DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
THORDI Village,
Bhavnagar District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
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GYANMANJRI INSTITUTE
OF TECHNOLOGY
BHAVNAGAR

Nodal Officer
Assit. Prof. Anish Gohil (Civil)
Civil Engineering Department

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

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CERTIFICATE

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

Detail Project Report for,

VILLAGE THORDI,
DISTRICT BHAVNAGAR

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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ABSTRACT

The concept of Rurbanization at regeneration and revitalization of both the physical as well as social environment in villages through a judicious and economic consumption of resources is the thought for betterment or the villages. It is designed to reduce and remove the rural-urban divide and to lead to process of rural transformation that is not exploitative. The aim of the project is to study the present status and techno-economic survey of villages in different districts of the state in terms of basic and public amenities, other infrastructural facilities for the need of people and to prepare a report on the expected socioeconomic growth of the area with consultation of the local revenue authorities, TDO and DDO, the leaders like the Sarpanch, the needs of the village has been to determine keeping in mind the population growth, growth of surrounding, Environmental Growth, Advancement in energy use and quality of life in the villages.Vishwakarma Yojana is an approach towards Rurbanisation, it has been proposed to provide the benefit of real world experience to engineering students and apply their technical knowledge in the planning, development and management of rural infrastructure facilities. Rurbanisation means urban facilities and amenities in rural area, developing village with help of rural soul and urban amenities. In this village on one hand some essential infrastructural facilities like Water Supply, Road Network and Electricity, primary school, secondary and higher secondary school etc. have been good and sufficient on the other hand lacking of infrastructural facilities like drainage, public toilet, and public garden.

Thordi is a Village in Bhavnagar Taluka in Bhavnagar District of Gujarat State, India. It is located 16 KM towards South from District headquarters Bhavnagar. 208 KM from State capital Gandhinagar.Thordi pin code is 364110 and postal sub post office is situated at Ghogha.There is a humidity in the weather. The latitude 21.6470° N, 72.1920° E are the coordinate of the Thordi. The village location is good & has many percepts of development & employment.

On the basis of survey data we have observed that there are some physical infrastructures like closed type of drainage system in Thordi. There are nearly 474 houses out of which 60% of the houses are pucca while 40% of the houses are kutchha. There is one government Primary school, two secondary school each government & private and four anganwadi three government & one privarte. There is piped water supply for every house with two sump & 1 ESR & pump house. there are five checkdam for agricultural usage & three lakes. Also there is a post office.Village is connected with 24 hour electricity supply.

There is need of internal road development as well as there are more kutchha houses so a well designed plan for house is necessary. Also there is a bridge needed to connect the new government higher secondary school as the path is closed during the rainy season. Also there are no street light to enlighten the paths. There are no such facilities of dustbin at every connecting points. There is no pipeline connected for gas. There is a need of repairs to old structures like Gram panchayat office. There is a need of new smashan, & snanghat. So we can plan on laying CC road with Paving blocks on side in internal roads, we can design a pipe culvert bridge for connection of school., design for houses, new smashan & snan-gahat design.

In part 2 we have decided some designs for future scope of the village development as, PHC, gram panchayat office, Animal water drinking facility, Bank etc.

Key Words: Developing Infrastructure, House Resettlement , Rurbanaization

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 support during project work.

We also express our gratitude to **Prof. (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 and staff members of Bhavnagar**, Thordi, 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. H. M. Nimbark Principal**, All faculty and Staff Members of our colleges for their encouragement and support to complete this project work.

An act of gratitude is expressed to our **Internal Guide Jignesh Rathod and Nodal Officer Prof. Anish Gohil from Gyanmanjari Institute of Technology - GMIT, Bhavnagar** for their invaluable guidance, constant inspiration and active involvement in our project work.

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

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

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

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ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
VY	VISHWAKARMA YOJNA
DPC	DAMP PROOF COURSE
PHC	PUBLIC HEATH CENTER
CHC	COMMUNITY HEALTH CENTER
RCC	REINFORCED CEMENT CONCRETE
PCC	PLAIN CONCRETE CEMENT
WBM	WATER BOUND MACADAM
BM	BRICK MASNORY
D	DOOR
V	VENTILATION
G	GAP
W	WINDOW
WC	WATER CLOSET
GDP	GROSS DOMESTIC PRODUCT
NH	NATIONAL HIGHWAY
SH	STATE HIGHWAY
ODR	OTHER DISTRICT ROAD
MDR	MAJOR DISTRICT ROAD
SC	SCHEDULE CAST
ST	SCHEDULE TRIBE
SWOT	STRENGTH WEAKNESS OPPORTUNITY THREAT

-: Summary of Project Villages :-

Village features	Allocated Village	Ideal Village	Smart Village
Village	Thordi	Rafala (Golden Village)	Kankot
Taluka	Bhavnagar	Bagasra	Rajkot
District	Bhavnagar	Amreli	Rajkot
Sarpanch	Ushaben Lakhani	Devabhai Somabhai Chouhan	Saileshbhai Nandaniya
Talati	Sangeetaben Sharma		
Distance (km)	16.8	162	182.1
Population (As per Census 2011)	2820	831	2279
Pin code	364110	360023	360005
Surveys	Techno-economic Survey	Techno-economic Survey	Smart Village Survey
Facilities/ Key Features	Gram Panchayat, Road Network, Primary education, Anganwadi, O/H watertank, Post office, Sump, etc.	Gram Panchayat, Road Network, Outpost, Library, Social Awarness Quotes & Exibition, Bus station, primary, sec. and hig. sec. education, O/H Watertank, sump, Post office, etc.	Gram Panchayat, Road Network, Bus station, primary and secondary education, PHC, Entrance gate, O/H Watertank, sump, Post office, Village Pond, Recreational area, etc.
Technology	Mobile and Internet connectivity etc.	Solar system, Mobile and Internet connectivity, WiFi, etc.	Mobile and Internet connectivity, WiFi , etc.
Drawbacks	Poor Maintenance	Less facility as low population.	Lack of services

TABLE NO.1 SUMMARY OF PROJECT VILLAGE

Chapter 1.

Ideal village visit from District of Gujarat State (Civil Concept) :

1.1 Background & Study Area Location Rafala Village :

A person living in surat has built a ‗Golden Village' in his hometown. Savjibhai Vekariya, belonging to surat patel seva samaj Vice President and world gujarati institute, is native to Rafala village in bagasara taluka of Amreli district. He has constructed Gate way of india, Ladali Bhavan, Sardar Gate, Gandhi Gate in rafala village. Mr.Vekariya to make the dream come true 20 years ago, Rafala has built a Golden Village. It has also been developed without the Government financial support. It was inaugurated by renowned ram kathakar Morari Bapu on 31st October 2017. This is the village where the ancient civilization of india are seen, and all the morden facilities have also been developed. The specialty of village is that the name of the main gate of four doors is the amar javan jyot, a replica of the gate way of india , which is dedicated to the paramvirchakra of the Indian army. The second ladali is dedicated to all the girls born in the village of Gate. Third is Gandhi gate.

FIG.1 MAP OF RAFALAVILLAGE

Forth of Sardar gate. All the gates are statue of the Jawans, Elephants and Women, according to indian cuiture. Many other dignitaries were present in the opening ceremony. Savjibhai vekariya, who always wanted to stay away from the name and popularity, said that it was possible due to the spirit that I should do something in the memory of my ancestors and the villagers' cooperation. Beti bachao campaign is promoted by the people of ladali bhavan, 151 by all the daughters of all castes. Photograph of the works done in the village are pictures of a special person visiting a village, until the marriage takes place after the birth of memorable girls.

Number of Households	**181**
Population	831
Male Population	423 (50.90%)
Female Population	408 (49.10%)
Children Population	111
Sex-ratio	964
Literacy	76.42%
Male Literacy	85.44%
Female Literacy	67.30%
Scheduled Tribes (ST) %	0%
Scheduled Caste (SC) %	15.88%

TABLE NO.2 RAFALA POPULATION FACTS

1.2 Concept: Ideal Village, Normal Village :

We are followed Mahatma Gandhi‘s concept of rural development revolves around creating model villages for transforming _SWARAJ‘ into _SU-RAJ‘.An ideal Indian village will be so constructed as to lend itself to perfect sanitation. The village lanes and streets will be free of all avoidable dust. It will have wells according to its needs and accessible to all. It will have houses of worship for all; also a common meeting place, a co- operative dairy, primary and secondary schools in which industrial education will be the central fact, and it will have panchayats for settling disputes. It will produce its own grains, vegetables and fruit, and its own khadi.

This is roughly my idea of a model village. That village may be regarded as reformed. where the largest possible number of village industries are increasing, in which nobody is illiterate, where the roads are clean, there is a fixed place for evacuation, the wells are clean, there is harmony among the different communities, and untouchability is completely absent, in which everybody gets cow‘s milk, ghee etc., in moderate quantities, in which nobody is without work, and which is free from quarrels and thefts.

Thus every village‘s first concern will be to grow its own food crops and cotton for its cloth. It should have a reserve for its cattle, recreation and playground for adults and children. Then if there is more land available, it will grow useful money crops, thus excluding ganja, tobacco, etc. The village will maintain a village theatre, school and public hall. It will have its own waterworks, ensuring clean water supply. This can be done through controlled wells or tanks. Education will be compulsory up to the final basic course. The task before every lover of the country is how to reconstruct the villages of India so that it live in them as it is supposed to be in the cities.

FIG.2 OPEN SPACE

1.2.1 Objectives :

- To initiative this processes which show to holistic development of the identified village.
- To significantly improve the standard of living and quality of life of all components of the villagers through Enhancing basic amenities.
- Higher productivity & Upgrade human development.
- Better livelihood time & Minimize disparities.
- Ingress to rights and entitlements & Outspread social mobilization.
- Boost social capital.
- To create models of local level development and effective local governance which can motivate and inspire neighboring Gram village to learn and transform.

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

- A small village near Bagsara, Saurashtra, Rafala found itself in the limelight recently as it received the title of 'Golden Village', bringing pride to Gujarat and its government. A small area with only a 1000 people to account for, the entire village is painted in gold and boasts of several visitors. Credit for the transformation of the village goes to social activist and leader Savjibhai Kurjibhai Vekaria Rafala

celebrated a three-day festival starting on October 31 which is also celebrated as Sardar Vallabhbhai Patel Jayanti.

- The celebrations saw three different themes on each day, with appropriate programmes held accordingly. The first say saw Ramji temple and Someshwar temple be dedicated to the public and a maha aarti of all the gods and goddesses of the village. Present on the occasion, Swami Madhavpriyadasji said that Savjibhai, along with support of the villagers, has established a feat not even the government was capable of. The second day saw several guests like Morari Bapu, well-known YA author Jay Vasavada, and others. On the third day, Mohanbhai Dayabhai Lok-Kalyan Trust organised 'Krushi Vandana', where farmers were given the *khedut gaurav* award.

FIG.3 RCC ROAD & PAVING BLOCK

- Addressing the event, Morari Bapu said, –I have travelled across the globe, but have never seen a village so entirely beautiful and pure any where in my life of 72 years. More than an *adarsh* village, this appears like a *fathers'* village.‖ Vasavada said statues of Sardar Vallabhbhai are installed every where, but Rafala is the first village to also realise his talent and dedication.
- The event also saw Shaurya Chakra awardee Major Rakesh Sharma, Param Vir Chakra awardee Col Bana Singh, Subaidar Sanjay Singh and Mahavir Chakra awardee Digendra Singh recognised for

FIG.4 SARASWATI MANDIR (SCHOOL) IN RAFALA VILLAGE

their undeterred contribution to the country.

- This is a village located in the green region of the bagasara range in Gujarat‘s Amreli district. Till the 1957s, farming in the village was largely rain fed, and farmers were forced to migrate seasonally to surrounding areas for work
- From the 2016s onwards, things began to change. The Mr. Savjibhai 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 Mr. Savjibhai also focused on village development, for which awareness programs and drives have frequently been organized in the village.

FIG.5 MUKTI DHAM (SMASHAN)

- The village Gram Sabha also launched an infrastructure development. Also contributed to greater agricultural productivity. Today, the golden village is considered a model for community- led, multi-sectorial growth of rural parts of the Gujarat state.

Village	Rafala
Block	Bagasara
District	Amreli
Capital	Gandhinagar
State	Gujarat
PIN code	365550
Area	444.06 hc.
Latitude	21.46° N
Longitude	70.89° E

TABLE NO.3 STUDY AREA OF RAFALA

1.2.2.1 Case Study of Model Village from the state of Gujarat- Madhapar :

Model Village: Madhapar

Madhapar is one of the 18 villages established by the Mistris of Kutch. In the 12th century, many people of this community also known as Kutch Gurjar Kshatriyas moved into a village named Dhaneti and later settled between Anjar and Bhuj. Madhapar is named after Madha Kanji Solanki who had shifted from the Dhaneti village to Madhapar in the year 1473–1474 (VS 1529). Madha Kanji was the third generation of Hemraj Hardas of Solanki dynasty of Gujarat, who moved from the Halar region to Dhaneti and then to Madhapar. This early Madhapar today is known as Juna Vaas (Old Residence). These warrior Kshatriyas later came to be known by Mistri mainly because of their occupation. These Mistris have founded the Juna Vaas and contributed a lot to the development of all early infrastructure, temples of the village and erection of other architects of Kutch. The Patel Kanbi community moved into the village around 1576 AD (V.S. 1633). Navo Vaas (New Residence) was started in around 1857, by which time Madhapar had become congested and other communities like the Kanbis had also increased and prospered. The village was not heavily affected by the 2001 Gujarat earthquake that had caused severe damage in the region. However, some of the century-old houses of Mistris in Juna Vaas (Old Residence) with unique architect were damaged in the earthquake of 26 January 2001.

FIG.6 BANK & ROAD

FIG.7 GATE

The first government boys' school was started in 1884. Bhimji Devji Rathod of Mistri Community built and started the first girls' school in Madhapar in 1900. The first high school, Madhapar Saraswati Vidhyalay High School, was founded in 1968.

The town of Madhapar, with a population of more than ninety two thousand people, some 3 km from the main town of Bhuj in the province of Kutch (Gujarat), is wealthiest town in the whole of Southern Asia with an average GDP of $132,000 per person. In recent times, the town has become greener, with new lakes, check dams and deep bore artesian wells that provide fresh water all year round. It has new health centers, playing fields, parks and temples.

There are two large lakes in Madhapar. One is called Jagasagar and was built by Mistri railway contractor Jagamal Bhima Rathod around the year 1900; it is named after him. His brother, Karasan Bhima Rathod also built an artificial lake with steps near the Suralbhit Temple, which today is known as Karasan Bhimjee's Pond. The other is called Meghrajji Lake, named after Meghrajji, the last ruler of the Cutch State.

Sanatan Thakor Mandir, Mahadev Temple, Barla Temple and Swaminarayan Temple (1949) are in Madhapar.Kuldevi Temples of Momai Mata of Solanki, Rathods are also there.As per records of the old Thakor Madir, Shiva Mandir and the noted Barla Temple were built by Mistri Mandan Jiwani Chauhan of the Mistri community around 1880–1890 from the monies he earned as railway contract works in Sindh Yaksh Mandir or Jakh Bautera (72) Temple is the most popular temple of town, enshrining the 72 Yakshas or Jakh Botera folk deities of Jakh community.

Agriculture plays a large part in the region's prosperity, and most of the agricultural goods are exported to Mumbai. These primarily consist of corn, mangoes and sugarcane.Many residents of Madhapar work abroad in the UK, USA, and Canada. But they prefer to save their money in India, which has made Madhapar one of the richest villages in terms of bank deposits worth over $200 crores. The village has earned a special name in India and is considered a barometer of NRI deposits. The migrant population of Madhapar living outside India have huge love for their village and have formed community associations. In 1968, Kutch Madhapar Karyalay was formed in London to bind the UK Madhapar community together and maintain their cultural activities and traditions.

Conclusion :

Madhapar represents a wealthy classic example as well as an exemplar of concerted efforts of elected leaders, community people, and government support to bring transformation and make villages smart and sustainable. The paper has highlighted the role played by a local leader whose vision and mission can achieve the impossible. However there still exists a gap between a model village and an ideal village. The gap can only be filled with the persistent efforts for rural revitalization not only by the government but also with effective involvement of the local leaders and village folks.

1.2.3 The Idea of a model/Smart Village :

A 21st century model village in India needs to incorporate certain key themes which would be essential for its success. The figure below highlights these broad thematic focus areas, and also mentions the important elements under each such theme. There were some indicators that should be fulfilled in developing smart village model. Smart Village is a concept adopted by national, state and local governments of India, as an initiative focused on holistic rural development, derived from Mahatma Gandhi's vision of Adarsh Gram (Ideal Village) and Swaraj (Self Reliance).

FIG.8 MODEL VILLAGE

❖ **SUSTANABLITY**

- Housing & livelihood
- Clean drinking water & sanitation
- Environmental sustainability
- Pollution free

❖ **COMMUNITY INVOLVEMENT**

- Planning for Village Development
- Mobilizing resources for the Plan, with active engagement with elected representative
- Influencing personal and community behavior

❖ **TECHNOLOGY**

- Delivery of government services
- Land records modernization
- ICT

❖ **CONNECTIVITY**

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

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

A village is a clustered human settlement or community, larger than a hamlet but smaller than a town (although the word is often used to describe both hamlets and smaller towns), with a population typically ranging from a few hundred to a few thousand. Though villages are often located in rural areas, the term urban village is also applied to certain urban neighborhoods. Villages are normally permanent, with fixed dwellings; however, transient villages can occur. Further, the dwellings of a village are fairly close to one another, not scattered broadly over the landscape, as a dispersed settlement. In the past, villages were a usual form of community for societies that practice subsistence agriculture, and also for some non-agricultural societies. In Great Britain, a hamlet earned the right to be called a village when it built a church. In many cultures, towns and cities were few, with only a small proportion of the population living in them. The Industrial Revolution attracted people in larger numbers to work in mills and factories; the concentration of people caused many villages to grow into towns and cities. This also enabled specialization of labor and crafts, and development of many trades. The trend of urbanization continues, though not always in connection with industrialization.
Historically homes were situated together for sociability and defense and land surrounding the living quarters was farmed. Traditional fishing villages were based on artisan fishing and located adjacent to fishing grounds.

Mahatma Gandhi is often quoted as having said: ―Real India lives in its villages.‖ The fact that in the early decades of the 20th century, India‘s urban segment constituted only 11 per cent of the total population gave strength to his argument. It was the villages in which 89 per cent of the population lived. That made India an agricultural country.

The development of Village India, for Gandhi, was the development of India. Illiteracy, ignorance, and poverty characterized the vast population of rural India. Gandhi organized mass movements to draw attention to the problems of the rural people, and also to involve the peasants in the freedom struggle. Social scientists also became interested in studying rural problems, particularly the deteriorating rural economy

Villages in Ancient India:

There is sufficient evidence to suggest that the village was one of the important settlements in ancient India. The Rig Veda talks about the gram to which various families owed their allegiance. Valmiki‘s Ramayana talks of two types of villages – the ghosh and the gram. The ghosh was smaller than the gram and was also known as vraja, or brij (signifying a cattle farm). Both types of villages had their officials, called the mahattar. There is also a reference to a senior official called gramani or gramik.

The Mahabharata talks of different types of settlements, for example, ghosh or brij (cattle farm), palli (small hutments), gram (villages around the forts or durgs), kharvata or pattan (towns), and pur, puri, nagar (cities of different types). The villages were linked with one another, culturally, socially and administratively. This is a clear indication of the interlink-ages between the villages. Kautilya‘s Arthashastra suggests that river, hill, forests, ditches, tanks, bunds or trees demarcated village boundaries. He prescribed that villages should be situated at distances of one or two krosha (in Rajasthan, it is spelt as koss, which is the equivalent of two miles or 3.219 km from each other so that in times of need, one village could go to the help of the other.

1.3 Detail study (Socio economic, physical, demographic and infrastructure details) of Ideal village Rafala with photograph :

Physical, Socio economic and Demographical Details:

Rafala is a medium size village located in Amreli district, Gujarat with total 170 families residing. The Rafala village has population of 831 of which 412 are males while 419 are females as per Population Census 2011.

In Rafala village population of children with age 0-6 is 111 which makes up 12.88 % of total population of village. Average Sex Ratio of Rafala village is 964 which is higher than Gujarat state average of 919. Child Sex Ratio for the Rafala as per census is 850.

