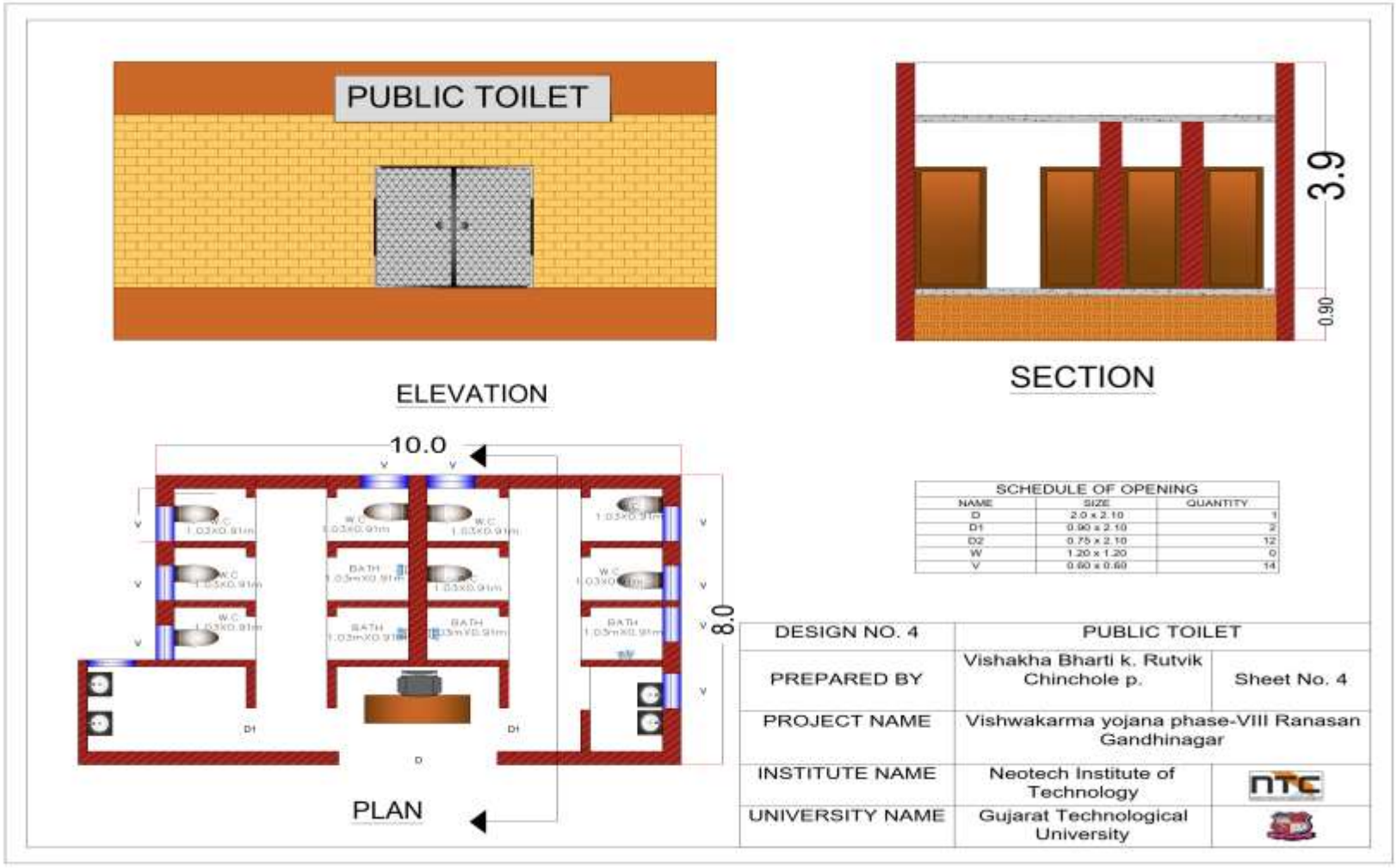
						Total	28.985445
6	**Damp proof course(DPC):-**						
	44.09-((0.3/2)*2)						
	43.79	1	43.79	0.3			13.137
7	**Brick Work in Super Structure:-**						
	44.09-((0.3/2)*2)						
	43.79	1	43.79	0.3	3		39.411
	Partition Wall:-						
	w/c1= (L=0.42m) ,(B=0.115m)	1	0.42	0.115	3	0.1449	
	w/c2=(L=1.76m),(B=0.115m)	1	1.76	0.115	3	0.6072	
	Office= (L=2.66m),(B=0.115)	1	2.66	0.115	3	0.9177	
	Office= (L=3.17m),(B=0.115)	1	3.17	0.115	3	1.09365	
						Total	42.17445
	Deduction:-						
	Door (1.20*2.10)	1	1.2	0.3	2.1	0.756	
	Door (0.90*2.10)	2	0.9	0.3	2.1	1.134	
	Door (0.90*2.10)	1	0.9	0.115	2.1	0.21735	
	Door (0.75*2.10)	2	0.75	0.115	2.1	0.36225	
	Windows(1.20*1.20)	1	1.2	0.3	1.2	0.432	
	Ventilation(0.60*0.60)	2	0.6	0.3	0.6	0.216	
							3.1176
	Lintel:-						
	Door (1.20*2.10)	1	1.5	0.3	0.15	0.0675	
	Door (0.90*2.10)	2	1.2	0.3	0.15	0.108	
	Door (0.90*2.10)	1	1.2	0.115	0.15	0.0207	
	Door (0.75*2.10)	2	1.05	0.115	0.15	0.036225	
	Windows(1.20*1.20)	3	1.5	0.3	0.15	0.2025	
	Ventilation(0.60*0.60)	2	0.9	0.3	0.15	0.081	

							0.515925
	Total Brickwork After Deduction: -					Total	38.540925
8	**brick work**						
	area:- ((2*2.70*10.65)+(2*2.70*8)) =100.7 (100.71/0.19*0.9*0.9)=65438.59nos.						68,000 NOS. of brick
9	**Plaster**						
	103.74						
	double plater = (2*103.74)=207.48m2						
	208m2						
10	**Slab**						
	L=10.65						
	B=8						
	H=0.15	1	10.65	8	0.15		12.78

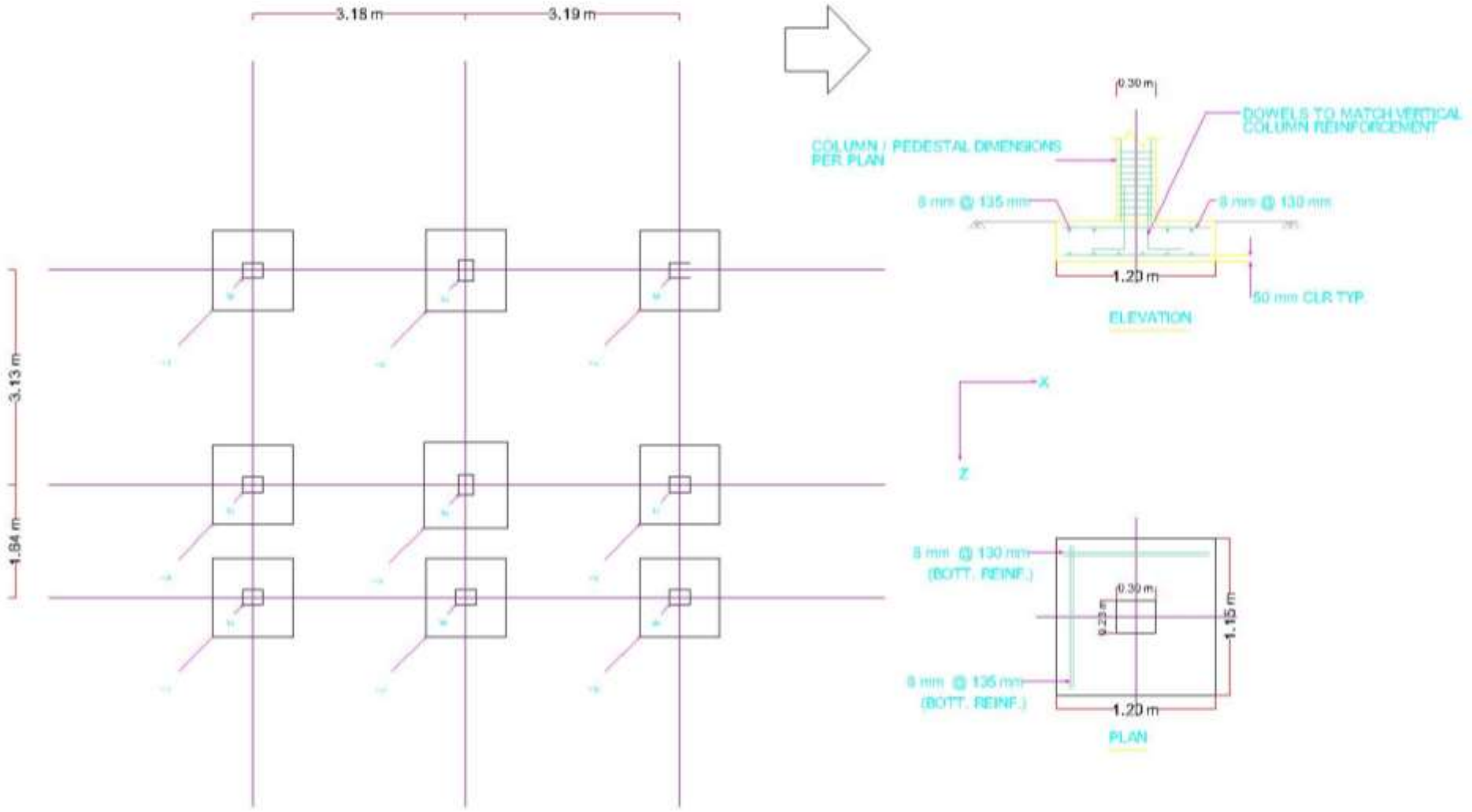
❖ **Abstract sheet**: -

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	450	BAGS	300	135000
2	SAND	16	M.T.	700	11200
3	AGGREGATES	31.2	M.T.	900	28080
4	STEEL	2365	KG	48	113520
5	BINDING WIRE	24	KG	61	1464
6	PLASTER	2240	sq.ft	30	67200
7	EXCAVATION WORK	46	m3	130	5980
8	BRICK (RAHI)	68000	NOS.	5.5	374000
				TOTAL	736444
				1.5% WATER	11046.66
				10% CONT.PROFIT	73644.4
				Total amount	821135.06

8.1.4 Planning proposal of public toilet: - (AREA = 34.61 sq.m)



FOOTING PLAN: -



❖ Measurement table: -

Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	Earthwork in Excavation in Foundation						
	Footing(1.20*1.15)	7	1.2	1.15	1.5	14.49	
	Footing(1.20*1.20)	1	1.2	1.2	1.5	2.16	
	Footing(1.25*1.25)	1	1.25	1.25	1.5	2.34375	
							18.99
2	P.P.C. in Foundation						
	Thickness=.10						
	Footing(1.20*1.15)	7	2	1.65	0.1	2.31	
	Footing(1.20*1.20)	1	1.7	1.7	0.1	0.289	
	Footing(1.25*1.25)	1	1.75	1.75	0.1	0.30625	
							2.90525
3	Column						
	Base:-						
	Thickness=0.305						
	Footing(1.20*1.15)	7	1.2	1.15	0.305	2.9463	
	Footing(1.20*1.20)	1	1.2	1.2	0.305	0.4392	
	Footing(1.25*1.25)	1	1.25	1.25	0.305	0.4765625	
						3.8620625	
	Stem(0.23*0.30):-						
	Height=1.5+0.85= 2.35m						
	Footing(1.20*1.15)	7	1.2	1.15	2.35	22.701	
	Footing(1.20*1.20)	1	1.2	1.2	2.35	3.384	
	Footing(1.25*1.25)	1	1.25	1.25	2.35	3.671875	
						29.756875	
						Total	33.6189375

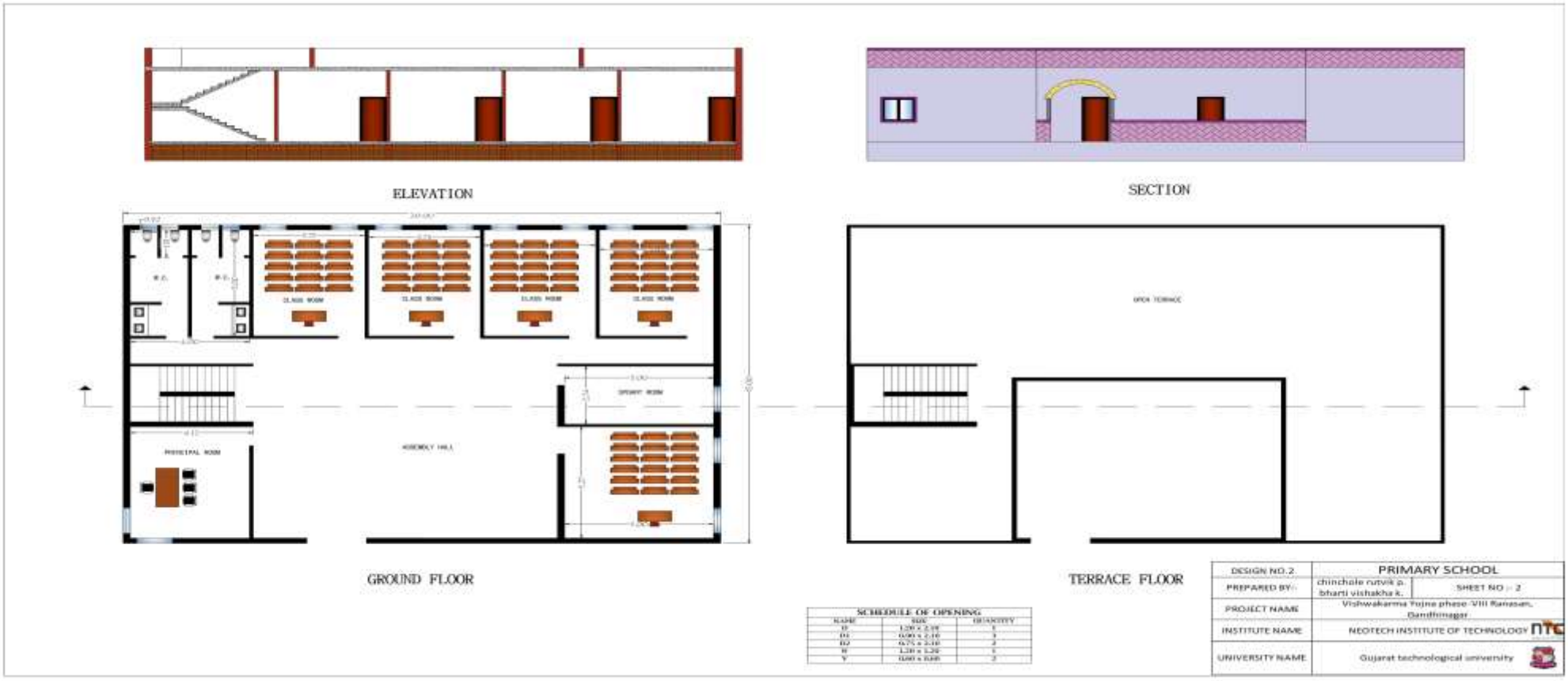
4	Plinth Beam:-						
	BEAM 1	6	3.18	0.23	0.3	1.31652	
	BEAM2	6	3.19	0.23	0.3	1.32066	
	BEAM3	6	3.13	0.23	0.3	1.29582	
	BEAM4	6	1.64	0.23	0.3	0.67896	
	BEAM5	4	1.03	0.23	0.3	0.28428	
						total	4.89624
5	Earth Filling in Plinth:-						
	Public Toilet(6.60m*5m)	1	6.6	5	0.45	14.85	
						Total	14.85
6	Damp proof course(DPC):-						
	26.51-((0.3/2)*0)						
	26.51	1	26.51	0.3			7.953
7	Brick Work in Super Structure:-						
	26.51-((0.3/2)*0)						
	26.51	1	26.51	0.3	3		23.859
	Partition Wall:-						
	w1= (L=1.03m) ,(B=0.115m)	11	1.03	0.115	3	0.35535	
	w2=(L=0.16m),(B=0.115m)	12	0.16	0.115	3	0.0552	
	w3=(L=0.71m),(B=0.115m)	3	0.71	0.115	3	0.24495	
						Total	24.5145
	Deduction:-						
	Door (1.0*2.10)	1	1	0.3	2.1	0.63	
	Door (0.75*2.10)	15	0.75	0.115	2.1	2.716875	
	Ventilation(0.60*0.60)	10	0.6	0.3	0.6	1.08	
							4.426875
	Lintel:-						

	Door (1.0*2.10)	1	1.3	0.3	0.15	0.0585	
	Door (0.75*2.10)	15	1.05	0.115	0.15	0.2716875	
	Ventilation(0.60*0.60)	10	0.9	0.3	0.15	0.405	
							0.7351875
	Total Brickwork After Deduction:-					Total	19.3524375
8	brick work						
	area:- ((2*2.70*6.60)+(2*2.70*5))=62.64 (62.64/0.19*0.9*0.9)=40701.75nos.						42,000 NOS. of brick
9	plaster						
	69.6						
	double plaster=(2*69.6)=139.2m2						
	140m2						
10	Slab						
	L=6.60						
	B=5						
	H=0.15	1	6.6	5	0.15		4.95

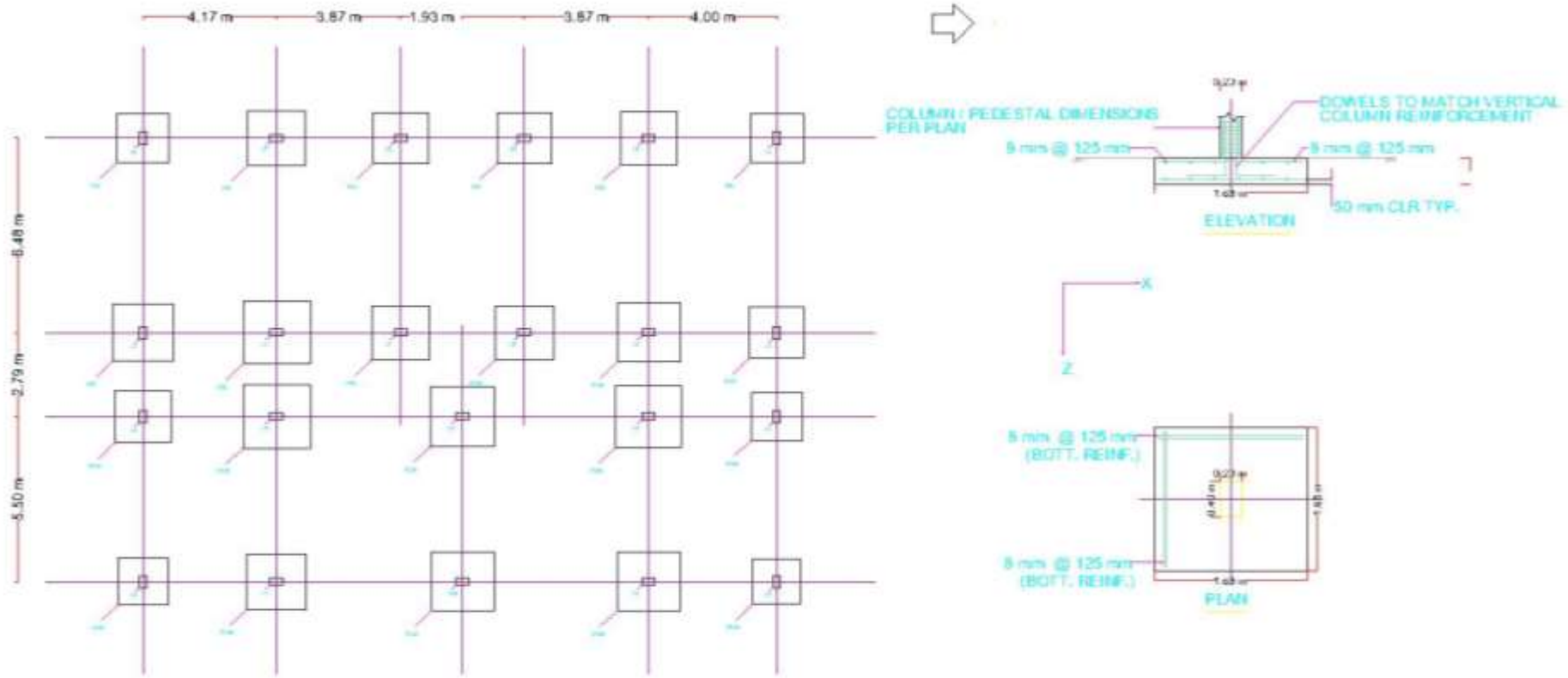
❖ Abstract sheet: -

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	280	BAGS	300	84000
2	SAND	9.5	M.T.	700	6650
3	AGGREGATES	20	M.T.	900	18000
4	STEEL	2200	KG	48	105600
5	BINDING WIRE	23	KG	61	1403
6	PLASTER	1510	sq. Ft	30	45300
7	EXCAVATION WORK	19	m3	130	2470
8	BRICK (RAHI)	42000	NOS.	5.5	231000
				TOTAL	494423
				1.5% WATER	7416.34
				10% CONT.PROFIT	49442.3
				Total amount	551281.64

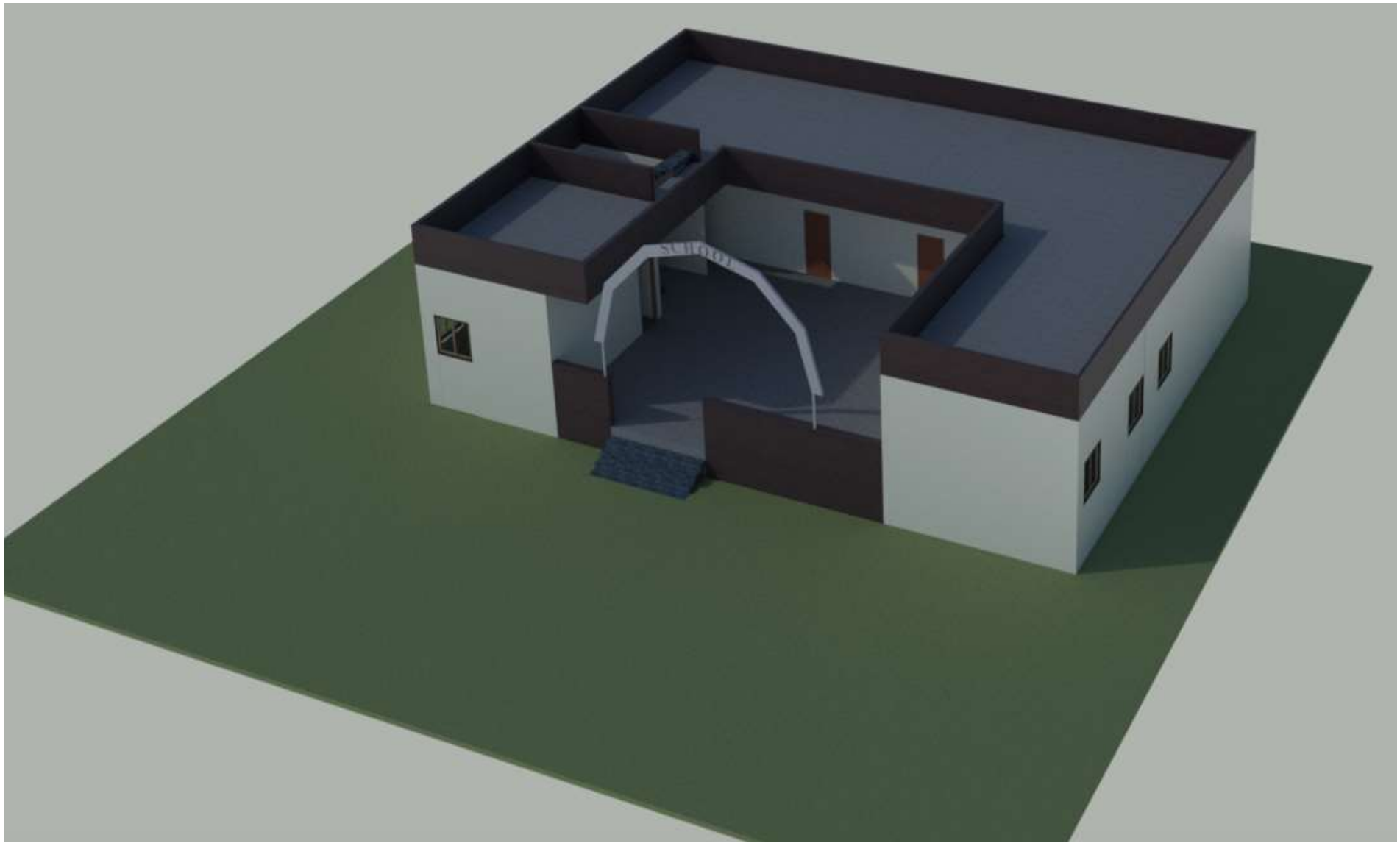
8.1.5 Planning proposal of primary school: – (AREA= 300 sq.m)



FOOTING PLAN: -




SCHOOL



❖ **Measurement table:-**

Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	Earthwork in Excavation in Foundation						
	Footing(1.65*1.65)	2	1.65	1.65	1.5	8.1675	
	Footing(1.80*1.80)	3	1.8	1.8	1.5	14.58	
	Footing(1.70*1.70)	3	1.7	1.7	1.5	13.005	
	Footing(1.75*1.75)	2	1.75	1.75	1.5	9.1875	
	Footing(1.90*1.90)	1	1.9	1.9	1.5	5.415	
	Footing(1.95*1.95)	1	1.95	1.95	1.5	5.70375	
	Footing(2.10*2.10)	2	2.1	2.1	1.5	13.23	
	Footing(2.05*2.05)	1	2.05	2.05	1.5	6.30375	
							75.59
2	P.P.C. in Foundation						
	Thickness=.10						
	Footing(1.65*1.65)	2	2.15	2.15	0.1	0.9245	
	Footing(1.80*1.80)	3	2.3	2.3	0.1	1.587	
	Footing(1.70*1.70)	3	2.2	2.2	0.1	1.452	
	Footing(1.75*1.75)	2	2.25	2.25	0.1	1.0125	
	Footing(1.90*1.90)	1	2.4	2.4	0.1	0.576	
	Footing(1.95*1.95)	1	2.45	2.45	0.1	0.60025	
	Footing(2.10*2.10)	2	2.6	2.6	0.1	1.352	
	Footing(2.05*2.05)	1	2.55	2.55	0.1	0.65025	
							8.1545
3	Column						
	Base:-						
	Thickness=0.305m OR 0.355m						
	Footing(1.65*1.65)	2	1.65	1.65	0.305	1.66	
	Footing(1.80*1.80)	3	1.8	1.8	0.305	2.96	
	Footing(1.70*1.70)	3	1.7	1.7	0.305	2.64	

	Footing(1.75*1.75)	2	1.75	1.75	0.305	1.87	
	Footing(1.90*1.90)	1	1.9	1.9	0.305	1.10	
	Footing(1.95*1.95)	1	1.95	1.95	0.305	1.16	
	Footing(2.10*2.10)	2	2.1	2.1	0.355	3.13	
	Footing(2.05*2.05)	1	2.05	2.05	0.355	1.49	
						16.0216	
	Stem(0.23*0.30):-						
	Height=1.5+0.85= 2.35m						
	Footing(1.65*1.65)	2	1.65	1.65	2.35	12.80	
	Footing(1.80*1.80)	3	1.8	1.8	2.35	22.84	
	Footing(1.70*1.70)	3	1.7	1.7	2.35	20.37	
	Footing(1.75*1.75)	2	1.75	1.75	2.35	14.39	
	Footing(1.90*1.90)	1	1.9	1.9	2.35	8.48	
	Footing(1.95*1.95)	1	1.95	1.95	2.35	8.94	
	Footing(2.10*2.10)	2	2.1	2.1	2.35	20.73	
	Footing(2.05*2.05)	1	2.05	2.05	2.35	9.88	
						118.43	
						Total	134.45
4	**Plinth Beam:-**						
	BEAM 1	10	4.17	0.23	0.4	3.8364	
	BEAM2	12	3.87	0.23	0.4	4.27248	
	BEAM3	8	4	0.23	0.4	2.944	
	BEAM4	8	5.8	0.23	0.4	4.2688	
	BEAM5	12	6.48	0.23	0.4	7.15392	
	BEAM6	8	2.79	0.23	0.4	2.05344	
	BEAM7	10	5.5	0.23	0.4	5.06	
						total	29.58904
5	**Earth Filling in Plinth:-**						
	Class Room(3.75m*5m)	3	3.75	5	0.45	25.3125	
	W/C (4m*5m)	1	4	5	0.45	9	
	Class Room(3.83m*5m)	1	3.83	5	0.45	8.6175	
	Sport-Room(5m*2.74m)	1	5	2.74	0.45	6.165	

	Class Room(5m*5.27m)	1	5	5.27	0.45	11.8575	
	Principal Room(4.12m*5.27m)	1	4.12	5.27	0.45	9.77058	
						Total	70.72308
6	**Damp proof course(DPC):-**						
	86.25-((0.3/2)*3)						
	85.8	1	85.8	0.3			25.74
7	**Brick Work in Super Structure:-**						
	86.25-((0.3/2)*3)						
	85.8	1	85.8	0.3	3		77.22
	Partition Wall:-						
	w/c1= (L=0.17m) ,(B=0.115m)	4	0.17	0.115	3	0.2346	
	w/c2=(L=1.31m),(B=0.115m)	2	1.31	0.115	3	0.9039	
	Class= (L=5m),(B=0.115)	7	5	0.115	3	12.075	
	Class= (L=2.85m),(B=0.115)	3	2.85	0.115	3	2.94975	
	Class= (L=2.5m),(B=0.115)	1	2.5	0.115	3	0.8625	
	Class= (L=2.93m),(B=0.115)	1	2.93	0.115	3	1.01085	
	Class= (L=4.37m),(B=0.115)	1	4..37	0.115	3	1.50765	
						Total	96.76425
	Deduction:-						
	Door (2*2.10)	1	2	0.3	2.1	1.26	
	Door (0.90*2.10)	5	0.9	0.115	2.1	1.08675	
	Door (0.90*2.10)	2	0.9	0.3	2.1	1.134	
	Door (0.75*2.10)	6	0.75	0.115	2.1	1.08675	
	Windows(1.20*1.20)	5	1.2	0.3	1.2	2.16	
	Ventilation(0.60*0.60)	4	0.6	0.3	0.6	0.432	
	Windows(0.90*1.20)	8	0.9	0.3	1.2	2.592	
							9.7515

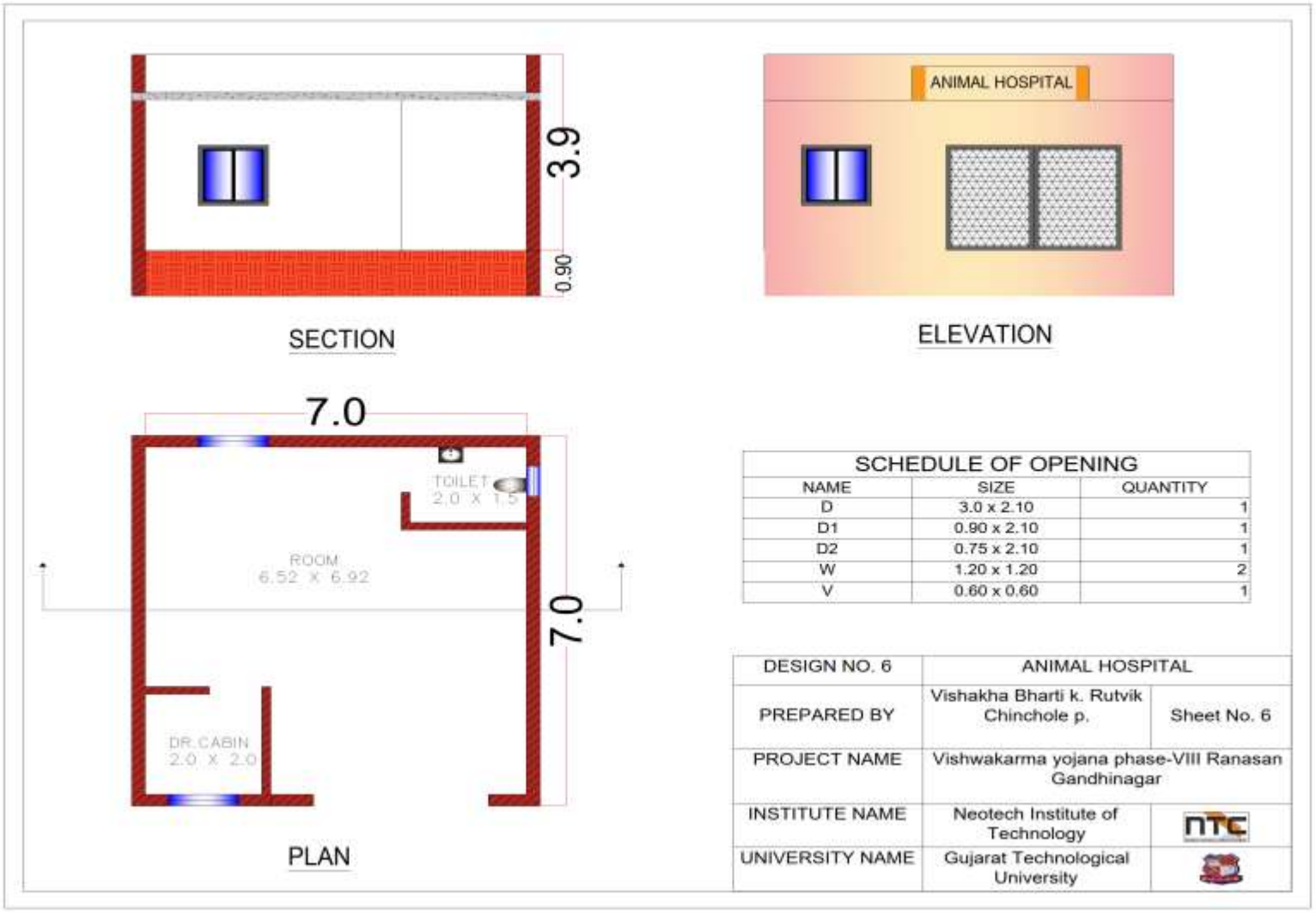
	Lintel:-						
	Door (2*2.10)	1	2.3	0.3	0.15	0.1035	
	Door (0.90*2.10)	5	1.2	0.115	0.15	0.1035	