	Total	Male	Female
Total No. of Houses	**181**	-	-
Population	**831**	423	408
Child (0-6)	**111**	60	51
Schedule Caste	**132**	67	65
Schedule Tribe	**0**	0	0
Literacy	**76.42%**	85.44%	67.30%
Total Workers	**206**	179	27
Main Worker	**33**	-	-
Marginal Worker	**173**	159	14

TABLE NO.4 RAFALA DEMOGRAPHIC DATA

Rafala Work Profile:

Out of total population, 320 were engaged in work or business activity. In census survey, worker is defined as person who does business, job, service and cultivator and labor activity. Of total working population, 84.64 % were engaged in Main Work while 15.36 % of total workers were engaged in Marginal Work. Rafala has 39% population engaged in either main or marginal works. 59% male and 18% female population are working population.

Economic Profile:

Rafala village comes under Amreli district & Bagasra Taluka. Bagasra is famous for its bagasra ornaments & posses a powerful business. Amreli is based for cement, metallurgy, electrical equipments, ports & ship building materials. It has presence of large reserves of limestone, several major cement conglomerates such as L&T & Ultratech Co. Ltd. has established their units in Amreli. L&T has calculated investment of aprox. INR 1682 crores. Excellent port connectivity with the presence of Pipavav port of more than INR250 crore of investment. Over more than 5455 MSME Presently working

Social Profile

Rafala village is a wonderful example for other villages. They people of this village are united & are highly emotional for Indian army, Indian daughter, all cast & community are appreciated & welcomed in this village. They have constructed a ‑Ladli Bhavan‖ for daughters with the facility of AC. They have named the panchayat ofiice as the gramya sansad bhavan, also they have a shaeed jawan chowk, which shows their strong opnion for unity of India.

Rafala Infrastructures facilities (All Types):

Infrastructure and facilities	Details
1. PHC	0
2. Government Hospital	0
3. Private Hospital/ clinic	1
4. CHC	0
5. Government dispensary	0
6. Anganwadi	3
7. Primary school (Eng. & Guj.)	1
8. Sec and high. Sec. school	1
9. ITI college	0
10. Private Tuitions	Available
11. Community hall	1
12. Library	1
13. Public garden	1
14. Village pond	1
15.Museum	1
16. Handpump	1
17. Overhead tank	1
18. Assembly polling station	1
19. Post office	1
20. Panchayat building	1
21. U/G Sump	1
22. Polling Stations	1
23. Mahila mandal	1
24. Dairy	1
25. Nursing Home	1
26. Police station and jail	0
27. veterinary hospital	0
28.Small scale industries	Near By
29. Recreational Centre	Chowk, temples and Play ground
30. Bus station	1
31. Telephone exchange office	0
32. Electricity	24/7
33. Road network	CC,RCC and Paver Blocks
34. waste collection	Daily
35. Shops Approximately	4
36. Bank	0
37. ATM	0
38. Local Transportation	Available
39. Gov. grocery shop	0
40. Multispec. hospitals	0
41. U/G Drainage	Available

TABLE NO.5 RAFALA INFRASTRUCTURE DETAILS

(FIG.9 LADLI GATE)

(FIG.10 AMAR JAWAN)

(FIG.11 LADLI BHAVAN)

(FIG.12 GRAM PANCHAYAT)

(FIG.13 ROAD)

(FIG.14 STORE ROOM)

(FIG.15 LIBRARY)

(FIG.16 TEMPLE)

1.4 SWOT analysis of Ideal village :

FIG.17 SWOT ANALYSIS OF IDEAL VILLAGE

SWOT analysis (or SWOT matrix) is a strategic planning technique used to help a person ororganization identify strengths, weaknesses, opportunities, and threats related to business competition or project planning. This technique, which operates by 'peeling back layers of the company' is designed for use in the preliminary stages of decision-making processes and can be used as a tool for evaluation of the strategic position of organizations of many kinds (for-profit enterprises, local and national governments, NGOs, etc.). It is intended to specify the objectives of the business venture or project and identify the internal and external factors that are favorable and unfavorable to achieving those objectives. Users of a SWOT analysis often ask and answer questions to generate meaningful information for each category to make the tool useful and identify their competitive advantage. SWOT has been described as the tried-and-true tool of strategic analysis, but has also been criticized for its limitations

1.5 Future prospects of Development of the Ideal village :

We have done an interaction with villagers and they have suggested some possible future prospects of development of the Rafala village. And we personally observed that things & those suggestions are as follows,

- Gas Pipelines
- Biogas Plant
- Cold Storage Area
- PHC
- Wifi Facility

1.6 Benefits of the visits of Ideal village :

- Almost all the civil benefits such as, Water supply network, Pucca roads, LED Street lights,Drainage network, Waste disposal, Water storage tanks, waste collection system were observed in the village.
- Apart from this, infrastructure facilities such as, schools, colleges, roads, post-office, banks,clinics, Public health center, bus stop, Public toilets, anganwadi, police station, community hall, places of recreational interest etc. are also present.

By visiting the village we got an insight about:

- The culture of a village.
- Lifestyle of village
- Socioeconomic conditions of village
- Working of village governing bodies
- Importance of infrastructure facilities
- Functioning of a village

1.7 Civil aspects required in Ideal village :

There are four gates constructed in the village out of which the India Gate is constructed as the same replica of INDIA GATE Delhi, The panchayat office is named as gramya sansad bhavnan which have a dome constructed on top. It has many infrastructure development which are really good for the village.

We have observed the balance of commercial, residential and recreational land use in the Rafala village but as per the feedback which were given by villagers some facilities are lacking in the village from civil aspects and these are, PHC, Gas Pipelines, Biogas Plant, Cold Storage Area, Rain Water Harvesting, Public WiFi Connection, etc.

Creating walkable localities –reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security. The road network is created or refurbished not only for vehicles and public transport, but also for pedestrians and cyclists, and necessary administrative services are offered within walking or cycling distance

Housing and inclusiveness expand housing opportunities for all

Preserving and developing open spaces parks, playgrounds, and recreational spaces in order to enhance the quality of life of citizens, reduce the urban heat effects in Areas and generally promote eco-balance.

Making governance citizen-friendly and cost effective - increasingly rely on online services to bring about accountability and transparency, especially using mobiles to reduce cost of services and providing services without having to go to municipal offices. Forming e-groups to listen to people and obtain feedback and use online monitoring of programs and activities with the aid of cyber tour of worksites

Chapter 2.

Thordi Village Literature Review – (Civil Concept)

2.1 Introduction: Urban & Rural village concept:

2.1.1 Urban village concept:

The Urban Village Concept is Based on two circumstances, which is due to the effect of urbanization and the result of the urban village formation concept brought about by the planning and strategy of re-developing the urban area. Hence, the urban village formation concept must take into consideration the basic characteristics of the urban village environment, which consist of its geography, background of the village, type of village, the position or status of the village, traditional practices and culture, local organizations, certified status of the land title and the land, distance from the city cent government reserve land were not included in the definition of the urban village concept because this type of settlement does not have certified characteristics of a land title

Places which are being administered by Municipal Corporation, cantonment board are automatically considered as urban areas.

Census 2011 of India has also defined agglomeration as an integrated urban area with a core town together with its outgrowths.

2.1.2 Rural village concept:

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 people in the panchayat. The National Sample Survey Organisation (NSSO) defines _rural‘ as follows:

- An area with a population density of up to 400 per square kilometer,
- Villages with clear surveyed boundaries but no municipal board,
- A minimum of 75% of male working population involved in agriculture and allied activities.
- 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. According to the Planning Commission, a town with a maximum population of 15,000 is considered rural in nature.

2.2 Importance of the Rural development:

2.2.1 Rural development introduction:

Rural Development is the process of improving the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas.

Rural Development has traditionally centered on the exploitation of land-intensive natural resources such as agriculture and forestry. However, changes in global production networks and increased urbanization have changed the character of rural areas. Increasingly tourism, niche manufacturers, and recreation have replaced resource extraction and agriculture as dominant economic drivers. The need for rural communities to approach development from a wider perspective has created more focus on a broad range of development goals rather than merely creating incentive for agricultural or resource based businesses. Education, entrepreneurship, physical infrastructure, and social infrastructure all play an important role in developing rural regions. Rural development is also characterized by its emphasis on locally produced economic development strategies. In contrast to urban regions, which have many similarities, rural areas are highly distinctive from one another. For this reason there are a large variety of rural development approaches used globally.

Rural development is a comprehensive term. It essentially focuses on action for the development of areas outside the mainstream urban economic system.

2.2.2 Need for Rural Development in India:

Rural development is a complete term that concentrates on the action taken for the development of rural areas improve the village economy. However, few areas that demand more focused attention and new initiatives are.

- Education
- Public Health and Sanitation
- Women Empowerment
- Infrastructure Development (e.g. electricity, irrigation, etc.)
- Facilities for agriculture extension and research
- Availability of Credit
- Employment opportunity

The aim objectives composed by the government in the sixth five-year plan for rural development are.

- To improve productivity and the wages of rural people.
- To guarantee increased and quick employment possibilities.
- To demolish unemployment and a notable decline in underemployment.
- To guarantee to increase the standard of living of the underprivileged population.
- To provide the basic needs – e.g. elementary education, health care, clean drinking water, and, rural roads, etc.

2.3 Ancient Villages / Different Definition of Rural Urban Villages:

Rural area :

In general, a Rural area or Countryside is a geographic area that is located outside towns and cities. The Health Resources and Services Administration of the United States Department of Health and Human Services defines the word rural as encompassing " all population, housing, and territory not included within an urban area. Whatever is not urban is considered rural."

Typical rural areas have a low population density and small settlements. Agricultural areas are commonly rural, as are other types of areas such as forests. Different countries have varying definitions of rural for statistical and administrative purposes.

Characteristics of rural area are:

- Lower literacy rate.
- Lack of educational facilities.
- Lack of good health infrastructure.
- Less population density.
- Agriculture as prime employment (more than 75% male).
- Lower standard of living and less amenities.
- Migration in search of opportunities.

Characteristics of a village:

- Village have population between 500 and 10000.
- The villagers managed their own affairs through the traditional institution of Panchayat. The central government had neither inclination nor the means for interfering with the self-government of villages.
- Village has the atmosphere of simplicity, calmness and peace. There is no noise and little sophistication.
- Generally the women in villages are less educated and their social status is lower than that of their counterparts in the towns.
- Factors like prevalence of child marriage, joint family system, traditional ideals, old values and lack of education among females are responsible for the low status of women.
- The poverty and illiteracy of the village people.

2.4 Scenario: Rural / Urban village of India population Growth:

Agenda of census of India is to release of provisional population totals-Rural urban distribution. Population of Rural and Urban area (in crore)

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

TABLE NO.6 POPULATION OF RURAL AND URBAN AREAS AS PER CENSUS 2001 AND 2011

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

Literacy rates (in %)

	2001	2011	Difference
India	64.8	74.0	+9.2
Rural	58.7	68.9	+10.2
Urban	79.9	85.0	+5.1

TABLE NO.7 LITERACY RATES IN RURAL AND URBAN AREAS AS PER CENSUS 2001 AND 2011

The improvement in literacy rate in rural area is two times that in urban areas. The rural urban literacy gap which was 21.2% points in 2001, has come down to 16.1% points in 2011

Literacy Rates (in %)

	2001	2011	Difference
Male			
India	75.3	82.1	+6.8
Rural	70.7	78.6	+7.9
Urban	86.3	89.7	+3.4
Female			
India	53.7	65.5	+11.8
Rural	46.1	58.8	+12.7
Urban	72.9	79.9	+7.0

TABLE NO.8 LITERACY RATES IN RURAL AND URBAN AREA AS PER THE MALES AND FEMALE

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

Gujarat Census:

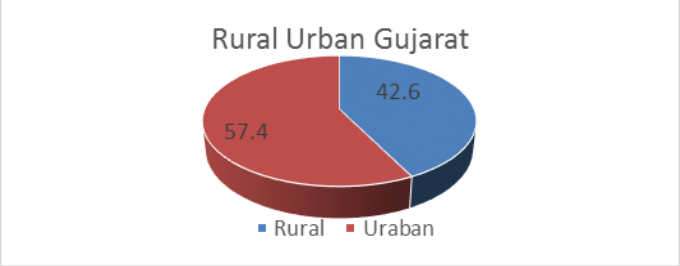


FIG.18 POPULATION OF GUJARAT IN %

Description	2011	2001
Approximate Population	6.04 Crores	5.07 Crore
Actual Population	60,439,692	50,671,017
Male	31,491,260	26,385,577
Female	28,948,432	24,285,440
Population Growth	19.28%	22.48%
Percentage of total Population	4.99%	4.93%
Sex Ratio	919	920
Child Sex Ratio	890	883
Density/km2	308	258
Density/mi2	798	669
Area(Km2)	196,244	196,024
Area mi2	75,770	75,685
Total Child Population (0-6 Age)	7,777,262	7,532,404
Male Population (0-6 Age)	4,115,384	4,000,148
Female Population (0-6 Age)	3,661,878	3,532,256
Literacy	78.03 %	69.14 %
Male Literacy	85.75 %	79.66 %
Female Literacy	69.68 %	57.80 %
Total Literate	41,093,358	29,827,750
Male Literate	23,474,873	17,833,273
Female Literate	17,618,485	11,994,477

TABLE NO.9 POPULATION OF GUJARAT AS PER CENSUS 2001 AND 2011

2.6 Rural Development Issues - Concerns – Measures:

Thordi Population – Bhavnagar, Gujarat :

Thordi is a large village located in Bhavnagar Taluka of Bhavnagar district, Gujarat with total 474 families residing. The Thordi village has population of 2826 of which 1447 are males while 1379 are females as per Population Census 2011.In Thordi village population of children with age 0-6 is 368 which makes up 13.02 % of total population of village. Average Sex Ratio of Thordi village is 953 which is higher than Gujarat state average of 919. Child Sex Ratio for the Thordi as per census is 937, higher than Gujarat average of 890.Thordi village has lower literacy rate compared to Gujarat. In 2011, literacy rate of Thordi village was 77.10 % compared to 78.03 % of Gujarat. In Thordi Male literacy stands at 86.40 % while female literacy rate was 67.36 %.As per constitution of India and Panchyati Raaj Act, Thordi village is administrated by Sarpanch (Head of Village) who is elected representative of village

Particulars	Total	Male	Female
Total No. of Houses	474	-	-
Population	2,826	1447	1379
Child (0-6)	368	190	178
Schedule Caste	233	116	117
Schedule Tribe	0	0	0
Literacy	77.10 %	86.40 %	67.36 %

Total Workers	**895**	824	71
Main Worker	**888**	-	-
Marginal Worker	**7**	6	1

TABLE NO.10 POPULATION OF THORDI AS PER CENSUS

2.6.1 Crime Free / Dispute Free

- The types of crime that commonly occur in Indian villages include dacoity, robbery, agricultural feuds , disputes over : land , irrigation , cattle, election rivalries. Further crimes such as un-touch ability offences, insurgency, domestic violence etc. also prevail in the villages.
- As of now all the small disputes occurring in Thordi are solved internally and no FIR is reported.

2.6.2 Resources

- Various natural resources like wind, water from lakes, ponds and rivers are available in Thordi village.
- Generally all the villages have easy access to crops and food items used in daily life. But some resources are not available easily in Thordi village. For this village needs to dependent on other villages or cities which are sometimes not easily accessible . monetary factor plays an important role in this.
- Previous studies have found that resource dependence strongly decreases with income. Efforts to improve the village natural resource base would help the poorest of the poor.

2.6.3 Literacy

- Literacy is traditionally understood as the ability to write, read and use arithmetic. Literacy is the key to human progress in development.
- The Literacy rate of Thordi village is 77.10% which is lower than Gujarat which has a literacy rate of 78.03%.

2.6.4 Health/ Hygiene

- Poor sanitation and hygiene are a major health concern in all villages. Poor personal and household hygiene can lead to increased rate of infections and other diseases.
- Various reasons for poor hygienic conditions are open drainage, breading of mosquitoes in water logged areas, improper waste disposal, lack of sanitation facilities and cleanliness.
- We should educate our village communities about the importance of household and personal hygiene, sanitation.
- Clean drinking water should be easily accessible to the village communities

2.6.5 Women Empowerment

- Empowerment of women is a necessity for the development of a society, since it enhances both the quality and quantity of human resources. Empowerment of women makes them economically independent.
- Various vocational skills such as weaving, stitching, cooking, etc. should be introduced to the rural women which can provide them with the source of income.
- Mahila Mandals have been established in many villages which provide cooperation of all the

women of the village.

- No Mahila Mandal hall is present in Thordi village

2.7 Various infrastructure guidelines with the Norms for Villages for the provisions of different infrastructure facilities:

An ideal village should have the following facilities:

A) Physical Facilities

i) 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 the other nearby village or town or city must be provided.

ii) Dwelling Facilities

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.

iii) Electricity

The electricity should be supplied 24 hours. The village should have good facilities of electricity because most of the work now days depend on electricity

B) Social Facilities

i) Sanitation & 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.

ii) Food & Fooder

The villagers grow food for themselves and fodder for their cattle. They eat fresh and healthy food. They grow good grass for fodder and also leave sufficient land for pasture.

iii) Drinking water

An ideal village should have good supply of drinking water. There are enough tube-wells in an ideal village. There are separate ponds for men and cattle.

iv) Agricultural & 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. They do all kinds of home-industry including spinning and weaving.

v) Educational Facilities

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

vi) Clinical Facilities

In an ideal village, there are clinical facilities for men and the domestic animals. Hence, there are dispensaries and veterinary dispensaries.

C) Socio-Cultural Facilities

These include facilities like playgrounds, library, gardens, Lake Etc.

D) Sustainable Facilities

An ideal village should have facilities like biogas plant, solar systems, use of rain water harvesting etc.

Facilities	Planning Commission/UDPFI Norms	Required as per Norms
Education		
Anganwadi	Each Village	1
Primary School	Each Village	1
Secondary School	Per 7,500 Population	2
Higher Secondary School	Per 15,000 Population	0
College	Per 125,000 Population	0
Tech. Training Institute	Per 100,000 Population	0
Agriculture Research Center	Per 100,000 Population	0
Medical Facility		
Gov./Panchayat Dispensary or Sub PHC or Health Center	Each Village	1
PHC & CHC	Per 20,000 Population	0
Child Welfare and Maternity Home	Per 10,000 Population	1
Hospital	Per 100,000 Population	0
Transportation		
Pucca Village Approach Road	Each Village	
Bus/Auto Stand Provision	All Village connected by PT (ST Bus or Auto)	1
Drinking Water		
Over Head Tank	1/3 of Total Demand	1.6 lac cap
U/G Sump	2/3 of Total Demand	3.2 lac cap
Public Latrines	Each Village	60
Cremation Ground	Per 20,000 Population	1
Post Office	Per 10,000 Population	1
Gram Panchayat Building	Each individual/group Panchayat	1
APMC	Per 100,000 Population	0
Fire Station	Per 100,000 Population	0
Police Station	Per 15,000 Population	0
Community Hall	Per 10,000 Population	1

TABLE NO.11 VARIOUS GUIDELINES/NORMS FOR VILLAGE FOR THE INFRA FACILITIES

Rural Infrastructure in India: Scope and Importance:

The word urban (rural + urban) refers to a geographic territory or landscape which possess the economic characteristics and lifestyles of an urban area while retaining its essential rural area features. Rurbanisation may be due to either urban expansion or rural migration. This change is made possible through urban–rural interactions, including accumulation of capital/remittances and exposure to western /modern ideas and lifestyles that eventually build new mindsets.

According to the 2011 census report, a huge chunk of migration is happening within rural areas. The report says that almost half of the rural population now lives in 1.2 lakh (120000) villages with a population ranging between 2000 to slightly more than 10,000 inhabitants. In the last 10 years

the number of big villages (those with more than 10000 inhabitants) has increased by 670. In many parts of the developed as well as developing world even cities don‘t have this kind of population. Due to their organic and haphazard development these villages are raging hell in terms of hygiene and other facilities.

Rurban town is the town that includes rural and urban facilities both. The people of the rural area will get all the facilities in the town so that they do not have to migrate to the urban area. There should be soul of rural area with all the amenities as urban area.

Importance of rural infrastructure in India:

- The National Rurban Mission (NRuM) follows the vision of "Development of a cluster of villages that preserve and nurture the essence of rural community life with focus on equity and inclusiveness without compromising with the facilities perceived to be essentially urban in nature, thus creating a cluster of "Rurban Villages".
- The objective of the National Rurban Mission (NRuM) is to stimulate local economic development, enhance basic services, and create well planned Rurban clusters.
- Bridging the rural-urban divideviz: economic, technological and those related to facilities and services.
- Attracting investment in rural areas.
- Stimulating local economic development with emphasis on reduction of poverty and unemployment in rural areas.

Scope for development of rural infrastructure in India:

- As per the Census 2011, still 45 per cent of the rural households are not connected with
- electricity and depend on kerosene and other means for lighting. Hence, rural electrification infrastructure is needed to make the lives of rural people better.
- Although there are schools in the rural areas but they lack in terms of the number of classrooms, availability of safe drinking water facilities, toilet facilities etc. Hence, the education infrastructure in rural India also needs a lot more improvement.
- It goes without saying that the health infrastructure is poorly developed in rural India. Even if it is there, there are no good doctors because the rural areas have very low connectivity and doctors or skilled health workers are unable to access these areas. This poses a great threat to the lives of rural population in the country.

A. Sansad adarsh gram yojana gram panchayat:

- It is a rural development programme 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 programme was launched by the Prime minister of India, NarendraModi on the birth anniversary of Jay Prakash Narayan.
- The distinct feature of this yojana is that it is
  a) Demand driven
  b) Inspired by society

OBJECTIVES:

The development of model villages is called adarsh grams, through the implementation of existing schemes, and certain new intiatives to be designed for the local context , which may vary from village to village.

Creating models of local development which can be replicated in other villages.

B. Award winning gram panchayat pradhans:

Sr no	State	District	Panchayat name and year
1	Gujarat	Rajkot	Amargadh - 2008
2	Gujarat	Rajkot	Fadadang - 2008
3	Gujarat	Patan	Amarpura -2007
4	Gujarat	Halol	Sonipur - 2008
5	Gujarat	Kadana	Diwada - 2007

TABLE NO.12 AWARD WINNING GRAM PANCHAYAT PRADHANS

C. Action towards poverty free:

- The poverty alleviation programmes in India can be categorized based on weather it is targeted for rural areas or urban areas.
- Most of the programmes are designed to target the rural poverty as prevalence of poverty is high in rural areas.
- Also targeting poverty is challenging in rural areas due to various geographic and infrastructure limitations
- The programmes can be mainly grouped into:

i. Wage employment
ii. Self employment
iii. Food security
iv. Social security
v. Urban poverty alleviation

Some intiatives are as follow:

a) Jawahar gram samruddhiyojna
b) National old age pension scheme
c) National family benefits scheme
d) National maternity benefit scheme

D. India State Specific Special Finance Grant for Village:

- Matching grants for panchayat
- Grant in aid
- Grants to weaker section for strengthening their administration
- Grants to All Panchayat Parishad and Mahila Mandals

- Loans to gram panchayat
- Rural garbage disposal scheme
- Housing scheme: Rajiv avaas yojana

E. Projects / Schemes by Govt / Private. Sector:

Following are the projects/schemes running by the private sector:

i) Non-Govermental organization (NGO‘s)

ii) Provision Urban Amenities in Rural Area (PURA)

iii) Good governance project

i) Non Govermantal Organization (NGO’s)

The NGOs became prominent after independence, especially after 1970s. Development parishioners, government officials and foreign donors consider that NGOs by virtue of being small scale, flexible, innovative and participatory, are more successful in reaching the poor and in poverty alleviation, NGOs involved in initiating and implementing rural development programme. At present 30,000 NGOs working in India.

Definition of NGOs:

The term NGOs is used to denote / specify those organizations which undertake voluntary action and social movements. A non-governmental organization (NGO) is a legally constituted organization created by legal persons that operates independently from any government and a term usually used by governments to refer to entities that have no government status. In the cases in which NGOs are funded totally or partially by governments, the NGO maintains its non-governmental status by excluding government representatives from membership in the organization. The term is usually applied only to organizations that pursue some wider social aim that has political aspects, but that are not overtly political organizations such as political parties.

ii) Provision of Urban Amenities in Rural Area (PURA)

Objective of the Scheme:

The objective of the scheme is to provide urban amenities and livelihood opportunities in rural areas to bridge the rural-urban divide, thereby reducing migration from rural to urban areas.

PURA aims to achieve –holistic and accelerated development of compact areas around a potential growth centre in a Panchayat (or group of Panchayats) through PPP by providing livelihood opportunities and urban amenities to improve the quality of life in rural areas.‖

The PURA Scheme (provision of Urban Amenities in Rural Areas) envisages rapid growth of rural India -- given enhanced connectivity and infrastructure, the rural population would be empowered and enabled to create opportunities and livelihoods for themselves on a sustainable and growing basis.

The key characteristics of the scheme are:

- Simultaneous delivery of key infrastructure in villages leading to optimal use of resources.
- Provision of funds for O&M of assets for 10 years post-construction, along with capital investment for creation of assets.
- Transformation of several schemes into a single project, to be implemented as per set standards in a defined timeframe, with the requirements of each scheme being kept intact

- Combining livelihoods creation with infrastructure development
- Enforcement of standards of service delivery in rural areas almost at par with those obtaining in urban areas
- Enforcement of service standards through a legally binding arrangement.

iii) Good Governance Project

- Good governance is an intermediate term used in the international development literature to describe how public institutions conduct public affairs and manage public resources
- Governance is –the process of decision making and the process by which decisions are implemented.
- The term governance can apply to corporate, international, national, local governance or to the interactions between other sectors of society.
- The concept of –good governance –often emerges as a model to compare ineffective economics or political bodies with viable economics and political bodies.

iv) Other projects\ schemes:

In other projects for the development of the rural area is the Public Private Partnership (PPP).

Public-Private-Partnership - The Concept:

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

The potential benefits expected from PPP could be mentioned as below:

- Cost-effectiveness- since selection of the developer/ service provider depends on competition or some bench marking, the project is generally more cost effective than before.
- Higher Productivity-by linking payments to performance, productivity gains may be expected within the programme/project.
- Accelerated Delivery– since the contracts generally have incentive and penalty clauses is implementation of capital projects/programmes this leads to accelerated delivery of projects.

Clear Customer Focus- the shift in focus from service inputs to outputs create the scope for innovation in service delivery and enhance customer satisfaction.

- Enhanced Social Service- social services to the mentally ill, disabled children and delinquents etc. require a great deal of commitment than sheer professionalism. In such cases, it is Community/Voluntary Organizations (VOs) with dedicated volunteers who alone can provide the requisite relief.

- Recovery of User Charges- Innovative decisions can be taken with greater flexibility on account of decentralization. Wherever possibilities of recovering user charges exist, these can be imposed in harmony with local conditions.

2.8 Other Projects / Schemes of Gujarat / Indian Government :

Following are the projects/schemes by Govt. Sector:

i) Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
ii) Pradhan Mantri Gram SadakYojana (PMGSY)
iii) Indira AwasYojana (IAY)

i) Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA):

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

This work guarantee also serve other objectives: generating productive assets and skills thereby boosting the rural economy, protecting the environment, empowering rural women, reducing rural urban migration and fostering social equity, among others. The Act offers an opportunity to strengthen our democratic processes by entrusting principle role to Panchayats at all levels in its implementation and promises transparency through involvement of community at planning and monitoring stages.

Objective:

- The objective of the Act is to enhance livelihood security in rural areas by providing at least 100 days of guaranteed wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work.
- Strong social safety net for the vulnerable groups by providing a fall-back employment source, when other employment alternatives are scarce or inadequate
- Empowerment of rural poor through the processes of a rights-based Law
- Growth engine for sustainable development of an agricultural economy. Through the process of providing employment on works that address causes of chronic poverty such as drought, deforestation and soil erosion, the Act seeks to strengthen the natural resource base of rural livelihood and create durable assets in rural areas. Effectively implemented, MGNREGA has the potential to transform the geography of poverty

ii) Pradhan Mantri Gram SadakYojana (PMGSY):

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

According to latest figures made available by the State Governments under a survey to identify Core Network as part of the PMGSY programme, about 1.67 lakh Unconnected Habitations

are eligible for coverage under the programme. This involves construction of about 1.67 lakh Unconnected Habitations are eligible for coverage under the programme. This involves construction of about 3.71 lakh km. of roads for New Connectivity and 3.68 lakh km. under up gradation.

The President of India, in his address to Parliament on 25th February, 2005 announced a major business plan for rebuilding rural India called Bharat Nirman. The Finance Minister, in his Budget Speech of 28th February,2005, identified Rural Roads as one of the six components of Bharat Nirman and has set a goal to provide connectivity to all habitations with a population of 1000 persons and above (500 persons and above in the case of hilly or tribal areas) with an all- weather road. A total of 59564 habitations are proposed to be provided new connectivity under Bharat Nirman. This would involve construction of 1, 46,185kms of rural roads. In addition to new connectivity, Bharat Nirman envisages up gradation/renewal of 1, 94,130kms of existing rural roads. This comprises 60% up gradation from Government of India and 40% renewal by the State Governments.

iii) Indira AwasYojana (IAY):

Housing is one of the basic requirements for human survival. For a normal citizen owning a house provides significant economic security and status in society. For a shelter less person, a house brings about a profound social change in his existence, endowing him with an identity, thus integrating him with his immediate social background. A former component of Jawahar Rozgar Yojana, Indira Gandhi Awas Yojana was launched in 1985 by then Prime Minister, Rajiv Gandhi. However, from 1996 the IAY started operating as an independent scheme. The initial aim of the scheme was to provide housing for people belonging to Scheduled Caste, Schedule Tribe, freed bonded labourers residing in rural areas and people belonging below the poverty line regardless of their SC or ST status. BPL cardholders of the SC/ST community were allocated 60% assistance under the housing scheme and rest 40% was for non-SC/ST BPL cardholders. Furthermore, 4% and 15% from the mentioned categories, were respectively secured for mentally-physically changed individuals and applicants of minor communities. The key point to remember is that the beneficiary list under the Indira Gandhi Awas Yojana was made based on the BPL list as approved by respective Gram Sabhas.

Objective:

- The objective of Indira AwaasYojana is primarily to help construction of dwelling units by members of Scheduled Castes/ Schedule Tribes, freed bonded labourers and also non-SC/ST rural poor below the poverty line by providing them with grant-in-aid.
- The Objective of the Indira Awas Yojana is primarily to help construction/Upgradation of dwelling units of members of Scheduled Castes/Scheduled Tribes, freed bonded labourers and other below the poverty line non-SC/ST rural households by providing them a lump sum financial assistance.

Chapter 3.

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

3.1 Introduction: Concepts, Definitions and Practices :

Concepts

The basic concept of smart village is to collect community efforts and strength of people from various streams and integrate it with information technology to provide benefits to the rural community. According to Mahatma Gandhi's philosophy and thoughts smart village project provides, –Global means to the local needs.‖ The concept of smart village is defined as below

S	Social, skilled and simple.	Zero tolerance for caste and creed and no discrimination on gender and religion. Skilled simple living and high thinking.
M	Moral, methodical and modern.	Moral values of Mahatma Gandhi and Swami Vivekananda using modern (latest) methods .
A	Aware, adaptive and adjusting.	Awareness about global, social and economic issues adaptive and adjusting the fast changing environment.
R	Responsive and ready	Ready to generate all resources for self - sufficiency and self-governance. Responsive for co-operative movements and collective wisdom.
T	Techno savvy and transparent	Tecnosavy for IT and transparent mobile usage harmonic relations.

TABLE NO.13 SMART VILLAGE CONCEPT

Defination

Smart Villages are communities in rural areas that use innovative solutions to improve their resilience, building on local strengths and opportunities. They rely on a participatory approach to develop and implement their strategy to improve their economic, social and/or environmental conditions, in particular by mobilising solutions offered by digital technologies. Smart Villages benefit from cooperation and alliances with other communities and actors in rural and urban areas. The initiation and the implementation of Smart Village strategies may build on existing initiatives and can be funded by a variety of public and private sources.

We have selected Kankot Village as a smart village located in Rajkot.

Brief about Kankot:

Kankot is a Village in Rajkot Taluka in Rajkot District of Gujarat State, India. It is located 11.5 KM towards west from District headquarters Rajkot. 249 KM from State capital Gandhinagar. Kankot Pin code is 360005. The total population of Kankot is 1451 with total 257 households. The village had attain the status due to its good civic amenities and infrastructural facilities. The village has Primary school, well equipped public health center, a good road network, water distribution facility, drainage facility, Anganwadi, polling station, R.O. Plant.

FIG.19 VILLAGE ENTRANCE

Kankot is a medium size village located in Rajkot Taluka of Rajkot district, Gujarat with total 257 families residing. The Kankot village has population of 1451 of which 761 are males while 690 are females as per Population Census 2011.In Kankot village population of children with age 0-6 is 183 which makes up 12.61 % of total population of village.

FIG.20 INTERNAL STREETS

Average Sex Ratio of Kankot village is 907 which is lower than Gujarat state average of 919. Child Sex Ratio for the Kankot as per census is 812, lower than Gujarat average of 890. Kankot village has higher literacy rate compared to Gujarat. In 2011, literacy rate of Kankot village was 81.70 % compared to 78.03 % of Gujarat. In Kankot Male literacy stands at 91.36 % while female literacy rate was 71.22 %. As per constitution of India and Panchyati Raaj Act, Kankot village is administrated by Sarpanch (Head of Village) who is elected representative of village.

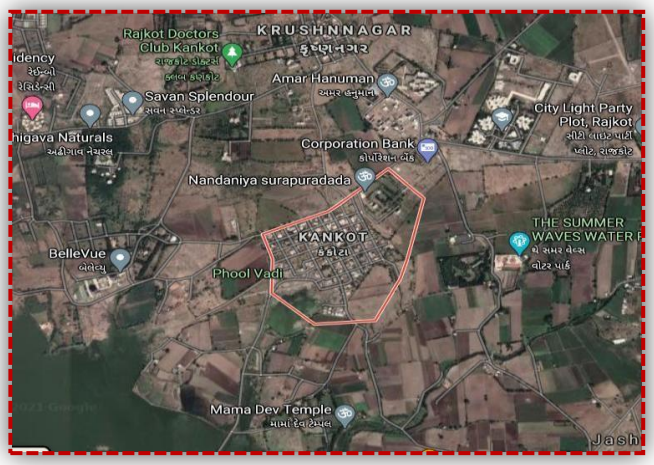


FIG.21 MAP OF KANKOT

3.2 Vision-Goals, Standards and Performance Measurement Indicators :

Smart Village Development Vision-Goals-Activities

1) Stop or decrease Urbanization due to unavailability of facilities.
2) Locally produced and locally consumed energy: In villages if the mountains, hilly area are present then use of solar energy & wind energy then energy is produce in that village itself & use for development of village.
3) Creation of job: Generally village people migrate from village to city for purpose of job. If village becomes smart so all the job requirements are fulfills & people not migrate from one place to another.

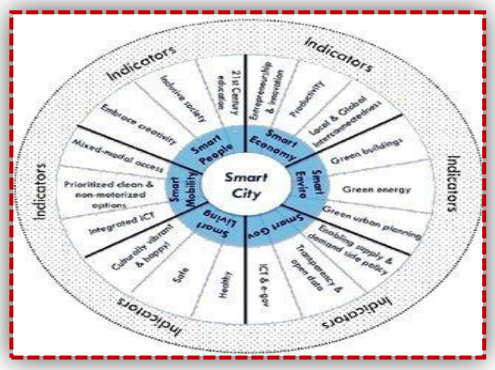


FIG.22 SMART CITY MEASURMENT INDICATOR

4) Contribution to global environment: The system can reduce reliance on fossil fuels &contribute to reduction of green house gases such as carbon dioxide. Energy consumption optimization 25-30% average energy saving.
5) For farmer e-learning etc. facility that will be able to ask there quarries online.
6) New technologies in education, e-learning, desktop publishing, horoscope generation of interested person of the village. Transportation of village into comfortable & safe space that enhance quality

Smart Cities Performance Measurement Indicators:

The indicators for smart cities focus on the monitoring the evolution a city towards an even smart city.

The time component –development over the years‖ is an important feature

3.3 Technological Options :

A. Smart energy

Both residential and commercial buildings in smart cities are more efficient, using less energy, and the energy used is analyzed and data collected. Smart grids are part of the development of a smart city, and smart streetlights are an easy entry point for many cities, "Lighting is ubiquitous--it's everywhere that people work, travel, shop, dine, and relax. Digital communications and energy-efficient LED lighting are revolutionizing urban lighting infrastructures already in place, transforming them into information pathways with the capacity to collect and share data and offer new insights that enable, and really drive, the smart city," said Susanne Seitinger, PhD., Philips Lighting, professional systems.

B. Smart transportation

A smart city supports multi-modal transportation, smart traffic lights and smart parking. It not only helps to reduce the cost of monitoring parking and making sure that they are collecting fines, it's also reducing congestion." By making parking smarter, people spend less time looking for parking spots and circling city blocks.

C. Smart infrastructure

Cities will be able to plan better with a smart city's ability to analyze large amounts of data. This will allow for pro-active maintenance and better planning for future demand. Being able to test for lead content in water in real time when the data shows a problem is emerging could prevent public health issues. Having a smart infrastructure means that a city can move forward with other technologies and use the data collected to make meaningful changes in future city plans.

FIG.23 GEC RAJKOT-1KM

D. Smart mobility

"Mobility refers to both the technology and the data which travels across the technology. The ability to seamlessly move in and out of many different municipal and private systems is essential if we are to realize the promise of smart cities. Building the smart city will never be a project that is "finished." Technology needs to be interoperable and perform to expectations regardless of who made it or when it was made. Data also needs to be unconstrained as it moves between systems, with all due attention to intellectual property, security and privacy concerns.

FIG.24 BANK

The civilization is witness for various changes related to its development through different catalysts like industrial development, green revaluation, science and technology, etc. India has more than 72% of its population living in villages. Near about seven decade had been passed since India got freedom, but the scenario in villages in our country is still unchanged. On one side India has recently selected 100 cities for Smart City project and ready to adapt all the advanced technologies for these smart cities and on other hand villages in our country are still struggling for getting basic amenities like 24 x 7

FIG.25 POST OFFICE

electricity. Our Governments are joining hands with developed countries like America, China, Japan to run bullet trains to connect big cities in India whereas villages in our country are still disconnected and are lacking with basic facilities like drinking water, healthy food, sanitization, toilets, transportation, education, etc. The technology that we use here can be availed to the people living in rural areas to help in improving their lifestyle.

Benefits of Application of Technology in Rural Area

1. The socio-economically backward sections of the society such as landless
2. The productivity gets increased; whether it is agricultural productivity or
3. Development of technologies generates more employment opportunities
4. It facilitates reasonable allocation and social equality.
5. It stimulates people towards self-help and self-reliance.
6. It eliminates hard work and toil of the people and contributes in the

As villages and the villagers have farming - agriculture as their primary source of income. So having villages reap the benefits of irrigation is really very important. The biggest barrier to achieve our goal of developing smart villages will be to deal with the mentality of the villagers and make them understand the real need of modernization. Also to create and develop SMART VILLAGES across the country, the authorities thought process would need a shift. Adopting a village or group of villages by each of MPs and MLAs for its development is good initiative taken by our governments and should be implemented up to a grass root level. Also we can promote many of self-financed firms like industries, educational institutes to adopt such villages or group of villages for developing them and can provide possible technical support. Recently 02 years back, ITM College of Engineering, Kamptee had adopted Ghorpad villages in its vicinity and extended their technical and staff support for few services like drinking water testing, sewage water analysis, etc. Such types of movement can be conducted by other Engineering Institutes too.

3.4 Road Map and Safe Guards :

In India to the new central government‘s stated priority of building _Smart Cities‘ has found a relatively modest budgetary allocation of Rs. 7,060 crore for FY 2014-15, though its significance for the long term can be much larger. Be it the push of the _Smart City‘ concept from solution providers, real estate developers or the government itself, the concept finds wide appeal. The Government of India‘s stated plan to set up 100 Smart Cities across the country has the potential to be a game-changer in the country‘s urban landscape and the lives of ordinary citizens.

Generating new avenues of employment in villages, reviving agriculture and improving services in rural areas are some of the components that need to be included right away in rural development policies. The visual perception of Indian villages has not changed much though certain corrective policy measures and infrastructural reforms have taken place. Governments need to transform our villages into smart habitats by generating lucrative economic opportunities and addressing the basic challenges rural areas are facing for decades. Delhi and Mumbai add almost 200 migrants every day. A combination of factors like agriculture becoming less remunerative, poor civic services, defunct infrastructure, and unavailability of good career opportunities has accelerated the migration from rural areas to cities.