	Door (0.90*2.10)	2	1.2	0.3	0.15	0.108	
	Door (0.75*2.10)	6	1.05	0.115	0.15	0.108675	
	Windows(1.20*1.20)	5	1.5	0.3	0.15	0.3375	
	Ventilation(0.60*0.60)	4	1.2	0.3	0.15	0.216	
	Windows(0.90*1.20)	8	1.2	0.3	1.2	3.456	
							0.977175
	Total Brickwork AferDeduction:-					Total	86.035575
8	**brick work**						
	area:- ((2*2.70*6.60)+(2*2.70*5)+(9*48.6)=628m2 (628/0.19*0.9*0.9)=408057.18nos.						410000 NOS. of brick
9	plaster						
	300m2						
	double plaster=(2*300)=600m2						
	600m2						
10	**Slab**						
	L=20						
	B=15						
	H=0.15	1	20	15	0.15		45

❖ **Abstract sheet**: -

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	1290	BAGS	300	387000
2	SAND	45	M.T.	700	31500
3	AGGREGATES	90	M.T.	900	81000
4	STEEL	6770	KG	48	324960
5	BINDING WIRE	68	KG	61	4148
6	PLASTER	6460	sq.ft	30	193800
7	EXCAVATION WORK	76	m3	130	9880
8	BRICK (RAHI)	410000	NOS.	5.5	2255000
				TOTAL	3287288
				1.5% WATER	7416.34
				10% CONT.PROFIT	49442.3
				Total amount	3344146.64

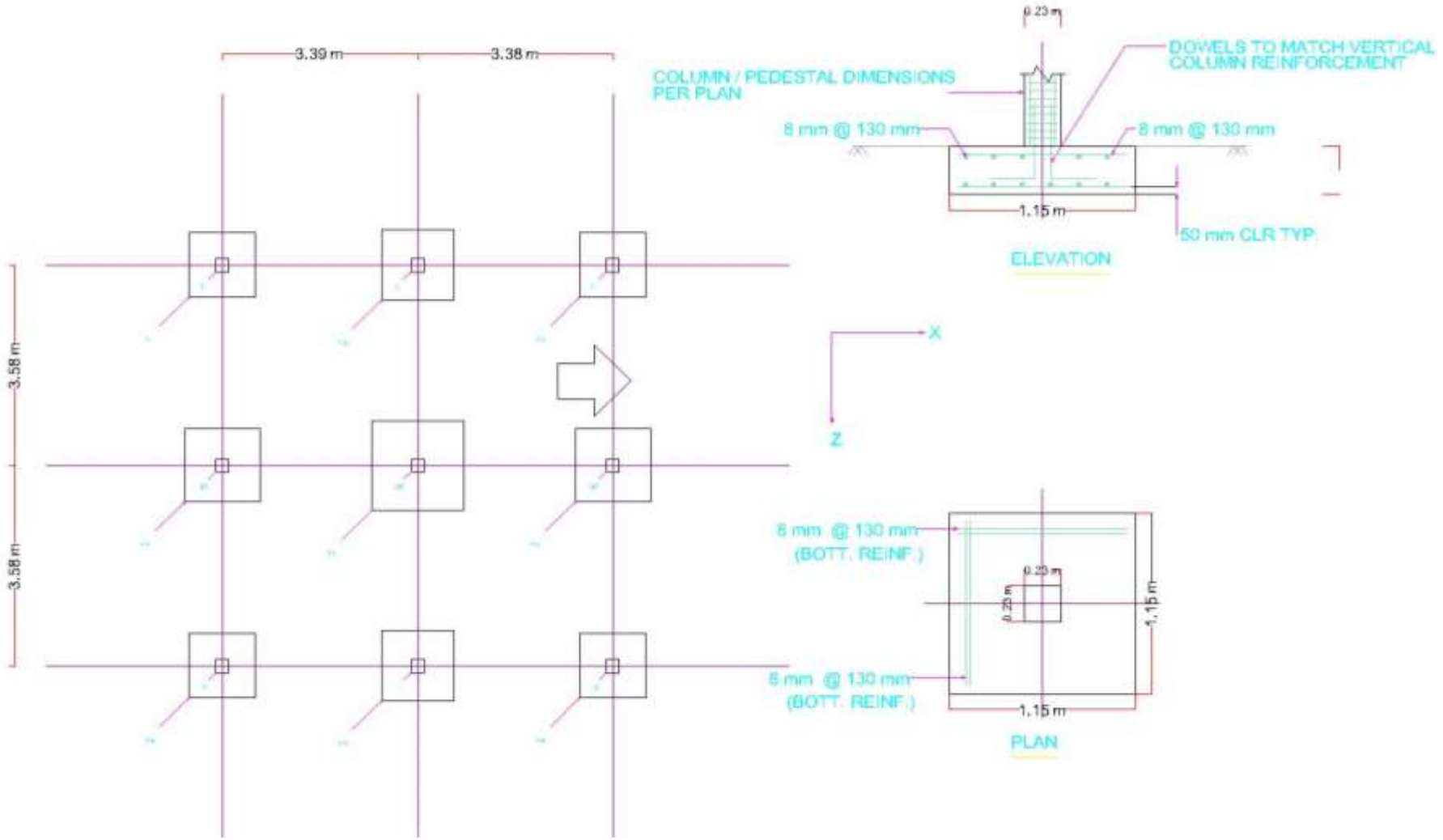
8.1.6 Planning proposal of Animal Hospital: – (AREA= 140 sq.m)



SCHEDULE OF OPENING		
NAME	SIZE	QUANTITY
D	3.0 x 2.10	1
D1	0.90 x 2.10	1
D2	0.75 x 2.10	1
W	1.20 x 1.20	2
V	0.60 x 0.60	1

DESIGN NO. 6	ANIMAL HOSPITAL	
PREPARED BY	Vishakha Bharti k. Rutvik Chinchole p.	Sheet No. 6
PROJECT NAME	Vishwakarma yojana phase-VIII Ranasan Gandhinagar	
INSTITUTE NAME	Neotech Institute of Technology	
UNIVERSITY NAME	Gujarat Technological University	

FOOTING PLAN: -



❖ Measurement table:

Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	Earthwork in Excavation in Foundation						
	Footing(1.50*1.50)	4	1.5	1.5	1.5	13.5	
	Footing(1.25*1.25)	2	1.25	1.25	1.5	4.6875	
	Footing(1.30*1.30)	2	1.3	1.3	1.5	5.07	
	Footing(1.60*1.60)	1	1.6	1.6	1.5	3.84	
							27.10
2	P.P.C. in Foundation						
	Thickness=.10						
	Footing(1.25*1.50)	4	2	2	0.1	1.6	
	Footing(1.25*1.25)	2	1.75	1.75	0.1	0.6125	
	Footing(1.30*1.30)	2	1.8	1.8	0.1	0.648	
	Footing(1.60*1.60)	1	2.1	2.1	0.1	0.441	
							3.3015
3	Column						
	Base:-						
	Thickness=0.305						
	Footing(1.50*1.50)	4	1.5	1.5	0.305	2.745	
	Footing(1.25*1.25)	2	1.25	1.25	0.305	0.953125	
	Footing(1.30*1.30)	2	1.3	1.3	0.305	1.0309	
	Footing(1.60*1.60)	1	1.6	1.6	0.305	0.7808	
						5.509825	
	Stem(0.23*0.30):-						
	Height=1.5+0.85= 2.35m						

	Footing(1.50*1.50)	4	1.5	1.5	2.35	21.15	
	Footing(1.25*1.25)	2	1.25	1.25	2.35	7.34375	
	Footing(1.30*1.30)	2	1.3	1.3	2.35	7.943	
	Footing(1.60*1.60)	1	1.6	1.6	2.35	6.016	
						42.45275	
						Total	47.962575
4	Plinth Beam:-						
	BEAM 1	12	3.39	0.23	0.23	2.151972	
	BEAM2	12	3.575	0.23	0.23	2.26941	
						total	4.421382
5	Earth Filling in Plinth:-						
	Class room (6.54m*6.92m)	1	6.54	6.92	0.45	20.36556	
	W/C (1m*1m)	1	1	1	0.45	0.45	
						Total	20.81556
6	Damp proof course(DPC):-						
	28.76-((0.3/2)*0)						

	28.76	1	28.76	0.3			8.628
7	**Brick Work in Super Structure:-**						
	28.76-((0.3/2)*0)						
	28.76	1	28.76	0.3	3		25.884
	Partition Wall:-						
	w1= (L=1m) ,(B=0.115m)	2	1	0.115	3	0.69	
	w2=(L=2m),(B=0.115m)	2	2	0.115	3	1.38	
						Total	27.954

	Deduction:-						
	Door (2*2.10)	1	2	0.3	2.1	1.26	
	Door (0.75*2.10)	1	0.75	0.115	2.1	0.181125	
	Windows(1.20*1.20)	3	1.2	0.3	1.2	1.296	
	Ventilation(0.60*0.60)	1	0.6	0.3	0.6	0.108	
							2.845125
	Lintel:-						
	Door (2*2.10)	1	2.3	0.3	0.15	0.1035	
	Door (0.75*2.10)	1	1.05	0.115	0.15	0.0181125	
	Windows(1.20*1.20)	3	1.5	0.3	0.15	0.2025	
	Ventilation(0.60*0.60)	1	0.9	0.3	0.15	0.0405	
							0.3646125
	Total Brickwork After Deduction:-					Total	24.7442625
8	**brick work**						
	area:- ((2*2.70*7)+(2*2.70*7.38))=77.65 (77.65/0.19*0.9*0.9)=50456.14nos.						52,000 NOS. of brick
9	**Plaster**						
	81.72						
	double plater = (2*81.72) =163.44m2						
	170m2						
10	**Slab**						

	L=7						
	B=7.38						
	H=0.15	1	7	7.38	0.15		7.749

❖ **Abstract sheet: -**

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	285	BAGS	300	85500
2	SAND	10	M.T.	700	7000
3	AGGREGATES	20	M.T.	900	18000
4	STEEL	2195	KG	48	105360
5	BINDING WIRE	22	KG	61	1342
6	PLASTER	1830	sq.ft	30	54900
7	EXCAVATION WORK	28	m3	130	3640
8	BRICK (RAHI)	52000	NOS.	5.5	286000
				TOTAL	561742
				1.5% WATER	8426.13
				10% CONT.PROFIT	56174.2
				Total amount	626342.33

8.2 REASON FOR STUDENTS RECOMMENDING THIS DESIGN: -

DESIGN NAME	REASON
POST-OFFICE	In this village the post-office is not in proper place, very small in comfortable no facilities, etc. so we decided to develop the pot-office.
BANK	In this village the post-office is very small in comfortable no facilities, etc so we decided to develop the bank.
ANGANWADI	The existing anganwadi is need to be renovate Because the existing structure life if is over.
PUBLIC TOILET	In this village public toilet is not provided soWe design public toilet in village.
PRIMARY SCHOOL	The existing primary school is need to be renovate Because the existing structure life if is over.
ANIMAL HOSPITAL`	The existing animal hospital is need to be renovate Because the existing structure life if is over.

8.3 ABOUT DESIGNS SUGGESTIONS / BENEFIT OF THE VILLAGERS: -

- The villagers get better facilities and comfort.
- The village get source of income.
- Good student teaching facilites.
- Peoples get employment.
- The village have better appearance.
- Fulfilment of water facilities.

Chapter 9. Future Scope-Requirement of the Village (for the PART- II)

After completion of visit & data collection the project carried out in the current semester by me. Thenin1st semester we are designed various infrastructure facility like Post office, Public Toilet, Bank, Primary school. Etc.

Future scope would be study over different amenities like Public garden, pond beatification, and water tank are need to maintenance.

The village still lacks in maintenance of the building and various structures. Taking this into consideration the estimation of its rehabilitation with other necessary amenities will be designed in the next semester

Chapter 10: Conclusion (Entire Village Project)

Main work for a village development is the systematic planning of the region where one is working. Secondly, responsibility is to collect necessary data on any topic. Village development has traditionally cantered on the exploitation of land- intensive natural resources such as agriculture and forestry. However, changes in global production networks and increased urbanization have changed the character of rural areas Education, entrepreneurship, physical infrastructure, and social infrastructure all play an important role in future development.

- Study and survey about the village is most important for various parameters.
- The extension uses democratic methods in educating the farmers.
- Extension Helps in adoption of innovations.
- Extension helps in studying and solving the rural problems.
- Extension increases farm yields and improve the standard of living over peoples.
- The extension makes good communities better and progressive.
- Extension contributes to national development program.
- Improve the communication and tourism due to good facility in the village.

Chapter 11: References

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Chapter 12. Annexure attachment

12.1 SURVEY FORM OF IDEAL VIROD VILLAGE

(એનેક્ષર:- ૧)

અરજી ફોર્મ (પરિશિષ્ટ-અ)

ક્રમ	વિગત	માહિતી
૧	ગ્રામ પંચાયતનું નામ	વિરોદ
૨	તાલુકાનું નામ	વડોદરા
૩	જિલ્લાનું નામ	વડોદરા
૪	પછાત તાલુકા પૈકી નું ગામ હોય તો વિગત	—
૫	કુલ વસ્તી (૨૦૧૧ વસ્તી ગણતરી મુજબ)	
	પુરૂષ	૨૫૮૮
	સ્ત્રી	૨૪૦૨
	કુલ	૪૯૯૨
	અનુસુચિત જાતી	૨૫૮
	અનુસુચિત જન જાતી	૨૦૦૬
	અન્ય	
૬	કુલ કુટુંબોની સંખ્યા	૧૦૫૬
૭	સાક્ષરતા દર	
	પુરૂષ	૮૫.૫૬
	સ્ત્રી	૮૭.૦૮
૮	કુલ પ્રાથમિક શાળા	૧
૯	કુલ આંગણવાડી	૩
૧૦	પ્રાથમિક આરોગ્ય કેન્દ્ર	CH.C. Sub Centre
૧૧	ગ્રામ પંચાયતના કુલ સભ્યો (સદસ્યો સહિત)	૯
૧૨	સરપંચનું નામ :- વિક્રમભાઈ બાબુભાઈ ઠાકોર	
૧૩	સામાજિક ન્યાય સમિતિના ચેરમેનનું નામ:- કેસાજીભાઈ શંકરભાઈ પાઘીના.	

સરપંચશ્રીની સહી
V.B.T
સરપંચ
વિરોદ ગ્રામપંચાયત
તા.જી.વડોદરા

ગ્રામ પંચાયતનું સાઉન્ડ સીલ

તલાટી કમ મંત્રીની સહી
તલાટી કમ મંત્રી
વિરોદ ગ્રામ પંચાયત
તા. જિ. વડોદરા.

પરિશિષ્ટ-બ

સ્પર્ધામાં ભાગ લેવા ગ્રામપંચાયતે નીચે મુજબના ધારા ધોરણોને ધ્યાને રાખીને વિગતો આધાર પુરાવા સહિત રજુ કરવાની રહેશે.

.....

૧. શિક્ષણ

ક્રમ	વિગત	માહિતી
૧	શાળા પ્રવેશ દર	
	ગત વર્ષ નો પ્રવેશ દર	79.16
	ચાલુ વર્ષનો પ્રવેશ દર	84.61%
૨	ડ્રોપ આઉટ પ્રમાણ	
	ગત વર્ષનો ડ્રોપ આઉટ	14
	ચાલુ વર્ષનો ડ્રોપ આઉટ	–
3	શિક્ષણ ગુણવત્તા સુધારણા આંક (A, B, C, D)	B

૨. આરોગ્ય

ક્રમ	વિગત	માહિતી
૧	જન્મ નોંધણી ની ટકાવારી	24
૨	મરણ નોંધણી ની ટકાવારી	20
3	રસીકરણ ની ટકાવારી (૧૧ મહિનાથી ૨૩ મહિનાના બાળકો)	24
૪	ઇન્ફન્ટ બાળ મૃત્યુદર ની ટકાવારી	1
૫	માતા મૃત્યુદર ની ટકાવારી	0
૬	સંસ્થાકીય પ્રસુતિ ની ટકાવારી	24
૭	સ્ત્રી – પુરૂષ પ્રમાણ (√) કરવી	
	દર ૧૦૦૦ પુરૂષે ૯૭૫ કે તેથી વધુ સ્ત્રીઓ	
	દર ૧૦૦૦ પુરૂષે ૯૨૫ કે ૯૫૦ ની વચ્ચે	
	દર ૧૦૦૦ પુરૂષે ૯૨૫થી ઓછી	—

3. સ્વચ્છતા

ક્રમ	વિગત	માહિતી
૧	૧૦૦% વ્યક્તિગત શૌચાલયની કામગીરી	Yes
	કુલ ઘર	
	વ્યક્તિગત શૌચાલય ધરાવતા ઘર	
૨	શુધ્ધ પીવાના પાણીની વ્યવસ્થા (બે વાક્યમા લખવુ)	
	પ્રત્યેક ઘરમાં નળની સુવિધા, ફરતાક સ્થાન પર હેન્ડપંપ	
૩	જાહેર સ્થળોની સ્વચ્છતા (હાલની વ્યવસ્થા બે વાક્યમા)	
૪	ડોર ટુ ડોર ધન કચરાના નિકાલની વ્યવસ્થા	ના
	કુલ ઘર	
	આવરી લેવાયેલ ઘર	
૫	સ્પર્ધા ના સમયગાળા દરમ્યાન ગામમાં કોઇ રોગચાળાનો બનાવ બનેલ છે ? (હા કે ના)	ના

4. પંચાયત

ક્રમ	વિગત	માહિતી
૧	પંચાયત વેરો	
	ગત વર્ષની વસુલાત	૫૩૩૯૩૫/-
	ચાલુ વર્ષની વસુલાત	૨૩૬૪૫૫/-
૨	એરિયા બેઝ આકારણી લાગુ કરી છે ? (હા કે ના)	ના
૩	છેલ્લી ગ્રામસભામાં હાજરીની ટકાવારી	૫૧%
૪	છેલ્લી ગ્રામસભામાં મહીલા હાજરીની ટકાવારી	૨૫%
૫	ઇ-ગ્રામ મારફતે સુવિધાઓ	
		આવક દાખલા, ૭/૧૨.
		૮.૨૫ નકલ જન્મમરણ
૬	છેલ્લા વર્ષમા ગ્રામ પંચાયતની મળેલ બેઠકની સંખ્યા	

૫. વિશિષ્ટ સિદ્ધી

ક્રમ	વિગત	માહિતી
૧	મળેલ પુરસ્કારો (√) કરવી	
	સમરસ	
	નિર્મળ ગ્રામ પુરસ્કાર	
	પાવન ગ્રામ	
	તીર્થગ્રામ	
	૧૦૦ ટકા બેન્ક ખાતા	
	ગૌરવ ગ્રામ સભા એવોર્ડ	
	શ્રેષ્ઠ ગ્રામ પંચાયત એવોર્ડ	
	અન્ય એવોર્ડ	
	અન્ય વિગતો:-	

૬. કેન્દ્ર સરકારશ્રીની નીચે મુજબની યોજનાઓની વિગતો

ક્રમ	યોજનાનું નામ	માહિતી
૧	પ્રધાનમંત્રી સુરક્ષા વિમા યોજના	હા
૨	પ્રધાનમંત્રી જીવન જ્યોત વીમા યોજના	હા
3	અટલ પેન્શન યોજના	-
૪	સુકન્યા સમૃધ્ધી યોજના	હા

V.N.T

સરપંચશ્રીની સહી

વિરોદ ગ્રામપંચાયત
તા.જી.વડોદરા

તલાટી ક્રમ મંત્રીની સહી

તલાટી ક્રમ મંત્રી
વિરોદ ગ્રામ પંચાયત

ઠરાવનો નમૂનો (પરિશિષ્ટ-૬)

ઠરાવ નંબર-

ગ્રામપંચાયત ને સ્માર્ટ વિલેજ યોજના અંતર્ગત ચાલુ વર્ષ ---------- ની સ્માર્ટ વિલેજ સ્પર્ધામા ભાગ લેવા અંગે નિયત અરજી ફોર્મની વિગતો વંચાણે લેવામાં આવી. જે અંગે ચર્ચા વિચારણા કરી તમામ ધારણો પૂર્ણ કરતી હોઇ દરખાસ્ત તાલુકા વિકાસ અધિકારીશ્રી ને મોકલી આપવાનું તેમજ આ માટે ગામની પસંદગી થયે મળનાર ગ્રાન્ટ માથી કરવામા આવેલ કામો અને પ્રાપ્ત કરેલ સંપત્તિની જાળવણી કરવા , પુરતી નાણાકીય અને અન્ય બાબતોની વ્યવસ્થા કરવા ગ્રામ પંચાયત સંમત છે. તે અંગેની બાંહેધરી આપવા આથી ઠરાવવામા આવે છે.

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	Viorad
Name of Taluka:	vadodara
Name of District:	vadodara
Name of Institute:	Neotech Institute of tech.
Nodal Officer Name & Contact Detail:	Prof. Piyush D. Prajapati (9722776378)
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Vidyaben Nanambhai Thakor
Date of Survey:	9/11/2020

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	2128	167	222	64
ii)	2011	2461	1289	1172	506

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	1341
	Forest Area (In hect.)	-
	Agricultural Land Area (In hect.)	100
	Residential Area (In hect.)	1 hect.
	Other Area (In hect.)	-
	Water bodies	5 pond
	Nearest Town with Distance:	Vadodara (12km)

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1	farmers
	2	businessmen
	3	Labours

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	yes	✓		
	• RO Water	—	—		
	• Well (Covered/ Uncovered)	yes	✓		
	• Hand pumps	yes	✓		
	• Tube well/ Borehole	yes	✓		
	• River/ Canal/ Spring/ Lake/ Pond	yes	✓		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	50,000 lit		
	Underground Sump	Capacity:	30,000 lit		
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	yes	✓		
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	closed	—	—	—
	If Open than Pucca / Kutcheha	—	—	—	—
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	—	—	—	
Suggestions if any:					

E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	NO			
	Main road	yes	✓		Pucca
	Internal streets	yes	✓		Pucca
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH-48 4 km			
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO			Dashrath village (9 km)
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	yes			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	yes			
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	yes	✓		
	Power supply for Domestic Use	yes	✓		
	Power supply for Agricultural Use	yes	✓		
	Power supply for Commercial Use	yes	✓		
	Road/ Street Lights	yes	✓		

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

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks

K.	**Health Facilities:**				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No of Beds) Condition:	sub center			
	Private Clinic/Private Hospital/ Nursing Home	—			
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
L.	**Education Facilities:**				
	Aaganwadi/ Play group	yes	✓		1
	Primary School	yes	✓		3
	Secondary school	NO			
	Higher sec. School	NO			
	ITI college/ vocational Training Center	NO			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	yes			
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
M.	**Socio- Culture Facilities**				
	Community Hall (With or without TV) Location:	yes	✓		

	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	NO			
	Public Garden Location: Condition:	NO			
	Village Pond Location: Condition:	yes			
	Recreation Center Location: Condition:	NO			
	Cinema/ Video Hall Location: Condition:	NO			
	Assembly Polling Station Location: Condition:	NO			
	Birth & Death Registration Office Location: Condition:	Gram Panchayat 9 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	NO-			
	Telecommunication Network/ STD booth	NO			

	General Market	NO			
	Shops (Public Distribution System)	-			
	Panchayat Building	yes			
	Pharmacy/Medical Shop	NO			
	Bank & ATM Facility	NO	✓		
	Agriculture Co-operative Society	NO			
	Milk Co-operative Soc.	yes			
	Small Scale Industries	NO			
	Internet Cafes/ Common Service Center/Wi Fi	NO			
	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	NO			
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	NO

8. Additional Information/ Requirement:

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

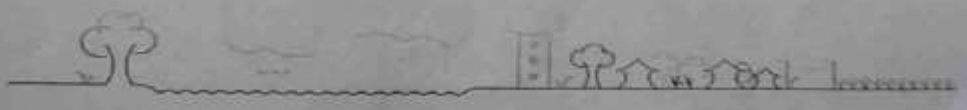
9. Smart Village Proposal Design

Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

Chauhan
તલાટી કમ મંત્રી
વિરોદ ગામ પંચાયત
તા. જિ. વડોદરા.

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 VASAD VILLAGE

(એનેક્ષર:- ૧)

અરજી ફોર્મ (પરિશિષ્ટ-અ)

ક્રમ	વિગત	માહિતી
૧	ગ્રામ પંચાયતનુ નામ	વાસદ
૨	તાલુકાનુ નામ	આણંદ
૩	જિલ્લાનુ નામ	આણંદ
૪	પછાત તાલુકા પૈકી નુ ગામ હોય તો વિગત	-
૫	કુલ વસ્તી (૨૦૧૧ વસ્તી ગણતરી મુજબ)	
	પુરૂષ	7530
	સ્ત્રી	6854
	કુલ	14384
	અનુસુચિત જાતી	1037
	અનુસુચિત જન જાતી	733
	અન્ય	
૬	કુલ કુટુબોની સંખ્યા	3047
૭	સાક્ષરતા દર	
	પુરૂષ	94.37%
	સ્ત્રી	83.79%
૮	કુલ પ્રાથમિક શાળા	6
૯	કુલ આંગણવાડી	12
૧૦	પ્રાથમિક આરોગ્ય કેન્દ્ર	1
૧૧	ગ્રામ પચાયતના કુલ સભ્યો (સદસ્યો સહિત)	17
૧૨	સરપચનુ નામ :- દક્ષાબેન અલ્પેશભાઈ પટેલ	
૧૩	સામાજિક ન્યાય સમિતિના ચેરમેનનુ નામ:- જગદીશભાઈ M. ચૌહાણ	

20/10/2020

સહી/-
ગ્રામ પંચાયત વાસદ,
તા. જી. આણંદ

તલાટી કમ મંત્રી
ગ્રામ પંચાયત વાસદ
તા. જી. આણંદ.

પરિશિષ્ટ-બ

સ્પર્ધામાં ભાગ લેવા ગ્રામપંચાયતે નીચે મુજબના ધારા ધોરણોને ધ્યાને રાખીને વિગતો આધાર પુરાવા સહિત રજુ કરવાની રહેશે.

.....

૧. શિક્ષણ

ક્રમ	વિગત	માહિતી
૧	શાળા પ્રવેશ દર	282
	ગત વર્ષ નો પ્રવેશ દર	292
	ચાલુ વર્ષનો પ્રવેશ દર	282
૨	ડ્રોપ આઉટ પ્રમાણ	0
	ગત વર્ષનો ડ્રોપ આઉટ	0
	ચાલુ વર્ષનો ડ્રોપ આઉટ	0
૩	શિક્ષણ ગુણવત્તા સુધારણા આંક (A, B, C, D)	B

૨. આરોગ્ય

ક્રમ	વિગત	માહિતી
૧	જન્મ નોંધણી ની ટકાવારી	558 %
૨	મરણ નોંધણી ની ટકાવારી	—
૩	રસીકરણ ની ટકાવારી (૧૧ મહિનાથી ૨૩ મહિનાના બાળકો)	5 %
૪	ઇન્ફન્ટ બાળ મૃત્યુદર ની ટકાવારી	—
૫	માતા મૃત્યુદર ની ટકાવારી	—
૬	સંસ્થાકીય પ્રસુતિ ની ટકાવારી	558%
૭	સ્ત્રી – પુરૂષ પ્રમાણ (√) કરવી	
	દર ૧૦૦૦ પુરૂષે ૯૭૫ કે તેથી વધુ સ્ત્રીઓ	
	દર ૧૦૦૦ પુરૂષે ૯૨૫ કે ૯૫૦ ની વચ્ચે	
	દર ૧૦૦૦ પુરૂષે ૯૨૫થી ઓછી	

૩. સ્વચ્છતા

ક્રમ	વિગત	માહિતી
૧	૧૦૦% વ્યક્તિગત શૌચાલયની કામગીરી	yes
	ફુલ પર	
	વ્યક્તિગત શૌચાલય ધરાવતા પર	
૨	શુધ્ધ પીવાના પાણીની વ્યવસ્થા (બે વાક્યમાં લખવુ)	
	5 દિવસે કલોરિ ગોળીઓ ની પ્રક્રિયા થાય છે.	
૩	જાહેર સ્થળોની સ્વચ્છતા (ગંદની વ્યવસ્થા બે વાક્યમાં)	
	Door to Door collection main Road clean	
૪	ડોર ટુ ડોર ઘન કચરાના નિકાલની વ્યવસ્થા	દરરોજ દિવસે
	ફુલ પર	
	આવરી લેવાયેલ પર	
૫	રમતો ના સમયગાળા દરમ્યાન ગામમાં કોઇ રોગચાળાનો બનાવ બનેલ છે ? (હા કે ના)	

૪. પંચાયત

ક્રમ	વિગત	માહિતી
૧	પંચાયત વેરો	
	ગત વર્ષની વસુલાત	14,06,850
	ચાલુ વર્ષની વસુલાત	
૨	એરિયા બેઝ આકારણી લાગુ કરી છે ? (હા કે ના)	nil
૩	છેલ્લી ગ્રામસભામા હાજરીની ટકાવારી	73%
૪	છેલ્લી ગ્રામસભામા મહીલા હાજરીની ટકાવારી	62%
૫	ઇ-ગ્રામ મારફતે સુવિધાઓ	
	light bill, Income certi,	
	Widow certi, Mobile recharge,	
	Widrawal, DTH, Bank Account, etc.	
૬	છેલ્લા વર્ષમા ગ્રામ પંચાયતની મળેલ બેઠકની સંખ્યા	8

૫ વિશિષ્ટ સિદ્ધી

ક્રમ	વિગત	માહિતી
૧	મળેલ પુરસ્કારો (√) કરવી	
	સમરસ	
	નિર્મળ ગ્રામ પુરસ્કાર	✓
	પાવન ગ્રામ	
	તીર્થગ્રામ	
	૧૦૦ ટકા બેન્ક ખાતા	
	ગૌરવ ગ્રામ સભા એવોર્ડ	
	શ્રેષ્ઠ ગ્રામ પંચાયત એવોર્ડ	
	અન્ય એવોર્ડ	
	અન્ય વિગતો:-	

૬. કેન્દ્ર સરકારશ્રીની નીચે મુજબની યોજનાઓની વિગતો

ક્રમ	યોજનાનું નામ	માહિતી
૧	પ્રધાનમત્રી સુરક્ષા વિમા યોજના	✓
૨	પ્રધાનમત્રી જીવન જ્યોત વીમા યોજના	✓
૩	અટલ પેન્શન યોજના	✓
૪	સુકન્યા સમૃધ્ધી યોજના	✓

સરપંચશ્રીની સહી
સરપંચ
ગ્રામ પંચાયત વાસદ,
તા. જી. આણંદ
ઠરાવ નંબર-

તલાટી કમ મંત્રી
20/10/2020.
તલાટી કમ મંત્રી
ગ્રામ પંચાયત વાસદ
તા. જી. આણંદ.