Funding of Smart Cities Development

India is planning for 100 new smart cities and will also develop modern satellite towns around existing cities under the smart city program. Investments of around USD 1.2 trillion will be needed over the succeeding 20 years across areas like shipping, energy and public security to build smart cities in India. Robust capital markets, innovative business models, a sound tax environment, public-private partnerships, and world class investment-grade projects. These are the building blocks for the financial infrastructure on which a smart city thrives. The risk-return profile of a Smart City investment in India is unique: For both Government and investors, strong and continued master planning is the key to the dynamic management of both potential risks and opportunities. It is expected that a large part of the financing for Smart Cities will have to come from the Private sector with the States/Cities and the Central Government is only supplementing that effort. To attract financing, policymakers should increase risk mitigation efforts to make their Smart City competitive not just with other Indian urban centers but with comparable global investment opportunities. Tools available toward this goal include planning, credit enhancements, tax incentives, concession agreements, and upgraded reporting and data management systems. 65% of India‘s population lives in its villages. The youth from villages have been migrating to cities in search of work as there are no or less opportunities for employment in villages. They leave a good quality life of village for a poor quality of life in cities. This leads to slums & poor hygienic conditions of life for them in cities. We need to stop this migration from villages to cities. For this we need to create work opportunities in villages & make villages SMART for our citizens. Above all else, policymakers should turn to assure a consistent, predictable, transparent business climate for both domestic and global investors with regular, meaningful industry dialogue. USD 1.2 billion allocated for smart cities and FDI norms relaxed USD 83 million allocated for Digital India Initiative. PPP Model to be used to upgrade infrastructure in 500 urban areas. Smart City projects to create 10-15% rise in employment. Government of India and World Bank signed USD 236 million agreement for reducing disaster risks in coastal villages of Tamil Nadu and Pondicherry. The Power Grid Corporation of India Ltd has planned to invest USD 26 billion in the next five years (2012-17)

3.5 Issues & Challenges :

3.1.1 Key issues in development of human being

Some challenges are lingering (deprivations), some are deepening (inequalities) and some are emerging (violent extremism). Some are global (gender inequality), some are regional (water stress) and some are within national boundaries (natural disasters). Most are mutually reinforcing: Climate change reduces food security, and rapid urbanization marginalizes poor people in urban areas. Whatever their nature or reach, these challenges have an impact on people‘s well-being. Poverty is no longer a problem of developing regions only; it is also on the rise in developed countries. The International Labour Organization estimates that in 2012 more than 300 million people in developed countries lived in poverty Children and women are the most affected by poverty, and 36 percent of children in developed countries live under the relative poverty line, in households with an income below 60 percent of the national median household income. In the United States 32 million adults are functionally illiterate, and in the United Kingdom 8 million.

FIG 26 HUMAN BEING DEVELOPMENT

There are many different theoretical approaches regarding human development. As we evaluate them in this course, recall that development focuses on how people change, and the approaches address the nature of change in different ways:

- Are changes an active or passive process?
- Is the change smooth or uneven (continuous versus discontinuous)?
- Is this pattern of change the same for everyone, or are there different patterns of change (one course of development versus many courses)?
- Are there prescribed periods in which change must occur (critical and sensitive periods)?
- How do genetics and environment interact to influence development (nature versus nurture)

3.1.2 Education / Job opportunities development

Educational development is about facilitating positive change in teaching and learning in post-secondary institutions at the individual, program/department and institutional levels. It is about helping these institutions function as robust, evidence-based, student-centered learning communities. There can be no better platform than technology to impart education not at just basic level but even for researchers and innovators. Starting from online school admissions to participation of citizens in innovative ideas and projects everything can be imbibed in the smart city solutions.

India's improved education system is often cited as one of the main contributors to its economic development. At the primary and secondary level, India has a large private school system complementing the government run schools, with 29% of students receiving private education in the 6 to 14 age group.

India has a literacy rate of around 70%, which is less than some of the least developed countries, and when it comes to employability, only 20% of them are employable. Literacy is not just restricted to education but even broadens to the concept of skills, which comprises technical expertise, vocational skills, transferrable skills, digital skills, and other such knowledge and abilities required for employment and livelihood. According to a survey, only 25% of the Indian workforce has undergone a skill development program, and India needs a higher number of skilled workforce.

FIG 27 URBAN WATER CHALLENGES

In this era, many organizations prefer skilled employees over less skilled ones as they have outstanding career growth, and they help boost the organisation in the same way with proficient working. Skills intensify the productiveness and quality of work for more significant results. According to the World Trade Organization, the GDP level can increase up to 3%-5% in 2035, if India focuses on skill development and training. There is a great need for India to train and skill the youth for the overall development of the country.

3.1.3 Urban water and sanitation challenges

Urban sanitation in India faces many challenges. Nearly 60 million people in urban areas lack access to improved sanitation arrangements, and more than two-thirds of wastewater is let out untreated into the environment, polluting land and water bodies. To respond to these environmental and public health challenges, urban India will need to address the full cycle of sanitation, i.e. universal access to toilets, with safe collection, conveyance and treatment of human excreta.

The problem of access to safe drinking water and sanitation facilities in urban areas of India is also a major concern. It is estimated that by 2050, half of India's population will be living in urban areas and will face acute water problems. At present, 163 million people do not have access to safe drinking-water and 210 million people lack access to improved basic sanitation in India. In urban areas, 96% have access

to an improved water source and 54% to improved sanitation. Whereas in rural areas, which accounts for 72% of India's population lives, only 84% have access to safe water and only 21% for sanitation. In addition, there is a lack of wastewater treatment facilities to treat the wastewater of a growing population. There is a need to reuse treated wastewater in order to meet the current and future demands for water.

The consistent increase in the rate of growth of India's population has also led to the increase in demand for water, particularly in the urban areas where the rate of increase is highler compared to rural areas. In 2001, urban population was 285 million and assuming water supply of 135 litres per

capita per day, the domestic water demand is estimated at around 38,475 million litres per day (MLD), whereas as in 2011 urban population was 377 million with a domestic water demand of 50,895 MLD. It shows that growth in urban population leads to additional water demand of 12,420 MLD in urban areas. The water supply of 135 litres per capita per day (LPCD) as a service level benchmark should be given for domestic water use in urban local bodies. However, currently as per Central Public Health and Environmental Engineering Organisation (CPHEEO), an average water supply in urban local bodies is 69.25 LPCD. This indicates that there is a vast gap between the demand and supply of water in urban areas of India.

Urban sanitation in India faces many challenges. Nearly 60 million people in urban areas lack access to improved sanitation arrangements, and more than two-thirds of wastewater is let out untreated into the environment, polluting land and water bodies. To respond to these environmental and public health challenges, urban India will need to address the full cycle of sanitation, i.e. universal access to toilets, with safe collection, conveyance and treatment of human excreta. This paper outlines these concerns, and highlights the need for focusing on access to water and the full cycle of sanitation for the urban poor, as fundamental to addressing the sanitation challenge. Priorities for policy and financing for urban sanitation in India are discussed, and the paper concludes with an examination of key policy initiatives in the last decade, assessing the extent to which these priorities are gaining attention.

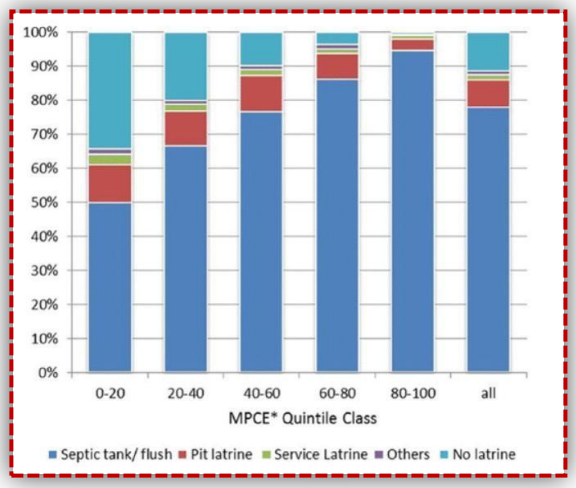


FIG 28 DISTRIBUTION OF TOILET FACILITIES

Lack of adequate sanitation remains a major cause of disease in developing countries. Diarrhea is the second leading cause of mortality among children under five globally, with deaths directly attributable to lack of adequate sanitation and associated hygiene practices. In the absence of adequate sanitation, interventions that improve water or hygiene are less effective than they would be if sanitation were improved.

The urban poor suffer disproportionately from the lack of adequate sanitation. A study estimating related economic losses showed that urban households in the poorest quintile bear the highest per capita economic impacts of inadequate sanitation, 1.75 times the national per capita losses and 60 per cent more than the urban figure.

3.6 Smart Infrastructure - Intelligent Traffic Management :

Smart Infrastructure:

- **Social Health Indices:**

The number of businesses per ten lakh population can form a city‘s level of economic activity and economic performance. It provides a single indication of the business climate in a jurisdiction, and attitudes towards entrepreneurship. The unemployment rate is measured by taking the unutilized labor supply and then tracks business cycles. It is measured in terms of working-age city residents

who during the survey period were not considered in paid employment or self-employment and were searching for work divided by the number of total labor force.

- **Sanitation :**

The sanitation front will see figuring out of sanitary toilet facilities used by the people and community toilet facilities provided at public places. The rate is 10 people per seat. Share of primary, secondary or tertiary treatment of wastewater shall give ranking in matters of handling of waste water. For solid waste management, disposal by bio digestion, landfills, burning or recycling will end the Smart Cities their place in the ranking.

- **Electricity:**

All the electrical lines will be present underground by not disturbing aesthetics of a place or making any kind of nuisance. The power generated will be available from renewable sources like wind energy farm, hydroelectric plant or natural gases will also be used for not exhausting natural resources.

- **Transportation:**

An entire intermodal transport available to all at affordable rate with minimum time delay and maximum possible comfort. It has an elaborated recommendation to keep track of transport facilities such as high capacity public transport and light passenger transport The results will be expressed in annual number of public transport trips per capita and ridership of public transport.

- **Security system**:

CCTV camera present everywhere in every gate. Specially trained policemen will be present System to detect probe of water and electricity, parking or anything necessary.

Intelligent Traffic Management System (ITMS):

Intelligent Traffic Management System (ITMS) enables users to be better informed and to make safer, more efficient, coordinated, and smarter use of transport networks. It is defined as an advanced application that aims to provide innovative solutions related to different modes of transportation and traffic management.

ITMS creates a perfect platform for addressing traffic-related issues faced by traffic management authorities, in terms of predicting an optimum route, reducing average waiting time, traffic congestion, travel cost, and the extent of air pollution. The system aims at using artificial intelligence algorithms for predicting optimum routes based upon traffic mobilization patterns, vehicle categorization, accident occurrences, and levels of precipitation.

ITMS product portfolio includes:

- Automatic Number Plate Recognition (ANPR)
- Electronic Enforcement Systems (EES)
  - Red Light Violation Detection (RLVD)
  - Speed Violation Detection (SVD)
  - Video Incident Detection System (VIDS)
- Video-based Automatic Traffic Counter and Classifier (ATCC)
- Adaptive Traffic Control System (ATCS)
- Other systems such as Emergency Call Box (ECB) and Public Address Systems (PAS), City ERP, Integrated Command and Control Center (ICCC), Video Management Systems (VMS), etc. complement the core solutions outlined above to provide a comprehensive and robust ITMS solution

The ITMS suite provides a wide range of benefits, such as:

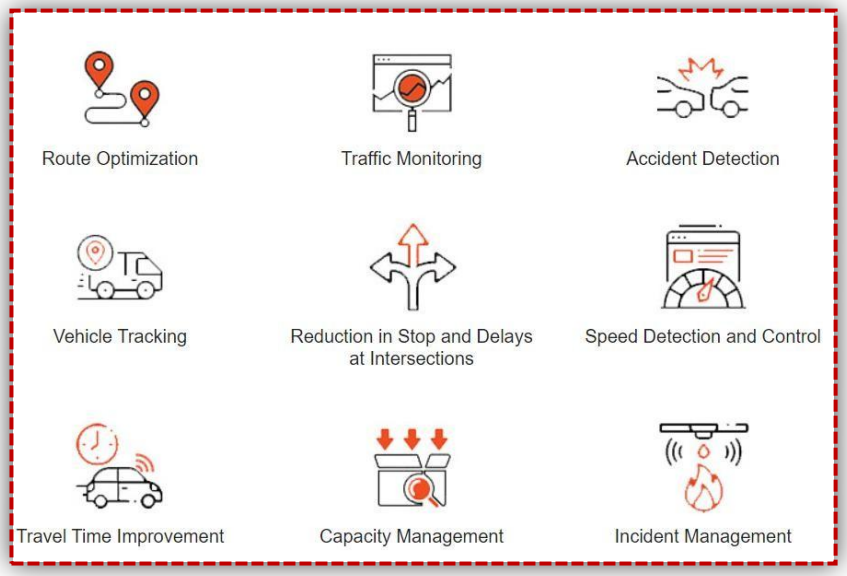


FIG 29 ITMS SUITE SYSTEM

Surat is implementing a city wide integrated system – ―Intelligent Transit Management System‖ (ITMS), to manage diverse set of transportation needs for the city – this includes: (a) public transport and (b) vehicles related to civic services like Solid Waste Management, Drainage, Heavy Engineering, Emergency Services etc. ITMS is planned to bring in best-in-class operational effciency and automation to the operational capability of the city in respect to transport.

3.7 Cyber Security :

With computing systems the kernel of security concerns is the information handled by the system.

The Three General areas to be secured are

(1) The ―privacy‖ and confidentiality of the information

(2) The integrity and authenticity of the information and

(3) The availability of the information for its use and services.

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

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

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling :

Retrofitting:

The word retrofit means to apply new technologies to an older system. Retrofit is a process od adding some new features that were not there before Retrofitting in construction industry refers to re-strengthening of existing structures to make them sesmic resistant.

Retrofitting is an economic approach to increase life span of an existing structure rather than developing it.

Types of Retrofitting:

1- Retrofitting of RCC

2- Retrofitting of masonry work

3- Other Retrofitting techniques

Advantages of Retrofitting

- Energy efficient
- Increase life span
- Existing buildings can be made green later on
- Reduce maintenance cost

Disadvantages of Retrofitting

- It is an expensive and inconvenient method

- Wall insulation may reduce internal spaces
- Retrofitting can cause damage to heritage or ancient assets.

Redevelopment:

Redevelopment is any new construction on a site that has pre-existing uses. It represents a process of land development uses to revitalize the physical, economic and social fabric of urban space. 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 a 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 neighborhoods or districts in which they are located. On the economic side, such properties lower neighboring 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 neighborhoods. 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 neighborhood'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 neighborhoods have been destroyed

Green field development:

Greenfield development is a term often used for land that has not been used before for any human activity like agriculture or real estate development. Greenfield Land is generally land where there is no development of any kind. These open fields evolve on their own volition and are often sprawling expanses of land near cities and in the countryside. These lands which are not used for any purpose can be classified as Greenfield lands. Greenfield land is available in urban areas as well as rural areas. The land between towns and cities all over the world which is unused and characterized by grass, barren lands, and wild growth of vegetation and open fields is Greenfield land. This is the land on earth that is untouched by human beings and exists in its natural habitat.

Types of Greenfield Land

- Greenfield Land is open fields which lie between cities and towns or in suburban areas. These are unfenced open fields which often have wild natural vegetation growing unchecked and as per the climate of the region. In dry areas, barren fields which are not used for construction or any agricultural activities are also called as Greenfield lands.
- Restricted closed properties with no development often owned by the government are also Greenfield lands. Governments of most countries own vast areas of land in the country in the rural areas and the semi-urban and urban areas.

- Private property with or without fencing is the land bought by the owner and not used for any purpose or kept for future use is also Greenfield land.

Advantages of Greenfield Projects

- Increased ease of compliance with environmental and sustainability standards. It will be easier to create an environmentally conscientious space when you don‘t have to focus your time, efforts, and money on decontaminating the area.

- More opportunity to design community-focused projects. Greenfield sites are typically located in residential or suburban areas. These locations are perfect for building schools, healthcare facilities, and civic centers that community members can easily access.

3.9 Strategic Options for Fast Development :

Some typical features of comprehensive development in Smart Cities are described below.

1. Promoting mixed land use in area-based developments — planning for _unplanned areas‘ containing a range of compatible activities and land uses close to one another in order to make land use more efficient. The States will enable some flexibility in land use and building bye-laws to adapt to change
2. Housing and inclusiveness — expand housing opportunities for all
3. Creating walkable localities — reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security. The road network is created or refurbished not only for vehicles and public transport, but also for pedestrians and cyclists, and necessary administrative services are offered within walking or cycling distance
4. Preserving and developing open spaces — parks, playgrounds, and recreational spaces in order to enhance the quality of life of citizens, reduce the urban heat effects in Areas and generally promote eco-balance
5. Promoting a variety of transport options — Transit Oriented Development (TOD), public transport and last mile para-transport connectivity
6. Making governance citizen-friendly and cost effective — increasingly rely on online services to bring about accountability and transparency, especially using mobiles to reduce cost of services and providing services without having to go to municipal offices; form e-groups to listen to people and obtain feedback and use online monitoring of programs and activities with the aid of cyber tour of worksites
7. Giving an identity to the city — based on its main economic activity, such as local cuisine, health, education, arts and craft, culture, sports goods, furniture, hosiery, textile, dairy, etc
8. Applying Smart Solutions to infrastructure and services in area-based development in order to make them better. For example, making Areas less vulnerable to disasters, using fewer resources, and providing cheaper services

Govt. of Gujarat has formed Gujarat Urban Development Mission (GUDM) as Nodal Agency at the State Level. Government of India announces the list of 20 cities selected to be taken up for development as smart cities in Round 1 of the Smart City Programme.

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

The water supply and sanitation in India has increased greatly from 1980 to present. Still, many people lack access to clean water, toilets, and sewage infrastructure. Various government programs at national, state, and community level have brought rapid improvements in sanitation and the drinking water supply. Some of these programs are ongoing.

In 1980 rural sanitation coverage was estimated at 1% and it reached 95% in 2018. The share of Indians with access to improved sources of water has increased significantly from 72% in 1990 to 88% in 2008.

At the same time, local government institutions mandated to provide drinking water and sanitation services are seen as weak and lack the financial resources to carry out their functions. In addition, only two Indian cities have continuous water supply and according to an estimate from 2018 about 8% of Indians still lack access to improved sanitation facilities.

Access

In 2015, 88% of the total population had access to at least basic water, or 96% in urban areas and 85% in rural areas. The term "at least basic water" is a new term since 2016, and is related to the previously used "improved water source".

In India in 2017, 59.5% have access to "at least basic sanitation". Between 2014 and 2019, the NDA Government in India claims to have built around 110 million toilets all across India, due to which the basic sanitation coverage went up from 38.7% in October, 2014 to 93.3% in 2019.

If these numbers sound too good to be true, they are most likely to be quite off the mark. A new study by a team from the Research Institute for Compassionate Economics (RICE) suggests that 44% of the rural population in Bihar, Madhya Pradesh, Uttar Pradesh, and Rajasthan still defecate in the open.In 2015, 44% had access to basic sanitation, or 65% in urban areas and 34% in rural areas. In 2015, there were still 150 million people without access to "at least basic" water.

According to Indian norms, access to improved water supply exists if at least 40 litres/capita/day of safe drinking water are provided within a distance of 1.6 km or 100 meter of elevation difference, to be relaxed as per field conditions. There should be at least one pump per 250 persons.In urban areas, those that do not receive water from the piped network often have to purchase expensive water of dubious quality from private water vendors. For example, in Delhi water trucks get water from illegal wells on the banks of the Yamuna River for 0.75 rupees per gallon (about US$2.70/m3).

Challenges.

As of 2010, only two cities in India — Thiruvananthapuram and Kota — get continuous water supply. In 2005 none of the 35 Indian cities with a population of more than one million distributed water for more than a few hours per day, despite generally sufficient infrastructure. Owing to inadequate pressure people struggle to collect water even when it is available. According to the World Bank, none have performance indicators that compare with average international standards. A 2007 study by the Asian Development Bank showed that in 20 cities the average duration of supply was only 4.3 hours per day. None of the 20 cities had continuous supply. The longest duration of supply was 12 hours per day in Chandigarh, and the lowest was 0.3 hours per day in Rajkot. According to the results of a Service Level Benchmarking (SLB) Program carried out by the Ministry of Urban Development (MoUD) in 2006 in 28 cities, the average duration of supply was 3.3 hours per day, with a range from one hour every three days to 18 hours per

day. In Delhi residents receive water only a few hours per day because of inadequate management of the distribution system. This results in contaminated water and forces households to complement a deficient public water service at prohibitive 'coping' costs; the poor suffer most from this situation. For example, according to a 1996 survey households in Delhi spent an average of ₹2,182 (US$30.60) per year in time and money to cope with poor service levels. This is more than two times as much as the 2001 water bill of about US$18 per year of a Delhi household that uses 20 cubic meters per month.