ઠરાવનો નમૂનો (પરિશિષ્ટ-ક)

ગ્રામપચાયત ને સ્માર્ટ વિલેજ યોજના અંતર્ગત ચાલુ વર્ષ ---------- ની સ્માર્ટ વિલેજ સ્પર્ધામા ભાગ લેવા અંગે નિયત અરજી ફોર્મની વિગતો વચાણે લેવામા આવી. જે અંગે ચર્ચા વિચારણા કરી તમામ ધારણો પૂર્ણ કરતી હોઇ દરખાસ્ત તાલુકા વિકાસ અધિકારીશ્રી ને મોકલી આપવાનુ તેમજ આ માટે ગામની પસદગી થયે મળનાર ગ્રાન્ટ માથી કરવામા આવેલ કામો અને પ્રાપ્ત કરેલ સંપત્તિની જાળવણી કરવા , પુરતી નાણાંકીય અને અન્ય બાબતોની વ્યવસ્થા કરવા ગ્રામ પંચાયત સંમત છે. તે અંગેની બાંહેધરી આપવા આથી ઠરાવવામા આવે છે.

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

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

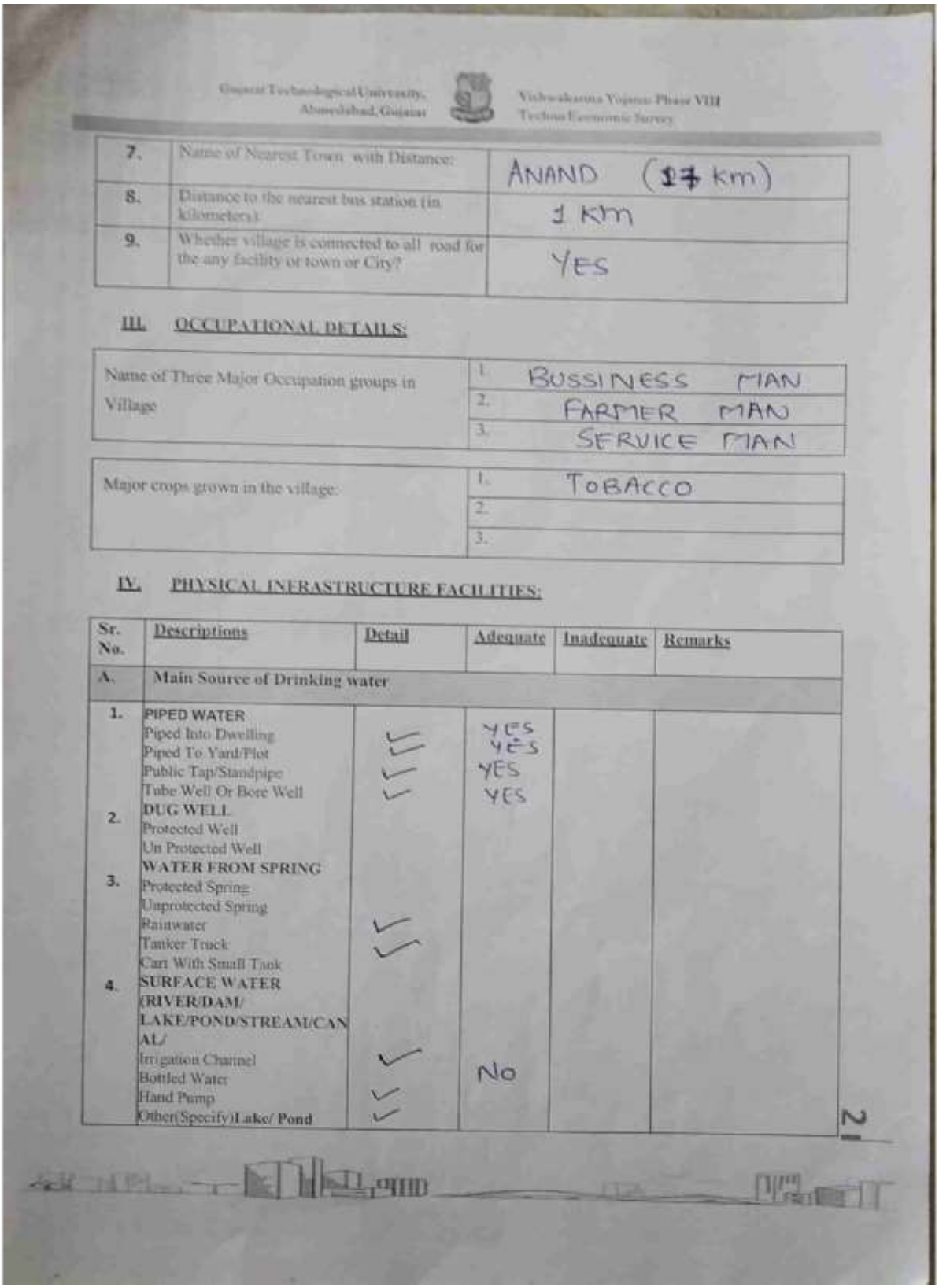
Name of District:	ANAND
Name of Taluka:	ANAND
Name of Village:	VASAD
Name of Institute:	NEOTECH INSTITUTE OF TECHNOLOGY
Nodal Officer Name & Contact Detail:	
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	DHARMISHTA ALPESHBHAI PATEL
Date of Survey:	10/11/20

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	2196	1010	1186	
2.	2011	14384	7530	6854	3047

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1358 Hec.
2.	Forest Area (In hect.)	- 193
3.	Agricultural Land Area (In hect.)	- 145
4.	Residential Area (In hect.)	113
5.	Other Area (In hect.)	-
6.	Distance to the nearest railway station (in kilometers):	VASAD JUNCTION (700 m)



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7.	Name of Nearest Town with Distance:	ANAND (17 km)
8.	Distance to the nearest bus station (in kilometers):	1 KM
9.	Whether village is connected to all road for the any facility or town or City?	YES

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	BUSSINESS MAN
	2.	FARMER MAN
	3.	SERVICE MAN
Major crops grown in the village:	1.	TOBACCO
	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	✓	YES		
	Piped To Yard/Plot	✓	YES		
	Public Tap/Standpipe	✓	YES		
	Tube Well Or Bore Well	✓	YES		
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		No		
	Hand Pump	✓			
	Other(Specify)Lake/ Pond	✓			

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

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

	Power supply for Domestic Use	✓	YES		
	Power supply for Agricultural Use	✓	YES		
	Power supply for Commercial Use	✓	YES		
	Road/ Street Lights	✓	YES		
	Electrification in Government Buildings/ Schools/ Hospitals	✓	YES		
	Renewable Energy Source Facilities (Y/ N)	SO ✓	YES		SOLAR
	LED Facilities	✓	YES		

Suggestions if any:

G.	Sanitation Facility				
	Public Latrine Blocks If available than Nos.	✓	YES		(2 Nos)
	Location Condition	✓	YES		
	Community Toilet (With bath/ without bath facilities)	✓	YES		With Bath
	Solid & liquid waste Disposal system available	✓	YES		
	Any facility for Waste collection from road	✓	YES		DAILY DOOR TO DOOR CLEANING

Suggestions if any:

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

Suggestions if any:

I.	Housing Condition:				
	Kutchha/Pucca (Approx. ratio)	YES			(90/10)

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

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	YES	✓	-	All buildings are good facilities and condition
	Sub-Centre	YES	✓	-	
	PHC	YES	✓		
	BLOCK PHC	-			
	CHC/RH	YES	✓		
	District/ Govt. Hospital	YES	✓	-	(Gov hospital)
	Govt. Dispensary	YES	✓		
	Private Clinic	YES	✓		
	Private Hospital/ Nursing Home	YES	✓		
	AYUSH Health Facility	YES	✓		
	sonography /ultrasound facility	YES	✓		
	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	✓		Both
	Primary School	YES	✓		(1 to 8)
	Secondary school	YES	✓		(9 to 10)
	Higher sec. School	YES	✓		(11 to 12)
	ITI college/ vocational Training Center	YES	✓		(ITI)
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	YES	✓		ENGINEERING COLLAGE
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				

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Suggestions if any:

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

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

Suggestions if any:

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

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	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Good		✓	
	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	Good		✓	
	4. Kishori Shakti Yojana			✓	
	5. Balika Samriddhi Yojana			✓	
	6. Mid-day Meal Programme			✓	
	7. Intergrated Child Development Scheme (ICDS)			✓	
	8. Mahila Mandal Protsahan Yojana (MMPY)			✓	
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme			✓	
	11. Sanitation Programme (SP)				
	12. Rajiv Gandhi National Drinking Water Mission			✓	
	13. Swarnjayanti Gram Swarozgar Yojana				
	14. Minimum Needs Programme (MNP)		✓		✓
	15. National Rural Employment Programme				✓
	16. Employee Guarantee Scheme (EGS)				✓
	17. Prime Minister Rojgar Yojana (PMRY)				✓
	18. Jawahar Rozgar Yojana (JRY)				
	19. Indira Awas Yaojna (IAY)			✓	
	20. Samagra Awas Yojana (SAY)			✓	
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)				

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

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

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	YES	SWARNIM GRAM AWARD (2011)

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:
Ms.Darshana Chauhan,Project Co-ordinator
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

ગ્રામ પંચાયત વાસદ • વા. તા. જી.આણંદ •

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12.3 SURVEY FORM OF VARNAMA VILLAGE

(એનેક્ષર:- ૧)

અરજી ફોર્મ (પરિશિષ્ટ-અ)

ક્રમ	વિગત	માહિતી
૧	ગ્રામ પંચાયતનું નામ	વરનામા.
૨	તાલુકાનું નામ	વડોદરા
૩	જિલ્લાનું નામ	વડોદરા
૪	પછાત તાલુકા પૈકી નુ ગામ હોય તો વિગત	
૫	કુલ વસ્તી (૨૦૧૧ વસ્તી ગણતરી મુજબ)	
	પુરૂષ	૨૨૨૮
	સ્ત્રી	૨૦૨૩
	કુલ	૪૨૫૧
	અનુસુચિત જાતી	૭૫૨
	અનુસુચિત જન જાતી	૮૨૨
	અન્ય	૨૬૭૭
૬	કુલ કુટુબોની સંખ્યા	૬૩
૭	સાક્ષરતા દર	
	પુરૂષ	૪૭.૩૭
	સ્ત્રી	૭૫.૫૫.
૮	કુલ પ્રાથમિક શાળા	૦૨
૯	કુલ આંગણવાડી	૦૬
૧૦	પ્રાથમિક આરોગ્ય કેન્દ્ર	૦૨
૧૧	ગ્રામ પંચાયતના કુલ સભ્યો (સદસ્યો સહિત)	૧૨
૧૨	સરપંચનુ નામ :- [illegible]	
૧૩	સામાજિક ન્યાય સમિતિના ચેરમેનનું નામ:- [illegible]	

સરપંચશ્રીની સહી

ગ્રામ પંચાયતનું રાઉન્ડ સીલ

તલાટી કમ મંત્રીની સહી

પરિશિષ્ટ-બ

સ્પર્ધામાં ભાગ લેવા ગ્રામપંચાયતે નીચે મુજબના ધારા ધોરણોને ધ્યાને રાખીને વિગતો આધાર પુરાવા સહિત રજુ કરવાની રહેશે.

.....

૧. શિક્ષણ

ક્રમ	વિગત	માહિતી
૧	શાળા પ્રવેશ દર	૧૦૦ ટકા
	ગત વર્ષ નો પ્રવેશ દર	૧૦૦ ટકા
	ચાલુ વર્ષનો પ્રવેશ દર	૧૦૦ ટકા
૨	ડ્રોપ આઉટ પ્રમાણ	૦ ટકા
	ગત વર્ષનો ડ્રોપ આઉટ	૦ ટકા
	ચાલુ વર્ષનો ડ્રોપ આઉટ	૦ ટકા
૩	શિક્ષણ ગુણવત્તા સુધારણા આંક (A, B, C, D)	A

૨. આરોગ્ય

ક્રમ	વિગત	માહિતી
૧	જન્મ નોંધણી ની ટકાવારી	૧૦૦ ટકા
૨	મરણ નોંધણી ની ટકાવારી	૧૦૦ ટકા
૩	રસીકરણ ની ટકાવારી (૧૧ મહિનાથી ૨૩ મહિનાના બાળકો)	૧૦૦ ટકા
૪	ઇન્ફન્ટ બાળ મૃત્યુદર ની ટકાવારી	—
૫	માતા મૃત્યુદર ની ટકાવારી	—
૬	સંસ્થાકીય પ્રસુતિ ની ટકાવારી	૬૦ ટકા
૭	સ્ત્રી – પુરૂષ પ્રમાણ (√) કરવી	
	દર ૧૦૦૦ પુરૂષે ૯૭૫ કે તેથી વધુ સ્ત્રીઓ	
	દર ૧૦૦૦ પુરૂષે ૯૨૫ કે ૯૫૦ ની વચ્ચે	√
	દર ૧૦૦૦ પુરૂષે ૯૨૫થી ઓછી	

3. સ્વચ્છતા

ક્રમ	વિગત	માહિતી
૧	૧૦૦% વ્યક્તિગત શૌચાલયની કામગીરી	૧૦૦%
	કુલ ઘર	૧૪૯૮
	વ્યક્તિગત શૌચાલય ધરાવતા ઘર	૧૪૯૮
૨	શુધ્ધ પીવાના પાણીની વ્યવસ્થા (બે વાક્યમાં લખવુ)	
	વાસ્મો - યોજના અંતર્ગત બોર, સા.લ. વડોદરા થી વારનામા ગામે પાણીની વ્યવસ્થા કરવામાં આવી છે.	
૩	જાહેર સ્થળોની સ્વચ્છતા (હાલની વ્યવસ્થા બે વાક્યમા)	
	જાહેર સ્થળો ની સ્વચ્છતા માટે સફાઈ-કામદાર રાખેલ છે.	
૪	ડોર ટુ ડોર ઘન કચરાના નિકાલની વ્યવસ્થા	ટ્રેક્ટર દ્વારા ડોર ટુ ડોર
	કુલ ઘર	૧૪૯૦
	આવરી લેવાયેલ ઘર	૧૪૯૦
૫	સ્પર્ધા ના સમયગાળા દરમ્યાન ગામમા કોઇ રોગચાળાનો બનાવ બનેલ છે ? (હા કે ના)	ના.

૪. પંચાયત

ક્રમ	વિગત	માહિતી
૧	પંચાયત વેરો	
	ગત વર્ષની વસુલાત	૧૮,૪૨,૩૬૫/-
	ચાલુ વર્ષની વસુલાત	૦૮,૪૨,૮૧૧/-
૨	એરિયા બેઝ આકારણી લાગુ કરી છે ? (હા કે ના)	ના
૩	છેલ્લી ગ્રામસભામા હાજરીની ટકાવારી	૧૦૦%
૪	છેલ્લી ગ્રામસભામા મહીલા હાજરીની ટકાવારી	૦૮%
૫	ઇ-ગ્રામ મારફતે સુવિધાઓ	
		૭/૧૨ ના નકલ.
		જન્મ/મરણ ની નોંધણી
૬	છેલ્લા વર્ષમા ગ્રામ પંચાયતની મળેલ બેઠકની સંખ્યા	૧૨

૫. વિશિષ્ટ સિદ્ધી

ક્રમ	વિગત	માહિતી
૧	મળેલ પુરસ્કારો (√) કરવી	
	સમરસ	
	નિર્મળ ગ્રામ પુરસ્કાર	
	પાવન ગ્રામ	
	તીર્થગ્રામ	
	૧૦૦ ટકા બેન્ક ખાતા	✓
	ગૌરવ ગ્રામ સભા એવોર્ડ	
	શ્રેષ્ઠ ગ્રામ પંચાયત એવોર્ડ	
	અન્ય એવોર્ડ	
	અન્ય વિગતો:-	

૬. કેન્દ્ર સરકારશ્રીની નીચે મુજબની યોજનાઓની વિગતો

ક્રમ	યોજનાનું નામ	માહિતી
૧	પ્રધાનમંત્રી સુરક્ષા વિમા યોજના	✓
૨	પ્રધાનમંત્રી જીવન જ્યોત વીમા યોજના	✓
૩	અટલ પેન્શન યોજના	✓
૪	સુકન્યા સમૃધ્ધી યોજના	✓

સરપંચશ્રીની સહી

તલાટી-કમ મંત્રીની સહી

વરણામા જુથ ગ્રામપંચાયત
તા.જી.વડોદરા

ઠરાવનો નમૂનો (પરિશિષ્ટ-ક)

ઠરાવ નંબર-

ગ્રામપંચાયત ને સ્માર્ટ વિલેજ યોજના અંતર્ગત ચાલુ વર્ષ ૨૦/૨૧ ની સ્માર્ટ વિલેજ સ્પર્ધામા ભાગ લેવા અંગે નિયત અરજી ફોર્મની વિગતો વંચાણે લેવામા આવી. જે અંગે ચર્ચા વિચારણા કરી તમામ ધારણો પૂર્ણ કરતી હોઇ દરખાસ્ત તાલુકા વિકાસ અધિકારીશ્રી ને મોકલી આપવાનુ તેમજ આ માટે ગામની પસંદગી થયે મળનાર ગ્રાન્ટ માંથી કરવામા આવેલ કામો અને પ્રાપ્ત કરેલ સપત્તિની જાળવણી કરવા , પુરતી નાણાકીય અને અન્ય બાબતોની વ્યવસ્થા કરવા ગ્રામ પંચાયત સંમત છે. તે અંગેની બાહેધરી આપવા આથી ઠરાવવામા આવે છે.

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

Name of District:	VARNAMA
Name of Taluka:	VADODARA
Name of Village:	VADODARA
Name of Institute:	NEOTECH INSTITUTE OF TECHNOLOGY
Nodal Officer Name & Contact Detail:	PROF. PIYUSH PRAJAPATI
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	PINKUBEN DINESHBHAI AMIN
Date of Survey:	20/9/2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	4054	2087	1967	40
2.	2011	4251	2228	2023	951

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	173 hector
2.	Forest Area (In hect.)	0
3.	Agricultural Land Area (In hect.)	161 hector
4.	Residential Area (In hect.)	9 hector
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	(1 km) Varnama

7.	Name of Nearest Town with Distance:	Vasada (2 km)
8.	Distance to the nearest bus station (in kilometers):	Varnama (500 m)
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Worker
	2.	Farmer
	3.	Business man

Major crops grown in the village:	1.	Cotton
	2.	Tuvar
	3.	Arandaa

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Other(Specify)Lake/ Pond	Yes	✓		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity	150000	✓	
	Underground Sump	Capacity	200000	✓	
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE	Yes	✓		
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Yes	✓		Pucca
	Main road	Yes	✓		Pucca
	Internal streets	Yes	✓		Pucca
	Nearest NH/SH/MDR/ODR Dist. in kms.	Yes (500m)	✓		Pucca (NH-48)
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Yes (1 Km)	✓		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes (500m)	✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Yes	✓		
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes	✓		More than 6 hrs

	Power supply for Domestic Use	Yes	✓		
	Power supply for Agricultural Use	Yes	✓		
	Power supply for Commercial Use	Yes	✓		
	Road/ Street Lights	Yes	✓		
	Electrification in Government Buildings/ Schools/ Hospitals	Yes	✓		
	Renewable Energy Source Facilities (Y/ N)	Yes	✓		
	LED Facilities	No			
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes	✓		(1 Nos)
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	Yes	✓		
	Solid & liquid waste Disposal system available	Yes	✓		
	Any facility for Waste collection from road	Yes	✓		(Door to Door)
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL OTHER (SPECIFY)	Yes	✓		Borewell
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	1:9	✓		

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

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

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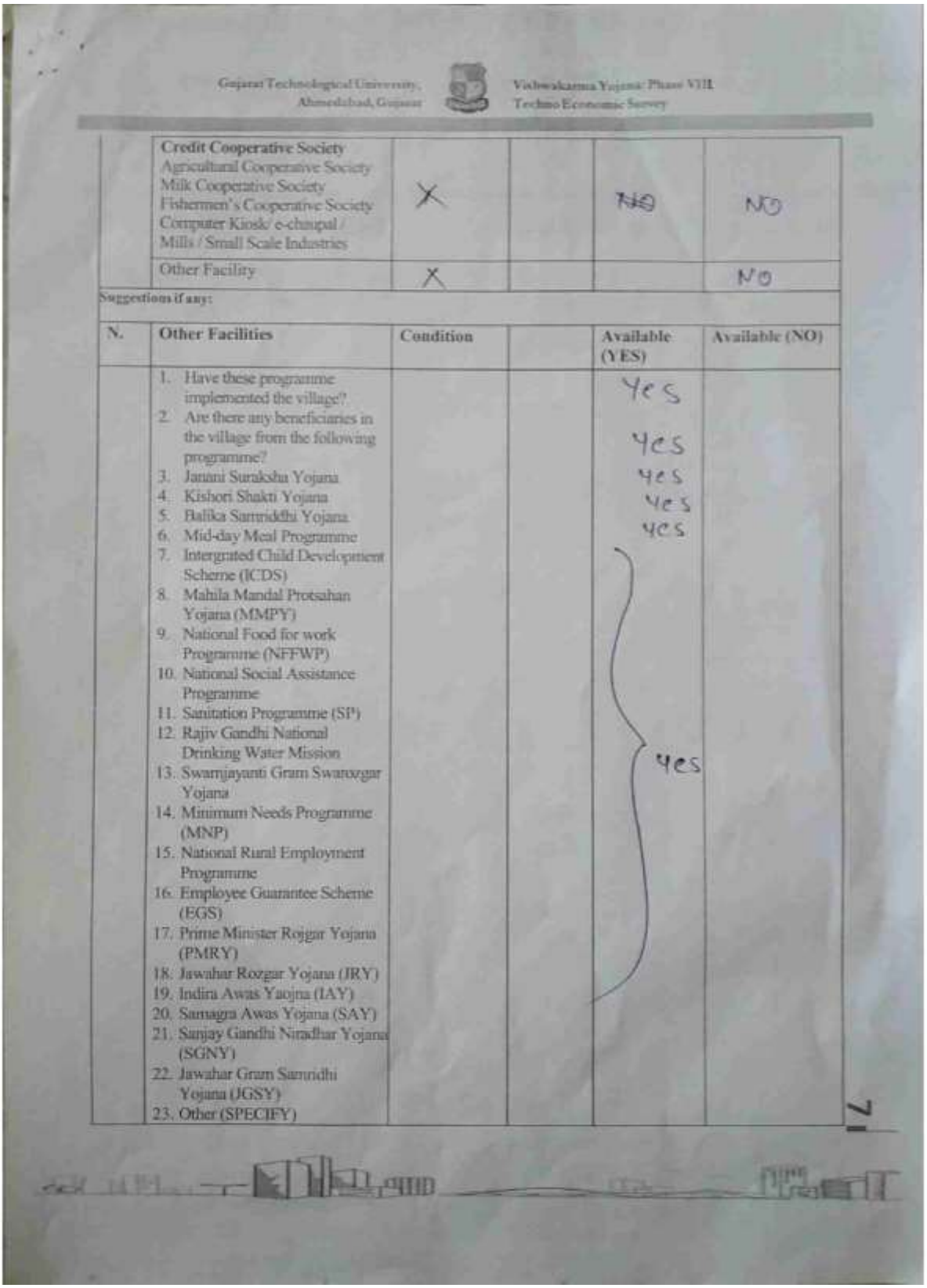
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
L.	**Socio- Culture Facilities**	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	✓		Yes	
	Public Library (With daily newspaper supply: Y/N)	✓		Yes	
	Public Garden			N	No
	Village Pond			Yes	
	Recreation Center				No
	Cinema/ Video Hall				No
	Assembly Polling Station	✓		Yes	No
	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	X		Yes	
	Telecommunication Network/ STD booth			No	
	General Market			No	
	Shops (Public Distribution System)	✓		Yes	
	Panchayat Building	X		Yes	
	Pharmacy/Medical Shop	✓		yes	
	Bank & ATM Facility	✓		Yes	
	Agriculture Co-operative Society	X		NO	
	Milk Co-operative Soc.	X		NO	
	Small Scale Industries	✓		yes	
	Internet Cafes/ Common Service Center/Wi Fi	X		NO	
	Youth Club	X		NO	
	Mahila Mandal	✓		yes	

9



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	X		NO	NO
	Other Facility	X			NO

Suggestions if any:

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

17

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

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VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	Yes	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING .....04/4..... FOGGING.....12..... Drive was undertaken in the village?		

IX. Smart Village / Heritage Details

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

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:
Ms.Darshana Chauhan,Project Co-ordinator
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

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12.4 GAP ANALYSIS

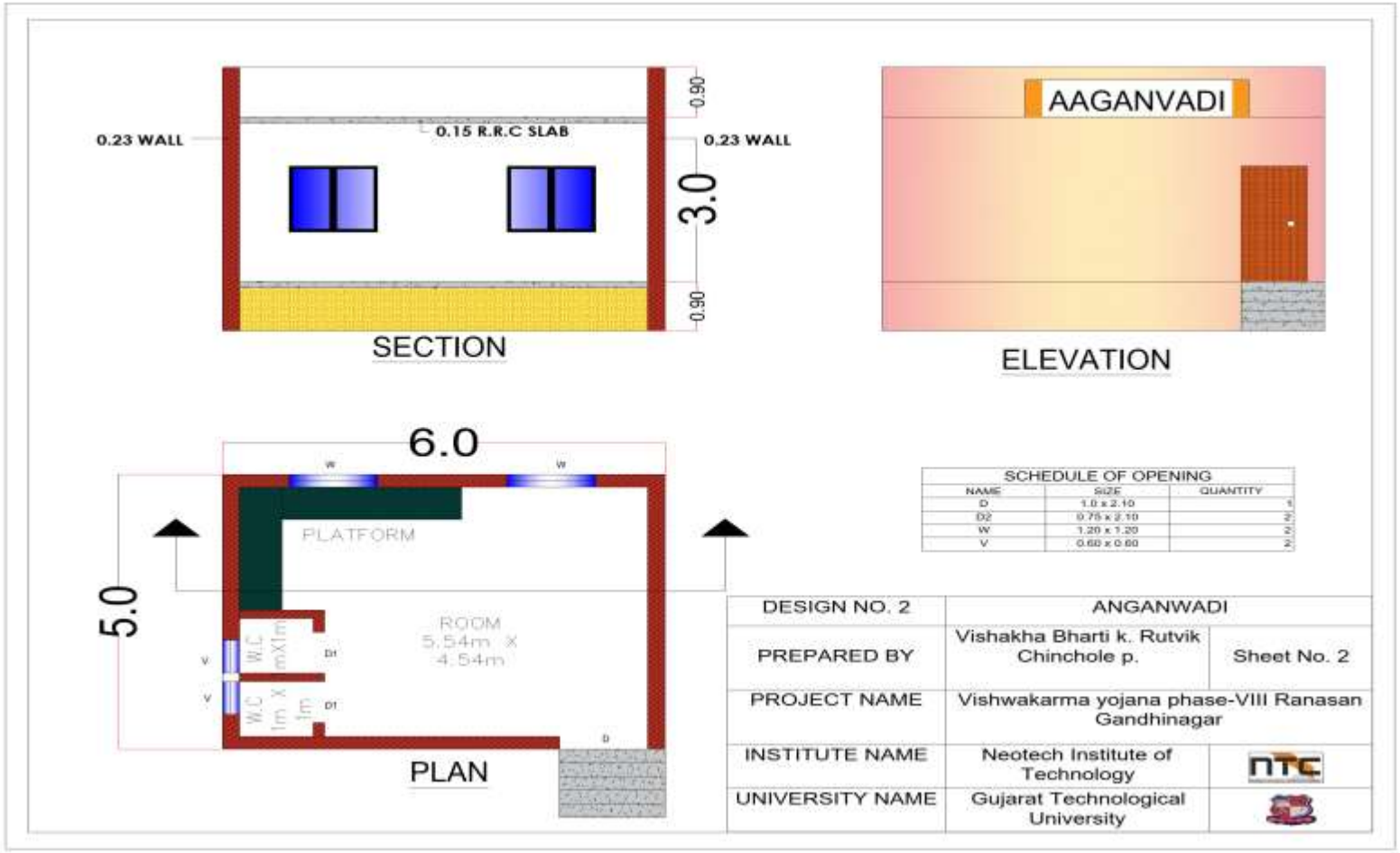
Village Facilities	Planning Commission/UDPFI Norms	Village Name:	varnama		
		Population:		4251	
		Existing	Required as per Norms	Smart Village / Cities / Heritage Future Projection Design	Gap
Social Infrastructure Facilities					
Education					**renovation required**
Anganwadi	Each or Per 2500 population	6	1		**-5**
Primary School	Each Per 2500 population	2	1		**-1**
Secondary School	Per 7,500 population	1	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/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	1	1		**0**
Primary Health & Child Health Center	Per 20,000 population	2	0		**0**
Child Welfare and Maternity Home	Per 10,000 population	1	0		**0**
Multispeciality Hospital	Per 100000 Population	0	0		**0**
Public Latrines	1 for 50 families (if toilet is not there in home, especially for slum pockets & kutcha house)	0	1		**1**

Physical Infrastructure Facilities					
Transportation		**Adequate / Inadequate**			
Pucca Village Approach Road	Each village	adequate	no needed		0
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	1	0		**0**
Drinking Water (Minimum 70 lpcd)		**Adequate / Inadequate**			
Over Head Tank	1/3 of Total Demand	adequate	1		
U/G Sump	2/3 of Total Demand	adequate	1		
Drainage Network - Open		**Adequate / Inadequate**			
Drainage Network - Cover		adequate			
Waste Management System		**Adequate / Inadequate**			
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	1	0		**0**
community hall and Public Library	Per 15000 Population	0	1		**-1**
Cremation Ground	Per 20,000 population	0	0		**0**
Post Office	Per 10,000 population	1	1		
Gram Panchayat Building	Each individual/group panchayat	1	1		
APMC	Per 100000 Population	0	0		**0**
Fire Station	Per 100000 Population	0	0		**0**
Public Garden	Per village	0	0		**0**
Police post	Per 40,000Population	1	1		
Shopping Mall					

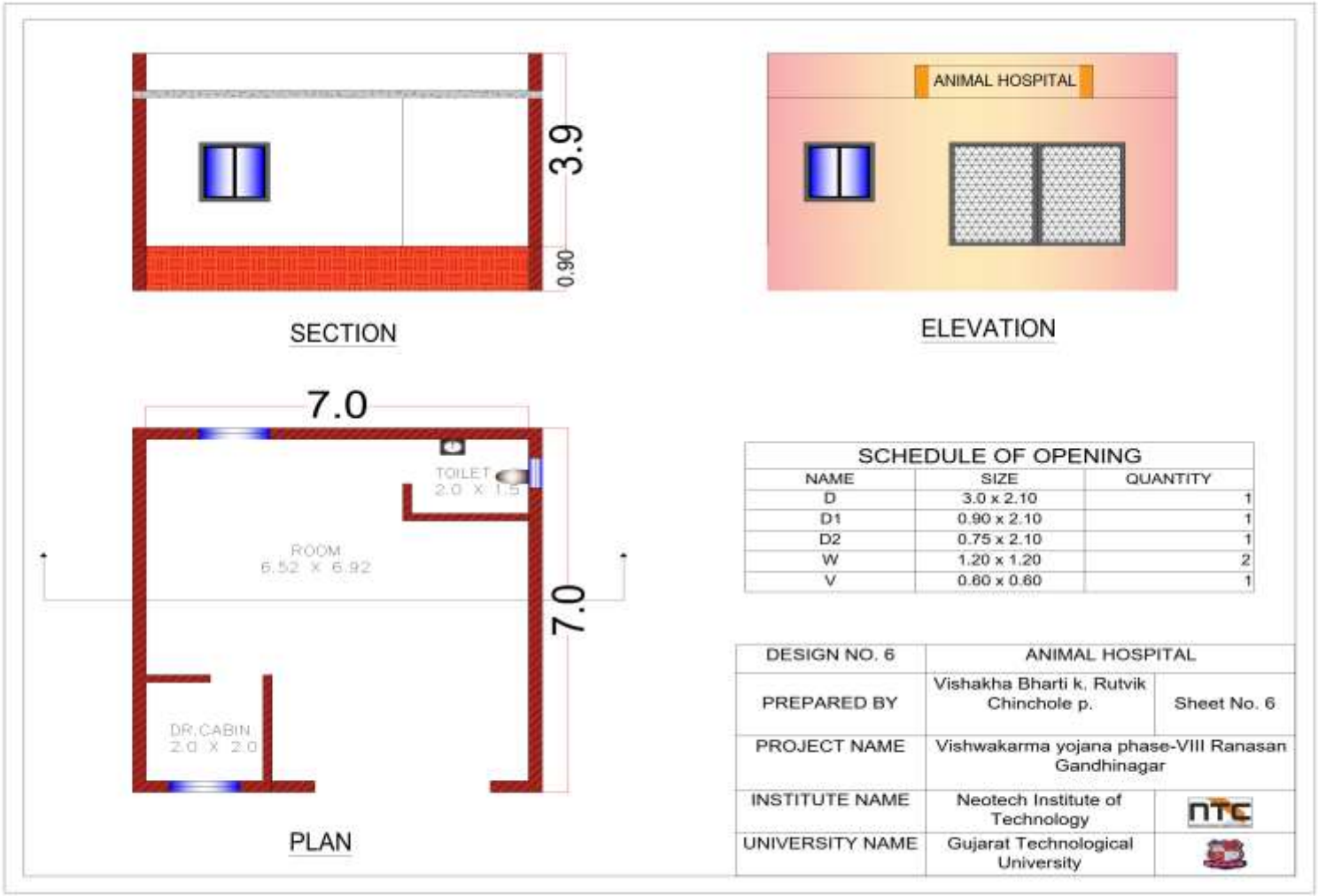
12.5 SUMMARY OF ALL VILLAGES DESIGN AS PART -I & PART-II

Sr.no.	Village Name	Branch	Part-I Design	Part-II Design
1	Bahutha	Civil Engineering	Post Office	School
			Public Toilet	Dairy
			Library	Entrance Gate
			Community Hall	Bus stop
			Krishi Seva Kendra	Dhobi Ghat
			Panchayat Building	Bio-Gas Plant
2	Bhaniyara	Civil Engineering	Post Office	School
			Krishi Seva Kendra	Community Hall
			Bus Stop	Library
			Gov. Dispensery	Gov. Ration Shop
			Lake Beautification	Water Tank
			Public Toilet	Panchayat Building
3	Varsada	Civil Engineering	Post Office	Bank
			Public Garden	Police Station
			Community Hall	Lake Beautification
			Public Toilet	PHC Center
			Bus stop	School
			Panchayat Building	Dairy
4	Sundan	Civil Engineering	Public Toilet	School
			Public Garden	Crematorium
			Panchayat Building	Lake Beautification
			Road Pavement	Dairy
			U/G Water Tank	Community Hall
			Aaganwadi	Fire Safety Building
5	Varnama	Civil Engineering	Animal Health Care Center	Police Station
			Public Toilet	Water Tank
			Primary School	Bio-Gas Plant
			Post Office	Resort
			Bank	Lake Beautification
			Aaganwadi	Fire Safety Building

12.6 DRAWING A3/A4: -



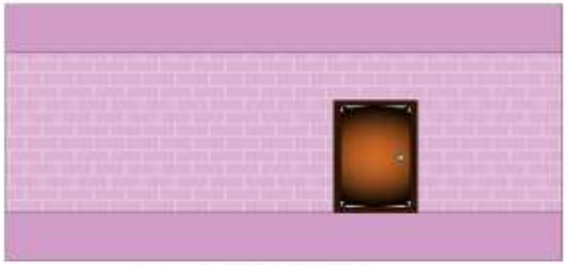
ANGANWADI



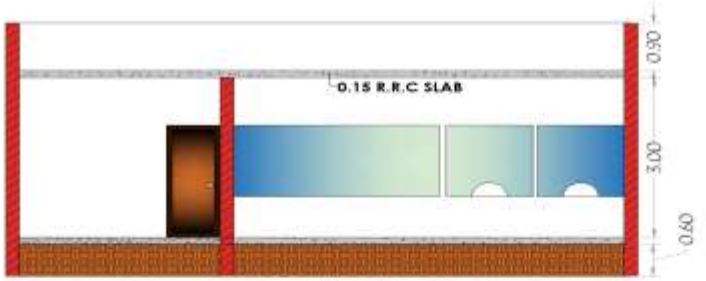
SCHEDULE OF OPENING		
NAME	SIZE	QUANTITY
D	3.0 x 2.10	1
D1	0.90 x 2.10	1
D2	0.75 x 2.10	1
W	1.20 x 1.20	2
V	0.60 x 0.60	1

DESIGN NO. 6	ANIMAL HOSPITAL	
PREPARED BY	Vishakha Bharti k. Rutvik Chinchole p.	Sheet No. 6
PROJECT NAME	Vishwakarma yojana phase-VIII Ranasan Gandhinagar	
INSTITUTE NAME	Neotech Institute of Technology	
UNIVERSITY NAME	Gujarat Technological University	

ANIMAL HOSPITAL



ELEVATION



SECTION

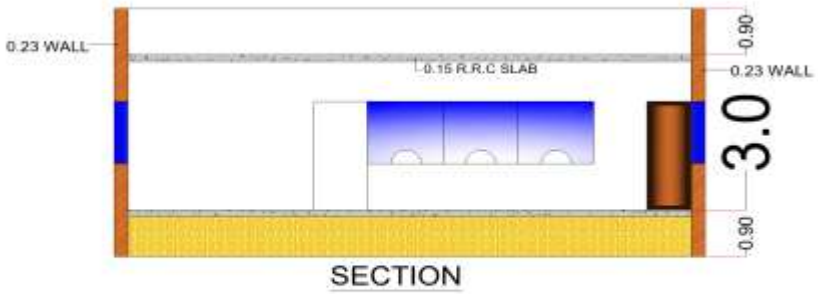
PLAN

SCHEDULE OF OPENING

NAME	SIZE	QUANTITY
D	1.20 x 2.10	1
D1	0.90 x 2.10	3
D2	0.75 x 2.10	2
W	1.20 x 1.20	1
V	0.60 x 0.60	2

DESIGN NO.3	BANK	
PREPARED BY:-	Chinchole Rutvik p. Bharti Vishakha k.	SHEET NO :- 3
PROJECT NAME	Vishwakarma Yojna phase-VIII Ranasan, Gandhinagar	
INSTITUTE NAME	NEOTECH INSTITUTE OF TECHNOLOGY	
UNIVERSITY NAME	Gujarat technological university	

BANK



SECTION

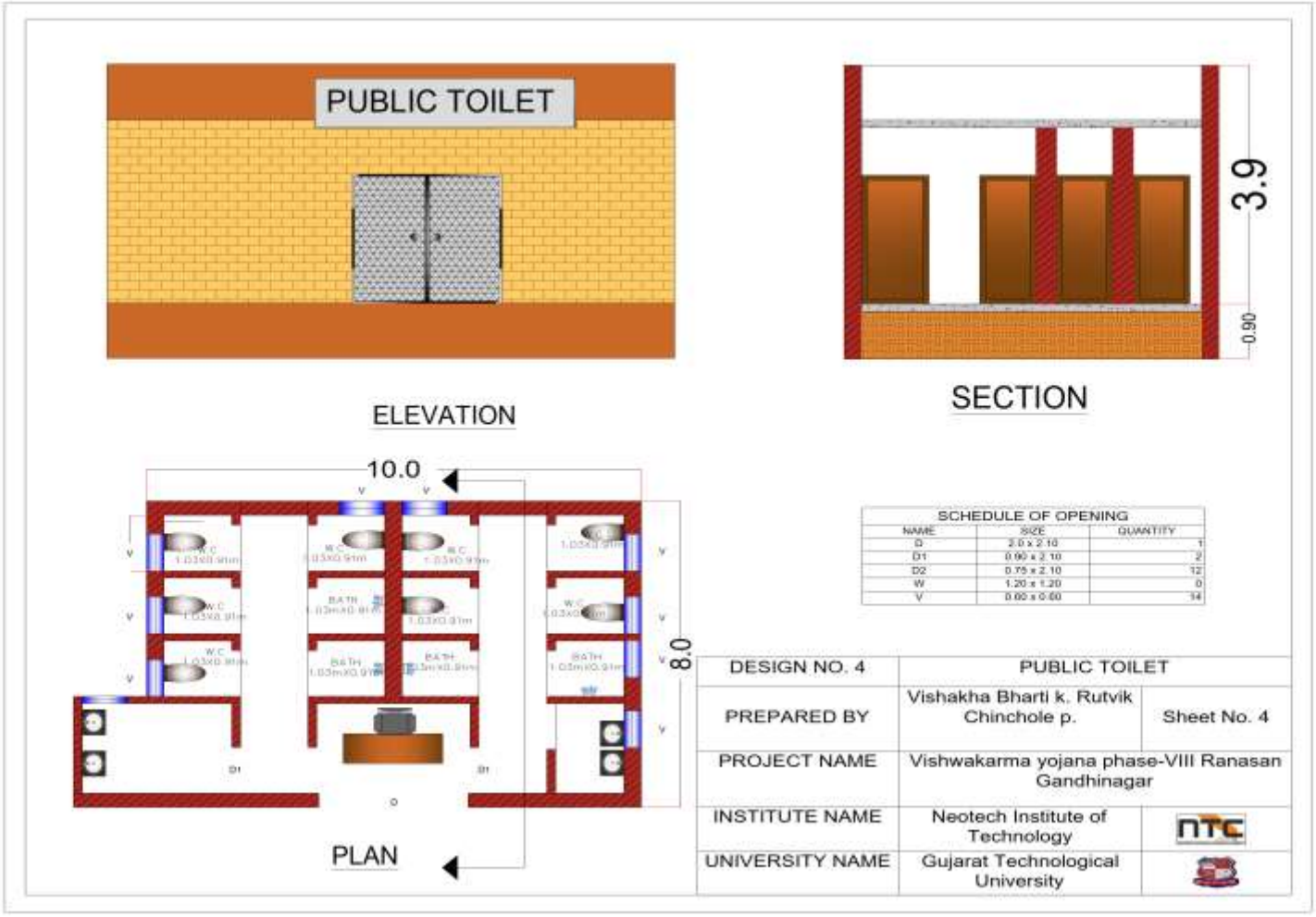
ELEVATION

PLAN

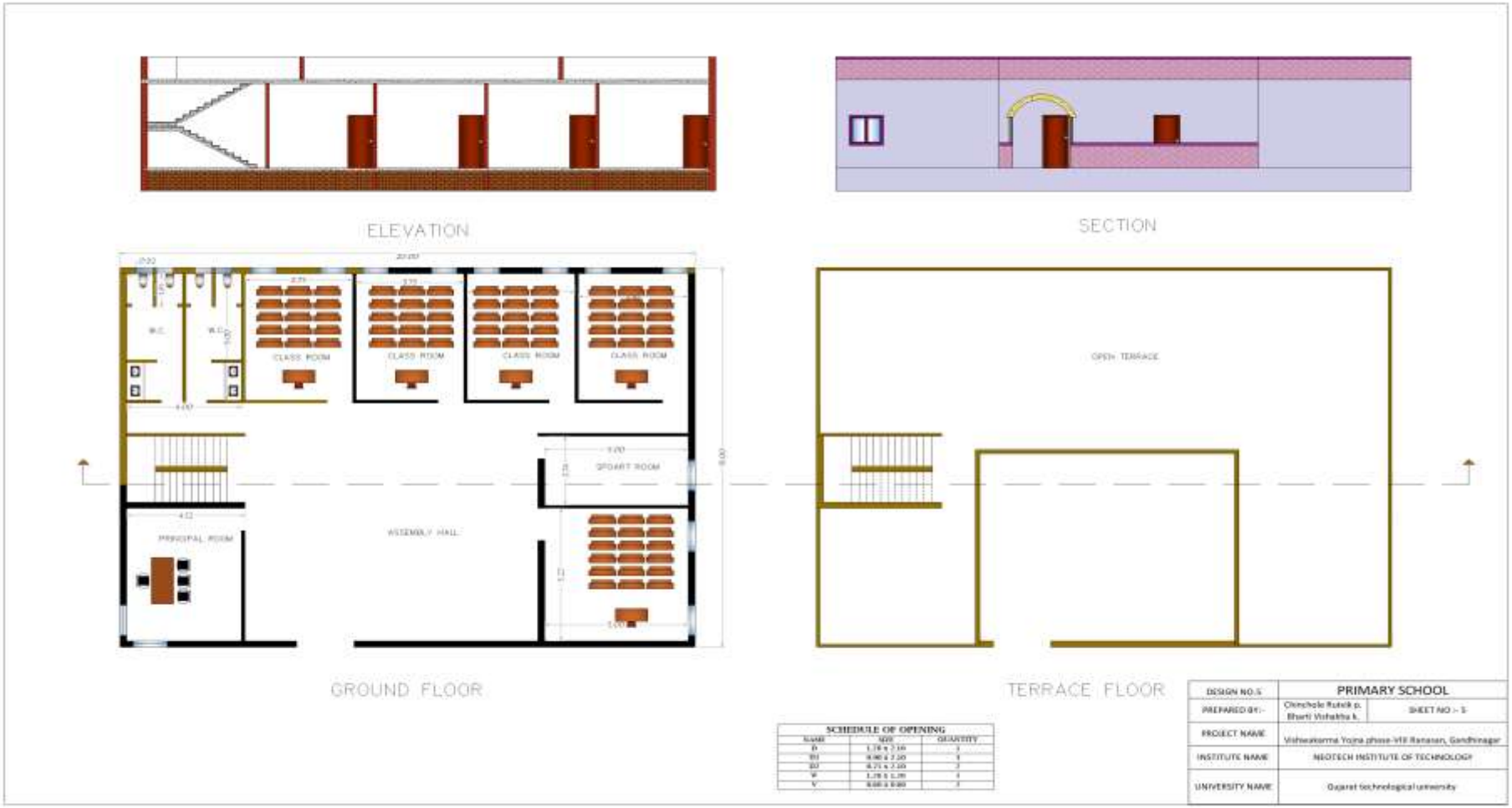
SCHEDULE OF OPENING		
NAME	SIZE	QUANTITY
D	1.0 x 2.10	2
D1	0.90 x 2.10	3
D2	0.75 x 2.10	2
W	1.20 x 1.20	3
V	0.60 x 0.60	2

DESIGN NO. 1	POST-OFFICE	
PREPARED BY	Vishakha Bharti k. Rutvik Chinchole p.	Sheet No. 1
PROJECT NAME	Vishwakarma yojana phase-VIII Ranasan Gandhinagar	
INSTITUTE NAME	Neotech Institute of Technology	
UNIVERSITY NAME	Gujarat Technological University	

POST-OFFICE

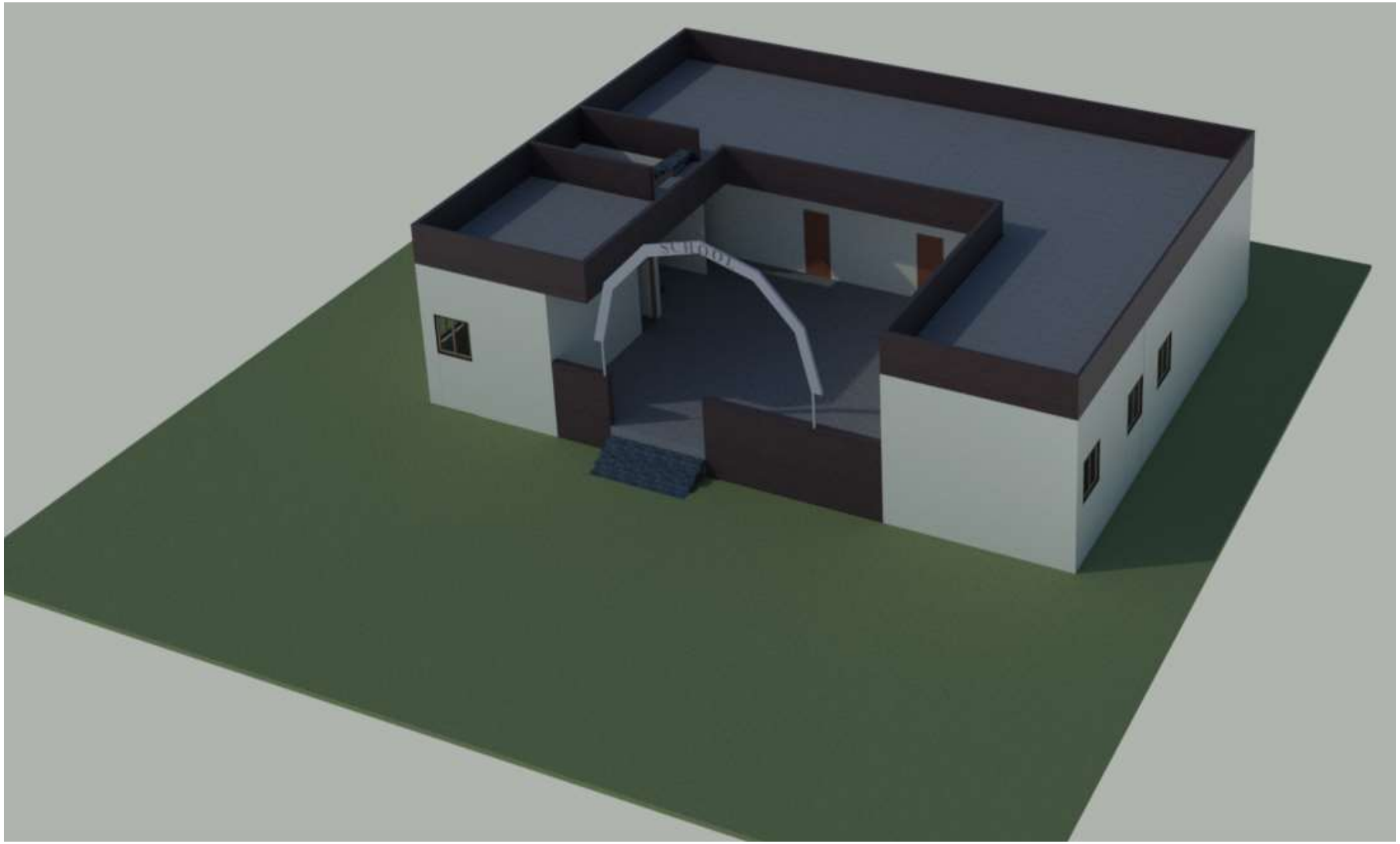


PUBLIC TOILET


ELEVATION
SECTION
CLASS ROOM
CLASS ROOM
CLASS ROOM
CLASS ROOM
W.C.
W.C.
SPORT ROOM
PRINCIPAL ROOM
ASSEMBLY HALL
GROUND FLOOR
OPEN TERRACE
TERRACE FLOOR
SCHEDULE OF OPENING
NAME
SIZE
QUANTITY
DESIGN NO.5
PRIMARY SCHOOL
PREPARED BY:-
SHEET NO :- 5
PROJECT NAME
Vishwakarma Yojna phase-VIII Ranasan, Gandhinagar
INSTITUTE NAME
NEOTECH INSTITUTE OF TECHNOLOGY
UNIVERSITY NAME
Gujarat technological university

SCHOOL


SCHOOL


SCHOOL

12.7 SUMMARIES OF GOOD PHOTOGRAPHS (VILLAGE VISITS IDEAL, SMART VILLAGE OR ANYOTHER)

✓ **Photos of Ideal village (Virod):**

Fig 12.7.1 Virod village

✓ **Photos of smart village (Vasad):**

Fig 12.7.2 Vasad village

✓ **Photos of allocated village(Varnama):**

Fig 12.7.3 Varnama village

12.8 Village Interaction Report with the photograph as a report format: -

Fig 12.8.1 Photo with talalti

As per the circular GTU guideline dated 10/10/2017, GTU informed all the teams of Vishwakarma Yojana to present their work in village for the effective implementation of Vishwakarma Yojana. Under this guideline Student's team of Varnama village presented the village development plan of Varnama village at Varnama Panchayat office on 27/10/2017.

Sarpanch, Talati, All the Panchayat members and Village dwellers remained present to know how the development of Varnama village is possible and to give their feedback.

We explained various designs under Physical infrastructure, Social infrastructure and Socio-Cultural facilities such as Public garden with Public toilet blocks, Community hall, Post office in village and Estimates Vegetable market in village. And in part 2 we design the different design like lakefront, green building, bus stand etc. Sarpanch and village dwellers shared various problems faced by them while designing such a facility, we gave various approaches and also present management techniques of such facilities with proposed design.

12.9 Sarpanch Letter (village design proposal shown to the Sarpanch interaction report):

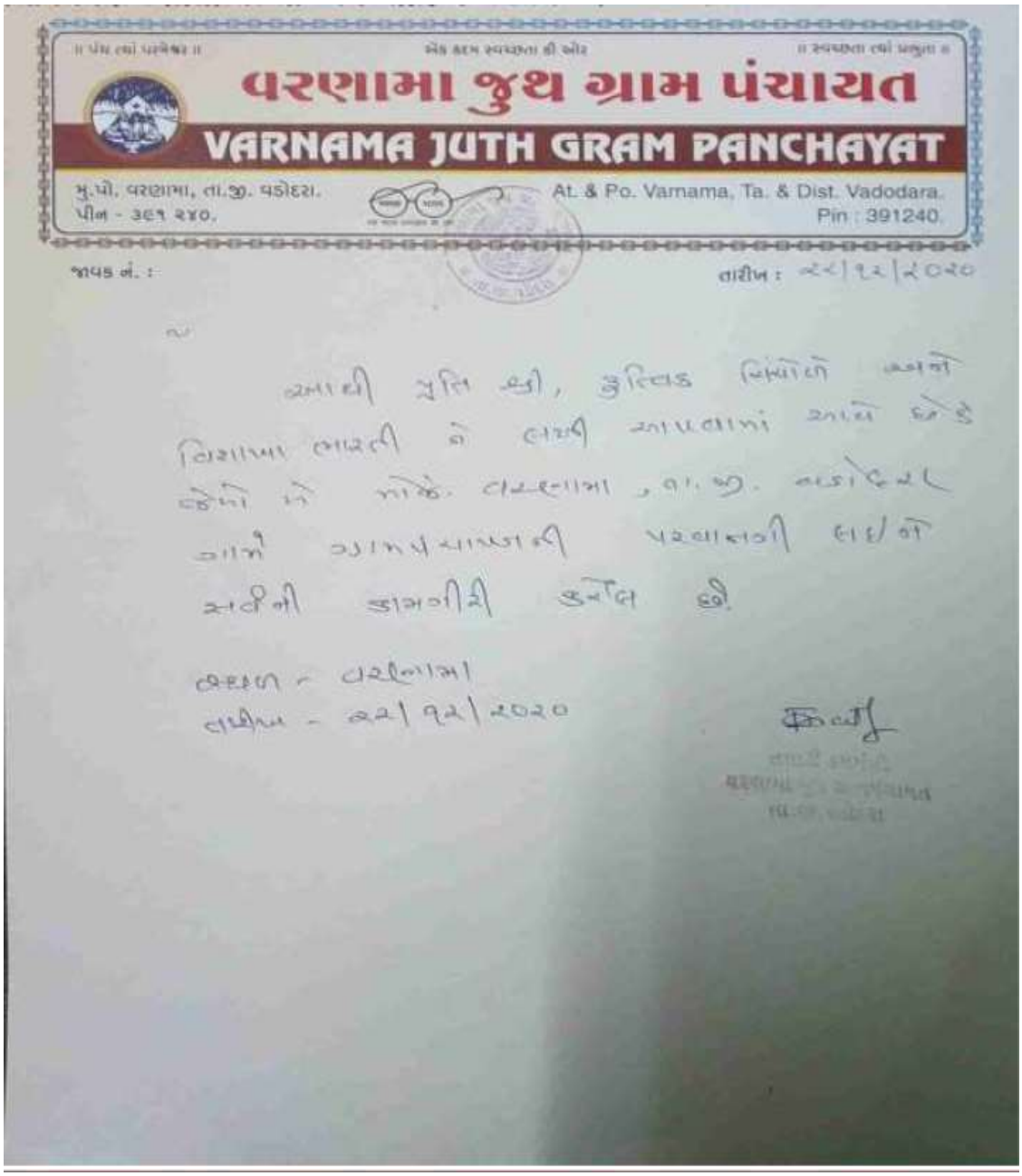

વરણામા જુથ ગ્રામ પંચાયત
VARNAMA JUTH GRAM PANCHAYAT
મુ.પો. વરણામા, તા.જી. વડોદરા.
પીન - ૩૯૧ ૨૪૦.
At. & Po. Varnama, Ta. & Dist. Vadodara.
Pin : 391240.
જાવક નં. :
તારીખ : ૨૨/૧૨/૨૦૨૦

Fig 12.9.1 Sarpanch Letter

12.10 COMPREHENSIVE REPORT PREPARATION AS PER FORMAT

About 70% of India's population or 750 million, live in its 600,000 villages. More than 85% of these villages are in the plains or on the Deccan plateau. The average village has 200-250 households, and occupies an area of 5 sq.km. Around 65% of the state's population is living in rural areas. Peoples in rural should have the same quality of life as is enjoyed by people living in sub urban and urban areas. Further there are cascading effect of poverty, unemployment, poor and inadequate infrastructure in rural areas on urban centers causing slums and consequential social and economic tensions manifesting in economic deprivation and urban poverty.

Hence rural development which is concerned with economic growth and social justice, improvement in the living standard of the rural people by providing adequate and quality social services and minimum basic needs become essential. So we government had decided to make a yojana known as "vishwakarma yojana". The yojana consist development of infrastructure in the allocated village.

In this project students have to select their allocated village for development of village. We had selected allocate village named ' Varnama'. The Varnama village located in vadodara Tehsil of vadodara district in Gujarat, India. It is situated 12 km away from Vadodara, which is both district headquarter of Varnama village. The total geographical area of village is 1761.79 hectares. The total population according to 2011 census is 4251 peoples which consists 2228 males and 2023 females. There are 951 households.

Firstly we have to survey the allocated, ideal and smart village and compare the smart and ideal village infrastructures and know the utilities and facilities of allocated village. From this we have to design the infrastructures according to survey.

We visit the village meet the sarpanch, talati, and other officers and discuss about our project and get the more details about our village and their infrastructure development. Then we visit the existing infrastructures and take a photographs and details about that.

We surveyed the structures which we have to renovate or give new design, firstly we make plans, elevation, section in autocad then we design the structures in staad-pro or etabs and then prepare a excel sheet of quantity sheet and abstract sheet.

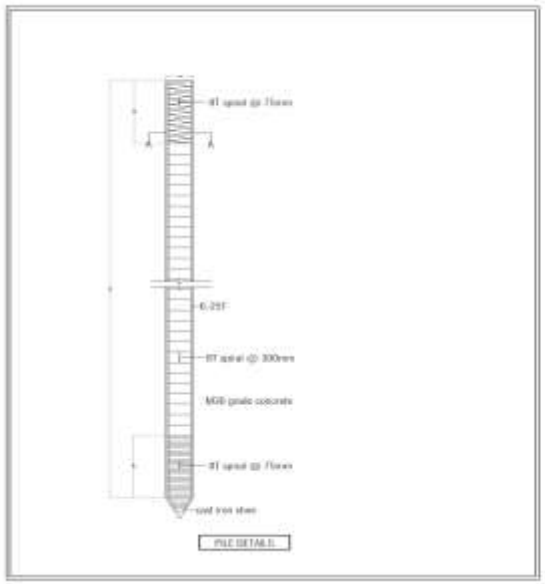
We had design post office, bank, public toilet, animal hospital, aaganwadi and primary school in 1st phase of the project. And then we designed police station, fire station, lake beautification, resort, biogas and water tank in 2nd phase.

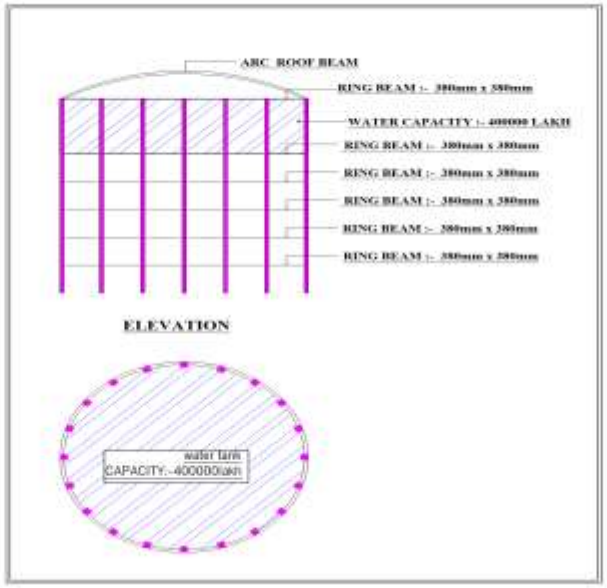
NAME OF STRUCTURE	COST OF STRUCTURE
(PHASE-I)	
Post office	
Bank	
Public toilet	
Animal hospital	
Aaganwadi	
Primary school	
(PHASE-II)	
Police station	
Fire station	
Lake beautification	
Resort	
Biogas	
Water tank	

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

13.1 DESIGN PROPOSALS: -

13.1.1 WATER TANK





DESIGN NO. 7	WATER TANK	
PREPARED BY	Vishakha Bharti k. Rutvik Chinchole p.	Sheet No. 7
PROJECT NAME	Vishwakarma yojana phase-VIII Ranasan Gandhinagar	
INSTITUTE NAME	Neotech Institute of Technology	
UNIVERSITY NAME	Gujarat Technological University	

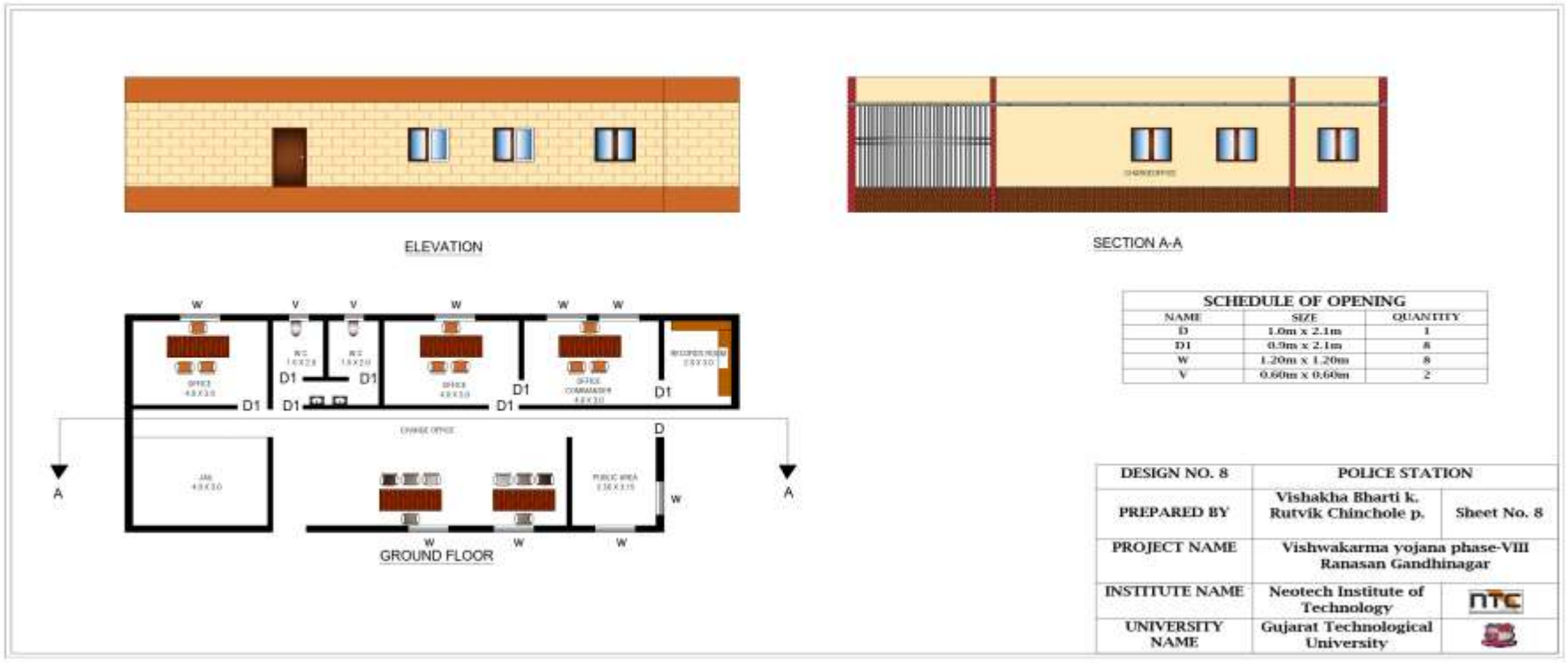
QUANTITY SHEET:

Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	**pile foundations**						
	PILES	45	1	28.26	12	15260.4	
							15260.40
2	**Column**						
	COLUMN	45	0.6	0.6	15	243	
							243
3	**beam**						
	BEAMS	240	1	0.38	0.38	34.656	
							34.66
4	**circular wall**						
	WALL	1	1	78.5	6	471	
							471
5	**Arc dome**						
	DOME	1	1	78.5	2	157	
							157
6	**circular slab**						
	SLAB	1	1	78.5	0.3	23.55	
							23.55

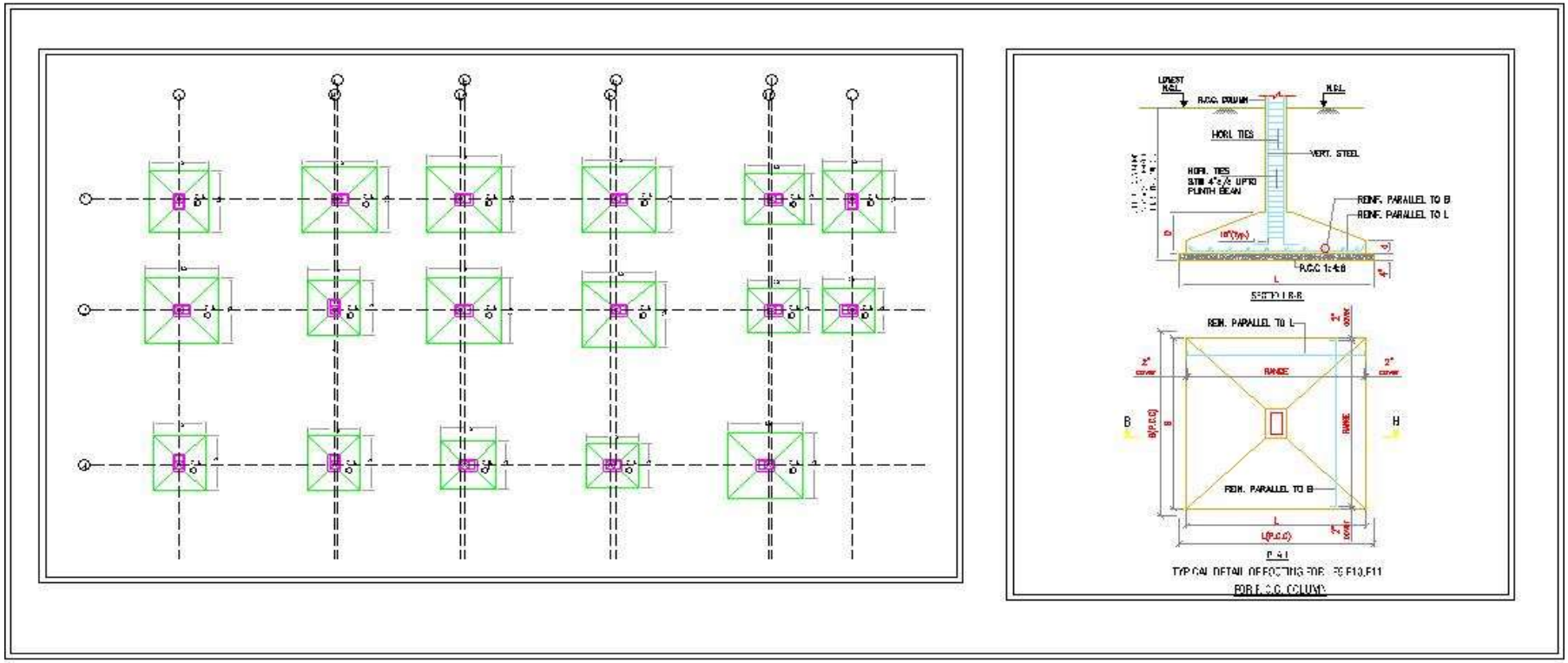
ABSTRACT SHEET:

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	32000	BAGS	500	16000000
2	SAND	150	M.T.	1000	150000
3	AGGREGATES	130	M.T.	1200	156000
4	STEEL	80000	KG	62	4960000
5	BINDING WIRE	800	KG	70	56000
6	PLASTER	4000	sq.ft	30	120000
7	EXCAVATION WORK	195	m3	130	25350
				TOTAL	21467350
				1.5% WATER	8426.13
				10% CONT.PROFIT	56174.2
				Total amount	21531950

13.1.2 POLICE STATION



FOOTING PLAN:-



QUANTITY SHEET:-

Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	Earthwork in Excavation in Foundation						
	Footing(1.40*1.60)	3	1.4	1.6	2	13.44	
	Footing(1.60*1.80)	4	1.6	1.8	2	23.04	
	Footing(1.20*1.40)	6	1.2	1.4	2	20.16	
	Footing(2*2)	4	2	2	2	32	
							88.64
2	P.P.C. in Foundation						
	Thickness=.10						
	Footing(1.40*1.60)	3	1.7	1.9	0.1	0.969	
	Footing(1.60*1.80)	4	1.9	2.1	0.1	1.596	
	Footing(1.20*1.40)	6	1.5	1.7	0.1	1.53	
	Footing(2*2)	4	2.3	2.3	0.1	2.116	
							6.211
3	Column						
	Base:-						
	Thickness=0.305m OR 0.355m						
	Footing(1.40*1.60)	3	1.4	1.6	0.305	2.05	
	Footing(1.60*1.80)	4	1.6	1.8	0.305	3.51	
	Footing(1.20*1.40)	6	1.2	1.4	0.305	3.07	
	Footing(2*2)	4	2	2	0.305	4.88	
						13.0052	
	Stem(0.23*0.38):-						
	Height=2+0.85= 2.85m						
	Footing(1.40*1.60)	3	1.4	1.6	2.85	19.15	
	Footing(1.60*1.80)	4	1.6	1.8	2.85	32.83	
	Footing(1.20*1.40)	6	1.2	1.4	2.85	28.73	
	Footing(2*2)	4	2	2	2.85	45.60	
						121.52	
						Total	131.43
4	Plinth Beam:-						
	BEAM 1	14	4.3	0.23	0.415	5.74609	
	BEAM2	28	3.3	0.23	0.415	8.81958	

						total	14.56567
	Earth Filling in Plinth:-						
	Class Room(3.75m*5m)	3	3.75	5	0.45	25.3125	
	W/C (4m*5m)	1	4	5	0.45	9	
	Class Room(3.83m*5m)	1	3.83	5	0.45	8.6175	
	Sport-Room(5m*2.74m)	1	5	2.74	0.45	6.165	
	Class Room(5m*5.27m)	1	5	5.27	0.45	11.8575	
	Principal Room(4.12m*5.27m)	1	4.12	5.27	0.45	9.77058	
						Total	70.72308
5	Damp proof course(DPC):-						
	86.25-((0.3/2)*3)						
	85.8	1	85.8	0.3			25.74
6	Brick Work in Super Structure:-						
	86.25-((0.3/2)*3)						
	85.8	1	85.8	0.3	3		77.22
	Partition Wall:-						
	w/c1= (L=1.15m) ,(B=0.115m)	2	1.5	0.115	3	1.035	
	w/c2=(L=2m),(B=0.115m)	1	2	0.115	3	0.69	
	room= (L=7m),(B=0.115)	7	4	0.115	3	9.66	
						Total	11.385
	Deduction:-						
	Door (2*2.10)	1	2	0.3	2.1	1.26	
	Door (0.90*2.10)	5	0.9	0.115	2.1	1.08675	
	Door (0.90*2.10)	2	0.9	0.3	2.1	1.134	
	Door (0.75*2.10)	6	0.75	0.115	2.1	1.08675	
	Windows(1.20*1.20)	5	1.2	0.3	1.2	2.16	
	Ventilation(0.60*0.60)	4	0.6	0.3	0.6	0.432	
	Windows(0.90*1.20)	8	0.9	0.3	1.2	2.592	
							9.7515
	Lintel:-						
	Door (2*2.10)	1	2.3	0.3	0.15	0.1035	
	Door (0.90*2.10)	5	1.2	0.115	0.15	0.1035	
	Door (0.90*2.10)	2	1.2	0.3	0.15	0.108	
	Door (0.75*2.10)	6	1.05	0.115	0.15	0.108675	
	Windows(1.20*1.20)	5	1.5	0.3	0.15	0.3375	
	Ventilation(0.60*0.60)	4	1.2	0.3	0.15	0.216	
	Windows(0.90*1.20)	8	1.2	0.3	1.2	3.456	
							0.977175
	Total Brickwork Afer Deduction:-					Total	0.656325
7	brick work						

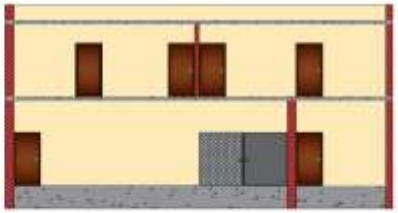
	area:- ((2*2.70*6.60)+(2*2.70*5)+(9*48.6)=628m2 (628/0.19*0.9*0.9)=408057.18nos.						410000 NOS. of brick
8	plaster						
	150m2						
	double plaster=(2*150)=300m2						
	300m2						
9	Slab						
	L=18.41						
	B=7.76						
	H=0.115	1	18.41	7.76	0.115		16.429084

ABSTRACT SHEET:-

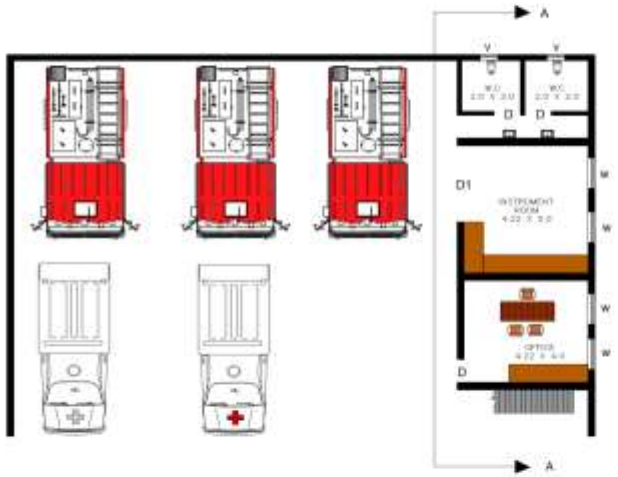
SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	800	BAGS	350	280000
2	SAND	5	M.T.	1000	5000
3	AGGREGATES	8	M.T.	1200	9600
4	STEEL	5800	KG	62	359600
5	BINDING WIRE	60	KG	70	4200
6	PLASTER	2000	sq.ft	30	60000
7	EXCAVATION WORK	89	m3	130	11570
8	BRICK (RAHI)	41000	NOS.	5.5	225500
				TOTAL	955470
				1.5% WATER	8426.13
				10% CONT.PROFIT	56174.2
				Total amount	1020070.3

13.1.3 FIRE STATION

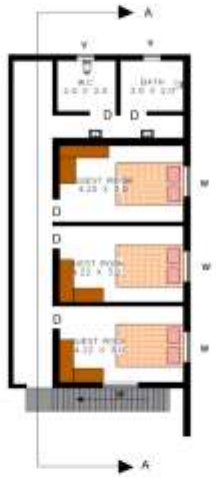
ELEVATION



SECTION A-A



GROUND FLOOR

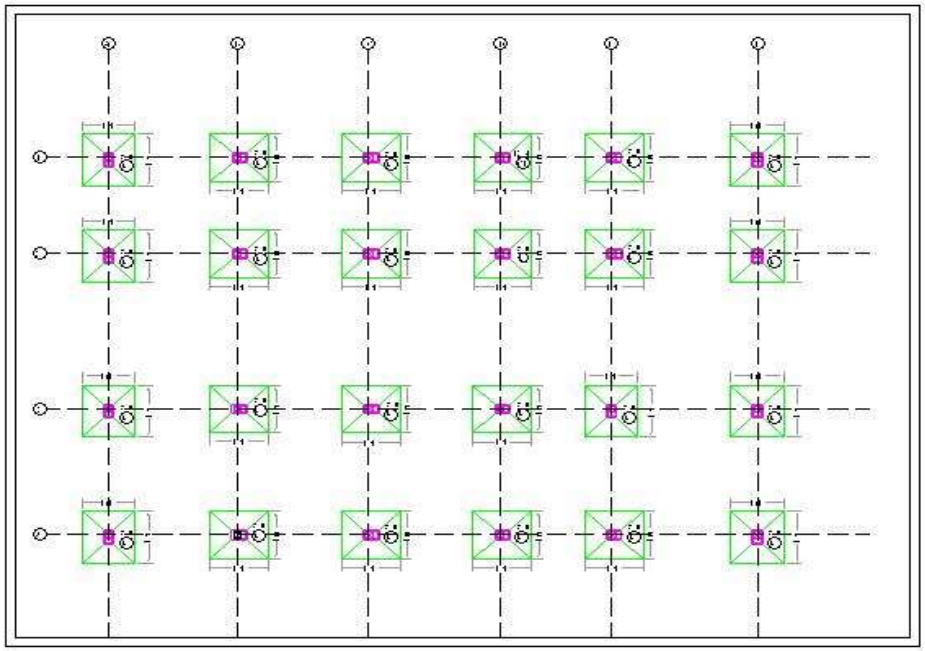


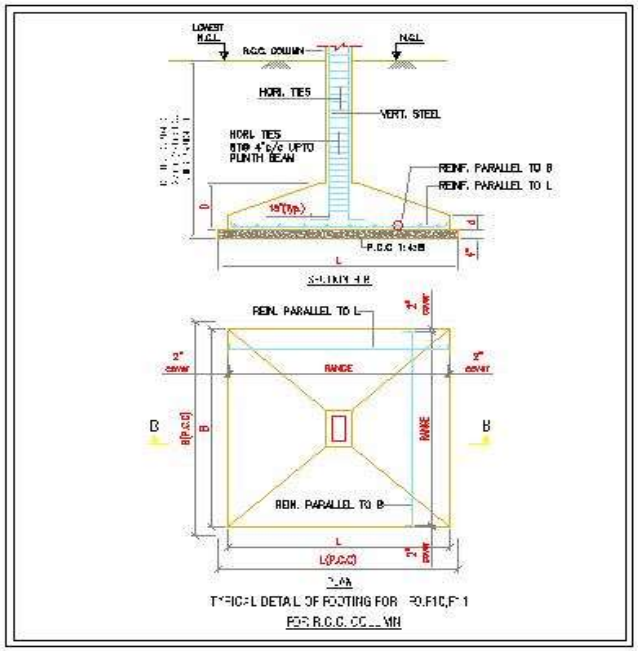
FIRST FLOOR

SCHEDULE OF OPENING		
NAME	SIZE	QUANTITY
D	1.0m x 2.1m	8
D1	3.0m x 2.1m	1
W	1.20m x 1.20m	8
V	0.60m x 0.60m	4

DESIGN NO. 9	FIRE STATION	
PREPARED BY	Vishakha Bharti k. Rutvik Chinchole p.	Sheet No. 9
PROJECT NAME	Vishwakarma yojana phase-VIII Ranasan Gandhinagar	
INSTITUTE NAME	Neotech Institute of Technology	
UNIVERSITY NAME	Gujarat Technological University	

FOOTING PLAN: -





QUANTITY SHEET: -

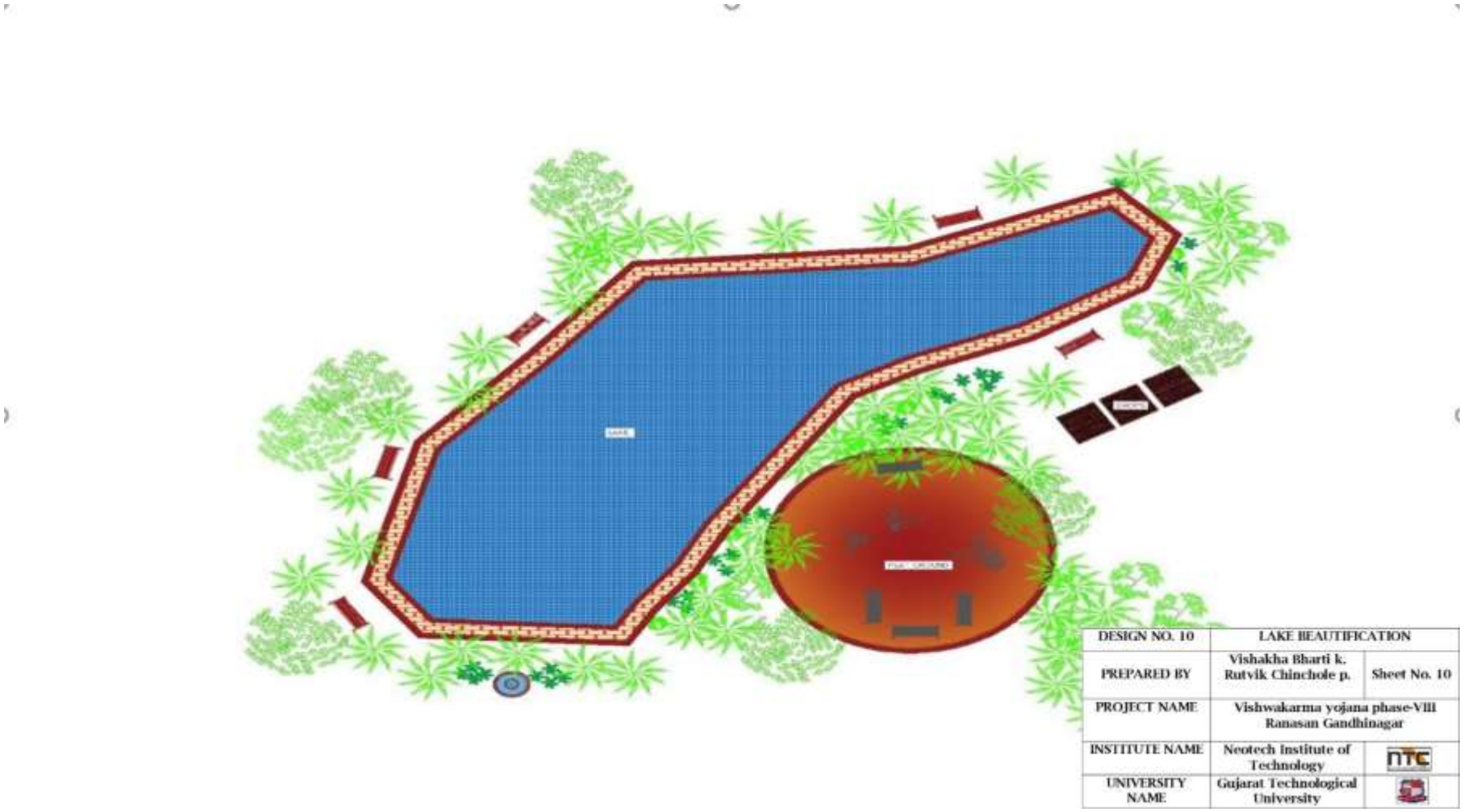
Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	Earthwork in Excavation in Foundation						
	Footing(1.60*1.70)	24	1.6	1.7	2	130.56	
							130.56
2	P.P.C. in Foundation						
	Thickness=.10						
	Footing(1.60*1.70)	24	1.9	2	0.1	9.12	
							9.12
3	Column						
	Base:-						
	Thickness=0.305m OR 0.355m						
	Footing(1.60*1.70)	24	1.6	1.7	0.305	19.91	
						13.0052	
	Stem(0.23*0.38):-						
	Height=2+0.85= 2.85m						
	Footing(1.60*1.70)	24	1.6	1.7	2.85	186.05	
						121.52	
						Total	131.43
4	Beam:-						
	BEAM 1	65	4	0.23	0.415	24.817	
						total	24.817
5	Earth Filling in Plinth:-						
	OFFICE(4m*4.22m)	1	4	4.22	0.45	7.596	
	W/C (4m*5m)	2	4	5	0.45	18	
	STORE ROOM(4.22m*5m)	1	4.22	5	0.45	9.495	
	ROOM(4.22m*3m)	3	4.22	3	0.45	17.091	
						Total	52.182

6	DPC						
	300-((0.3/2)*3)						
	299.55	1	299.55	0.3			89.865
	Brick Work in Super Structure:-						
	300-((0.3/2)*3)						
	299.55	1	299.55	0.3	3		269.595
	Partition Wall:-						
	w/c1= (L=0.17m) ,(B=0.115m)	2	0.17	0.115	3	0.1173	
	w/c2=(L=1.31m),(B=0.115m)	2	1.31	0.115	3	0.9039	
						Total	270.6162
8	Deduction:-						
	Door (2*2.10)	9	0.9	0.3	2.1	5.103	
	Windows(1.20*1.20)	5	1.2	0.3	1.2	2.16	
	Ventilation(0.60*0.60)	4	0.6	0.3	0.6	0.432	
							7.695
	Lintel:-						
	Door (2*2.10)	9	0.9	0.3	0.15	0.3645	
	Windows(1.20*1.20)	5	1.2	0.3	0.15	0.27	
	Ventilation(0.60*0.60)	4	0.6	0.3	0.15	0.108	
							0.7425
	Total Brickwork Afer Deduction:-					Total	262.1787
9	brick work						
	area:- ((3*5*4)+(3*4*4)+(9*100)=1000m2 (1000/0.19*0.9*0.9)=50000nos.						500000 NOS. of brick
10	plaster						
	600m^2						
	double plaster=(2*600)=1200m2						
	1200m2						
11	Slab						
	L=20						
	B=15						
	H=0.15	1	20	15	0.15		45

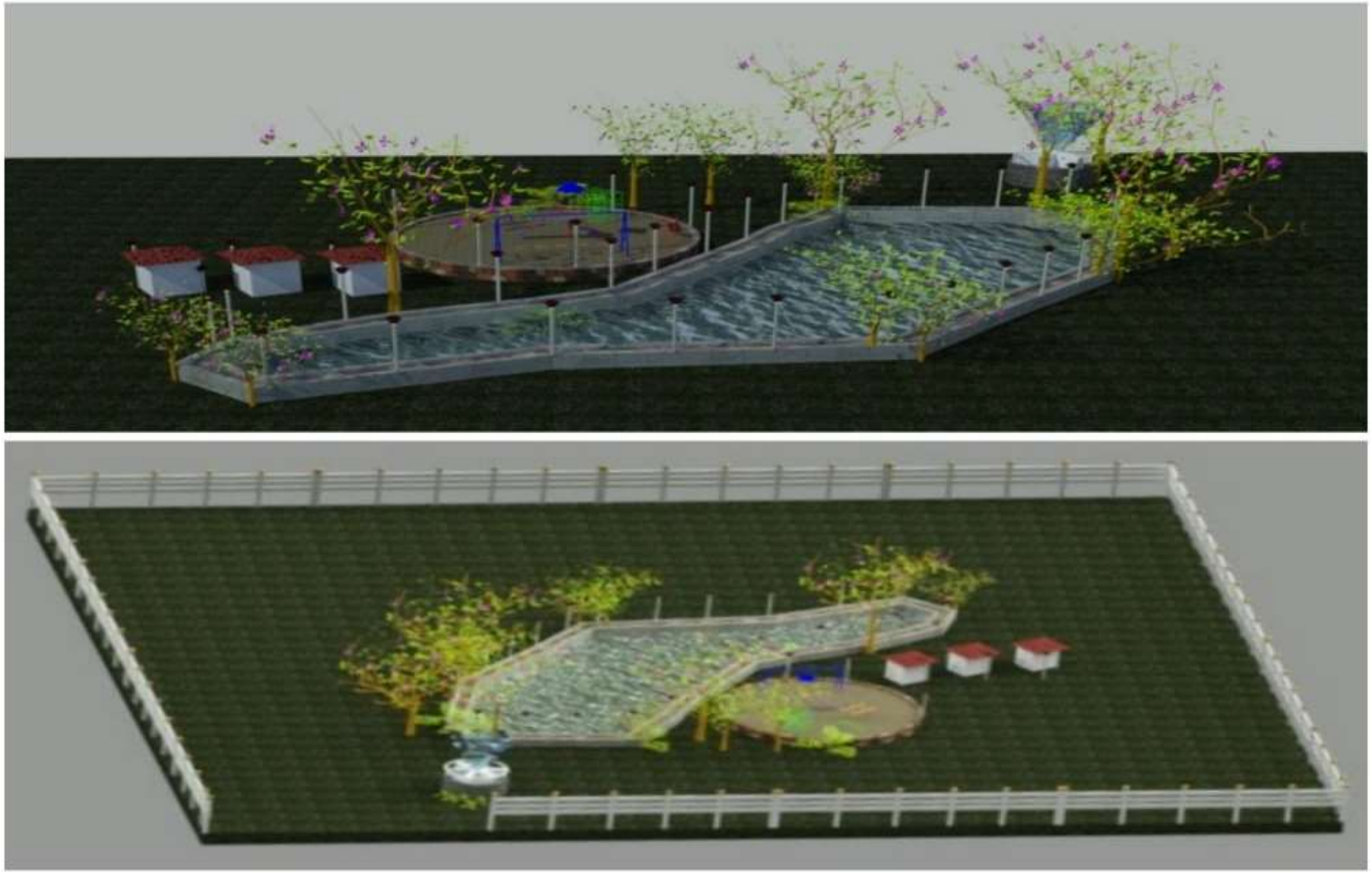
ABSTRACT SHEET: -

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	820	BAGS	350	287000
2	SAND	3	M.T.	1000	3000
3	AGGREGATES	6	M.T.	1200	7200
4	STEEL	7000	KG	62	434000
5	BINDING WIRE	70	KG	70	4900
6	PLASTER	1500	sq.ft	30	45000
7	EXCAVATION WORK	130.56	m3	130	16972.8
8	BRICK (RAHI)	50000	NOS.	5.5	275000
				TOTAL	1073072.8
				1.5% WATER	8426.13
				10% CONT.PROFIT	56174.2
				Total amount	1137673.13

13.1.4 LAKE BEAUTIFICATION



DESIGN NO. 10	LAKE BEAUTIFICATION	
PREPARED BY	Vishakha Bharti k. Rutvik Chinchole p.	Sheet No. 10
PROJECT NAME	Vishwakarma yojana phase-VIII Ranasan Gandhinagar	
INSTITUTE NAME	Neotech Institute of Technology	
UNIVERSITY NAME	Gujarat Technological University	



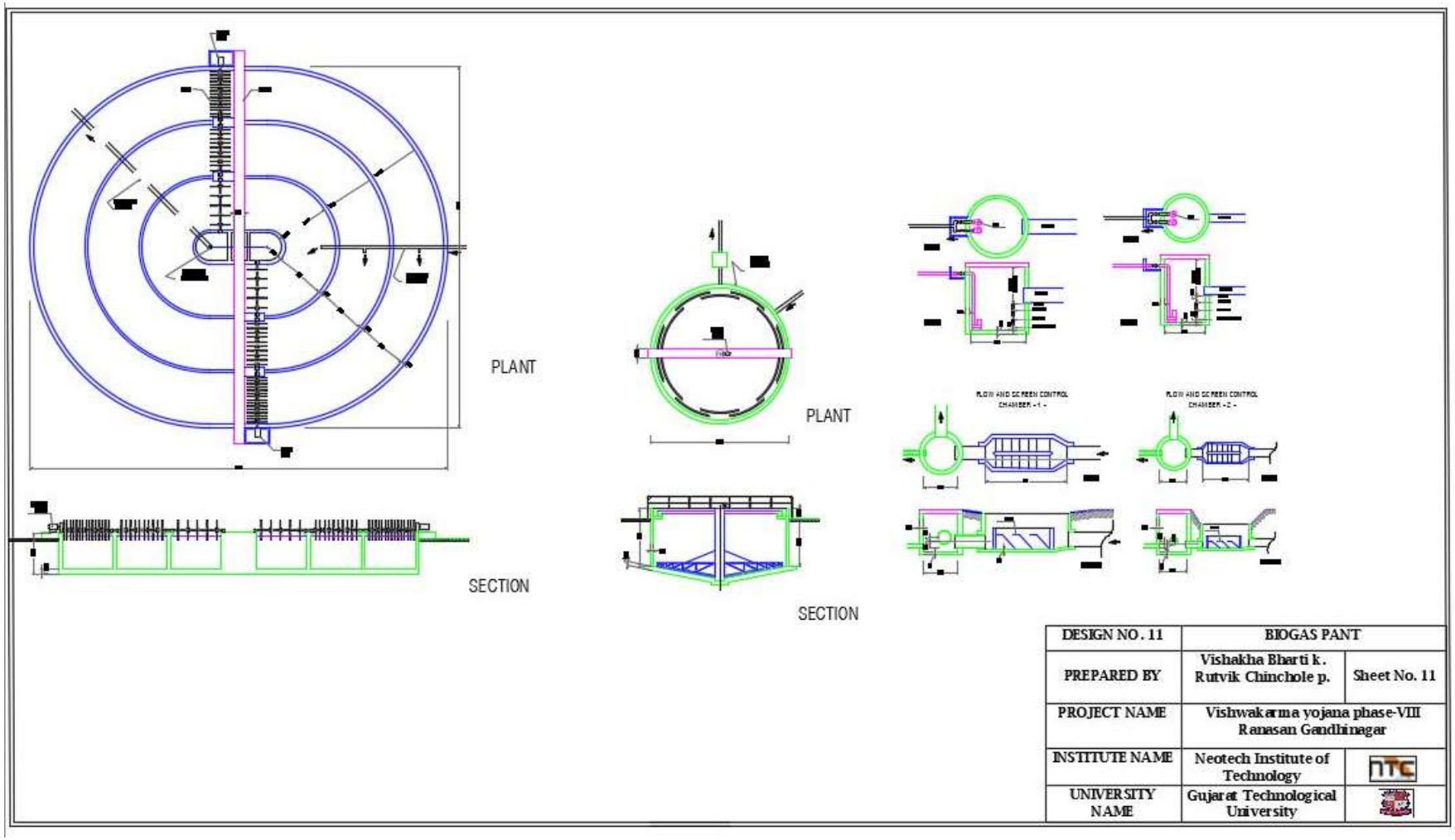
QUANTITY SHEET: -

Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	Providing Site clearance complete etc.						
		1	24	24	1		576
2	Providing iron jali in periphery Boundary wall						
		1	60	60	2.1		7560
3	Providing walking track in garden periphery						
		1	30	3			90
4	Providing sand pit in garden						
		1	10	10			100
5	Paver Block						
		1	30	3			90
6	Providing RCC seating benches in garden						
		10					10
7	Providing Iron strip Gate						
		1					1
8	Providing Tigard plants in periphery of garden						
		60					60
9	Steel railing around the lake						
		1	30				30

ABSTRACT SHEET: -

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	Providing Site clearance etc. complete	576	sq.m	20	11520
2	Providing iron jali in periphery Boundary wall	7560	sq.m	250	1890000
3	Providing walking track in garden periphery	90	sq.m	0	0
4	Providing sand pit in garden	100	sq.m	0	0
5	Paver Block	90	nos.	100	9000
6	Steel railing	30	dia.	50	1500
7	Providing RCC seating benches in garden	10	nos.	2000	20000
8	Providing Iron strip Gate	1	nos.	1200	1200
9	Providing Tigard plants in periphery of garden	60	nos.	600	36000
				TOTAL	1969220
				1.5% WATER	29538.3
				10% CONT.PROFIT	196922
				Total amount	2195680.3