Achievements.

Jamshedpur, a city in Jharkhand with 573,000 inhabitants, provided 25% of its residents with continuous water supply in 2009. Navi Mumbai, a planned city with more than 1m inhabitants, has achieved continuous supply for about half its population as of January 2009. Badlapur, another city in the Mumbai Conurbation with a population of 140,000, has achieved continuous supply in 3 out of 10 operating zones, covering 30% of its population. Trivandrum, the capital of Kerala state with a population of 1,645,000 in 2011, is the largest Indian city and the only Million agglomeration that enjoys uninterrupted hygienic water supply. Malkapur, a town in Satara District of Maharashtra, is the first Indian town to provide 24*7 water supply with 100 percent coverage. The program started in 2008 as a pilot project and soon covered the entire city. The connection is 100 percent metered with telescopic tariff. The project is still functioning successfully. A nearby village, Kaapil, has also been successful in providing continuous piped water supply to all households. The model is same as Malkapur.

Sanitation

For years, most Indians depended on on-site sanitation facilities which means mainly pit latrines in rural areas. The government has been investing heavily in building sanitation units, in a nation-wide campaign called the Swachh Bharat Mission, with satisfying results. Between 2014 and 2020, the Indian government managed to make household toilets accessible to over 99% of the population. This translates to a total of 110 million toilets build since 2014, according to Statista. Preceding this success is the success of the Slum Sanitation Program in Mumbai that has provided access to sanitation for a quarter million slum dwellers. Sewage, where available, is often in a bad state. In Delhi the sewage network has lacked maintenance over the years and overflow of raw sewage in open drains is common, due to blockage, settlements and inadequate pumping capacities. The capacity of the 17 existing wastewater treatment plants in Delhi is adequate to cater a daily production of waste water of less than 50% of the drinking water produced. Of the 892 million people in the world that defecate openly, some 15 million live in India, making it the country with the highest number of people who defecate in the open. This has serious public health implications.

A specific Indian problem is also the (officially prohibited) "manual scavenging" which is connected to the officially banned caste system, and relates to unsafe and undignified emptying of toilets and pits, as well as handling of raw, untreated human excreta.

Responsibility for water supply and sanitation

According to the Indian Constitution, legislating regarding matters related to provision of drinking water supply and sanitation is responsibility of the State governments as it falls in the state list included in its seventh schedule. The 73rd and the 74th Amendment to the constitution required the state governments to devolve provision of drinking water and sanitation services to the Panchayati Raj Institutions (PRI) in rural areas or municipalities in urban areas, called Urban Local Bodies (ULB). At present, the arrangements for provision of these services vary. In some

states, parastatal agencies are involved in provision of either of the two services or both. Further, within states, different arrangements are also observed for rural and urban areas. For Example, in urban and rural areas of Kerala, drinking water is supplied by the Kerala Water Authority a parastatal agency. In Maharashtra on the other hand, ULBs provide drinking water supply in most urban areas, but Maharashtra Jeevan Pradhikaran provides drinking water in most rural areas and a few urban areas as well.

Highly centralised decision-making and approvals at the state level, which are characteristic of the Indian civil service, affect the management of water supply and sanitation services. For example, according to the World Bank in the state of Punjab the process of approving designs is centralised with even minor technical approvals reaching the office of chief engineers. A majority of decisions are made in a very centralised manner at the headquarters. In 1993 the Indian constitution and relevant state legislations were amended in order to decentralise certain responsibilities, including water supply and sanitation, to municipalities. Since the assignment of responsibilities to municipalities is a state responsibility, different states have followed different approaches. According to a Planning Commission report of 2003 there is a trend to decentralise capital investment to engineering departments at the district level and operation and maintenance to district and gram panchayat levels.

Indigenous technology

Technologies employed and discovered by the native inhabitants of a country are regarded as Indigenous technology.

Importance of indigenous technology :

It provides effective alternatives to western; it gives local people and development workers extra points when designing projects. They can choose from indigenous knowledge or combination of indigenous and western technology instead of searching only western technologies for the feasible solution. Indigenous technologies are cheaper than western technologies. They rely on locally available skills, materials and require little or no cash outlay.

3.11 Initiatives in village development by local self-government :

Elections in villages are often acrimonious and the bitterness creates impediments in the development of the village. In order to prevent such hindrances, the Government of Gujarat launched the Samaras Gram Yojana. Under this initiative, villages, which select a Sarpanch by consensus, receive monetary benefits. Almost 3700 villages in the state are now _Samaras villages‘ and have received Rs.2306.4 lakh from the government.

Houses in rural India often lack toilets leading to uncomfortable situations for the residents, especially women. Empathising with them, the government of Gujarat has launched the Nirmal Gram Yojana. In the past decade over four lakh toilets have been built in Gujarat and today there are over 4000 Nirmal Villages in the state, up from only 4 a decade back.

Understanding the importance of a clean and green environment for the well-rounded development of the state, the government of Gujarat has launched schemes to promote cleanliness in the villages and has undertaken afforestation drives. Under the _Swachch Gram Swasth Gram scheme,‘ sanitation and hygiene are highlighted and monetary incentives are offered to villages, which undertake cleanliness drives. Under the _Panchavati Yojana‘ the advantages of tree-plantation are explained to the people and fallow lands are identified for tree plantation drives. These schemes have not only made the villages more scenic but have also improved rural health.

The institutions of Local Government have flourished in India since time immemorial. The Panchayats or Village Governments, as they were called, were ancient institutions and were themselves small republics. They exercised power in various spheres such as industrial, commercial, administrative, and social including civic education and religious functions. The development of Urban Local Self-Government, as compared to that of Rural Local Self Government, has been very slow after independence. The first two Plans did not carry much for the improvement of Urban Local Bodies. It was only at the end of the Second Plan that the planners focused their attention on the Urban Local Bodies. In the Third Plan, it was suggested strengthening the Municipal Administration by the way of better Personnel and Finances and by enlarging their jurisdiction and functions. It was also suggested to cover all the Towns and Cities having a population of over one lakh under the scheme of planning in an organic way. Election to Municipalities- The superintendence, direction, and control of the preparation of the electoral rolls for, and the conduct of, all elections to the Panchayats and Municipalities shall be vested in the State Election Commission. Audit and Accounts- The maintenance of the Accounts of the Municipalities and other audit shall be done in accordance with the provisions of the State law. The State Legislatures will be free to make appropriate provisions in this regards, depending upon the local needs and institutional framework available for this purpose. Committee for District Planning- There shall be constituted in every State at the District level a District Planning Committee to consolidate the plans prepared by the Panchayats and the Municipalities in the District and to prepare a Draft Development Plan for the District.

3.12 Smart Initiatives by District Municipal Corporation :

For the betterment & good facilities for enhancing quality of life for the citizens Bhavnagar municipal corporation has implemented many schemes & programs as an initiatives

The initiatives taken by Bhavnagar Municipal Corporation are :

- Solar roof Panels
- Green Bhavnagar campaign
- Installation of CCTV cameras
- Installation of public wi-fi
- Parking encroachment drive
- Flyovers
- Beautification of lakes

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

Make in India

Government of India has introduced Make in India campaign for making India as the most favourable place for foreign investors to do their investments. Since India has not been the country in which investors have ease of doing their businesses due to the corruption, uneven rules and regulations and adverse manners of civil servants (Kaur, H. 2016). India is a country which is mainly considered as a nation of its orientation towards service sector, but as soon as the new initiatives such as Make in India program is being started by Government of India. The mindset of India‟s workforce is approaching in the direction of manufacturing sector as the motto of Make in India campaign is to converting the India into a worldwide centre of manufacturing (Green, R.A. 2014) . Make in India program inculcates in minds of the citizens of India about the discovery of innovative ideas, increasing the skill development and utilizing the worldwide technology in such a manner so that it

can be easy to afford by Indians, In order to help in boosting of Indian economy to protecting and upholding the countries inclusive growth (Chaudhari, A.N. 2015) .

Digital India

Today India is changing to the country empowered with digitally equipped group of people in the society by the virtue of Digital India initiative of Government. This program provides an upgraded technology oriented knowledge base for bright future. The main aim of Digital India theme is to put the Indian technology appropriate and adaptable to the rigorously upgrading technology of the world (RamanaMurthy, D.V. & Sastry, G.V. 2016). Digital India program binds together citizen of India with Government organisations. This initiative focuses at making sure about providing services of Government accessible to people with reducing paper work and increasing working through electronic mode. Such programme combines many different thinking‟s and suggestions to a single, inclusive imagination for making all of them to be looked as an element of larger objective. This initiative is having its top priority for enhancement of rural India to transform the whole country (Goswami, H. 2016) . To make Digital India programme more effective and widespread mission, innovative ideas and research based exploration acts as a main component for advancing the Indian economy (Singh, S. 2017) .

Skill India

Nowadays many developing countries are focusing on enhancing the skill development for empowering their people with social and economic development through expanding the approaches to gain knowledge of sharpening the skill through different kind of trainings on skill development. Countries like India are confronting with the problem of increasing population and lesser expertise jobs, which is like a hurdle in socio-economic empowerment of rural and socially backward class therefore for India such initiatives of skilling the reluctant part of society is like a boon (Das, A.K. 2015) . The main motive of launching skill India programme is to reduce the skill mismatch factor in performing a particular job. Due to this factor of skill mismatch among the workforce and youth, GDP (Gross Domestic Product) of India is affected as there is continues reduction in productivity of an individual and a firm (Quintini, G. 2011) . The association between productivity and skill is very beneficial in terms of economic growth because it only not helpful to businesses and economies but also beneficial in empowering under privileged part of community (Sanghi, S. & Srija, A. 2015) .

Smart Cities Mission

Smart cities mission has been proposed by our Hon‟ble Prime Minister Narendra Modi for developing 100 smart cities all over the India. This initiative helps Government of India in making these smart cities as a centre of attraction for foreign investments and employment generation (Liu, A. & Puentes, R. 2015) . Smart cities are not only the cities equipped with modern technology but also having the concept of applying these newer technologies for maximum utilisation of available resources. Governments‟ main focus through the smart cities mission is to change conventional model of businesses to the more deterministic integrated service delivery model (Glasmeier, A. & Christopherson, S. 2015) . Smart cities are the cities with the wider acceptance to tackle with problem relating to socioeconomic and ecological concern in the relationship with elevated infrastructure and information technology services in India (Datta, A. 2015) .

3.14 How to implement other Countries smart village projects in Indian village context (Regarding Environment , Employment) :

Smart cities revolution to boost employment in India

Government of India's _smart cities mission', a flagship initiative, is aimed at developing 100 sustainable and citizen friendly cities across the country. Each of these smart cities will be a key driver of economic growth boosting the GDP of the country and creating multiple new-age employment opportunities. With increased urbanization, urban areas are expected to house 40 per cent of India's population and contribute to over 75 per cent of India's GDP by 2030. This calls for large scale infrastructural development which is not just physical and institutional but also social and economic infrastructure. Only then would these cities will attract investments leading to continuous growth and development. A key way of developing smart cities is by enabling using smart evolved technology for local area development in the cities. Such development will generate employment for a large segment of local population. Application of smart solutions will enable cities to use technology, information and data to improve their services. Integration of technology is a major challenge and implementation of technology across smart cities needs a lot of hand holding at the moment. To understand the dynamics of smart cities and to create a strong eco-system it is important that the workforce has advanced skill sets. Smart cities have emerged as a potential job creator in the past few months. Many new-age profiles are likely to witness potential growth especially in the areas of ICT (Information Communication Technology), Data Management & Analytics and e-Governance. As there is a large pool of data being used in the building and management of smart cities, data monitoring and surveillance will become a crucial aspect. Whether the data is used for intelligence gathering, prevention of crime, public health, investigation or surveys; surveillance will hold a lot of importance for citizens. It is important for us to understand that the existing workforce and the new workforce entering the labor market need to align their skill sets basis the requirements of smart cities. Each and every sector and job roles will need enhancement of knowledge, specialized skills training and continuous upskilling. People with varied skill sets will be needed to manage and monitor data across smart cities. Data Skills, Communication skills, Business Intelligence and Analytics, Visualization, Data Modelling, Numerical skills, Quantitative Analysis, Product Development are few key skills that will be required for continuous surveillance at smart cities.

Some of the prominent skills that are essential for smart cities are:

1. **Data Skills** − Information gathering is a very essential part for any developmental projects. Right information at the right time with accuracy is a key factor for development of specialized projects. Based on the precision and reliability of the data, the decision can be made and presented to the clients for approval processes. Validated data can be a success factor for any project development.
2. **Business Skills –** Planning capability is one of the most important skills required in project management. Planning of finance, resources, manpower are essential elements one needs to possess. Financial Management plays a very important role in project development. The skill to handle a problem and manage crisis during the execution phase, networking with different departments and sectors, negotiation with vendors, overall exhibiting the leadership qualities are the core skills of business.
3. **Product Development –** Analysing needs is an important skill in product development. And pricing of the product and validating the quality of the product is a core skill factor. Knowing the market segment, understanding the technicalities of the product and evaluation of quality are the business needs in demand. Strategic thinking and skill prioritization is very important.

4. **Numerical Skills** – Analytics, budgets and financials are the critical skills required for business development. Reviewing and reasoning provides the clarity for better decision making. The logical derivatives of the financial implications are crucial for any decisions in the development of smart cities.
5. **Communication Skills –** Strong communication skills are always a boon in the workplace. The selling of your ideas and concepts through effective presentation are important

Smart Environment

Smart environments link computers and other smart devices to everyday settings and tasks. Smart environments include smart homes, smart cities and smart manufacturing. Smart environments are an extension of pervasive computing. According to Mark Weiser, pervasive computing promotes the idea of a world that is connected to sensors and computers. These sensors and computers are integrated with everyday objects in peoples' lives and are connected through networks.

Smart environments are broadly classified to have the following features

1) Remote control of devices, like power line communication systems to control devices.
2) Device Communication, using middleware, and Wireless communication to form a picture of connected environments.
3) Information Acquisition/Dissemination from sensor networks
4) Enhanced Services by Intelligent Devices
5) Predictive and Decision-Making capabilities

Technologies

To build a smart environment, involves technologies of

1. Wireless communication
2. Algorithm design, signal prediction & classification, information theory
3. Multilayered software architecture, Corba, middleware
4. Speech recognition
5. Image processing, image recognition
6. Sensors design, calibration, motion detection, temperature, pressure sensors, accelerometers
7. Semantic Web and knowledge graphs
8. Adaptive control, Kalman filters
9. Computer networking
10. Parallel processing
11. Operating systems

Chapter 4.

About Thordi VILLAGE :

4.1 Introduction :

4.1.1 Introduction About Thordi Village details :

In Thordi village Grampanchayat office is located in Bhavnagar district of Gujarat, India. The Geocoordinate of thordi village is latitude (21.6470° N) & longitude (72.1920° E). The state capital for the thordi village is Gandhinagar. Which is 208 K.M. away from the village.

- TALATI : ―Sangeetaben Sharma‖
- SARPANCH : -Ushaben Rameshbhai Lakhani‖

Thordi is a large village located in Bhavnagar Taluka of Bhavnagar district, Gujarat with total 474 families residing. The Thordi village has population of 2826 of which 1447 are males while 1379 are females as per Population Census 2011.In Thordi village population of children with age 0-6 is 368 which makes up 13.02 % of total population of village. Average Sex Ratio of Thordi village is 953 which is higher than Gujarat state average of 919. Child Sex Ratio for the Thordi as per census is 937, higher than Gujarat average of 890.Thordi village has lower literacy rate compared to Gujarat. In 2011, literacy rate of Thordi village was 77.10 % compared to 78.03 % of Gujarat. In Thordi Male literacy stands at 86.40 % while female literacy rate was 67.36 %.As per constitution of India and Panchyati Raaj Act, Thordi village is administrated by Sarpanch (Head of Village) who is elected representative of village.

Thordi - Village Overview	
Gram Panchayat :	Thordi
Block / Tehsil :	Bhavnagar
District :	Bhavnagar
State :	Gujarat
Pincode :	364110
Area :	1484.18 hectares
Population :	2,826
Households :	474
Nearest Town :	Bhavnagar (17 km)

TABLE NO.14 THORDI VILLAGE OVERVIEW

Caste Data as per Census 2011

Schedule Caste (SC) constitutes 8.24 % of total population in Thordi village. The village Thordi currently doesn‘t have any Schedule Tribe (ST) population.

Working Population as per Census 2011

In Thordi village out of total population, 895 were engaged in work activities. 99.22 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 0.78 % were involved in Marginal activity providing livelihood for less than 6 months. Of 895 workers engaged in Main Work, 289 were cultivators (owner or co-owner) while 109 were Agricultural labourer.

Thordi Details:

Particulars	Total	Male	Female
Total No. of Houses	474	-	-
Population	2,826	1,447	1,379
Child (0-6)	368	190	178
Schedule Caste	233	116	117
Schedule Tribe	0	0	0
Literacy	77.10 %	86.40 %	67.36 %
Total Workers	895	824	71
Main Worker	888	-	-
Marginal Worker	7	6	1

TABLE NO.15 THORDI VILLAGE DATA

4.1.2 Justification/ need of the study :

The implementation work in village development that could under taken as per the need of the village in particular includes, Physical infrastructure facilities (Road, Solid waste Management, Telecommunication & other), Social infrastructure facilities (Education, Health, Sanitation) Socio-Cultural Facilities (Community Hall, Library, Recreation Facilities & other) and Sustainable Infrastructures (Rain water harvesting, Biogas plant, Eco Toilets, Solar Street lights & other) for effective development of Villages.

Vishwakarma Yojana‖ has provided the platform for real world experience to engineering students and continuously apply their technical knowledge in the rural infrastructure development for this project.

4.1.3 Study Area (Broadly define) :

Thordi is a Village in Bhavnagar Taluka in Bhavnagar District of Gujarat State, India. It is located 17 KM from District head-quarters Bhavnagar. 208 KM from State capital Gandhinagar. Thordi Pin code is 364110 and postal head office is Bhavnagar. Thordi village is located in Bhavnagar Tehsil of Bhavnagar district in Gujarat, India. It is situated 17km away from district headquarter Bhavnagar. As per 2009 stats, Thordi village is also a gram panchayat. The total geographical area of village is 1484.18 hectares. Thordi has a total population of 2,826 peoples. There are about 474 houses in Thordi village. Bhavnagar is nearest town to Thordi which is

approximately 17km away.Nearby Villages of Thordi : Pithalpur (2.1 KM) , Rampar (3.5 KM) , Malpar (3.7 KM) , Mamsa (6.7 KM) , Bhumbhali (6.5 KM) Budhel (7.7 KM).

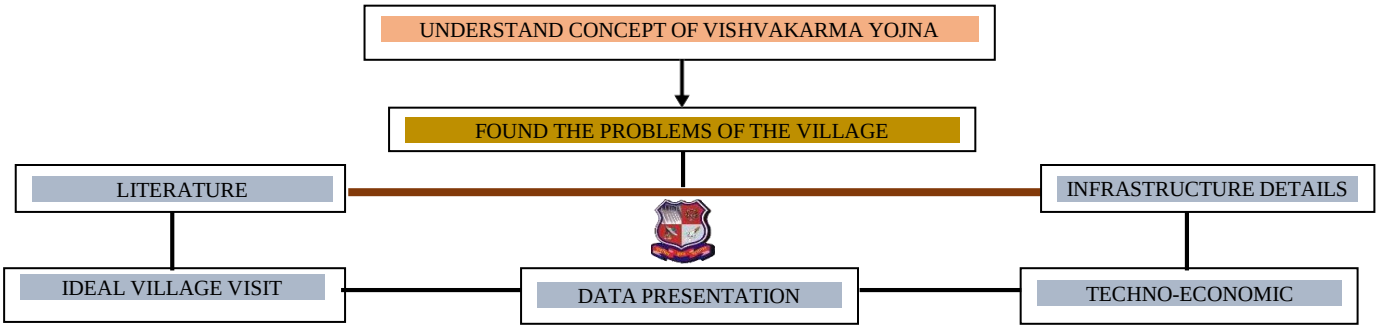
4.1.4 Objectives of the study :

- Prevent distress migration from rural to urban areas, which is a common phenomenon in India‘s villages due to lack of opportunities and facilities that guarantee a decent standard of living.
- Make the model village a ‒hub‖ that could attract resources for the development of other villages in its vicinity.
- Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages.
- Contribute towards social empowerment by engaging all sections of the community in the task of village development.
- Create and sustain a culture of cooperative living for inclusive and rapid development.