13.1.5 BIOGAS PLANT: -



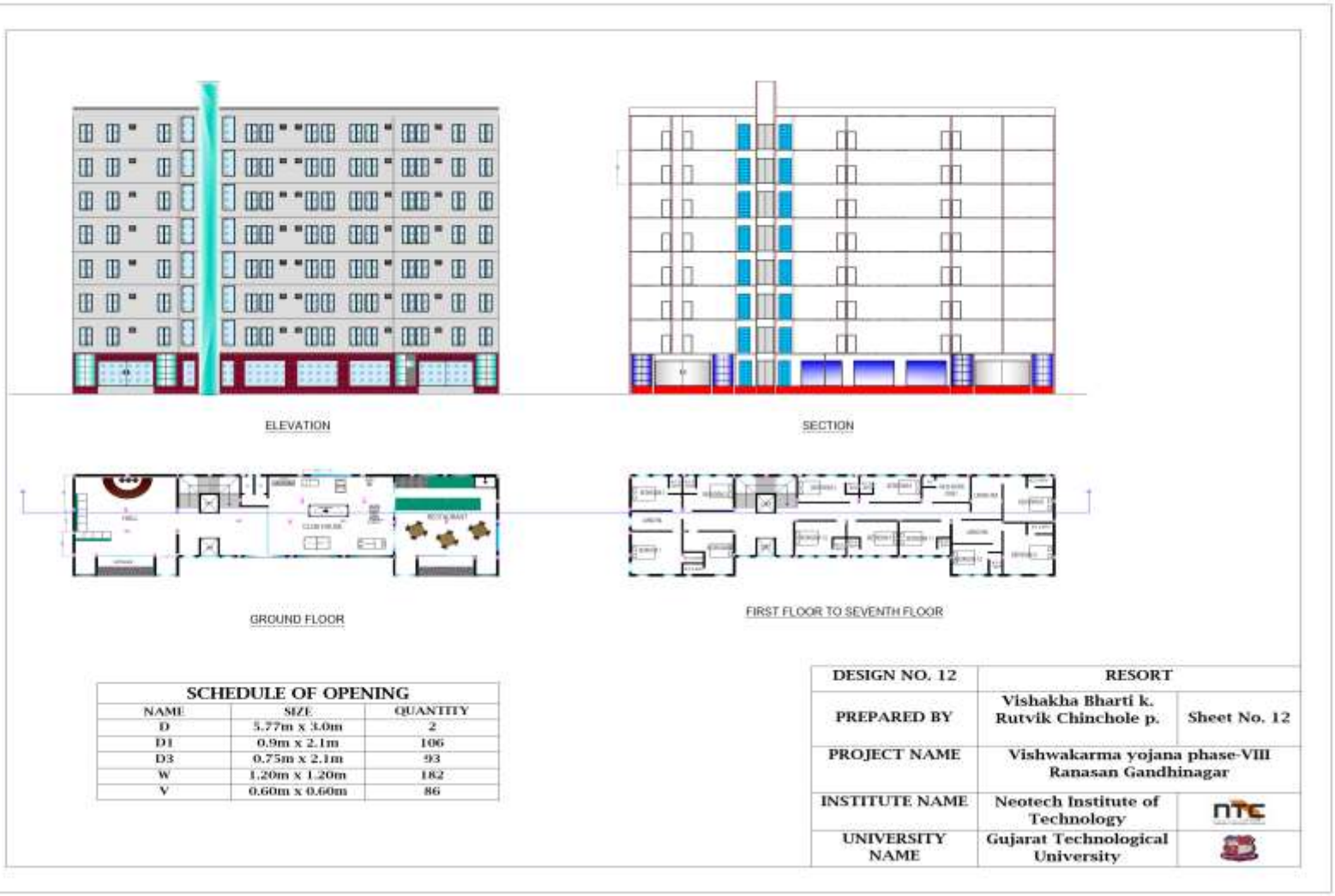
QUANTITY SHEET: -

Sr.No.	item description	Nos.	lenght (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	**OUTER WALL**						
		1	126.6127	1	1		126.61265
2	**MIDAL WALL**						
		1	60.7904	1	1		60.7904
3	**INTERNAL WALL**						
		2	18.84785	1	1		37.6957
4	**FLOW AND SCREEN CONTROL CHAMBER**						
		2	5	4	6		240

ABSTRACT SHEET: -

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	5650	BAGS	350	1977500
2	SAND	10	M.T.	1000	10000
3	AGGREGATES	8	M.T.	1200	9600
4	STEEL	2500	KG	62	155000
5	BINDING WIRE	28	KG	70	1960
6	PLASTER	1200	sq.ft	30	36000
7	EXCAVATION WORK	150	m3	130	19500
8	BRICK (RAHI)	50000	NOS.	5.5	275000
9	SHAFT	1	NOS.	40000	40000
10	BLADES	1	NOS.	50000	50000
11	MOTER 20hp	1	NOS.	45000	45000
12	MOTER 2hp	1	NOS.	10000	10000
13	MOTER 5hp	1	NOS.	12000	12000
14	SENSOR	1	NOS.	5000	5000
15	VALVES	5	NOS.	4000	20000
16	BEARING	2	NOS.	9000	18000
17	GEAR BOX	1	NOS.	30000	30000
				TOTAL	2714560
				1.5% WATER	126.39195
				10% CONT.PROFIT	5617.42
				Total amount	2720303.8

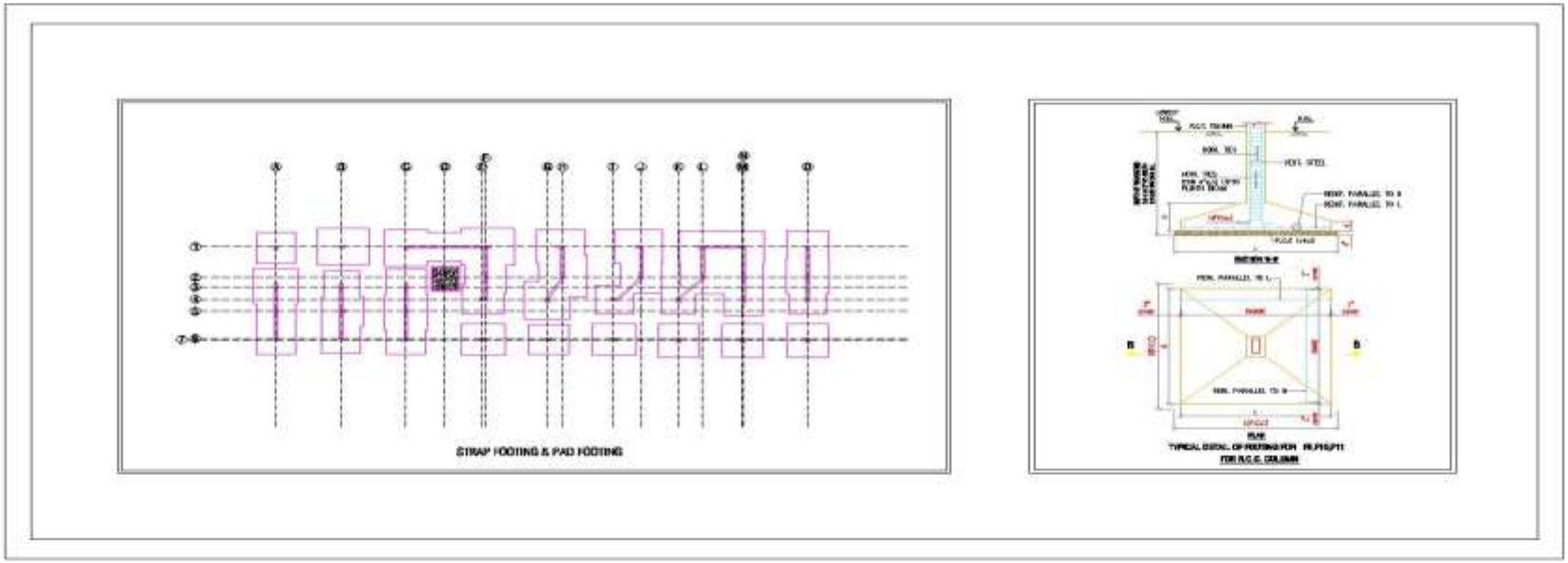
13.1.6 RESORT: -



SCHEDULE OF OPENING		
NAME	SIZE	QUANTITY
D	5.77m x 3.0m	2
D1	0.9m x 2.1m	106
D3	0.75m x 2.1m	93
W	1.20m x 1.20m	182
V	0.60m x 0.60m	86

DESIGN NO. 12	RESORT	
PREPARED BY	Vishakha Bharti k. Rutvik Chinchole p.	Sheet No. 12
PROJECT NAME	Vishwakarma yojana phase-VIII Ranasan Gandhinagar	
INSTITUTE NAME	Neotech Institute of Technology	
UNIVERSITY NAME	Gujarat Technological University	

FOOTING PLAN: -



RESORT AREA: -

QUANTITY SHEET: -

Sr.No.	item description	Nos.	length (m)	width (m)	height (m)	Quantity	Total Quantity cu.m
1	**Earthwork in Excavation in Foundation**						
	Footing(3.0*4.0)	8	3	4	2.5	240	
	combind Footing(52.86)	1	52.86		2.5	132.15	
	combind Footing(36.29)	1	36.29		2.5	90.725	
	combind Footing(30.72)	1	30.72		2.5	76.8	
	combind Footing(55.86)	1	55.86		2.5	139.65	
	combind Footing(27.58)	1	27.58		2.5	68.95	
	combind Footing(28.28)	1	28.28		2.5	70.7	
	combind Footing(25.78)	1	25.78		2.5	64.45	
	combind Footing(28.50)	1	28.5		2.5	71.25	
							954.68
2	**P.P.C. in Foundation**						
	Thickness=.10						
	Footing(3.0*4.0)	8	3.3	4.3	2.5	283.8	
	combind Footing(52.86)	1	54		2.5	135	
	combind Footing(36.29)	1	38		2.5	95	
	combind Footing(30.72)	1	32		2.5	80	
	combind Footing(55.86)	1	58		2.5	145	
	combind Footing(27.58)	1	29		2.5	72.5	
	combind Footing(28.28)	1	31		2.5	77.5	
	combind Footing(25.78)	1	27		2.5	67.5	
	combind Footing(28.50)	1	30		2.5	75	
							1031.3
3	**Column**						
	Base:-						
	Thickness=0.305m OR 0.355m						
	Footing(3.0*4.0)	8	3.3	4.3	0.305	34.62	
	combind Footing(52.86)	1	54		0.305	16.47	
	combind Footing(36.29)	1	38		0.305	11.59	
	combind Footing(30.72)	1	32		0.305	9.76	
	combind Footing(55.86)	1	58		0.305	17.69	
	combind Footing(27.58)	1	29		0.305	8.85	
	combind Footing(28.28)	1	31		0.355	11.01	
	combind Footing(25.78)	1	27		0.355	9.59	
	combind Footing(28.50)	1	30		0.355	10.65	
						130.22	
	Stem(0.23*0.30):-						

	Height=2.5+0.90= 3.4m						
	Footing(3.0*4.0)	8	3.3	4.3	3.4	385.97	
	combind Footing(52.86)	1	54		3.4	183.60	
	combind Footing(36.29)	1	38		3.4	129.20	
	combind Footing(30.72)	1	32		3.4	108.80	
	combind Footing(55.86)	1	58		3.4	197.20	
	combind Footing(27.58)	1	29		3.4	98.60	
	combind Footing(28.28)	1	31		3.4	105.40	
	combind Footing(25.78)	1	27		3.4	91.80	
	combind Footing(28.50)	1	30		3.4	102.00	
						1300.57	
						Total	1430.79
4	**Beam:-**						
	BEAM 1	400	5	0.23	0.38	174.8	
	BEAM2	350	6	0.23	0.38	183.54	
	BEAM3	190	4	0.23	0.4	69.92	
						total	428.26
5	**Earth Filling in Plinth:-**						
	Room(5m*5m)	56	5	5	0.45	630	
	W/C (2m*2m)	91	2	2	0.45	163.8	
	Room(6m*5m)	35	6	5	0.45	472.5	
						Total	1266.3
6	**Damp proof course(DPC):-**						
	456.81-((0.3/2)*3)						
	456.36	1	456.36	0.3			136.908
7	**Brick Work in Super Structure:-**						
	456.81-((0.3/2)*3)						
	456.36	1	456.36	0.3	4		547.632
	Partition Wall:-						
	w/c1= (L=0.17m) ,(B=0.115m)	91	0.17	0.115	3	5.33715	
	w/c2=(L=1.31m),(B=0.115m)	91	1.31	0.115	3	41.12745	
	rooms= (L=5m),(B=0.115)	56	5	0.115	3	96.6	
	rooms= (L=5m),(B=0.115)	56	5	0.115	3	96.6	
	rooms= (L=6m),(B=0.115)	35	6	0.115	3	72.45	
	rooms= (L=5m),(B=0.115)	35	5	0.115	3	60.375	
						Total	920.1216
	Deduction:-						

	Door (0.90*2.10)	112	0.9	0.115	2.1	24.3432	
	Door (0.75*2.10)	91	0.75	0.115	2.1	16.482375	
	Windows(1.20*1.20)	224	1.2	0.3	1.2	96.768	
	Ventilation(0.60*0.60)	13	0.6	0.3	0.6	1.404	
							138.997575
	Lintel:-						
	Door (0.90*2.10)	112	0.9	0.115	0.15	1.7388	
	Door (0.75*2.10)	91	0.75	0.115	0.15	1.1773125	
	Windows(1.20*1.20)	224	1.2	0.3	0.15	12.096	
	Ventilation(0.60*0.60)	13	0.6	0.3	0.15	0.351	
							15.3631125
	Total Brickwork Afer Deduction:-					Total	765.760913
8	**brick work**						
	area:- ((35*6*6)+(56*5*5)+(91*1.31*0.115) =2673.70m2 (2673.70/0.19*0.09*0.09)=17,37,300nos.						22,00,000 NOS. of brick
9	**plaster**						
	10000m2						
	double plaster=(2*10000)=20000m2						
	20000m2						
10	**Slab**						
	L=42						
	B=12						
	H=0.15	8	42	12	0.15		604.8

ABSTRACT SHEET: -

SR.NO	ITEM	QUANTITY	UNIT	RATE (Rs.)	AMOUNT
1	CEMENT	25000	BAGS	350	8750000
2	SAND	25	M.T.	1000	25000
3	AGGREGATES	15	M.T.	1200	18000
4	STEEL	750355	KG	62	46522010
5	BINDING WIRE	750	KG	70	52500
6	PLASTER	20000	sq.ft	30	600000
7	EXCAVATION WORK	1000	m3	150	150000
8	BRICK (SHEENATH)	2200000	NOS.	7	15400000
9	TILES	100000	NOS.	180	18000000
				TOTAL	89517510
				1.5% WATER	126.39195
				10% CONT.PROFIT	5617.42
				Total amount	89523253.8

13.2 REASON FOR STUDENTS RECOMMENDING THIS DESIGN: -

DESIGN NAME	REASON
POST-OFFICE	In this village the post-office is not in proper place, very small in comfortable no facilities, etc so we decided to develop the pot-office.
BANK	In this village the post-office is very small in comfortable no facilities, etc so we decided to develop the bank.
ANGANWADI	The existing anganwadi is need to be renovateBecause the existing structure life if is over.
PUBLIC TOILET	In this village public toilet is not provided soWe design public toilet in village.
PRIMARY SCHOOL	The existing primary school is need to be renovate Because the existing structure life if is over.
ANIMAL HOSPITAL`	The existing animal hospital is need to be renovate Because the existing structure life if is over.
LACK RENOVATION	The village has a lake which needs to renovate So we provided lake beautification.
POLICE STATION	The existing Police station is need to be renovate Because the existing structure life if is over.
WATER TANK	The existing water tank capacity is not enoughFor whole village peoples so we design 400000 capacity water tank.
FIRE STATION	In this village fire station is not existing so we design the fire station.

BIOGASS PLANT	The village have lots of agricultural waste, animal waste etc so we design the biogas plant.
RESORT	In this village land area is very high so we decided design of resort for village development & beautification. From this villager get source of income.

table 13.1 reason for students recommending this design

13.3 ABOUT DESIGNS SUGGESTIONS / BENEFIT OF THE VILLAGERS:-

- The villagers get better facilities and comfort.
- The village get source of income.
- Low in bio-degradable waste.
- Peoples get employment.
- The village have better appearance.
- Fulfilment of water facilities.

Chapter 14: Technical Options with Case Studies

CASE STUDY

MANDATORY SEISMIC RETROFITTING - A CASE STUDY OF THE LAND USE IMPACTS ON A SMALL PROVINCIAL TOWN

-P.BRENT NAHKIES

ABSTRACT

Lincoln University As a result of the Christchurch Earthquake that occurred on 22nd February 2011 and the resultant loss of life and widespread damage, a Royal Commission of E'!quiry was convened in April2011. The Royal Commission recommended a number of significant changes to the regulation of earthquake prone building in New Zealand. Earthquake prone buildings are buildings that are deemed to be of insufficient strength to perform adequately in a moderate earthquake. In response to the Royal Commission recommendations the New Zealand Government carried out a consultative process before announcing proposed changes to the building regulations in August 2013. One of the most significant changes is the imposition of mandatory strengthening requirements for earthquake prone buildings on a national basis. This will have a significant impact on the urban fabric of most New Zealand towns and cities. The type of traditional cost benefit study carried out to date fails to measure these impacts and this paper proposes an alternative methodology based on the analysis of land use data and rating valuations. This methodology was developed and applied to a small provincial town in the form of a case study. The results of this case study and the methodology used are discussed in this paper.

Keywords: Mandatory seismic retrofitting, earthquake-prone buildings, land use impacts, Case Study

INTRODUCTION

The purpose of this research was to develop and test a method of measuring some of the likely social and economic impacts of the changes to the Building Act 2004 proposed by the New Zealand Government in response to the Christchurch earthquakes. The New Zealand Government is proposing to make it mandatory for the owners of earthquake prone buildings to either strengthen or demolish their buildings within 15 years of being identified as being earthquake prone.

Earthquake prone buildings are defined as buildings that will have their ultimate capacity exceeded in the event of a moderate earthquake and are buildings with a seismic capacity ofless than 33% of new building standard (NBS). Earthquake mitigation measures such as seismic retrofitting of existing buildings are seen as a rational response to the risk posed by earthquakes. Evidence from past studies on hazard mitigation suggest that seismic retrofitting of earthquake prone buildings (EPBs) reduce loss of life and property, disaster relief costs, business interruption, and social and environmental losses from an earthquake disaster (Nuti and Vanzi 2003, Rose eta/. 2007). However, despite these benefits and the growth of the technical knowledge base on earthquake risk mitigation, property owners are often unwilling to retrofit their EPBs (Hopkins 2005). The unwillingness of owners of EPBs to retrofit their EPBs has been a critical issue in earthquake pre-disaster planning and management. Many factors such as cost, risk perception and efficacy of mitigation measures interact to influence seismic retrofit decisions (Egbelakin and Wilkinson 2010, Lindell and Prater 2000a).

Studies in the social, economic and decision sciences have sought to address this dilemma from different perspectives. Many socio-psychologists have focused on the impact of risk perception on mitigation decisions, concluding that how people perceive and personalise earthquake risk significantly influences the types of protective decisions and behaviour adopted (Lepesteur et a/. 2008, Lindell and Prater 2000b, Lindell and Prater 2002, Mulilis and Duvall995, Tierney eta/. 2001, Weinstein eta/. 1998).

Sociologists have studied the social aspects of earthquake risk mitigation. The idea that risk is essentially a cultural and social construct has been strongly argued by sociologists such as Douglas and Wildavsky (1982). As they put it "the measurement of risk is scientific, the acceptability of risk is political". The drive to reduce risk and make society safe is thus a phenomenon that has been the subject of a substantial body of research by sociologists. Sociologists have studied the way in which society has perceived and responded to risks through time and have shown how attitudes to risk have changed. In early times risks were perceived as something largely outside the control or understanding of man. Religion and superstition were central to the way people thought about and mitigated for risk. Risks were often seen as an act of god, fate or magic. Mitigation required rituals, sacrifices and religious observance. Elements of this attitude or world view can still be seen in societies that are deeply religious (Ghafory-Ashtiany, 2009) where a fatalistic attitude to earthquakes acts as an impediment to modem seismic mitigation. Starting with the age of enlightenment a new paradigm in terms of risk began to be accepted in western society. Risk came to be seen as a calculable mathematical probability that could be measured.Recent research in New Zealand (Egbelakin and Wilkinson 2010, Egbelakin eta/. 2011) has looked at the importance of behavioural and social impediments to the successful implementation of earthquake mitigation. They found that although the level of awareness was high amongst building owners that were surveyed there was limited appetite for carrying out seismic retrofitting.

Researchers have also found that quality of risk information provided to owners, communication style, and characteristics of the agencies responsible for conveying this information affect building owners' willingness to adopt protective measures (Mileti and Fitzpatrick 1993, Mulilis and Lippa 1990, Pidgeon eta! 2003, Tierney et a! 2001).

Economists have focussed on the fmancial viability of valuation decisions and policies regarding hazardous situations, providing a rationale on the overall economic benefits of implementing various mitigation measures (Bemknopf eta/. 1990, Cohen and Noll1981, Schulze eta/. 1987). Various studies on earthquake risk and property market prices found correlations between risks information and communication style, property values, location, government initiated policies and programs, house prices, investment decisions and owners' attitudes towards implementing mitigation measures (Beck et a/. 2002, Onder et al. 2004, Palm 1985, Palm 1987, Willis and Asgary 1997).

Seismic retrofit decisions emphasised the reduction of the built environment's earthquake vulnerability (EERI 1998), while property investment decisions are based on ensuring that an investor achieves a satisfactory return on his investments in the market place in form of an income flow or capital gain or a combination ofboth (Adair eta/. 1994). Arguably, various stakeholders, including property owners, investors, developers, occupiers, valuers, insurance and fmancial institutions, governmental agencies and hazard-related professionals contribute to property investment and earthquake risk mitigation decisions (Lindell eta/. 1997, Luke eta/. 20 10). These stakeholders operate at different levels in the public and private sectors, having varying impacts on building owner's risk mitigation decisions (Lindell et al. 1997). It is also clear is that there are a number of other stakeholders either influencing or affected by the seismic retrofit decision. The occupier of the building (if different to the owner) is interested in the use value and especially in matters affecting business productivity and operating costs such as appearance, comfort, safety and energy efficiency. The need for employers to provide a safe working environment for their employees under the Health and Safety in Employment Act may well drive potential occupiers away from earthquake-prone buildings. Most building occupiers are generally unaware of the property's seismic risks, unless issues regarding the building safety are raised (Butcher and Cooper 2004).

Losses from natural disasters can have a severe impact on an insurer's financial situation. An insurer may limit coverage in any given area or charges higher premiums in order to keep the likelihood of insolvency at an acceptable level (Lindell et al. 1997). The prevalence of similar stakeholders in property investment and seismic risk mitigation decisions suggests similarities and overlaps in both decision-making processes, such as making investment and retrofit decisions simultaneously at the time of purchase or construction. Other similarities include the impacts of real estate market conditions and level of uncertainty and risks associated with both decisions (As gary and Willis 1997). However, Bradley et al. (2008) explained that retrofit and investment

decisions of existing buildings are usually considered individually, such that strengthening cost are not usually factored into property prices and investment decisions.

Langston eta!. (2008) highlight the need for a transformation in the traditional decisionmaking processes of property stakeholders towards more sustainable practices, strategies and outcomes. In dealing with the risk relating to earthquakes there is clearly a scientific element relating to the need to study a natural phenomenon. However, what is an acceptable level of risk for society is a subjective and political question. In order to aid policy development and insurance underwriting a large body of literature has been produced by experts in the fields of engineering, insurance, and economics. In particular a lot of effort has been put into improving the field of hazard assessment and various types of cost-benefit analysis (CBA). Earthquakes are low probability but high consequence events. The challenge of calculating the probability of earthquakes occurring and of then estimating their likely impact has received a lot of attention from both the insurance industry and earthquake engineers (Cardona et al. 2008a, Cardona et al. 2008b, Vanzi 2002, Bommer 2002). In New Zealand a mathematical model was developed by Hopkins and Stuart (2003) which calculated the benefit-cost ratio for 32 cities and towns in New Zealand using 18 input variables.

The methodology used in this paper was then recommended by central government to be used by Territorial Local Authorities (TLAs) when preparing their earthquake prone building policies as required by the Building Act 2004. Thus this paper is highly significant though it would appear that very few TLAs actually followed the methodology when preparing their earthquake-prone building policies. It is interesting to note that this paper identified that earthquake risk varies substantially around NZ and this resulted in benefit-cost ratios ranging from over 6 to .01 -a ratio of 600 to 1. The paper concluded that account needs to be taken of the wide range of benefit-cost ratios in framing legislation governing earthquake risk buildings.

This fading is also confirmed by the work of Cousins (20 13) who calculated the probability of dying in an earthquake in different locations in New Zealand with high, medium or low seismic hazard. He concluded that there was more chance of dying in a compliant modem building in Wellington than in an un-strengthened URM building in Auckland and therefore that it is difficult to argue a case for blanket strengthening all old URM buildings in places of moderate to low seismic hazard. Any CBA is reliant on the gathering of accurate data and sound scientific assumptions. This is particularly the case for low probability but high consequence events such as earthquakes.

A traditional CBA has been applied as part of the policy development undertaken by the New Zealand government. This CBA (Martin Jenkins, 2012) calculated the present value of the benefits of strengthening which were then compared with the present value of the costs to arrive at the Net Present Value (NPV). The results of this study showed that the government proposals have a NPV of negative $1,680 million compared with the current 'status quo' which has a NPV

of negative $933 million. The benefits were assessed as reduced building damage, and a reduced loss of life and injury. The analysis was done on a macro level with no attempt to split out the private and public components of the costs and benefits or to consider the costs and benefits on an individual building basis. Any attempt to carry out CBA on seismic retrofitting buildings in New Zealand is currently hamstrung by a lack of good data relating to existing building stock and the costs of retrofitting, There has been significant research done on building performance (Ingham and Griffith, 2011), and retrofitting techniques (Goodwin.et al, 2011), but basic information relating to earthquake strengthening costs is lacking in relation to New Zealand with the exception of some work done by Hare (Hare, 2009).

Hare analysed the costs of seismic retrofitting a sample of heritage buildings in Christchurch. The general lack of cost information was highlighted in the Royal Commission and appears to contrast with the situation in the USA where extensive research has been done by the Federal Emergency Management Agency (FEMA, 1994). Cost benefit analysis tends to be on a macro level being either national, regional or city scale using methodology that looks at the total benefits and costs with no attempt to consider to whom the benefits accrue or who must bear the costs of the mitigation. While this may be useful in terms of the insurance industry and policy analysts it fails to address the benefit to cost ratio from a building owner perspective. For many owners this ratio is negative and is a major impediment to both voluntary and mandatory seismic retrofitting as discussed by Nahkies (Nahkies, 2009, Nahkies, 2013).

➢ METHODOLOGY

In order to develop and test the method a case study approach was followed using the central commercial area of Waimate as the subject. The town ofWaimate was chosen as a case study example of a small provincial town in New Zealand typical of many others. Waimate is located in South Canterbury, in the South Island ofNew Zealand. The population in the Waimate urban area was assessed as 2,835 at the 2006 census. Early settlement in Waimate occurred in the 1870's and was based around the saw milling industry which utilised the nearby native forest and supplied the growing towns of Timaru and Oamaru. Over time the economy diversified into that of a typical provincial rural service town similar to many scattered throughout New Zealand.

The town suffered an economic downturn in the 1980's with the closure of the dairy factory and a number of sawmills. Recovery from this down turn has been slow and patchy with other economic setbacks occurring such as the closure of two furniture manufacturers and a vegetable processing plant early this century. However, there has been some recovery over the last 10 years as the local dairy farming industry has increased in significance.

A legacy of the comparatively prosperous early history is the significant number of substantial unreinforced masonry buildings that still line Queen Street, which is the main street of Waimate. The early prosperity was followed by a long period of limited economic growth. As a result there

has been little building of 'new' commercial buildings in Waimate over the last 50 years with the following exceptions:

- BNZ bank building (1975)
- Council building (1982)
- Police Station (1996)
- Industrial warehouse (1997)
- Supermarket (1997)

As a result the main street of Waimate is still largely original in terms of its building stock and architectural appearance. This gives Queen Street a distinct Victorian and Edwardian ambience that is valued by residents and tourists alike. A "Historic Walk" brochure is published by the Waimate Information Centre which describes 37 historical items or buildings, many of them located in Queen Street. Under current legislation all local authorities in New Zealand must have a policy prepared under section 131 of the Building Act 2004 setting out how the local authority manages the earthquake prone building problem in their jurisdiction. The current Waimate Earthquake-prone, Dangerous and Insanitary Buildings Policy was formally adopted by the Council on 191h September 2006.

The policy was reviewed in 2012 with the original policy left unchanged but with a proviso that it would be reviewed again once the results of the Royal commission became apparent. The Waimate policy is a "passive" approach where seismic assessments and structural upgrades are triggered by an application for a change of use. The Council may also assess a building if application is made for building alterations, extension of life or when a complaint is received. Due to the lack of building activity occurring in the central area this has meant that little or no earthquake strengthening has been 'triggered' since the policy has been in effect. Only one shop has had some structural strengthening carried out. Once identified as an earthquake prone building the upgrade time frame varies from 15 to 25 years depending on the existing strength of the building.

Weaker buildings below 20% ofNew Building Standard (NBS) are given 15 years while those that are 25-32% ofNBS have 25 years to carry out the strengthening work. Due to the passive approach taken by the Council towards earthquake prone buildings and the limited economic growth occurring in the town there has been little activity in the form of either seismic strengthening or demolition and redevelopment. The government proposal to introduce mandatory strengthening will therefore be a significant change impacting on the property market and land use in Waimate. While traditional CBA analysis has a place it is unable to provide useful

information in terms of measuring the micro economic impacts on individual property owners. Seismic retrofitting is a form of property development and as such, alternative models of CBA are necessary to shed light on the likely impacts and subsequent investment decisions made by individual owners. These models based around the private financial costs and benefits to the private property owner typically take the form of a feasibility study where the legally permissible, physically possible and financially viable alternatives are considered. The building owner served notice to strengthen or demolish under the proposed legislation effectively has four options to consider:

1. Seismic retrofit: Strengthen the building to 34% of NBS,

2. Conversion: Undertake a Change of Use and strengthen the buildings as near as reasonably practicable to NBS while fading a different use for the buildings.

3. Demolish and Redevelop: Clear the site and build a replacement building.

4. Demolish with no redevelopment. The owner clears the site and then either holds the site for future redevelopment or alternatively tries to sell the site.

Which of these options will be chosen by the owner will depend on their specific resources and their particular attitude, values and objectives. Of concern to the communities that will be impacted by the policies is the proportion of earthquake prone buildings that will be demolished as opposed to being strengthened. If large numbers of buildings are demolished then effectively it will be like "having an earthquake without the earthquake" as was stated by the Waitaki District Council chief executive Michael Ross (Littlewood, 2012). Clearly in the event of a 'regulatory earthquake' there will not be any loss of life or injury as would occur in a severe physical earthquake but the fmancial impacts on owners and communities are likely to be more damaging as there will not be any insurance money to fund any rebuild. The impacts on land use, heritage, local economies, and communities will be significant. In order to accurately estimate the likely number of demolitions individual feasibility studies would be required on each earthquake prone building along with interviews with their owners to establish their likely response to their individual circumstances.

From the land use data obtained from QV the central commercial area ofWaimate was identified and split out as a separate study area. Using the Waimate District Council Operative District Plan as a basis the central business district (CBD) ofWaimate was defined as the mix of"Business 1" zoned properties and the "Business 2" zoned properties clustered in and around the Queen Street precinct. The Business 1 (B 1) zone comprises Queen Street itself with a strong emphasis on retail activity. The Business 2 (B2) zone is described as a "Mixed Business Use Area" surrounding Queen Street and allows for a mixture of commercial, service, industrial and residential activities. Initially all buildings in the B 1 and B2 zones were considered for analysis but then any building

not subject to earthquake-prone building policies such as residential houses were excluded from the sample. Vacant land once identified was also excluded from the analysis leaving a final pool of 80 commercial buildings located in the Waimate CBD that are likely to be 'caught' by earthquake prone building regulation. Refer to below. Commercial Zoning Plan from the Waimate District Plan.

To aid in this study it was necessary to try and identify the number of buildings in the Waimate central business district (CBD) that would be considered earthquake prone. This was necessary as Waimate. District Council has not yet prepared a register of earthquake-prone buildings. Buildings constructed prior to 1976 are typically considered to have the potential to be earthquake-prone. Buildings constructed after 1976 were required to meet more stringent building regulations and are unlikely to be earthquake-prone unless they suffer from design flaws creating what are known as critical structure weaknesses. For the purpose of the study earthquake-prone buildings were defined as those buildings built before the 1950's of unreinforced masonry (URM) and which had not been significantly earthquake strengthened. The age of buildings were initially obtained using the land use data purchased from Quotable Value for the study area.

However, it was found that for many of the buildings the age was described as "mixed" as later additions had been made to the original building. These additions were often of a comparatively minor nature with the principal building clearly falling within the type and age of building that would constitute an earthquake prone building. As a result this 'raw' land use data was audited and augmented by curb side field inspections over a two day period in February 2013. These curb side inspections were also supplemented by the use of aerial photographs viewed on "Google Earth" to help identify the different parts of buildings that were 'modem' where the land use data assessed buildings as being of mixed age. No attempt was made to enter the properties or to carry out any internal inspections of buildings. Interviews were also undertaken with the building consents and regulatory staff of Waimate District Council to confirm what new construction and retrofitting had taken place in the town.