4.1.5 Scope of the Study :

According to us the Scope of this project proper dividing in to Normal village to adarsh village for providing or improving facilities solid waste management, sanitation, Swachta to Development of village and Increase living of standers and employment. Trying to providing or improving this solid west management, sanitation facilities, cleanness enhance facility between Village development & upliftment. Above facilities is to be provided through government scheme and fund and under campaign for adarsh village.

4.1.6 Methodology Frame Work for development of your village :



Above frame work is not only enhancement for the village it is also for the better enhancement. Also increase the people living hood too. The villages are the one of the fortune 5 elements in India country. People also said _Bharat ek Sone ki chidiya‘ to india when India had a good trade in goods & crops with the other countries & increased the economic value compared to other countries.

4.1.7 Available Methodology for development of related to Civil

Methodology:

- Identify customer needs
- Identify local/state/federal engineering and construction specifications
- Surveys & analysis

Objects which were available in the Thordi village were, Panchayat Building, Water Tank, Underground Sump, Post Office, Approach Road, Public Library, Primary School, Anganwadi, Village Temples, etc.

4.2 Thordi Village Study Area Profile :

4.2.1 Study Area Location with brief History land use details :

According to Census 2011 information the location code or village code of Thordi village is 516263. Thordi village is located in Bhavnagar Tehsil of Bhavnagar district in Gujarat, India. It is situated 17km away from Bhavnagar, which is both district & sub-district headquarter of Thordi village. As per 2009 stats, Thordi village is also a gram panchayat. Thordi village is located in Bhavnagar taluka which is 16KM away, the latitude location coordinates are 21.6470° N, 72.1920° E Thordi village has good Physical Condition comparatively with other villages but it doesn‘t fulfill all the facilities like city areas.The total geographical area of village is 1484.18 hectares. Thordi has a total population of 2,826 peoples.

Particulars	Total	Male	Female
Total No. of Houses	474	-	-
Population	2,826	1,447	1,379
Child (0-6)	368	190	178
Schedule Caste	233	116	117
Schedule Tribe	0	0	0
Literacy	77.10 %	86.40 %	67.36 %
Total Workers	895	824	71
Main Worker	888	-	-
Marginal Worker	7	6	1

FIG.30 THORDI VILLAGE OVERVIEW

There are about 474 houses in Thordi village. As per 2019 stats, Thordi villages comes under Bhavnagar Rural assembly & Bhavnagar parliamentary constituency. Bhavnagar is nearest town to Thordi which is approximately 17km away.

4.2.2 Base Location map, Land Map, Gram Tal Map :

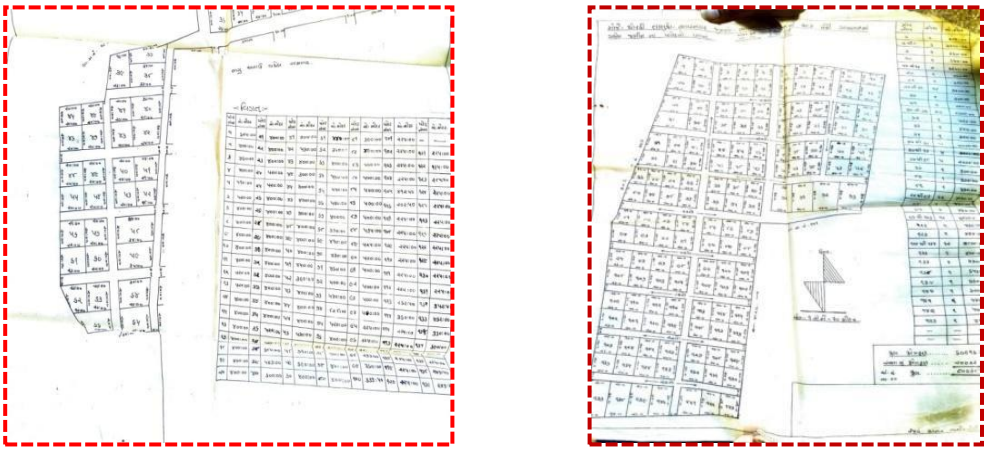


FIG.31 LOCATION MAP OF THORDI

4.2.3 Physical & Demographical Growth :

TOTAL AREA OF VILLAGE	1484.18 HECTARES
FOREST AREA	0
AGRICULTURE AREA	812.14 hectares
RESIDENTIAL AREA	21.60 hectares
OTHER AREA	650.44 hectares
DISTANCE OF THE NEAREST RAILWAY STATION	16.8 KM (Bhavnagar)
NEAREST TOWN WITH THE DISTANCE	15.8 KM (Bhavnagar)
DISTANCE TO THE NEAREST BUS STATION	17.9 KM (Bhavnagar)
NEAREST AIRPORT	16.5 KM (Bhavnagar)
CONNECTIVITY TO THE ROADS	VR,GJ SH 36

TABLE NO.16 GEOGRAPHICAL DATA OF THORDI

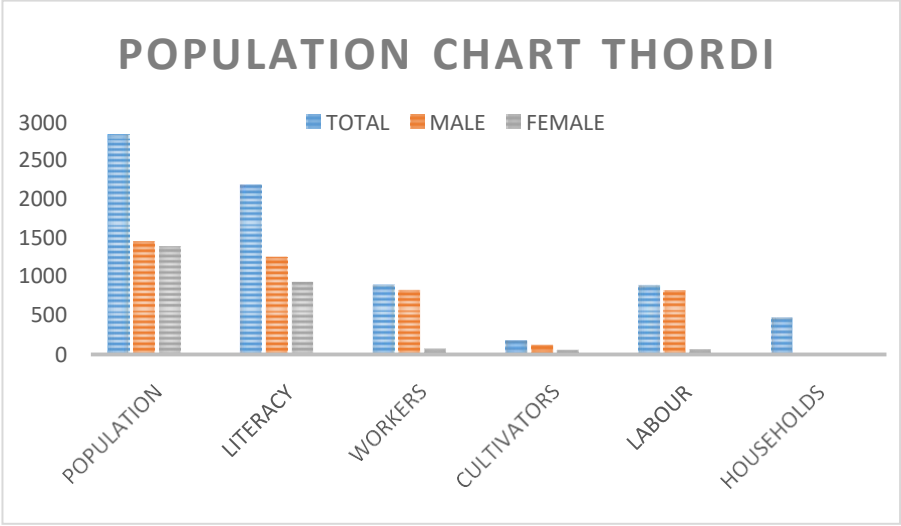


FIG.32 POPULATION CHART THORDI

4.2.4 Economic generation profile / Banks :

The major sources of income are

- Farming
- Labour
- As Shopkeepers
- As workers in mills and factories.

➢ Banks: There are no banks currently present in Thordi village. Banks can be found in a nearby village name Tagdi.

➢ Income: The average income of the village dwellers is about ₹6000 to ₹ 25000 per month.

➢ Post Office: There is one Post Office in Thordi village.

4.2.5 Actual Problem faced by Villagers and smart solution :

During an interaction with people of Thordi village we understood their problems and issues like:

➢ There is need of bridge for childrens to go to school

➢ There is a waterlogging problem during rainy season,
➢ There is no community hall available in the village,
➢ There is no bank existing in the village,
➢ There is no ATM in the village
➢ There is need of new smashan
➢ There is no snangruh

Other than these the villagers have no any issues and they are satisfied with the work of Sarpanch and Talati of Thordi village.

Smart solutions:

- Community Hall
- Pharmacy Store
- ATM
- PHC
- New Gram Panchayat office .

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine :

Gujarat Social Scenario
Culture

The Gujarati's are known for their diverse cultural heritage and rich traditions. It is a vibrant mix of Hinduism, Islam, Jainism and Buddhism and also a blend of different cultures of the Gujarat's like arts, beliefs, customs, traditions, institutions, inventions, language, technology and values. The culture of the people does not stop with one particular generation but instead the elders of the community see to that the future generations also practice it which automatically

leads to the wisdom and appreciation of cultural traditions and lifestyles. They also as a part of their culture join hands to greet the guests and the elders. The lifestyle of the people of Gujarat is very balanced because of the fact that they have a perfect system of learning, religious practices and excellent forms of artistic expressions. The culture of the Gujarati's does not only prevails in Gujarat but it has been widespread to different parts of the world and now recognized as an international culture. There is not much of culture shock seen in the people of Gujarat and so it makes people bold and courageous with lot of energy to face different challenges raised by the global scenario.

Tradition

Gujarat is a flourishing state with cultural diversity. It is vibrant with its true colors of rich heritage and cultural traditions. Dating back to history with the Harappan civilization, the state becomes a confluence of many religions – Hinduism, Islam, Jainism and Buddhism. The Gujarati culture blends in arts, beliefs, customs, traditions, institutions, inventions, language, technology and values

For costumes, several outfits are worn by the people of Gujarat as per the living in rural or urban areas. Generally, men wear trousers and shirts or t-shirts and younger women wear normal western outfits like skirts, dresses, jeans, etc. Older women usually wear saris or salwar kamiz. In rural parts, people are found to wear dhotis and kurtas or bandis. Even traditional outfits like chania choli by women and kedia dress is worn by men in rural areas or during cultural festivals.

Gujarat is influenced with enculturation; a culture shared with members of the society and passed on from one generation to the next. Enculturation has unified people with common sense experience and influence that lead to knowledge and appreciation of cultural traditions and lifestyles. The aspect of joining hands to greet or bow down comes through age influences as offering reverence.Social systems of learning, religious practices and forms of artistic expressions have led way to more balanced lifestyles in Gujarat. People of Gujarat are found to be sharing cultural traits and patterns with other regions and also extend beyond national boundaries towards International culture.As Gujarat stands as _Heart of India‘, Multiculturalism is traced in Gujarat. Shared cultural background making people feel to home ground and more comfortable with other people from their own culture. Culture shock unlike other countries is therefore, a missing point which makes people more confident and energetic as they stand for a challenge in global scenario.

Originally known as Gurjars, Gujaratis are influenced by the waves from the past that inherit values of arts, culture and traditions. Gujarat has a strong cultural influence of socio-economic-political history. It has a special significance in Indian Political History as it is a birthplace of Mahatma Gandhi and the main influence to the people of Gujarat with his system of non violence movement.Festivals and fairs, arts and crafts, folk dances, music, cuisine and lifestyles form a major cultural background of the people who belong to Gujarat. The customs and beliefs make the culture more homely and truly blended with values and moral characteristics

Cuisine

Majority of the Gujaratis are Vegetarian. A traditional _Gujarati Thali‘ consisting of dal (lentils), roti, rice and vegetables apart from salads, farsan and sweet dish followed by chaas, forms the morning meal. Evening food consist of _bhakri-shak‘ or khichdi kadhi. Mainly, the diet of the people

of Gujarat consists of cereals, pulses, green vegetables, fruits, milk, ghee, butter-milk, etc. A variety of Cuisine sub-ordinates like pickles, chutney, papad, yoghurt, etc serve as fillings on main menu. A variety of dishes are prepared by Gujarati women who also add spice to kitchen with eateries from other regions like the South Indian food, Continental, Chinese cuisines, etc.

4.2.7 Migration Reasons / Trends :

Thordi Migration Reasons as per the data available in Village Profile & Taluka Planning Atlas :

- Number of families who have migrated from village to village/city to get higher education are 212.
- Number of families who have migrated from village to other place in the country are 12.
- Number of families who have migrated from village to out of the country are 4.

Other reasons : Lack of physical and infrastructure facilities in the village like community hall, bank, PHC, etc.

Migration Trend

The latest census figures on migration for seven of Gujarat's eight municipal corporation managed cities have thrown up some eye-popping observations. Close to half the population in Gujarat cities are migrants — made up of people whose last place of residence was in other urban and rural areas of the state and outside the state Surat has the highest presence of migrants — 64.6% of which 32.2% are people from outside the state. Ahmedabad, which is the most populous city in Gujarat has just 12.4% migrants from outside the state. In all 46% of Ahmedabad's population are migrants including those from within the state. The city sees the maximum number of migrants from Rajasthan (2.16 lakh) followed by UP (1.9 lakh) and Maharashtra (1.10 lakh). The reasons for migration are mentioned in the census as work and shifting after marriage.

MIGRATION IN 7 MAJOR MUNICIPAL CORPORATIONS

Reason for migration	Ahmedabad	Rajkot	Vadodara	Surat	Jamnagar	Junagadh	Bhavnagar
Total migrants	25.64L	7.41L	9.01L	28.87L	2.69L	1.91L	2.51L
Migrants from other states	6.95L	56,215	2.26L	14.39L	26,537	5,726	13,942
Work/employment	4.45L	1.24L	1.68L	7.58L	30,897	26,167	33,078
Business	91,043	48,043	31,734	1.13L	10,597	7,905	10,818
Education	25,471	12,582	13,303	12,519	4,273	12,804	4,401
Marriage	4.37L	1.40L	1.87L	3.16L	48,476	38,440	57,215
Moved after birth	1.64L	44,367	83,882	1.75L	13,022	15,270	21,503
Moved with household	5.84L	2.25L	2.45L	8.81L	64,170	57,403	60,648

Gandhinagar Municipal Corporation has been avoided

FIG.33 GUJARAT MAJOR MUNCIPAL CORP.DATA

4.3. Data Collection Thordi village (Photograph/Graphs/Charts/Table) :

4.3.1 Describe Methods for data collection :

Interview Method

- First of all we Studied various internet content available on website.
- Then we have interacted with gram-panchayat.

- Through techno-economic survey we found required details of facilities and infrastructure.
- Through interaction with villagers.
- By inspecting with village.
- Interaction with school teachers and staff.

4.3.2 Primary details of survey :

- In primary survey we visited village and know about village by metting with sarpanch & gram sevak.
- After we interacted with some elders of village.
- We surveyed village and seen the existing condition of all structures.
- We have collected data as per techno-economic form given in guidelines.
- Also we have done feasibility survey for facilities as per criteria.
- Thordi is a Village in Bhavnagar Taluka in Bhavnagar District of Gujarat State, India. It is located 16 KM towards South from District headquarters Bhavnagar. 208 KM from State capital Gandhinagar.Thordi pin code is 364110 and postal sub post office is situated at Ghogha. Nearby villages of Thordi are Ramar (3 KM), Malpar (3.7 KM), Tagdi (5 KM), Budhel (8 KM), Nesvad (8.4 KM). Thordi is surrounded by Bhavnagar Taluka toward North, Talaja taluka towards South, Ghogha towards East, Sihor Taluka towards West, Bhavnagar, Sihor, Talaja are the nearby cities of Thordi.It is located nearby the Arabian sea. There is a humidity in the weather. The latitude 21.6470° N, 72.1920° E are the coordinate of the Thordi.The village location is good & has many percepts of development & employment. It has availability of industrial sector within the village which promotes in business & employment.
- There is closed type of drainage system in Thordi. There are nearly 411 houses out of which 60% of the houses are pucca while 40% of the houses are kutchha. There is one government Primary school, two secondary school each government & private and four anganwadi three government & one privarte. There is piped water supply for every house with one sump & 2 ESR & pump house. there are five checkdam for agricultural usage & three lakes. Also there is a post office.Village is connected with 24 hour electricity supply. The development of city will lead the people to develop their villages otherwise there will be more migration towards cities, which will setup RURBAN planning
- There is need of internal road development as well as there are more kutchha houses so a well designed plan for house is necessary. Also there is a bridge needed to connect the new government higher secondary school as the path is closed during the rainy season. Also there are no street light to enlighten the paths. There are no such facilities of dustbin at every connecting points. There is no pipeline connected for gas. There is a need of repairs to old structures like Gram panchayat office, Existing Sump &ESR. There is a need of new smashan, & snanghat.
- So we can plan on laying gas pipeline connection for every houses also RCC road with Paving blocks on side in internal roads, we can design a pipe culvert bridge for

connection of school. Smart sensing street lights, dustbin along with setting a network, design for houses, new smashan & snan-gahat design, & repairs to old structure, and wifi facility for digital connection of villager.

- Thordi village has more developed comparatively as there are profit making business available due to availability of bentomite in loacality. There is a huge production & sales of bentonite powder for fertilizer so the villagers are having good income & there are worker migrarting in this village for work. Also the farming is good as it has five checkdams which can be used for irrigation purpose.So there is a good future for the village.
- The village can make an industrial impact on basis of heavy production of bentonite. Changing to smart village will definitely decrease or stop migration to city of villagers.

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

In Thordi Average size of houses is 80sq.mt and total number of houses in 437 with population of 5190 as on 2020.

Geo-Tagging: The process of tagging infrastructure with geographical information like Latitude, Longitude, Distance, place name, etc. It is connected to GPS which are monitored through computer internet networks. It can be used to locate important places like labs, dispensaries, milk center, etc. Geo Tagging is not implemented in Thordi village.

- There are total 437 Houses as on 2020 which is shown below in Gam-tal map.
- Village is now developing at constant rate, shops, building, commercial and private offices are constructed with development of Bhavnagar city.

4.3.4 No of Human being in One House :

- There are 437 houses with population of 2826, there are different number of person in each house on an average 5 persons in one house can be said.

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

- Materials for food is easily available in village
- Material used for houses construction are OPC 53 GRADE, ordinary Bricks, sand and steel for RCC structure, hard stone and marbles are imported from nearby Bhavnagar town. Fine aggregate is available locally.

4.3.6 Geographical Detail:

The total geographical area of village is 1484.18 hectares, total residential area is 474 hectares.

Elevation above MSL : 11 meters

Latitude : 72.1123

Longitude : 21.3838

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

Total No. of houses : 437

Population : 2826 (Male : 1447 ; Female : 1379)

SC & ST : 233 & 0

Literacy : 77.10%

Total Workers : 895

Aadhar Card is majorly used as ID proof by villagers.

4.3.8 Occupational Detail - Occupation wise Details / Majority business :

MAJOR OCCUPATION IN VILLAGE	1. BENTONITE EXCAVATION
	2. LABOUR WORK
	3. AGRICULTURAL FARMING

TABLE NO.17 OCCUPATIONAL DETAILS OF THORDI

4.3.9 Agricultural Details / Organic Farming / Fishery :

MAJOR CROPS	1. COTTON
	2. ONIONS
	3. PEANUTS

TABLE NO.18 AGRICULTURAL DATA OF THORDI

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses :

A. Main source of drinking water

- The main source of drinking water is Lake.
- There is need of Sump of 5 lakh liter capacity as per population forecast.

B. Type of drainage facility

- Underground drainage facility is available

C. Road Network

- The nearest state highway distance is 4.8km.
- Village approach road is in bad condition & its construction is going on.
- The main road is in good condition
- Internal streets some are good with cc road or paving block but major streets are pending.

D. Transport Facility

- Railway station is not available in Thordi Village, but the nearest Railway station is in Bhavnagar at a distance of 15.5 KM.
- Bus stand is available & nearest bus station is 15.8 KM

E. Electricity Distribution

- There is availability of 24*7 hours electricity for domestic use.
- For agriculture use electricity is available for 8 hrs
- There is no source of renewable energy
- Led street light is available.

F. Sanitation facility

- Public latrine blocks are available
- Community toilet is also available

G. Main source of irrigation facility

- Pond, River, Canal,Bore Well

H. Housing Condition

- The percentage of Kutchha house is approx. 40%
- The percentage of pucca house is approx 60%
- The ratio of kutchha/pucca house is 0.66.

4.3.11 Tourism development available in the village for attracting the tourist :

- In Thordi village there are no any tourism activities available for attracting the tourist.

4.4 Infrastructure Details (With Exiting Village Photograph) :

4.4.1 Drinking Water / Water Management Facilities :

(FIG.34 OVERHEAD WATER TANK)

(FIG.35 SUMP)

In Thordi village the main source of drinking water is from Lake and that water is stored in village overhead water tank which is of 50000 lit. underground sumps as one in village area.

The water tank , sumps are not sufficient for all types of water requirements in the village. As per the present condition of water tank the village officials have decided to construct a new water tank of total 1,00,000 lit capacity. & as per population forecast there is requirement of 5 lakh liter capacity of sump.

4.4.2 Drainage Network / Sanitation Facilities :

The Thordi village has underground drainage facility as from drainage starting it is in closed underground condition and the pipelines are ending in lake. There is a good sanitation facility available in Thordi village. Dumping of garbage is done out of the village and other solid wastes are dumped in corner part of the village and it is burnt by villagers. Sanitation is done daily by villagers and there is no any solid waste collection system available in the village. No government sweepers are coming daily for other waste collection and for cleaning of the village.

(FIG.36 UNDERGROUND DRAINAGE)

4.4.3 Transportation & Road Network :

Nearest National highway: NH 51 Nearest State Highway: SH 36 ; Railway station : Not present (nearest railway station is in Bhavnagar) ; Bus stop is available at main highway as Tagdi village bus stop. The major bus stop is in Bhavnagar which is 17 km from Thordi. The main approach road of village is of Bitumen and village streets are of RCC and internal streets having paver blocks

FIG.37 CLEANED VILLAGE STREETS

4.4.4 Housing condition :

In Thordi village the major structures such as schools, panchayat buildings and majority of the houses are pucca houses and some are kuchha houses. Rest of the houses are made of cement and bricks as shown in figure.As per the data observed, **60%** houses are Pukka houses **&** **40%** houses are Kuchha houses

FIG.38 PUKKA HOUSE

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

Social Infrastructures:

In Thordi village there are 4 anganwadi , 1 primary school ,2 secondary school, 1 higher secondary school, 4-5 temples, 1 masjid, 1 Post office , 1 Panchayat building but not in good condition Village does not have any health care center, public latrine and recreational area or public garden

FIG.39-ANGANWADI 1

Health Facilities

In the village no PHC, CHC, dispensary is available only one private clinics is available in the village. The villagers go to Bhavnagar for any kind of health facility.

Education Facilities

Thordi village has 4 Anganwadi and 1 primary school, 2 secondary school, 1 higher secondary school. The school is Co-educational and the school have an attached playground section. Gujarati is the medium of instructions in this school. This school is approachable by all-weather roads. The school is Government building. It has got 8-10

FIG.40-PRIMARY SCHOOL

classrooms for instructional purposes. As per the observation classrooms are in good condition. The school has a separate room for Head master/Teacher. The school has electric connection. The source of Drinking Water in the school is Tap Water and it is functional and according to Talati there is rain water harvesting in school. Hence the Necessity of education is successfully available.

(FIG.41-SECONDARY SCHOOL)

(FIG.42-HIGHER SECONDARY SCHOOL)

(FIG.43 TEMPLE 1)

(FIG.44 MASJID)

(FIG.45-CLINIC)

(FIG.46 POST OFFICE)

Community Hall : In Thordi village there is no Community Hall, but it is required in the village and also during interaction with villagers they have also suggested that there should be one community hall in the village. As per the suggestion we will proposed the community hall design in part II.

Public Library : There is one Public library available in the Thordi village and it is in working condition. The villagers and students in the village are using that public library.

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

In the Thordi village as per the interaction with the villagers there is requirement of a clinic with pharmacy. Water tank is present but is not in good condition and village officials have said that new water tank will be constructed in place of current water tank with higher capacity of 1 lakh liter. Panchayat building is in very poor condition, Anganwadi, Public library and primary school are also in good working condition.

FIG.47 PANCHAYAT BUILDING

4.4.7 Technology Mobile/ WIFI / Internet Usage Details :

Almost in all the households the villagers are using mobile phone and they are also using the internet facility for personal usage. There are no private WIFI users in the village as per the data collected. But in the panchayat building there is a WIFI connection available.

4.4.8 Sports Activity as Gram Panchayat :

There are many sports activities being done. The school has some sports equipment and tools & also children and students are using these facilities. Also various tournaments are held. There is a cricket ground available in thordi village.

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

The Thordi village has panchayat building and it is not in good condition. The separate Post office building is there in village. Public Library is available in the Panchayat itself. Many playground are present. The village has no public garden, or any other recreational facilities. There is are village ponds.

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

There are no any kind of facilities like smart toilet-coin operated entry, footpath development, self- cleansing, waterless public building, etc. in the Thordi village. There are some houses in which is there like solar panel, solar water heater and solar cooker.

4.4.11 Any other details :

There are wells, tube wells in farms or agriculture areas and 1 pump. The farmers have the farming equipment like tractor, etc. in the Thordi village. Also there are many Bentonite Factories in Village Thordi.

4.5 Existing Institution like - Village Administration – Detail Profile :

FIG.48 Mahila Forum

4.5.1 Bachat Mandali : In the Thordi village there is Bachat Mandali existing & Working Good

4.5.2 Dudh Mandali : There is no Dudh Mandali existing in the Thordi village in Dairy.

4.5.3 Mahila forum :A mahila forum is active in the village anganwadi. There is no any mahila mandal existing in the Thordi village. As per the interaction with villagers there is a system of asking before any kind of decision implementation in the village and that is a good thing in Thordi village so that mahilas have the decision making authority.

4.5.4 Plantation for the Air Pollution : There is such activity done of tree plantation for the air pollution in the Thordi village. The privte & Government Schools educate about the need of plants & trees & make them plant trees in the ground.

4.5.5 Rain Water Harvesting - Waste Water Recycling : In the Thordi village no one is using the system of rain water harvesting and there is no any kind of waste water recycling process done.

4.5.6 Agricultural Development : The village farmers have agricultural tools and equipment. All the agri-materials are available from Bhavnagar District which is 17 km away from the Thordi village.

4.5.7 Any Other : There are no any other kind of institutions existing in the Thordi village apart from panchayat building, school, temples, anganwadi, etc. all houses have electricity connections. village has good education facilities as there is availability of government high school. There are many number of temples and also a masjid as apart of recreational area & there is one pond also which provides drinking water facility to village.

(FIG.49 BENTONITE FACTORY)

Chapter 5.

Technical Options with Case Studies : (FOR ANY ONE TOPIC, Take a new concept design , prototype model with actual costing) :

5.1 Concept (Civil) :

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying:

The term 'advanced construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies. The construction industry is repeatedly criticized for being inefficient and slow to innovate. The basic methods of construction, techniques and technologies have changed little since Roman times. But the application of innovation in the construction industry is not straight forward. Sustainable construction technologies typically include mechanisms to lessen energy consumption. The construction of buildings with wood, for instance is a sustainable construction technology because it has a lower embodied energy in comparison to those build of steel or concrete. Sustainable green construction also makes use of designs that cuts back air leakage and allows for free flow of air while at the same time using high performance windows and insulation techniques. Sustainable resource sourcing as the name suggests is a prime example of sustainable construction technology because it ensures the use of construction materials designed and created from recycled products and have to be environmentally friendly. In most cases, agricultural wastes or by-products are used to produce the construction materials. Overall, the materials are remanufactured, recycled, recyclable, and obtained from sustainable sources

Advanced construction technologies are commonly described as including (amongst many others) advanced forms of:

- 3D construction printing.
- Modern methods of construction.
- Modular construction.

3D construction printing.

3D printing in construction can either involve the use of a 3D printer attached to an arm which actively builds a project on-site or the use of printers in a factory which create components of a building project that are assembled later.As a concept, 3D printing is not new – it was first developed in the 1980s.

FIG.50 3D PRINTING CONSRTUCTION

However, only in the last decade has the technology improved enough (and the costs declined sufficiently) for it to become mainstream.3D printers are not unlike your desktop inkjet printer. A software programme _tells‘ the printer about the dimensions of the end product. The printer then

injects material on a platform according to that plan. 3D printers often use liquid metals, plastics, cement and a variety of other materials which then cool or dry to form a structure.For 3D printing in construction, a CAD or BIM programme _tells' the 3D printer what it needs to print, and the machines then begin layering out levels of material according to the plan.

THREE INNOVATIVE EXAMPLES

So far, only a handful of 3D printed projects completed in the construction sector. Here are three of the most promising examples:

1. **Dubai municipality office building, UAE**

In December 2019, 3D printing robot firm Apis Cor announced it had completed the world's largest individual 3D printed building. The office block, built in the UAE, is 9.5 metres in height and has a floor area of 640 m2.Apis Cor's 3D printer was moved around the open-air site by a crane as it built different parts of the structure.

2. **Office of the Future, UAE**

Another impressive 3D printed building in the UAE, the Office of the Future is a unique structure which is currently home (appropriately enough) to the emirate's Future Foundation.For this building, the printing itself was done offsite, with all the parts printed in 17 days. Workers installed the whole building in just 48 hours.

3. **3D printed houses by WinSun, China**

Chinese 3D printing firm WinSun also uses factory-based 3D printers to construct human dwellings. The firm has created a handful of home designs, including a small apartment block. The design's users can quickly and cheaply print the parts before installing them on-site.The firm reckons that one of their five-story apartment blocks could cost as little as $161,000 to print.3D printing in construction certainly seems exciting, but what are the benefits of this approach?

Proponents of 3D printed house and commercial office designs point to several benefits of this approach:

- **Zero waste construction**

In the UK, almost a third of the country's waste is generated by the construction industry. While a good portion of this comes from demolition, building sites tend to be wasteful too. It is common to order more materials than are needed, which is expensive and inefficient.By contrast, 3D printing has the potential to cut waste to almost zero. A 3D printer only uses the material required to print the structure – no more or less. This could translate into huge savings. Zero waste is the elimination of waste at the source and throughout the construction activity. Accordingly, implementation of the Zero waste concept in the construction industry helps to optimise the use of natural resources, reduce environmental issues and to promote sustainability.

- **Time and cost reduction**

As with AI in construction, a 3D printer can work 24 hours per day, 7 days per week. This means construction projects could potentially be completed much faster, and some low skilled labour costs could be avoided.1

- **Supports unusual designs**

One of the most appealing characteristics of 3D printers is their ability to create complex and unusual designs, including _one-offs'. Because 3D printers work by layering up material, they can be programmed to create unusual shapes which would be much harder to build using traditional techniques.

5.1.2 Soil Liquefaction :

Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world.

Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. This water exerts a pressure on the soil particles that influences how tightly the particles themselves are pressed together. Prior to an earthquake, the water pressure is relatively low. However, earthquake shaking can cause the water pressure to increase to the point where the soil particles can readily move with respect to each other.

Earthquake shaking often triggers this increase in water pressure, but construction related activities such as blasting can also cause an increase in water pressure.When liquefaction occurs, the strength of the soil decreases and, the ability of a soil deposit to support foundations for buildings and bridges is reduced as seen in the photo (SC) of the overturned apartment complex buildings in Niigata in 1964. Liquefied soil also exerts higher pressure on retaining walls,which can cause them to tilt or slide. This movement can cause settlement of the retained soil and destruction of structures on the ground surface (left, GH)Increased water pressure can also trigger landslides and cause the collapse of dams. Lower San Fernando dam (left, SC) suffered an underwater slide during the San Fernando earthquake, 1971. Fortunately, the dam barely avoided collapse, thereby preventing a potential disaster of flooding of the heavily populated areas below the dam.

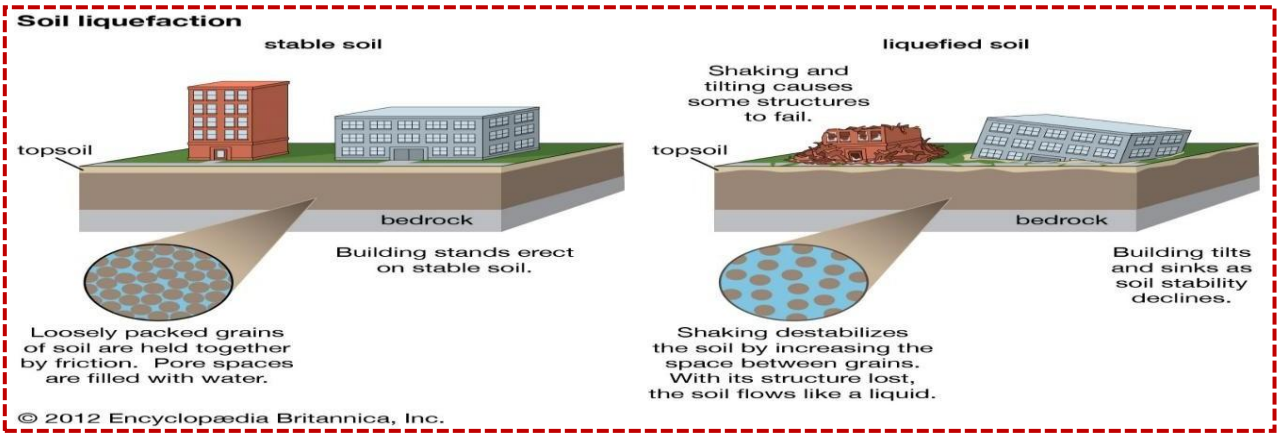


FIG.51 SOIL LIQUEFACTION

5.1.3 Sustainable Sanitation :

Sustainable sanitation is a sanitation system designed to meet certain criteria and to work well over the long-term. Sustainable sanitation systems consider the entire "sanitation value chain", from the experience of the user, excreta and wastewater collection methods, transportation or conveyance of waste, treatment, and reuse or disposal.The Sustainable Sanitation Alliance includes five features in its definition of "sustainable sanitation": Systems need to be economically and socially acceptable, technically and institutionally appropriate and protect the environment and natural resources. The purpose of sustainable sanitation is the same as sanitation in general: to protect human health. However, "sustainable sanitation" attends to all processes of the system: This includes methods of collecting, transporting, treating and the disposal of waste.

FIG.52 SUSTAINABLE SANITATION

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, but it should also protect the environment and the natural resources. According to the Sustainable Sanitation Alliance, when improving an existing and/or designing a new sanitation system, sustainability criteria related to the following aspects should be considered:

Health

Poorly handled fecal sludge poses high health risks (much spillage and no personal protective equipment for the workers)

Health aspects 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. The topic also covers aspects such as hygiene, nutrition and the improvement of livelihood achieved by the application of a certain sanitation system, as well as downstream effects.

Environment and natural resources

Environment and natural resources aspects 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 use. It also includes the degree of recycling and reuse of excreta practiced and the effects of these, for example reusing the wastewater, returning nutrients and organic material to agriculture, and the protecting of other non-renewable resources, for example through the production of renewable energy (e.g. biogas or fuel wood).

Technology and operation

Technology and operation aspects incorporate the functionality and the ease with which the system can be constructed, operated and monitored using the available human resources (e.g. the local

community, technical team of the local utility etc.). It also concerns the suitability to achieve an efficient substance flow management from a technical point of view. Furthermore, it evaluates the robustness of the system, its vulnerability towards disasters, and the flexibility and adaptability of its technical elements to the existing infrastructure, to demographic and socio-economic developments and climate change.

Finance and economics

Financial and economic issues relate to the capacity of households and communities to pay for sanitation, including the construction, maintenance and depreciation of the system. Besides the evaluation of investment, operation and maintenance costs, the topic also takes into account the economic benefits that can be obtained in ‒productive‖ sanitation systems, including benefits from the production of the recyclables (soil conditioner, fertiliser, energy and reclaimed water), employment creation, increased productivity through improved health and the reduction of environmental and public health costs.

Socio-cultural and institutional aspects

Socio-cultural and institutional aspects take into account the socio-cultural acceptance and appropriateness of the system, convenience, system perceptions, gender issues and impacts on human dignity, the contribution to subsistence economies and food security, and legal and institutional aspects

5.1.4 Transport Infrastructure / system :

Transport infrastructure is composed of the fixed installations of canals, waterways, airways, railways, roads, and terminals, as well as pipelines such as seaports, refueling depots, trucking terminals, warehouses, bus stations, railway station, and airports.

A road is an identifiable route of travel, usually surfaced with gravel, asphalt or concrete, and supporting land passage by foot or by a number of vehicles.The most common road vehicle in the developed world is the automobile, a wheeled passenger vehicle that carries its own motor. As of 2002, there were 591 million automobiles worldwide.

Rail transport is a means of conveyance of passengers and goods by way of wheeled vehicles running on rail track, known as a railway or railroad. The rails are anchored perpendicular to railroad train consists of one or more connected vehicles that run on the rails. Water transport is the process of transport that a watercraft, such as a barge, boat, ship or sailboat, makes over a body of water, such as a sea, ocean, lake, canal or river.Sustainable transport and the environment protection including green vehicles/ Urban transport, land use development, spatial and transport planning/ Bicycling, bike, bike-sharing systems, cycling mobility/ Human factor in transport systems/ Intelligent Mobility: emerging

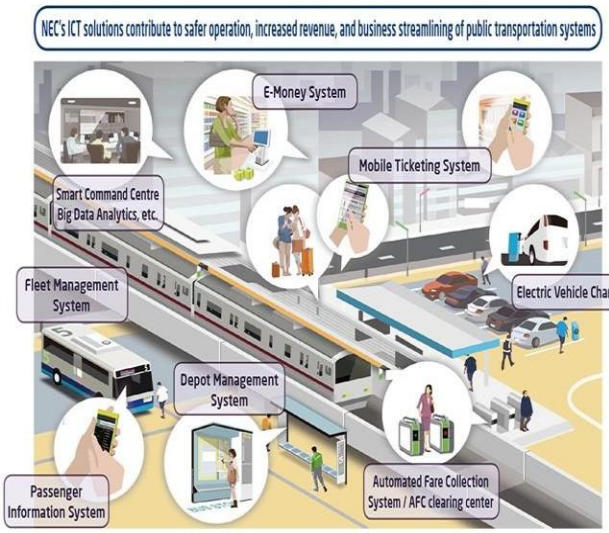


FIG.53 SUSTAINABLE SANITATION ICT SOLUTION

technologies to enable the smarter movement of people and goods/Airport landside: access roads, parking facilities, terminal facilities, aircraft apron and the azdjacent taxiway/ Transportation policy, planning and design, modelling and decision making/ Transport economics, finance and pricing issues, optimization problems, equity appraisal/ Road safety impact assessments, road safety audits, the management of road network safety and safety inspections/ Tunnels and underground structures: preventing incidents-accidents mitigating their effects for both people and goods/ Traffic flow characteristics, traffic control devices, work zone traffic control, highway capacity and quality of service/ Track-vehicle interactions in railway systems, capacity analysis of railway networks/ Risk assessment and safety in air and railway transport, reliability aspects/ Maritime transport and inland waterways transport research/ Intermodal freight transport: terminals and logistics.

5.1.5 Vertical Farming :

Vertical farming is cultivating and producing crops/ plants in vertically stacked layers and vertically inclined surfaces. The entire world is on the verge of population explosion and there is a gravest challenge of feeding the population. The population explosion has led to the decreased per capita land. Earlier with the aim of supplying the food to ever increasing population agricultural scientist stretched their innovative approaches to the tune of developing hybrid/ improved high yielding varieties, improved techniques, improved tools and implements, integrated practices in water, nutrient management and insect, pest management, greenhouse technology and even the genetically modified crops . All these efforts once were revolutionary, now sound inadequate. In 1915, Gilbert Ellis Bailey coined the term –vertical farming‖ and wrote a booktitled –Vertical Farming‖. In the early 1930s, William Frederick Gerick pioneered hydroponics at the University of California at Berkley. In the 1980s, Åke Olsson, a Swedish ecological farmer, invented a spiral-shaped rail system for growing plants and suggested vertical farming as a means for producing vegetables in cities. Professor Dickson Despommierin in 1999 came up with an idea of vertical farming. His concept was to grow the food in urban areas itself utilizing less distance and saving the time in bringing the food produced in rural areas to the cities. He intended in growing food within urban environments and thus have fresher foods available faster and at lower costs. Today, the context of vertical farming has completely changed and is confined to the aim of utilizing each and every inch of land and space, no matter whether it is urban or rural for growing maximum possible food for the hungry population. It has now emerged as a new farming technology all over the world. In India also, vertical farming is stepping in actually.Many entrepreneurs are coming forward for vertical farming with high net returns. Vertical farming can be implemented in buildings, warehouses, rooftops and balconies.

FIG.54 VERTICAL FARMING

OBJECTIVES –

Following are the objectives of this study

1. To discuss about the concepts of vertical farming.

2. To discuss about pros and cons of vertical farming.

3. To discuss practical feasibility of vertical farming in Indian context

Advantages of vertical farming

1. The first and the major advantage of vertical farming is producing extremely high yields per available land or area.

2. Producing the food throughout the year without the risk of vagaries of natureof nature like floods, heavy rains, uneven rains, hail and snowfall, drought, dry spells, extreme high temperatures, cold waves, epidemics of pest and diseases, etc.