Due to the passive nature of the Waimate Earthquake- prone Buildings Policy there was little market concern regarding seismic building capacity prior to the Christchurch earthquakes. Therefore the cost and liability of compulsory earthquake strengthening is not priced into the market in terms ofthe 2010 values and there is little danger of double counting these costs in the economic analysis undertaken. Sales evidence relating to the study area was also examined but is very limited in nature making it difficult to draw conclusions regarding value changes post the earthquakes. For example only three property sales were recorded in the study area for the whole of20 12. Two sold above their 2010 rateable value while one sold below. It is unclear as to what extent the potential for mandatory strengthening and/or the impact of the Christchurch earthquakes is being factored into recent commercial property sales in Waimate. The costs of earthquake strengthening were calculated based on $400 m2 as an average figure. This is slightly higher than the $300 m2 used in the Martin Jenkins CBA but this sum does not allow for non-

structural costs of retrofitting which can be substantial. It was therefore considered prudent to increase the estimate for strengthening costs to $400 m2 to make some allowance for the non-structural costs likely to be incurred. Demolition costs were estimated at $180m2 based on the analysis ofthe actual demolition costs of a small URM building in Christchurch. This was checked against Rawlinsons New Zealand Construction Handbook which provides a figure of$152 m2. Rawlinson notes that demolition costs vary considerably depending on a number of factors and that a quote from a demolition contractor is advisable. A comparison was made between existing values, as represented by the rating valuations and the costs of complying with the government proposals in terms of either strengthening or demolishing buildings. No attempt was made to allow for time delays in the completion of the demolition or strengthening work in the form of present value analysis.

The costs of demolition were also estimated for each building and these demolition costs were then deducted from the estimate of land value to arrive at the redevelopment value of the building site. By looking at both these different values it is then possible to predict the likely option that would be taken by the owner forced to make a decision on their buildings due to legislation. Where the existing use value is higher than the redevelopment value than the highest and best use of the property is to retain and strengthen. Where this value is less than the redevelopment value then the highest and best use is to demolish the building. The extent to which building owners choose the option to demolish rather than retrofit will potentially be affected by the impact of heritage protection on their buildings. The extent to which earthquake strengthening requirements under the Building Act 'trumps' the heritage protection objectives of the Resource Management Act is an area of developing case law. A recent decision by the Environment Court regarding the Harcourts Building in Wellington would indicate that heritage protection is still a significant factor to be considered.

The current Waimate District Plan recognises the amenity and heritage value of the existing building stock and street scene. It seeks to maintain this by the use of heritage protection rules. There are also building design controls over new and existing non-heritage buildings which were introduced in response to some of the more recent developments which were unsympathetic to the streetscape. Section 8 of the current District Plan deals specifically with heritage protection. Under this section heritage items are identified in the District Plan as either Category A, B or C. The demolition or removal of a Category A item is a Non-complying Activity. For Category B items any demolition, removal, alteration or addition is a Discretionary Activity. For Category C items demolition or removal is a permitted activity while alterations or additions are a controlled activity. This means that effectively there is no legal impediment to an owner demolishing a category C building. There is a requirement to delay any demolition for 3 months to allow a chance for alternatives to be explored. Photographs must also be taken. There are a total of 135 heritage items listed in the District Plan. Of these 23 (17%) are Category A, 22 (16%) are Category Band 90 (67%) are Category C. Within the study area there are 46 listed buildings. One building is Category A (2%), two are Category B (4%) and the other 43 (94%) are Category C.

Thus the great majority of heritage buildings in the study area can be demolished as of right and have little effective protection. Thus the decisions of the owners are expected to hinge around the economic impacts of the mandatory earthquake strengthening rather than heritage protection rules.

- **RESULTS OF STUDY**

The current 201 0 rating values are considered to be untainted by the impacts of either the Christchurch earthquakes or the resultant market corrections evident in many parts ofthe country. Any prudent purchaser expecting to be forced to earthquake strengthen their building under the current government proposals would therefore deduct the cost of the strengthening work from the current value. A large proportion of the Waimate central business district is highly likely to be earthquake prone. This is summarised in the following Table. Table 1. Analysis ofWaimate Commercial Buildings.

Of the total of85 properties analysed there were 5 that were vacant. Ofthe remaining properties it was considered that 59 (74%) out of the 80 contained suspected earthquake prone buildings. In terms of floor area it was estimated that approximately 24819 square metres of building would likely require strengthening or demolition. Based on a strengthening cost of$400m2 to bring the buildings above 33.33% ofNBS this equates to a total cost of$9,927,440 dollars. On an aggregate basis the total rateable value of the buildings is only $6,082,000. Therefore the cost to strengthen the buildings exceeds their current value by $3,845,440. On an individual building basis 46 (78%) out of the 59 suspected earthquake prone buildings have no residual building value once strengthening costs are deducted. Thus, the impact of the government proposals would be to wipe out any economic value currently accruing to most of the existing buildings in the central business district. The impact of the government proposals regarding earthquake prone buildings will effectively give many of the buildings a hypothetical negative value.

If just the B 1 zone which largely comprises the Queen Street properties which go to make up the main street of the town is considered then the situation is even worse. Of the 48 properties making up this zone 43 comprise earthquake prone buildings. This means that approximately 90% of the main retail and service centre for the district would be considered earthquake prone. Where an owner has an earthquake prone building with a negative value they may then attempt to limit their losses by choosing to demolish rather than strengthen. However, this means that the owner will incur a demolition cost which will reduce the net worth of their site. In extreme situations ifthe land value is low and demolition costs are high you can conceivably have the situation of negative land values. This is the situation for some sites in Waimate as the commercial land values are low. The rateable values for commercial land varies from between $41m2 and $171m2 • The variation in land values is due to the large number of variables typically impacting on land values such as location, shape, access, frontage, size and zoning. The average land value calculated for the sites being studied is $83m2 • If large scale demolition occurs as predicted, this may lead to

a secondary impact on land values. The supply of commercial land will considerably outstrip the demand for redevelopment and may drive commercial land values even lower. Having identified that a large proportion ofthe buildings in Waimate are earthquake prone an estimate was made of the number of buildings where the owner might choose to demolish the buildings. This is difficult to do without interviewing the individual owners as their decisions will vary widely depending on the resources, attitudes and objectives ofthe owner. The building owner served notice to strengthen or demolish under the current government proposals effectively has the four options of either a seismic retrofit with no change of use, a seismic retrofit with a change of use, to demolish and redevelop, or to demolish and not redevelop. For the owner of a typical URM commercial building in Waimate all four options are problematic as the following examples illustrate. The examples are based on a hypothetical, but typical main street property in Waimate that closely approximates a number of actual buildings in terms of construction, age and size. The building is a two storey URM building. It has a floor area of750 square metres and is on a section of 700m2 in the Business 1 Zone with frontage to Queen Street. Based on a cost of $400m2 to strengthen to 34 %NBS the strengthening costs would be $300,000. The cost of demolition has been estimated at $180 m2 or $135,000. Property values are based on the level of values applied in the 2010 Rating Valuations.

Option 1 - Seismic retrofit Current Value of Building $140,000 Current Land Value $90,000 Current Value of Property $230,000 Less costs of strengthening $300,000 Existing Use Value of property -$70,000 After deducting the costs of earthquake strengthening from the value of the buildings the buildings then have a negative value of -$160,000. This negative value exceeds both the current land value and building value. It would therefore indicate that the current existing use value of the property assuming a compulsory seismic retrofit would be negative $70,000. It could be argued that a degree of “betterment' will occur with the retrofitted building, however this is likely to be limited due to the difficulty of attracting any enhanced investment returns. In addition, a conservative cost of 9 20th ANNUAL PACIFIC-RIM REAL ESTATE SOCIETY CONFERENCE, CHRISTCHURCH, NEW ZEALAND, 19-22 JANUARY 2014 strengthening has been used which takes limited account of the indirect costs of earthquake strengthening or consequential costs relating to free safety and disabled access and facilities upgrades. These could both add substantially more to the strengthening costs as calculated previously.

Option 2- Conversion to an Alternative Use The building is currently subdivided into several shops and it unlikely that an alternative use will generate higher returns than currently available. In large cities such as Auckland and Wellington there is often potential to do this as obsolete office space can be converted to apartments due to the demand for inner city living. There is no such potential in Waimate. A challenge of any building conversion is that the costs of conversion are considerably higher due to the requirements of section 115 of the Building Act. The costs of earthquake strengthening alone triggered by a change of use can be considerably higher as the building must be bought up to a level as near as reasonably practicable to that of a new building. This is often interpreted to be a level that is at least 66.66% of NBS. The added cost of going to

66.66% of NBS will vary on a case-by-case basis however a study done by John Hare (Hare, 2009) of Holmes Consulting found that on average the cost increased by an average of 2.5 times that of 33.33%. This would increase strengthening costs to a rate of$1,000m2 and costs of strengthening the building to $750,000.

Option 3 - Demolition and Redevelopment

Assuming the owner elects to demolish their building and in the absence of any salvage value of materials then the fmancial situation of the owner will be as follows.

Land Value $ 90,000

Less costs of demolition $ 135,000

Redevelopment Value of property -$ 45,000

The owner would clearly have a number of challenges not the least being that his capital asset of $230,000 is now a liability of$45,000. He may now have considerable negative equity in the property but must also attempt to raise the money necessary to build a replacement building. He also has the problem offmding tenants for his new building as his existing displaced tenants may be unwilling to wait for the replacement building to be built, They may also be unable or unwilling to pay the higher rent necessary to make a new building financially feasible. The buildings in the study area house a large number of businesses and also contain some residential accommodation. At best these businesses and residents would need to relocate to alternative space while strengthening took place. In the event of demolition, this displacement may become permanent for many of the businesses. The building owner will not replace their demolished building unless they can obtain a reasonable return on the capital invested in their replacement building. This is likely to cause severe affordability issues for the displaced tenants. Current rents appear to be in the order of approximately $100m2 gross rent. If the owner wished to get a return of 10% on a replacement building cost of $2000 per square metre, they would need to get $200 m2 net of expenses. This excludes any allowance for a return on the land value. It is therefore likely that replacement.

buildings will need to be rented at double the amount of current rents. Many tenants will be unable to afford to pay double their existing rents.

Option 4 - Demolition with no rebuild

. This is a more likely scenario than Option 3 as the owner is unlikely to have the knowledge, experience or confidence necessary to undertake the role of property developer as required by Option 3. In larger more prosperous towns vacant sites can often be put to an alternative "interim

use" such as car parking to off-set holding costs. This is unlikely in Waimate and the number of new development sites is likely to 'flood' the local market.

As the above examples illustrate the owner is faced with a difficult decision as none of the options are economically feasible. His best option is to abandon the property completely although this option is not legally possible as under current and proposed legislation the Council has the power to have the building demolished and then recover the costs from the owner.

On the figures presented above the highest and best use is to demolish the building as the value as a redevelopment site of- $45,000 is higher than the existing use value of -$70,000. Thus the finical loss from demolition will be slightly less than the retrofit option. Either way the owner will suffer a serious financial setback which may cause hardship.

Clearly the results of the various options are highly sensitive to the levels of costs and values used. If lower demolition costs or strengthening costs are assumed then either one or other of the options may become relatively more 'attractive' to the owner. However, it is highly unlikely that any of them will become financially feasible for the owners.

Current analysis shows that of the 59 suspected earthquake-prone properties, 26 will show a negative value regardless of the option chosen. This means they are a fmancialliability rather than an asset regardless of whether the owner chooses to strengthen or demolish.

Out of the 59 properties in 26 cases (44%) the best financial result can be achieved by demolition and on pure economic grounds this is the option that would be expected of the owner. Of note however, is that in 46 cases out of 59 the cost of strengthening is likely to exceed or equal the current value of the buildings. This means that 78% ofthe buildings would appear to have no economic value once the costs of earthquake strengthening are deducted and are therefore in some danger of demolition.

CONCLUSIONS

This paper proposes the use of a feasibility based cost benefit analysis conducted on a building by building basis utilising readily available land use data and rating valuations from QV. The method was tested using a small rural town as a case study. This case study analysis was useful in testing the accuracy and relevance of the data and highlighted a number of issues.

While the QV data provided good base information it suffers from a number of limitations in terms of a study of this type. The information is based on the information contained in the rating roll. Therefore information is collected for each separately deformed Rating Unit. Such a rating unit may contain several different buildings or may include only part of a building. This creates difficulties in using the data for a building by building analysis.

Information on the age of the buildings is included but where there have been additions or alterations carried out then the age is given as "mixed". When there are multiple buildings of differing age forming a rating unit then the age is also described as mixed. This makes the data less useful in terms of identifying earthquake prone buildings. The Martin Jenkins CBA found similar problems using QV data as they found on a national basis that 41% of the buildings were age unknown.

In order to improve the usefulness of the raw QV data requires auditing of various types such as field inspection, inspection of building files or use of photographic records. Such auditing processes add time and cost to the process.

A study of this type must assess the seismic capacity of the commercial building stock. In order to do this accurately would require significant expert engineering input which was not available for this study. Instead reliance was placed on a basic analysis or the age and construction of the buildings to identify those likely to be earthquake prone. This lack of engineering data is a limitation of this study but eventually accurate lists of earthquake prone buildings compiled by T.As will be able to be used to supplement QV land use data thus making it unnecessary to estimate the numbers of earthquake prone buildings. However, the list of earthquake prone buildings will still need to be matched with the land use data in relation to floor areas and building values.
Future studies of this nature may also have problems in terms of using rating valuations as a proxy for the market values of the buildings in their pre strengthened state as these valuations may include a value discount to reflect their low seismic capacity. If the cost of seismic retrofitting is deducted from these already discounted values then the costs of earthquake strengthening will effectively be double counted leading to incorrect results.

The economic analysis in this study by necessity is crude, with no attempt made to use discounting techniques to arrive at net present values for costs and benefits. For the case study, market analysis was also limited with no attempt made to quantify any betterment accruing to owners from earthquake strengthening.

However, despite the limitations of the methodology developed and tested in Waimate it does have some advantages. It is comparatively simple and cost effective and provides information that should be valuable to land use planners and policy analysts. For example, for this particular case study it would indicate that a significant proportion of the commercial building stock in Waimate is at risk of demolition given the proposed legislative changes. These changes have the potential to cause a sharp market correction in the value of any buildings considered earthquake prone. These buildings will likely suffer a significant drop in value that may render them economically obsolete and thus result in their demolition.

For towns such as Waimate where earthquake prone buildings represent a significant portion of the building stock, the economic and social impacts will be severe. Owners and tenants will suffer displacement which at best will be temporary but this displacement may become permanent where tenants cannot afford rent increases. Those tenants that can meet the rent increases necessary for new buildings are likely to protect their profit margins by passing on the increased rents to their customers. Ultimately the rental increases then become a cost to the community.

It is highly likely that if owners are forced to take action on their buildings over a comparatively short time frame as per the government proposals that potentially 50% of the buildings in the study area could be demolished This compares with an estimate in the Martin Jenkins CBA of 10% which is "judgement based" rather than empirically based. The situation is likely to be exacerbated by the fact that most if not all of the owners will lack development experience and skills. Based on the analysis, any equity that owners have in their properties is liable to be severely eroded which will make it difficult to raise fiancés. Difficulties with insuring their retrofitted buildings may also impact negatively on the value of their property which may also reduce the feasibility of retrofitting.

Many of these buildings facing demolition will be heritage buildings. As discussed earlier the great majority of buildings have very limited heritage protection even if listed as having heritage value in the district plan. Of the 59 suspected earthquake prone buildings in the study area a total of 45 (76%) are heritage listed. Of the 45 only 1 is Category A, 3 are Category B and the balance are Category C. Demolition of Category C buildings is a permitted activity so over 90% of the heritage buildings are at risk of demolition. All the heritage listed buildings in the study area are likely to be earthquake-prone and as the previous economic analysis shows are probably uneconomic to earthquake strengthen. Large numbers of heritage buildings are likely to be demolished and not replaced. This will leave significant gaps in the street scene and destroy much of the current heritage value of Queen Street.

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14.1 CIVIL ENGINEERING

14.1.1 ADVANCED EARTHQUAKE RESISTANT:

Earthquake-resistant structures are structures designed to protect buildings from earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake-resistant construction is to erect structures that fare better during seismic activity than their

conventional counterparts. According to building codes, earthquake-resistant structures are intended to withstand the largest earthquake of a certain probability that is likely to occur at their location. Currently, there are several design philosophies in earthquake engineering, making use of experimental results, computer simulations and observations from past earthquakes to offer the required performance for the seismic threat at the site of interest.

Earthquake-resistant or a seismic structure are designed to protect buildings to some or greater extent from earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake-resistant construction is to erect structures that fare better during Seismic activity than their conventional counterparts. According to building codes, earthquake-resistant structures are intended to withstand the largest earthquake of a certain probability that is likely to occur at their location. This means the loss of life should be minimized by preventing collapse of the buildings for rare earthquakes while the loss of the functionality should be limited for more frequent ones.

To combat earthquake destruction, the only method available to ancient architects was to build their landmark structures to last, often by making them excessively stiff and strong.

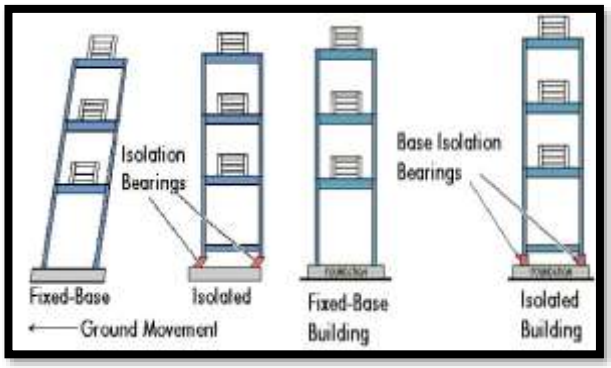


Fig.14.1 advanced earthquake resistant

Currently, there are several design philosophies in earthquake engineering, making use of experimental results, computer simulations and observations from past earthquakes to offer the required performance for the seismic threat at the site of interest. These range from appropriately sizing the structure to be strong and ductile enough to survive the shaking with an acceptable damage, to equipping it with base isolation or using structural vibration control technologies to minimize any forces and deformations. While the former is the method typically applied in most earthquake-resistant structures, important facilities, landmarks and cultural heritage buildings use the more advanced (and expensive) techniques of isolation or control to survive strong shaking with minimal damage. Examples of such applications are the Cathedral of Our Lady of the Angels and the Acropolis Museum.

14.1.2 SEISMIC RETROFITTING OF BUILDINGS:

Seismic retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. With better understanding of seismic demand on structures and with our recent experiences with large earthquakes near urban centers, the need of seismic retrofitting is well acknowledged. Prior to the introduction of modern seismic codes in the late 1960s for developed countries (US, Japan etc.) and late 1970s for many other parts of the world (Turkey, China etc.), many structures were designed without

adequate detailing and reinforcement for seismic protection. In view of the imminent problem, various research work has been carried out.

State-of-the-art technical guidelines for seismic assessment, retrofit and rehabilitation have been published around the world – such as the ASCE-SEI 41 and the New Zealand Society for Earthquake Engineering (NZSEE)'s guidelines. These codes must be regularly updated; the 1994 Northridge earthquake brought to light the brittleness of welded steel frames, for example.

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

OBJECTIVES

- Public safety only. The goal is to protect human life, ensuring that the structure will not collapse upon its occupants or passers-by, and that the structure can be safely exited. Under severe seismic conditions the structure may be a total economic write-off, requiring tear-down and replacement.
- Structure survivability. The goal is that the structure, while remaining safe for exit, may require extensive repair (but not replacement) before it is generally useful or considered safe for occupation. This is typically the lowest level of retrofit applied to bridges.
- Structure functionality. Primary structure undamaged and the structure is undiminished in utility for its primary application. A high level of retrofit, this ensures that any required repairs are only "cosmetic" – for example, minor cracks in plaster, drywall and stucco. This is the minimum acceptable level of retrofit for hospitals. Structure unaffected. This level of retrofit is preferred for historic structures of high cultural significance.

TECHNIQUES

1) External post-tensioning:

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

2) **Base isolators:**

Base isolation is a collection of structural elements of a building that should substantially decouple the building's structure from the shaking ground thus protecting the building's integrity and enhancing its seismic performance. This earthquake engineering technology, which is a kind of seismic vibration control, can be applied both to a newly designed building and to seismic upgrading of existing structures. Normally, excavations are made around the building and the building is separated from the foundations. Steel or reinforced concrete beams replace the connections to the foundations, while under these, the isolating pads, or base isolators, replace the material removed. While the base isolation tends to restrict transmission of the ground motion to the building, it also keeps the building positioned properly over the foundation. Careful attention to detail is required where the building interfaces with the ground, especially at entrances, stairways and ramps, to ensure sufficient relative motion of those structural elements.

3) Supplementary dampers:

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

4) Tuned mass dampers:

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

5) Slosh tank:

A slosh tank is a large container of low viscosity fluid (usually water) that may be placed at locations in a structure where lateral swaying motions are significant, such as the roof, and tuned to counter the local resonant dynamic motion. During a seismic (or wind) event the fluid in the tank will slosh back and forth with the fluid motion usually directed and controlled by internal baffles-partitions that prevent the tank itself becoming resonant with the structure, see Slosh dynamics. The net dynamic response of the overall structure is reduced due to both the counteracting movement of mass, as well as energy dissipation or vibration damping which occurs when the fluid's kinetic energy is converted to heat by the baffles. Generally the temperature rise in the system will be minimal and is passively cooled by the surrounding air. One Rincon Hill in San Francisco is a skyscraper with a rooftop slosh tank which was designed primarily to reduce the magnitude of lateral swaying motion from wind. A slosh tank is a

passive tuned mass damper. In order to be effective the mass of the liquid is usually on the order of 1% to 5% of the mass it is counteracting, and often this requires a significant volume of liquid. In some cases these systems are designed to double as emergency water cisterns for fire suppression.

6) Active control system:

Very tall buildings ("skyscrapers"), when built using modern lightweight materials, might sway uncomfortably (but not dangerously) in certain wind conditions. A solution to this problem is to include at some upper story a large mass, constrained, but free to move within a limited range, and moving on some sort of bearing system such as an air cushion or hydraulic film. Hydraulic pistons, powered by electric pumps and accumulators, are actively driven to counter the wind forces and natural resonances. These may also, if properly designed, be effective in controlling excessive motion – with or without applied power – in an earthquake. In general, though, modern steel frame high rise buildings are not as subject to dangerous motion as are medium rise (eight to ten story) buildings, as the resonant period of a tall and massive building is longer than the approximately one second shocks applied by an earthquake.

7) Adhoc addition of structural support/reinforcement:

The most common form of seismic retrofit to lower buildings is adding strength to the existing structure to resist seismic forces. The strengthening may be limited to connections between existing building elements or it may involve adding primary resisting elements such as walls or frames, particularly in the lower stories. Common retrofit measures for unreinforced masonry buildings in the Western United States include the addition of steel frames, the addition of reinforced concrete walls, and in some cases, the addition of base isolation.

8) Connections between buildings and their expansion additions:

Frequently, building additions will not be strongly connected to the existing structure, but simply placed adjacent to it, with only minor continuity in flooring, siding, and roofing. As a result, the addition may have a different resonant period than the original structure, and they may easily detach from one another.

The relative motion will then cause the two parts to collide, causing severe structural damage. Seismic modification will either tie the two building components rigidly together so that they behave as a single mass or it will employ dampers to expend the energy from relative motion, with appropriate allowance for this motion, such as increased spacing and sliding bridges between sections.

9) Exterior reinforcement of building:

Exterior concrete columns

Historic buildings, made of unreinforced masonry, may have culturally important interior detailing or murals that should not be disturbed. In this case, the solution may be to add a number

of steel, reinforced concrete, or post stressed concrete columns to the exterior. Careful attention must be paid to the connections with other members such as footings, top plates, and roof trusses.

Infill shear trusses

Shown here is an exterior shear reinforcement of a conventional reinforced concrete dormitory building. In this case, there was sufficient vertical strength in the building columns and sufficient shear strength in the lower stories that only limited shear reinforcement was required to make it earthquake resistant for this location near the Hayward fault.

Fig.14.2 infill shear trusses

Massive exterior structure

In other circumstances, far greater reinforcement is required. In the structure shown at right - a parking garage over shops -the placement, detailing, and painting of the reinforcement becomes itself an architectural embellishment.

Fig.14.3 massive exterior structure

14.1.3 ADVANCE PRACTICES IN CONSTRUCTION FIELD IN MODERN MATERIAL, TECHNIQUES AND EQUIPMENT'S

1) 3D Volumetric Construction

Using this modular construction technology, 3D units are produced in controlled factory settings using needful construction and building materials. Finished units are transported to site in various modules, basic structural blocks or final touched up units with all amenities installed, for assembly. Blocks can be erected rapidly at site and properties of concrete like fire retardant, sound resistivity, thermal mass etc. are retained.

Fig.14.4 3D volumetric construction

1) **Precast Flat Panel Modules**

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

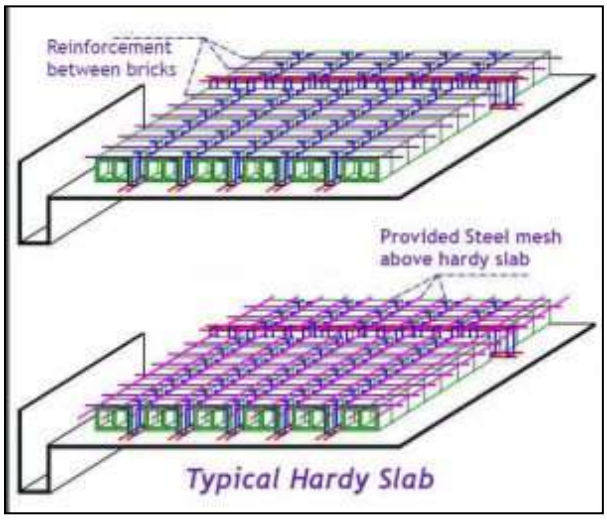
Fig.14.5 precast flat panel modules

2) **Tunnel Formwork System**

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

Fig.14.6 tunnel formwork system

3) **Flat Slabbing Technology**



This technique utilizes the simplicity of contemporary formwork for quickly building flat slabs to facilitate easy and swift placing of horizontal amenities and for partitioning.
Maximization of pre-fabricated services occurs as services can be carried out in an uninterrupted manner in zones underneath the floor slabs.
Every top-notch building Construction Company is using the same as internal layouts can be conveniently modified for accommodating alterations at a later date. Further, reinforcement needed is lesser which cuts down labour costs significantly.

Fig.14.7 flat slabbing technology

4) **Pre-cast Foundation Technique**

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

Fig.14.8 pre- cast foundation technique

5) **Hybrid Concrete Building Technique**

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

Fig.14.9 hybrid concrete building technique

6) **Thin Joint Masonry Technique**

Utilization of this technique leads to the reduction of the quantum of mortar applied by slashing it depth from 10mm to lesser than 3mm. Consequently, mortar can be laid swiftly with enhanced productivity on the longer wall panels. With large sized concrete blocks, higher construction efficiency along with significant cost reduction can be achieved. Within a single day, the number of mortar courses laid is higher as curing of mortar takes place quickly without compromising on bonding strength resulting in the elimination of floating problem.

Fig.14.10 thin joint masonry

7) **Insulating Concrete Formwork (ICF) Technique**

ICF technique employs polystyrene blocks that feature twin walls and can be rapidly put together for creating building wall formwork. The formwork is then pumped in with high quality, ready mixed, factory-made concrete. The building construction process becomes fool-proof and the resultant structure has a high level of sound and thermal insulation.

Fig.14.11 insulating concrete formwork (ICF) technique

NECESSITY:

1. The building construction activity, especially the residential and commercial complex is highly labour intensive with very little mechanization. Approximately 35% of the total construction cost is spent on labour.
2. The labourers have their limitations and may fail to meet the time limits. The quality of workmanship, too, differs from person to person. Hence, quality standards cannot be maintained. Wastage of material is considerably high as it is handled and utilized manually.
3. The objective of the construction organizations should be 'speed and economy'. This cannot be achieved with labour oriented advanced construction techniques.
4. Only studying and adopting modern industrial techniques and equipment is the solution. By this, one can save material, reduce labour expenses, and increase the speed of work, leading to the economy in construction.
5. Though the scope of the subject is vast, in this chapter we shall discuss only the advanced techniques to be used in advanced construction techniques activities.

14.1.4 ENGINEERING ASPECTS OF SOIL MECHANICS - ENVIRONMENTAL IMPACT ASSESSMENT

The Need for an Environmental Impact Assessment

An Environmental Impact Assessment is a formal method of judging the impact that any new developmental project would have on the environment and its constituents. This can include changes that the project would create in the physical aspects of existing geography, chemical changes to the atmosphere including air and water, biological changes that affect plant, animal and human life, cultural impact of a project on the society in the area, and other socio-economic effects that the project can have. Such an assessment allows problems to be foreseen, so that the

design and planning of the projects is modified to reduce any negative effects. It is now fashionable to build green buildings which have a positive effect on the environment.

There is historical precedent for the now mandatory Environmental Impact Assessments (EIA). Past efforts by governments have resulted in bans on activities that caused noxious odors, garbage dumps were positioned at places far away from habitation, and commercial activities were restricted to town centers.

Objectives of Environmental Impact Assessment

The objective of an EIA is to predict the environmental impact project would have on all aspects of the environment. Once this is done, a study has to be made to see if the impacts can be reduced in any way. The project has then to be modified to suit the local environment and all predictions and likely options presented to decision makers for final decisions.

You can gain a better understanding of EIA by understanding how any typical project can affect the environment of a particular area. Take for example the building of a new road in a city.

The alignment of the road may require that certain lands have to be leveled or new embankments created. Cutting of the land and the new embankments would affect the geography of the area and probably upset its drainage pattern. This would require re-planning existing methods of treating the run-off and could cause existing watercourses to be modified.

The new road may require the removal of existing green cover and this could affect the living conditions in that area. The traffic going through that area can cause pollution problems from vehicles which also includes an increase in sound pollution.

The emissions from the vehicles can affect already existing atmospheric pollutants which in turn could affect human health, animal health and affect greenery in the area. The road may affect existing structures in the area which may have to be removed and can cause changes in the economic wellbeing of the persons who are using those structures.

A positive impact of the new road may mean a reduction in traffic congestion, its positive effect on pollution, and the economic advantage of these two aspects.

For any environmental impact assessment, complete data on all these aspects as they are at present has to be made so that any changes can be reasonably judged to existing standards required for good living. The deterioration or increase in these living standards has then to be highlighted by the EIA before any final decision on the project can be undertaken.

14.1.5 WATER SUPPLY-SEWERAGE SYSTEM-WASTE WATER- SUSTAINABLE DEVELOPMENT TECHNIQUES

Sustainable development is a hard topic to nail down because it consists of a wide range of things. Due to the technicality and complexity of this topic, it's best to check out its importance holistically to be able to grasp it easily.

Now that the requirements for a sustainable wastewater treatment system have been presented, there are several options one can choose from in order to find the most appropriate technology for a particular region. This paper will discuss sustainable wastewater treatment systems including:

a) Lagoons/wetlands
b) USAB (anaerobic digesters)
c) SAT technologies.

- **Lagoons and wetlands**:

In wetland treatment, natural forces (chemical, physical, and solar) act together to purify the wastewater, thereby achieving wastewater treatment. A series of shallow ponds act as stabilization lagoons, while water hyacinth or duckweed acts to accumulate heavy metals. Multiple forms of bacteria, plankton, and algae act to further purify the water. Wetland treatment technology in developing countries offers a comparative advantage over conventional, mechanized treatment systems because the level of self-sufficiency, ecological balance, and economic viability is greater. The system allows for total resource recovery (Rose, 1999). Lagoon systems may be considered a low-cost technology if sufficient, non-arable land is available. However, the requirement of available land is not generally met in big cities. The demand for flat land is high for the expanding urban developments and agricultural purposes. The decision to use wetlands must consider the climate. There are disadvantages to the system that in some locations may make it unsustainable. Some mechanical problems may include clogging with sprinkler and drip irrigation systems, particularly with oxidation pond effluent. Biological growth (slime) in the sprinkler head, emitter orifice, or supply line causes plugging, as do heavy concentrations of algae and suspended solids.

- **Anaerobic Digestion**:

Another treatment option available, if there is little access to land, is anaerobic digestion. Anaerobic bacteria degrade organic materials in the absence of oxygen and produce methane and carbon dioxide. The methane can be reused as an alternative energy source (biogas). Other benefits include a reduction of total bio-solids volume of up to 50-80 percent, and a final waste sludge that is biologically stable can serve as rich humus for agriculture. So far, anaerobic treatment has been applied in Colombia, Brazil, and India, replacing the more costly activated sludge processes or diminishing the required pond areas. Various cities in Brazil have shown an interest in applying anaerobic treatment as a decentralized treatment system for poor, sub-urban

districts. The beauty of the anaerobic treatment technology is that it can be applied on a very small and very large scale. This makes it a sustainable option for a growing community.

- **Soil Aquifer Treatment:**

SAT (soil aquifer treatment) is a geo-purification system where partially treated sewage effluent artificially recharges the aquifers and is then withdrawn for future use. By recharging through unsaturated soil layers, the effluent achieves additional purification before it is mixed with the natural groundwater. In water scarce areas, treated effluent becomes a considerable resource for improved groundwater sources. The Gaza Coastal Aquifer Management Program includes treated effluents to strengthen the groundwater, in terms of both quantity and quality. With nitrogen reduction in the wastewater treatment plants, the recharged effluent has a potential to reduce the concentration of nitrates in the aquifer. In water scarce areas such as in the Middle East and parts of Southern Africa, waste water has become a valuable resource that, after appropriate treatment, becomes a commercially realistic alternative for groundwater recharge, agriculture, and urban applications.

SAT systems are inexpensive, efficient for pathogen removal, and are not highly technical to operate. Most of the cost associated with an SAT is for pumping the water from the recovery wells, which is usually $20-50 USD per m3. In terms of reductions, SAT systems typically remove all BOD, TSS, and pathogenic organisms from the waste and tend to treat wastewater to a standard that would generally allow unrestricted irrigation. The biggest advantage of SAT is that it breaks the pipe-to pipe connection of directly reusing treated wastewater from a treatment plant. This is a positive attribute for those cultures where water reuse is taboo. The pre treatment requirements for SAT vary depending on the purpose of groundwater recharge, sources of reclaimed water, recharge methods, and location. Some may only need primary treatment or treatment in a stabilization pond. However, pre treatment processes should be avoided if they leave high algae concentrations in the recharge water.

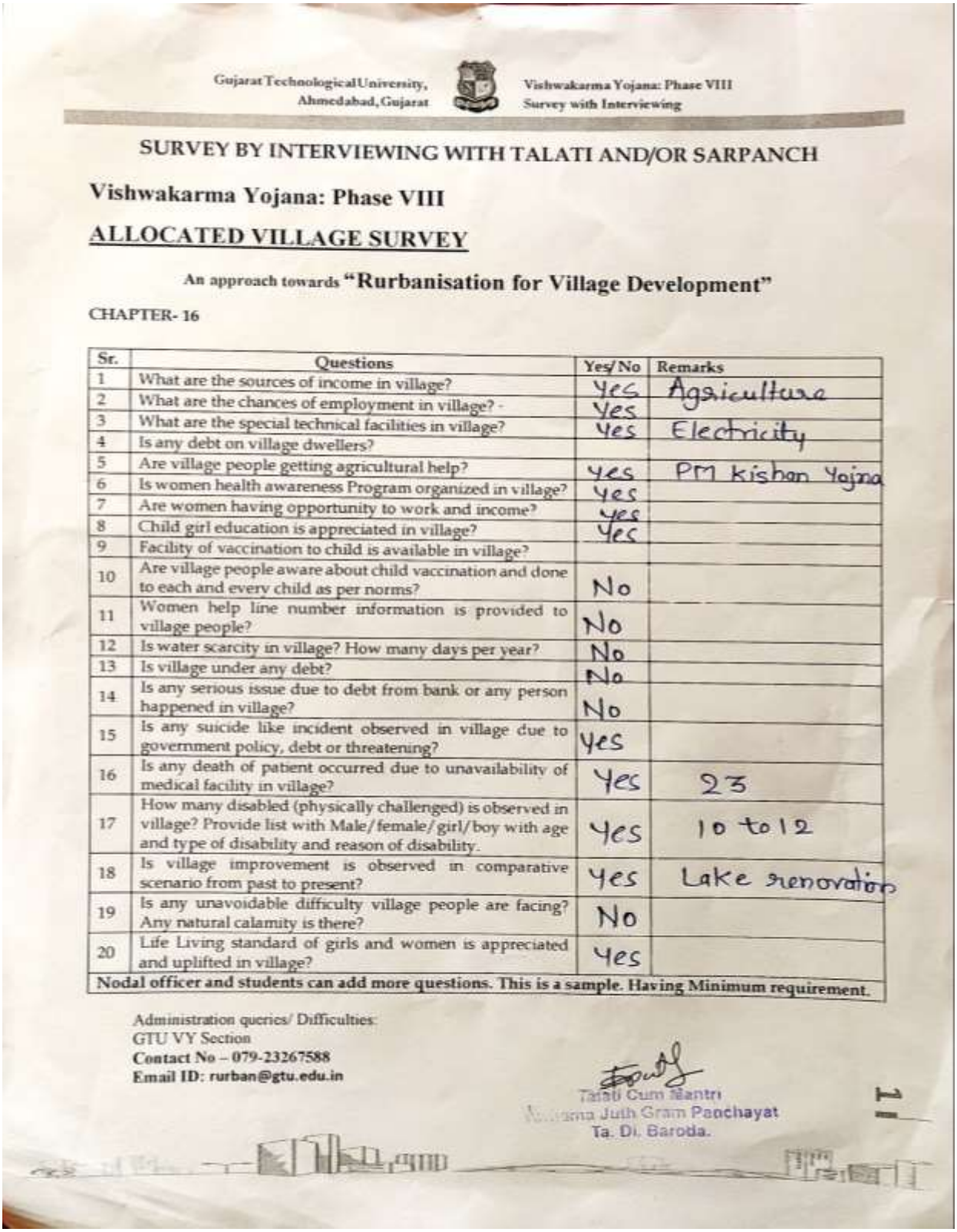
Chapter 15. Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society.

NO.	DESIGN NAME	COST (RS.)	ADVANTAGES
1	POST-OFFICE	796840	The post office which we had design is huge then existance post office and comfortable and have better features, comfortness of peoples.
2	ANGANVADI	451840.59	The existing structure is very old and damaged so we serve a design having comfort, safe, etc.
3	BANK	821135.06	The bank which we design consist facility , space, comfort,etc
4	PUBLIC TOILET	551281.64	The village have old public toilet but it is very damaged and small so we design big and better design and having W.C & bath both.
5	PRIMARY SCHOOL	3344146.64	The existing structure is damaged totally and structure life is also over so we designed a primary school which having class 1 & 7 .
6	ANIMAL HOSPITAL	626342.33	The villge have lots of cattles so we design animal hospital which serve the treatment to that cattles.
7	WATER TANK	21531950	The water tank which we design is having capacity 4,00,000 liters.
8	POLICE STATION	1020070.3	The existing police station is not proper condition so we design police station which have all facilities.
9	FIRE STATION	1137673.13	The village have no fire station so we design fire station.
10	LAKE BEAUTIFICATION	2195680.3	The lake have need to renovation so we give the design of lake beautification for

				better appearance, children prosperity, fittness of villagers.
11	BIOGAS PLANT		4387748	The village have lots of agricultural waste, animal waste etc so we design the biogas plant.
12	RESORT		71523254	In this village land area is very high so we desided design of resort for village development & beautification.

TABLE 15.1 Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society.

Chapter -16. Survey by Interviewing with Talati and/or Sarpanch



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Survey with Interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

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

CHAPTER- 16

Sr.	Questions	Yes/No	Remarks
1	What are the sources of income in village?	Yes	Agsiculture
2	What are the chances of employment in village? -	Yes	
3	What are the special technical facilities in village?	Yes	Electricity
4	Is any debt on village dwellers?		
5	Are village people getting agricultural help?	Yes	PM kishan Yojna
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?		
10	Are village people aware about child vaccination and done to each and every child as per norms?	No	
11	Women help line number information is provided to village people?	No	
12	Is water scarcity in village? How many days per year?	No	
13	Is village under any debt?	No	
14	Is any serious issue due to debt from bank or any person happened in village?	No	
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	Yes	
16	Is any death of patient occurred due to unavailability of medical facility in village?	Yes	23
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 to 12
18	Is village improvement is observed in comparative scenario from past to present?	Yes	Lake renovation
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	No	
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	

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

Talati Cum Mantri
Varnama Juth Gram Panchayat
Ta. Di. Baroda.

Chapter-17 Irrigation / Agriculture Activates and Agro Industry, Alternate Technics And Solution

IRRIGATION: -

irrigation is the artificial process of applying controlled amounts of water to land to assist in production of crops. 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. In contrast, agriculture that relies only on direct rainfall is referred to as rain-fed.

Fig.17.1 irrigation

Irrigation systems are also used for cooling livestock, dust suppression, disposal of sewage, and in mining. Irrigation is often studied together with drainage, which is the removal of surface and sub-surface water from a given location.

Irrigation has been a central feature of agriculture for over 5,000 years and is the product of many cultures. Historically, it was the basis for economies and societies across the globe, from Asia to the Americas.

Types of Agricultural Water Use: -

Irrigation vs. Rain-Fed Agriculture
There are two main ways that farmers and ranchers use agricultural water to cultivate crops:

- Rain-fed farming
- Irrigation

Rain-fed farming is the natural application of water to the soil through direct rainfall. Relying on rainfall is less likely to result in contamination of food products but is open to water shortages when rainfall is reduced. On the other hand, artificial applications of water increase the risk of contamination.

Fig.17.2 Agricultural Water

Irrigation is the artificial application of water to the soil through various systems of tubes, pumps, and sprays. Irrigation is usually used in areas where rainfall is irregular or dry times or drought is expected. There are many types of irrigation systems, in which water is supplied to the entire field uniformly. Irrigation water can come from groundwater, through springs or wells, surface water, through rivers, lakes, or reservoirs, or even other sources, such as treated wastewater or desalinated water. As a result, it is critical that farmers protect their agricultural water source to minimize the potential for contamination. As with any groundwater removal, users of irrigation water need to be careful in not pumping groundwater out of an aquifer faster than it is being recharged.

Its considered smart parking, smart traffic light and smart multi transportation by making parking smarter, people spend less time looking for parking spots and circling city blocks and convent life. traffic lights are particular based on the bus schedules so that less traffic and more freely during rush hours.

Types of Irrigation Systems:-

There are many different types of irrigation systems, depending on how the water is distributed throughout the field. Some common types of irrigation systems include:

Surface irrigation

Water is distributed over and across land by gravity, no mechanical pump involved.

Localized irrigation

Water is distributed under low pressure, through a piped network and applied to each plant.

Drip irrigation

A type of localized irrigation in which drops of water are delivered at or near the root of plants. In this type of irrigation, evaporation and runoff are minimized.

Sprinkler irrigation
Water is distributed by overhead high-pressure sprinklers or guns from a central location in the field or from sprinklers on moving platforms.

Center pivot irrigation
Water is distributed by a system of sprinklers that move on wheeled towers in a circular pattern. This system is common in flat areas of the United States.

Lateral move irrigation
Water is distributed through a series of pipes, each with a wheel and a set of sprinklers, which are rotated either by hand or with a purpose-built mechanism. The sprinklers move a certain distance across the field and then need to have the water hose reconnected for the next distance. This system tends to be less expensive but requires more labor than others.

Sub-irrigation
Water is distributed across land by raising the water table, through a system of pumping stations, canals, gates, and ditches. This type of irrigation is most effective in areas with high water tables.

Manual irrigation
Water is distributed across land through manual labor and watering cans. This system is very labor intensive.

Agro Industry: -

Biotechnologies in Agro-industry in Developing Countries

Fig.17.3 agro industry

Agro-industries provide a means of converting raw agricultural materials into value added products while generating income and employment and contributing to overall economic development in both developed and developing countries.Food processing converts relatively bulky, perishable and typically inedible raw materials into more useful, shelf-stable and palatable foods or potable beverages. Processing contributes to food security

by minimizing waste and loss in the food chain and by increasing food availability and marketability. Food is also processed to improve its quality and safety.

Biotechnology as applied to food processing makes use of microbial inoculants to enhance properties such as the taste, aroma, shelf-life, texture and nutritional value of foods. The process by which micro-organisms and their enzymes bring about these desirable changes in food materials is known as fermentation. Fermentation processing is also widely applied in the production of microbial cultures, enzymes, flavours, fragrances, food additives and a range of other high value-added products.

Fermentation is often one step in a sequence of food processing operations, which may include cleaning, size reduction, soaking, and cooking. Microbes associated with the raw food material and the processing environment serve as inoculants in spontaneous fermentation, while inoculants containing high concentrations of live micro-organisms, called starter cultures, are used to initiate and accelerate fermentation in non-spontaneous or controlled fermentation processes. Microbial starter cultures vary widely in quality and purity.

Fig.17.4 alamy stock

Fermentation processing as practised in most developing countries is more art than science, and, in low-income economies, often makes use of a rudimentary technological base with poor process control, resulting in low yields and products of variable quality. Spontaneous fermentations and those which make use of "appropriate" starter cultures produced largely through backslopping (a process which makes use of samples of a previous batch of a fermented product as inoculants) are widely applied at the household and village level in developing countries. With increasing research and development, a number of precultured single or mixed strains of micro-organisms, called "defined starter cultures", have been developed and are being used by small manufacturers in their fermentation

processing operations. Defined starter cultures are also imported by a number of developing countries for use in processing operations.

Traditional methods of genetic improvement such as classical mutagenesis and conjugation can be applied to improve the quality of microbial cultures. Hybridization is also used for the improvement of yeast strains. Recombinant gene technology is widely employed in research and development for strain improvement. While these techniques are common in developed countries, they are only now beginning to be applied in developing countries for the improvement and development of starter cultures. For example, random amplified polymorphic DNA (RAPD) techniques have been applied in Thailand in the molecular typing of bacterial strains for the production of a fermented pork sausage with differing flavours. The results of these analyses have led to the development of three different defined starter cultures, which are currently used for the commercial production of products with different flavour characteristics.

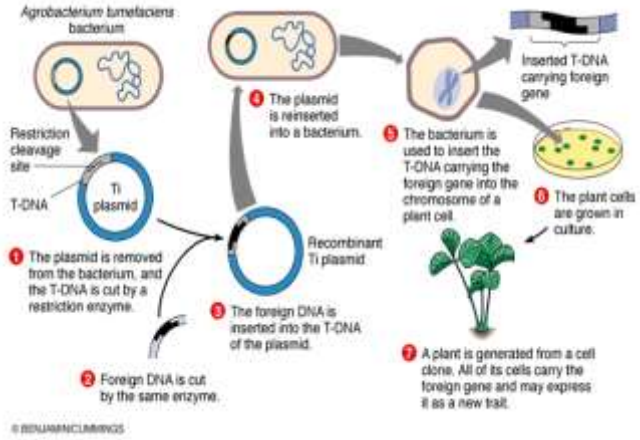


Fig.17.5 Genetically modified

Genetically modified (GM) microbial cultures are used in the production of enzymes and various food processing ingredients. Rennet, which is widely used throughout the world as a starter in cheese production, is produced using GM bacteria. Thailand currently makes use of GM Escherichia coli as an inoculant in lysine production. Many industrially important enzymes such as a-amylase, gluco-amylase, lipase and pectinase, as well as bio-based fine chemicals such as lactic acid, amino acids, antibiotics, nucleic acid and polysaccharides, are produced in China using GM starter cultures.

Food safety is defined as the assurance that food will not cause harm to the consumer when it is prepared and/or is eaten according to its intended use, and food safety along the food chain includes the good agricultural practices that establish basic principles for farming (including aquaculture), soil and water management, crop and animal production, post-harvest handling and treatment, good manufacturing practices for storage, processing, and distribution to the consumer. Biotechnology is

widely employed as a tool in diagnostics to monitor food safety, prevent and diagnose food-borne illnesses and verify the origins of foods.

The techniques applied in the assurance of food safety focus on the detection and monitoring of hazards. Biotechnological developments have led to the widespread availability of methods of identification that are more rapid and less costly than those based on conventional techniques. Polymerase chain reaction-based (PCR-based) and enzyme-linked immunoabsorbent assay (ELISA) methods are now applied in the detection of major food-borne pathogens. Genome sequence information, coupled with the support of advanced molecular techniques, have enabled scientists to establish defensive strategies to protect consumers from pathogens and provided industry with tools for developing strategies to design healthy and safe food by optimizing the effect of probiotic bacteria, the design of starter culture bacteria and functional properties for use in food processing. These advances have in turn led to more precise diagnostic tools and the ability to quickly develop efficient, specific and sensitive detection kits for new microbial strains. Kits are now also available for the detection of mycotoxins, which are a major biochemical hazard associated with pulses and grains, the raw material inputs for a number of traditional fermented foods in many developing regions. The identification of food ingredients and the origins of foods through traceability studies have also been enhanced by molecular methods.

Chapter -18. Social Activities – Any Activates Planned by Students

"HEALTH SAFETY IS OUR PRIORITY"




Figs.18.1 Mask Distribution

We done this activity by visited allocated village [varnama, Vadodara] by mask distribution in the village. In coronatimes our safety is very Important for our health so we decided to mask distribution because mask is the thing which protects us from viruses and disease.

Chapter -19. <Varnama village> SAGY Questionnaire Survey form with the Sarpanch Signature

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: VARNAMA Gram Panchayat: VARNAMA(167141) Ward No. 2

Block: 4967 District: VADODARA

State: GUJARAT L S Constituency: DABHOI

1. Family Identity and Size

Name of Head of Household	AMIN PINKYBEN DINESHBHAI							Male/ Female	
SECC Survey ID:	—	Family Size	9	Over 18	4	6 to 18	5	Under 6	—

2. Category & Entitlement Details (Tick as appropriate)

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

2. Adults (above 18 years)

Name	Age	Sex M/F/O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Aadhaar Card (Y/N)	Bank A/C (Y/N)	Social Security Pension[5]
AMIN DINESHBHAI	46	M	No	✓	✓	✓	✓	—
MINUBHAI	76	M	No	✓	✓	✓	✓	—
BANJANBEN	69	F	No	✓	✓	✓	✓	—
AASTHA BEN	19	F	No	✓	✓	✓	✓	—

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
DHRUV AMIN	18	M	No	X	✓	✓	12	✓

4. Children below 6 years

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

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

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

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

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

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

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

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

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

7. Do members take Regular Physical Exercise

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

8. Consumption of Tobacco

	Smoking	Chewing
Adults	✓	✓
Children	X	X

9. House & Homestead Data

Own House: Yes / ~~No~~	No of Rooms: 4
Type: Kutcha / Semi Pucca / Pucca	
Toilet: Private / Community / Open Defecation	
Drainage linked to House: Covered / Open / None	
Waste Collection System	Door Step / Common Point Collection System / No
Homestead Land: Yes / ~~No~~	Kitchen Garden : Yes / No
Compost Pit: Individual/ Group/ None	Biogas Plant: Individual/ Group/ None

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

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

11. Source of Lighting and Power

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

12. Landholding (Acres)

1. Total	173.39	2. Cultivable Area	1761.79
3. Irrigated Area	100	4. Uncultivable Area	73.39

13. Principal Occupations in the Household

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

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
TUVAR	Kg	50,000
COTTON	kg	50,000
ARANDA	kg	30,000

17. Livestock Numbers

Cows: 250	Bullocks: 5	Calves: 50
Female Buffalo: 300	Male Buffalo: 5	Buffalo Calves: 50
Goats/ ~~Sheep~~: 200	Poultry/ Ducks: 70	Pigs: —
Any other: Type No		No.
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): 350		

18. What games do Children Play
cricket, kho-kho, etc.

19. Do children play musical instrument (mention)

Schedule Filled By: Vishakha Bhatt, Ruthik Chinchole
Principal Respondent:
Date of Survey: 26/5/2021

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

I. Basic Information

a. Gram Panchayat: Varnama

b. Block: 4267

c. District: Vadodara

d. State: Gujarat

e. Lok Sabha Constituency: Chhota Udaipur

f. Number of Wards in the Gram Panchayat: 10

g. Number of Villages in the Gram Panchayat: 70

h. Names of Villages: Varnama

Demographic Information

Number of Households 1350 Total Population 4054 Male 2028 Female 2023

SC HHs 60 ST HHs 200 OBC HHs 250 Other HHs 550

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	Yes	
b.	Nearest Primary Health Centre (PHC)	Yes	
c.	Nearest Community Health Centre (CHC)	Yes	
d.	Nearest Post Office	Yes	
e.	Nearest Bank Branch (Any)	Yes	
f.	Nearest Bank with CBS Facility	NO	
g.	Nearest ATM	Yes	
h.	Nearest Primary School	Yes	
i.	Nearest Middle School	Yes	
j.	Nearest Secondary School	Yes	
k.	Nearest Higher Secondary School / +2 College	Yes	
l.	Nearest Graduate College	Yes	
m	Nearest ITI / Polytechnic Centre	NO	
n	Kisan Seva Kendra	Yes	

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	No	
p	Nearest Agro Service Centre	No	
p	MSP based Government Procurement Centre	No	
q	Milk Cooperative /Collection Centre	yes	
r	Veterinary Care Centre	No	
s	Ayurveda Centre	yes	
t	E – Seva Kendra	No	
u	Bus Stop	yes	
v	Railway Station	yes	
w	Library	yes	
x	Common Service Centre	yes	

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 5 Public ✓ Private _____

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 6

b. Number of villages without Angan Wadi Centres 0

Names of such villages: _____

_____

c. Schools (Number)

Primary Private: ____ Primary Govt.: 2

Middle Private: ____ Middle Govt.: 2

Secondary Private: ____ Secondary Govt.: 2

Higher Secondary Private: _____ Higher Secondary Govt: 2

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)		✓	✓				
b.	Kerosene	✓	✓	✓				
c.	Other (mention)							

2

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

VII. Coverage of Villages under different Facilities & Services

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

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	1761A	d.	Pasture / Grazing Land	0	g.	Check Dam	-
b.	Irrigated Land	110	e.	Forests/ Plantations	0	h.	Wells/Bore Wells	2
c.	Un-irrigated Land	550	f.	Other Common Land	0	i	Tanks /Ponds	2

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

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	150
b)	Number of Households receiving pension (old age, widow, disability)	100
c)	Number of eligible Households who are not receiving pension	—
d)	Number of Households eligible for Ration Card	800
e)	Number of eligible HHs having ration cards	100
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	—
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	—
h)	Number of active Job Card holders under MGNREGA	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	—
l)	Number of landless households	15
m)	Number of IAY beneficiaries	550
n)	Number of FRA[2] beneficiaries	0
o)	Number of Community Sanitary Complexes	3
p)	Number of Households headed by single women	0
q)	Number of Households headed by physically handicapped persons	10
r)	Total number of Persons with Disability in the village	12
s)	Number of SHGs	5
t)	Number of active SHGs	5
u)	Number of SHG Federations	1
v)	Number of Youth Clubs	1
w)	Number of Bharat Nirman Volunteers	—

Name and Signature of Surveyor and Respondent'

Rutvik chinchole Vishakha Bhagat Surveyor	Pinky .D Amin PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	26/5/2021 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: Vagnama

b. Ward Number: 2

c. Gram Panchayat: Vagnama

d. Block: 4267

e. District: ~~Gujarat~~ Vadodara

f. State: Gujarat

g. Lok Sabha Constituency: Chhota Udaipur

h. Number of Habitations / Hamlets in the Gram Panchayat: _____

i. Names of Habitations / Hamlets: Vagnama

Demographic Information

Number of Households 951 Total Population 4251 Male 2228 Female 2023

SC HHs 60 ST HHs 200 OBC HHs 250 Other HHs 550

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	yes	
b.	Nearest Middle School	yes	
c.	Nearest Secondary School	yes	
d.	Kisan Seva Kendra	yes	
e.	Milk Cooperative /Collection Centre	yes	
g.	Health Sub Centre	yes	
h.	Bank	yes	
i.	ATM	yes	
j.	Bus Stop	yes	
k.	Railway Station	yes	

[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

L	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	yes	
m	Common Service Centre	yes	
n	Veterinary Care Centre	yes	

ii. Road Connectivity
a. Habitations connected by All-weather Roads (1-All 2-None 3-Some) All
If 3 mention the name of the habitations where not available:

iii. Drinking Water Facilities
a.Piped Water Supply Coverage to Habitations:_____ (1-All 2-None 3-Some) All
If 3 mention the name of the habitations not covered:

b.Hand Pump Coverage in Habitations: _____ (1-All 2-None 3-Some) some
If 3 mention the name of the habitations not covered:

iv. Coverage of Habitations under Waste Management System
a. Coverage under Covered Drains: _____(1-All 2-None 3-Some) All
If 3 mention the name of the habitations not covered:

b. Coverage under Open Drains: _____(1-All 2-None 3-Some) some
If 3 mention the name of the habitations not covered:

c. Coverage under Doorstep Waste Collection: (1-All 2-None 3-Some) All
If 3 mention the name of the habitations not covered:

v. Coverage of Habitations under Electrification
a. Coverage under Household Connections: (1-All 2-None 3-Some) some
If 3 mention the name of the habitations not covered:

b.Coverage under Street Lighting: All(1-All 2-None 3-Some) All
If 3 mention the name of the habitations not covered:

vi. Sports Facilities in the Village
a.Number of Play Grounds in the Village (minimum size 200 square meters): 5
b.Mini Stadium : NO Yes(Y) /No (N)

vii. Education, ICDS
a. Number of Anganwadi Centres: 6
c. Schools (Number)
Primary Private: ___ Primary Govt.: 2
Middle Private:____ Middle Govt.: 2
Secondary Private:____ Secondary Govt.: 2
Higher Secondary Private: _____ Higher Secondary Govt: 2

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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	1761,19	d.	Pasture / Grazing Land	0	g.	Check Dam	-
b.	Irrigated Land	490	e.	Forests/ Plnatations	0	h.	Wells/Bore Wells	2
c.	Un-irrigated Land	550	f.	Other Common Land	0	I	Tanks /Ponds	2

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	~~No~~ 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	0
5	Number of landless households	15
6	Number of IAY beneficiaries	550
7	Number of FRA beneficiaries	0
8	Number of common sanitation complexes	3
9	Number of SHGs	5
10	Number of active SHGs	2
11	Existence of SHG Federation in the Village (Yes / No)	yes
12	Number of Youth Clubs	yes (1)
13	Number of Bharat Nirman Volunteers	0

Name and Signature of Surveyor and Respondent'

Ruthik chindole Vishakha Bhatt Surveyor	Pinky .D. Amin 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)	26-5-2021 Date of Survey

Talati Cum Mantri
Varnama Juth Gram Panchayat
Ta. Di. Baroda

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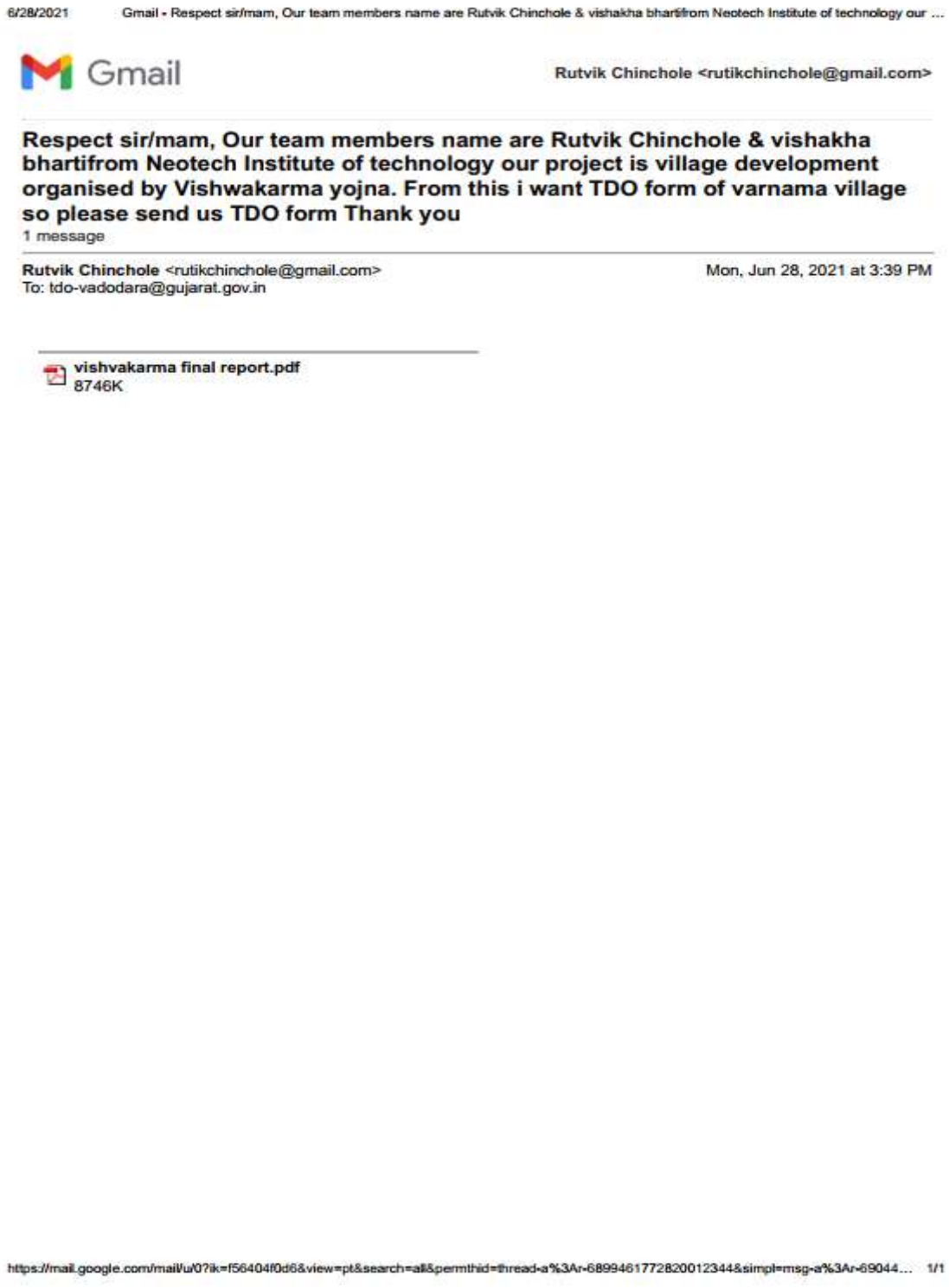
Chapter -20.TDO-DDO-Collector email sending soft copy attachment in the report



6/28/2021 Gmail - Respect sir/mam, Our team members name are Rutvik Chinchole & vishakha bhartifrom Neotech Institute of technology our ...

Gmail

Rutvik Chinchole <rutikchinchole@gmail.com>

Respect sir/mam, Our team members name are Rutvik Chinchole & vishakha bhartifrom Neotech Institute of technology our project is village development organised by Vishwakarma yojna. From this i want TDO form of varnama village so please send us TDO form Thank you

1 message

Rutvik Chinchole <rutikchinchole@gmail.com> Mon, Jun 28, 2021 at 3:39 PM
To: tdo-vadodara@gujarat.gov.in

vishvakarma final report.pdf
8746K

https://mail.google.com/mail/u/0?ik=f56404f0d6&view=pt&search=all&permthid=thread-a%3Ar-6899461772820012344&simpl=msg-a%3Ar-69044... 1/1

Chapter -21. Comprehensive report for the entire village

About 70% of India's population or 750 million, live in its 600,000 villages. More than 85% of these villages are in the plains or on the Deccan plateau. The average village has 200-250 households, and occupies an area of 5 sq.km. Around 65% of the state's population is living in rural areas. Peoples in rural should have the same quality of life as is enjoyed by people living in sub urban and urban areas. Further there are cascading effect of poverty, unemployment, poor and inadequate infrastructure in rural areas on urban centers causing slums and consequential social and economic tensions manifesting in economic deprivation and urban poverty.

Hence rural development which is concerned with economic growth and social justice, improvement in the living standard of the rural people by providing adequate and quality social services and minimum basic needs become essential. So we government had decided to make a yojana known as "vishwakarma yojana". The yojana consist development of infrastructure in the allocated village.

In this project students have to select their allocated village for development of village. We had selected allocate village named 'Varnama'. The Varnama village located in vadodara Tehsil of vadodara district in Gujarat, India. It is situated 12 km away from Vadodara, which is both district headquarter of Varnama village. The total geographical area of village is 1761.79 hectares. The total population according to 2011 census is 4251 peoples which consists 2228 males and 2023 females. There are 951 households.

Firstly we have to survey the allocated, ideal and smart village and compare the smart and ideal village infrastructures and know the utilities and facilities of allocated village. From this we have to design the infrastructures according to survey.

We visit the villages and survey of structures which we have to renovate or give new design, firstly we make plans, elevation, section then we design the structures in staadpro or etabs and then prepare a excel sheet of quantity sheet and abstract sheet.

We had design post office, bank, public toilet, animal hospital, aaganwadi and primary school in 1st phase of the project. And then we designed police station, fire station, lake beautification, resort, biogas and water tank in 2nd phase.