3. It reduces the cost over transporting loads of food grains from rural area to urban areas and reduce the spoilage occurring there in Fossil fuel consumption in transporting the farm produce to cities from village places is also reduced to a greater extent.

4. Vertical farming uses 70 to 95 % less water compared to traditional farming

5. 90%less or no soil is needed in vertical farming and thereby no pest and disease infestations.

6. Pesticide free or organic food is produced as there is no use of pesticides.

7. Due to reduced food supply chain, consumers get the fresh produce with all its original nutrient qualities.

8. High productivity per unit area i.e. almost 80% more harvest per unit of area in vertical farming.

9. It will lead to greening of the urban areas and help to reduce the rising temperatures and mainly the air pollution in cities.

Disadvantages of vertical farming

1. Initial hugh cost for establishing the vertical farming system is the major problem. It will include the cost erecting the structures along with its automation like Computerized and monitoring systems, remote control systems and software's, automated racking and stacking systems, programmable LED lighting systems, climate control system, etc.

2. Hugh energy cost as growing plant is entirely with artificial lights.

3. The excess nutrients used in vertical farming may interfere and contaminate the mainurban water system if not taken care of.

4. LED lighting systems emit heat though small amount will create problem of maintaining the temperatures especially in summer months and may overload the air conditioning systems which will again incur high energy cost.

5. Lot of garbage, plant residues, etc. will be generated around the buildings with vertical farming which needs to be dispose off properly. 6. Skilled workforce will be unavailable initially and will need to be trained.

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

Corrosion Mechnasim

The mechanism of corrosion in aqueous media is of electrochemical nature. This means that the oxidation of the metal is counterbalanced by the reduction of another substance in another region of

the metallic surface. Therefore, zones (anodes and cathodes) with different electrochemical potential, develop. In the case of concrete, the electrolyte is constituted by the pore solution, which is very alkaline. This pore solution is formed by mainly a mixture of KOH and NaOH presenting pH values ranging between 12,6- 14. The solution is saturated in Ca(OH)2. Steel embedded in concrete is naturally protected by this high alkalinity and by the barrier effect of the cover itself. The two main causes of electrochemical corrosion are carbonation and the presence of chlorides. Carbonation usually induces a generalized corrosion while chloride will lead into pitting or localized attack. The corrosion can be easily recognized by the rust presence on the rebar and by the appearance of cracks running parallel to the rebars.

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

1) Electrochemical methods use current and an external anode to protect the reinforcement, even when the chloride ion concentration is above the corrosion threshold.

2) Corrosion inhibitors offer protection by raising the threshold chloride concentration level, by reducing the permeability of the concrete, or by doing both.

Corrosion repair techniques:

A recent development is the impregnation with chemical corrosion inhibitors which are widely used in the power generation, chemical and manufacturing industries. Recently, attempts have been made to introduce these chemicals into hardened concrete. If successful, then these could be good, relatively simple methods of increasing the life span, reducing maintenance and providing a 'minimum intervention' method of slowing or stopping corrosion. One of the most effective corrosion inhibiting systems is also one of the simplest. An inorganic admixture made with calcium nitrate, which is added to the concrete before casting, performs equally well or better than more complicated systems that include sealers applied to the concrete or coatings on the steel bars.

5.1.7 Sewage treatment plant :

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

FIG.55 SEWAGE TREATMENT PLANT

Sewage treatment may also be referred to as wastewater treatment. However, the latter is a broader term that can also refer to industrial wastewater. For most cities, the sewer system will also carry a proportion of industrial effluent to the sewage treatment plant that has usually received pre-treatment at the factories to reduce the pollutant load. If the sewer system is a combined sewer, then it will also carry urban runoff (stormwater) to the sewage treatment plant. Sewage is

conveyed in sewerage which comprises the drains, pipework and pumps to convey the sewage to the treatment works inlet.

The aim of treating sewage is to produce an effluent that will do as little harm as possible when discharged to the surrounding environment, thereby preventing pollution.

The main processes involve removing as much of the solid material as possible, and then using biological processes to convert the remaining soluble material into a floc that entraps any remaining fine solids and which can then be settled as a sludge, leaving a liquid substantially free of solids, and with a greatly reduced concentration of pollutants.

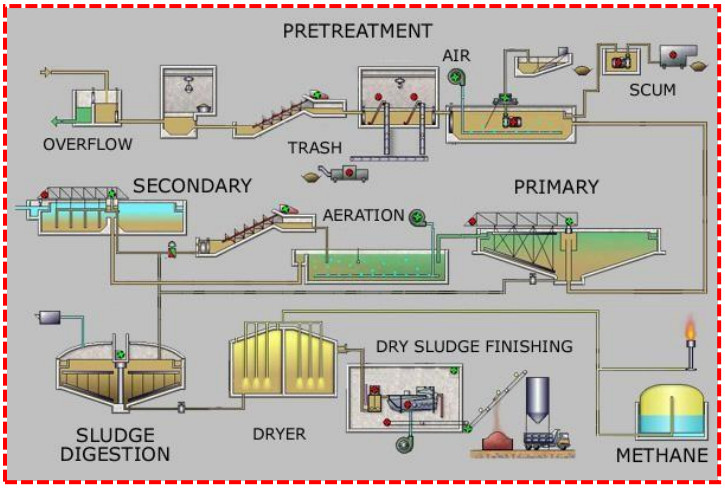


FIG.56 PRETREATMENT PLANT

Sewage treatment generally involves three main stages, called primary, secondary and tertiary treatment but may also include intermediate stages and final polishing processes.

- Primary treatment consists of temporarily holding the sewage in a quiescent basin where heavy solids can settle to the bottom while oil, grease and lighter solids float to the surface. The settled and floating materials are removed and the remaining liquid may be discharged or subjected to secondary treatment. Some sewage treatment plants that are connected to a combined sewer system have a bypass arrangement after the primary treatment unit. This means that during very heavy rainfall events, the secondary and tertiary treatment systems can be bypassed to protect them from hydraulic overloading, and the mixture of sewage and storm-water only receives primary treatment.

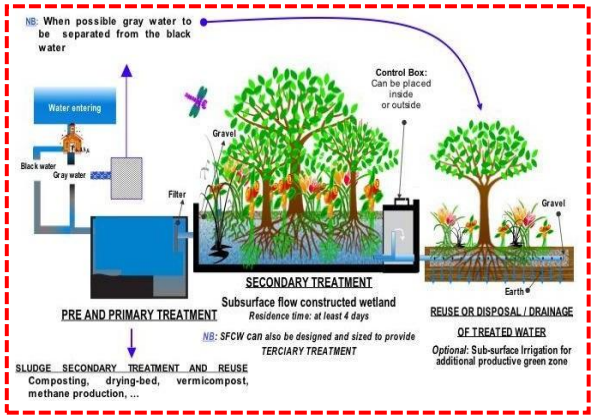


FIG.57 SECONDARY TREATMENT PLANT

- Secondary treatment removes dissolved and suspended biological matter. Secondary treatment is typically performed by indigenous, water-borne micro-organisms in a managed habitat. Secondary treatment may require a separation process to remove the micro-organisms from the treated water prior to discharge or tertiary treatment.
- Tertiary treatment is sometimes defined as anything more than primary and secondary treatment in order to allow ejection into a highly sensitive or fragile ecosystem such as estuaries, low-flow rivers or coral reefs. Treated water is sometimes disinfected chemically or physically (for example, by lagoons and microfiltration) prior to discharge into a stream, river, bay, lagoon or wetland, or it can be used for the irrigation of a golf

course, greenway or park. If it is sufficiently clean, it can also be used for groundwater recharge or agricultural purposes.

5.1.8 Technical Case Study On "Worlds 1st CNG Port Terminal -BHAVNAGAR"

We have selected an port terminal of CNG which will be constructed in Bhavnagar which will be Worlds 1st CNG Port Terminal as a technical case study. It is located 10 kilometers from Bhavnagar. Compressed natural gas is a fuel that can be used in place of petrol (gasoline), diesel fuel, and liquefied petroleum gas (LPG).A State government release said the facility, approval for which was given by the Gujarat Infrastructure Development Board headed by Chief Minister Vijay Rupani, would be the world's first CNG port terminal. It will be developed jointly by UK-headquartered Foresight Group and Mumbai-based Padmanabh Mafatlal Group, the release added.

FIG.58 PROPOSED DEMO DESIGN

The Gujarat Maritime Board (GMB) had signed an MoU with Foresight Group to set up this port terminal at Bhavnagar in the Vibrant Gujarat Summit held in January2019. Apart from the CNG terminal, the investors would also develop a Ro-Ro terminal, liquid cargo terminal and container terminal at Bhavnagar port with a cumulative investment of 1,900 crore, said the release. The proposed CNG port terminal will have a capacity to handle 1.5 million metric tonne per annum (MMTPA). The GMB manages the existing port at Bhavnagar, having a capacity to handle three MMTPA cargo, and the new terminals would take the overall capacity to nine MMTPA, the release said. While the consortium would invest 1,300 crore in the first phase, 600 crore will be invested in the second phase. To develop CNG and other terminals on the north side of the existing port would require major modifications in the existing infrastructure, including dredging in water channel of port basin, construction of two lock gates and off-shore infrastructure for CNG transportation. Completion of the CNG terminal in Bhavnagar could take nearly 4.5 years

Reason for Location of Bhavnagar:

Qatar provides major gas supply to India from Ship & the Bhavnagar is in the best location possible for the port establishment.

Already handling RO-RO ferry services in Dahej which gives advantage.

Design

The CNG terminal in Bhavnagar will be built in multiple phases, the first of which is estimated to cost INR13bn ($180m).

The project will have a capacity of handling 1.5 million tonnes of cargo annually. Besides, it will have a liquid cargo terminal with a capacity of 4.5 million tonnes per annum, a container and white cargo terminal, and an RO-RO terminal.
As per the Gujarat government, the consortium of developers will begin preparing a detailed project report (DPR) and work towards securing an environmental approval. The processes are expected to take 18 months, following which the construction works at the site will be completed in three years, said the state government.

FIG.59 EXISTING PORT

To enable the development of the CNG terminal, the Bhavnagar port will see certain modifications in the existing infrastructure, reported The Hindu. These include dredging in channel and port basin, and addition of two new lock-gates and infrastructure facilities for CNG transportation on shore.

The Gujarat government stated: ‒At present, the Bhavnagar port is managed by the Gujarat Maritime Board and handling 30-lakh metric tonnes of cargo per year. With the completion of the CNG Terminal, the cargo handling capacity of the Bhavnagar port will become 90-lakh metric tonnes per annum.‖

The government expects the benefits of the CNG terminal project to pass on to the northern and western regions of India as well due to the connectivity that Bhavnagar has with broad-gauge railways and national highways.

LOCATION	OWNER & OPERATOR	REGAS CAPACITY
DAHEJ (GUJARAT)	PLL	17.5
HAZIRA (GUJARAT)	SHELL	5
KOCHI (KERELA)	PLL	5
KOCHI (KERELA)	GAIL	1.3
MUNDRA (GUJARAT)	GSPC LNG LTD	5
ENNORE (TAMILNADU)	INDIAN OIL	5

TABLE NO.19 EXISTING LNG TERMINALS

TOTAL CAPACITY 38.8 MMTPA
TOTAL REGAS CAPACITY 140MMSCMD

USE OF NATURAL GAS

1) **GENERATION OF ELECTRICITY BY UTILITIES-** AS FUEL FOR BASE LOAD POWER PLANTS IN COMBINED CYCLE/CO-GENERATED POWER PLANTS
2) **FERTILIZER INDUSTRY -** AS FEED STOCK IN THE PRODUCTION OF AMONIA AND UREA
3) **INDUSTRIAL -** AS AN UNDER BOILER FUEL FOR RAISING STEAM AS FUEL IN FURNANCE AND HEATING APPLICATIONS

4) **DOMESTIC & COMMERCIAL -** FOR HEATING OF SPACES AND WATER FOR COOKING
5) **AUTOMATIVE -** AS A NON POLLTING FUEL
6) **PETROCHEMICALS -** AS THE RAW MATERIAL FROM WHICH A VARIETY OF CHEMICAL PRODUCT E.G METHANOL ARE DERIVED

Gujarat will be the only state in the country, which will have terminals for both CNG and LNG (with LNG terminals at Dahej and Hazira).The project will create vast employment opportunities for Bhavnagar and adjoining area youth in logistics, transportation and warehousing.

Drawbacks of CNG Vehicles

- Another essential disadvantage of the CNG is its shorter range compared to the diesel and petrol vehicle. The lower fuel range means that you will have to take the car to refilling station more regularly. Additionally, the fuel efficiency of CNG-powered vehicles is also lower than other regular vehicles.

- Compared to the petrol and diesel-powered counterparts, the CNG versions are usually more expensive in case the car manufacturer provides both diesel/petrol variants and factory-fitted CNG version. For vehicles that are not originally available with CNG kit, the owners have to pay an extra amount of money to converse regular car into CNG-powered version.

- The CNG tanks are installed on cargo space of the car. This additional fuel tank usually takes up a lot of space at the back. For vehicles with limited boot space like hatchback or sedans, the instalment of the fuel tank can consume most of the cargo space which hardly allows the car to load any luggage or stuff. The loss of boot space is one factor that you should take into account when considering buying CNG car or conversing your car into CNG-fitted vehicle.

FIG.60 PROPOSED INFRASTRUCTURE DEVELOPMENT

- Apart from the lowered performance output, the instalment of CNG kits also put heavy tools on the function of the engine injector. It is advised that for the first drive, the CNG vehicle should run on the petrol engine. Petrol serves as an effective lubricant that can warm the engine up and help the motor to perform better. Otherwise, using the CNG for the first run might make the fuel injectors get dry easily. In the long run, it can cause a heavy impact on fuel injection and hamper the performance of the engine in the long run

Chapter 6.

Swachh Bharat Abhiyan (Clean India) :

Introduction

It is a country-wide campaign initiated by the Government of India in 2014 to eliminate open defecation and improve solid waste management (SWM). Phase 1 of the mission lasted till October 2019. Phase 2 will be implemented between 2020-21 and 2024-25.

Initiated by the Government of India, the mission aimed to achieve an "open-defecation free" (ODF) India by 2 October 2019, the 150th anniversary of the birth of Mahatma Gandhi. The objectives of the first phase of the mission also included eradication of manual scavenging, generating awareness and bringing about a behavior change regarding sanitation practices, and augmentation of capacity at the local level. The second phase of the mission aims to sustain the open defecation free status and improve the management of solid and liquid waste. The mission is aimed at progressing towards target of the Sustainable Development Goals Number 6 established by the United Nations in 2015.

The campaign's official name is in Hindi. In English, it translates to "Clean India Mission". The campaign was officially launched on 2 October 2014 at Rajghat, New Delhi by Prime Minister Narendra Modi. It is India's largest cleanliness drive to date with three million government employees and students from all parts of India participating in 4,043 cities, towns, and rural communities. At a rally in Champaran, the Prime minister called the campaign Satyagrah se Swachhagrah in reference to Gandhi's Champaran Satyagraha launched on 10 April 1916. The mission was split into two: rural and urban. In rural areas "SBM - Gramin" was financed and monitored through the Ministry of Drinking Water and Sanitation; whereas "SBM - urban" was overseen by the Ministry of Housing and Urban Affairs.

As part of the campaign, volunteers, known as Swachhagrahis, or "Ambassadors of cleanliness", promoted indoor plumbing and community approaches to sanitation (CAS) at the village level. Other activities included national real-time monitoring and updates from non-governmental organizations (NGOs) such as The Ugly Indian, Waste Warriors, and SWaCH Pune (Solid Waste Collection and Handling).

The government provided subsidy for construction of nearly 110 million toilets between 2014 and 2019, although many Indians especially in rural areas choose to not use them. The campaign was criticized for using coercive approaches to force people to use toilets. Many households were threatened with a loss of benefits such as access to electricity or food entitlements through the public distribution system. To accelerate the efforts to achieve universal sanitation coverage and to put the focus on sanitation, the Prime Minister of India had launched the Swachh Bharat Mission on 2nd October 2014. Under the mission, all villages, Gram Panchayats, Districts, States and Union Territories in India declared themselves "open-defecation free" (ODF) by 2 October 2019, the 150th birth anniversary of Mahatma Gandhi, by constructing over 100 million toilets in rural India. To ensure that the open defecation free behaviours are sustained, no one is left behind, and that solid and liquid waste management facilities are accessible, the Mission is moving towards the next Phase II of SBMG i.e ODF-Plus. ODF Plus activities under Phase II of Swachh Bharat Mission (Grameen) will reinforce ODF behaviours and focus on providing interventions for the safe management of solid and liquid waste in villages.

6.1 Swachhta needed in Thordi village -Existing Situation with photograph :

We have done one survey on existing condition of village regarding swachhta. The people are maintaining cleanliness of the village but in some streets there is no swachhata because there are animal and their waste , mud, etc. The stuuf gets collected in open which looks inappropriate. Other than these there re clean streets, main road and approach road

FIG. 61 EXISTING PHOTO OF VILLAGE

Some Suggestions/things to be implemented are:

- Dry and Wet Dustbins
- Garbage Collecting Cars
- Sweepers with good skills to clean
- Time management
- Responsible Residents
- Public Toilets
- Dustbins Near individual Houses of the Village.

6.2 Guidelines - Implementation in Thordi village with Photograph :

FIG.62 EXISTING PHOTOS OF SWACHHTA

According to Talati, Sarpansh and villagers, the people are cleaning their nearby area regularly and collect that waste and dispose it to out of the village and burn it. No daily basis waste collection is therein the Thordi village

6.3 Activities Done by Students for Thordi village with Photograph :

Firstly we took a permission from village Talati and Sarpanch for doing one Swachhta awareness camp and then we have done one activity of swachhta awareness in the village and we have done an interaction with villagers and aware them about the importance of swachhta in our life and told them to keep the village and infrastructure clean and safe. We have also done a cleaning of village street.

FIG.63 Swachata Awarness Activity Photo

We have suggested them for not dumping the waste in village streets and dispose it at right place.Villagers were motivated to keep their surroundings clean so that the community may be free from diseases. Peoples were made aware and educated about the importance of cleanliness, sanitation and hygiene. They were told that cleanliness is an integral part of our civilization which is one of the good qualities for a healthy life.

We also stressed upon positive thinking, good health and personal hygiene and how these factors may contribute to improve their financial condition by reducing expenditure on treatment of diseases at one hand and by converting garbage and agricultural waste in to compost for using in agriculture on the other hand. They were educated to understand difference between biodegradable and non-biodegradable waste and advised to collect and segregate garbage and waste and dispose off accordingly.

Chapter 7.

Village condition due to Covid-19 :

The COVID-19 pandemic has brought the entire nation to a halt. Health officials and medical professionals are struggling with containing the disease, and testing and treating affected people. Last night, Prime Minister Narendra Modi announced a three-week, nation-wide, complete lockdown to contain the spread of this virus, as the number of reported positive cases in India crossed 500. In a COVID-19 pandemic there are lots of difficulties comes and gone but all villagers took care about it.Gram panchayat of the village took a prorper care of sanitation and hygine.In Lock down situtation all the government guide line are followed in village. All the road are two-three time a week taking care of cleaning work on daily basis and proper spary of DDT powder are done by gram panchayat. The nation-wide lockdown imposed in India from March 25 to May 31, 2020 following the breakout of the Covid-19 pandemic affected rural India in diverse ways. This was only to be expected given the great variation in production systems and socio-economic conditions in villages across agro-ecological zones

7.1 Taken steps in Thordi village related to existing situation with photograph :

During interaction with the Talati, he told us that quarantine place and home quarantine facility were implemented during the lockdown. According to Talati, Sarpanch and villagers ; in the Thordi village the sanitization process was done during the lockdown period when first case of covid 19 came in the village.

Awareness about COVID-19 transmission and protective measures was given through online mode.

7.2 Activities Done by Students for Thordi village with Photograph:

We have taken a permission from Talati and Sarpanch for doing one awareness regarding covid 19 in the Thordi village and then we did awareness camp regarding covid 19. In that awareness camp we have distributed some face masks to the villagers for the protection against covid 19 and aware them about covid 19 situation in India and told them to take precautionary measures like wear a mask perfectly, wash hands regularly, maintain social distancing in public and avoid crowdy area & firstly make yourself home quarantined if you fill any COVID-19 symptom in your body.

FIG.64 Mask Distribution

We have also suggest that the pandemic should not be taken in negative way & we should not be scared but the precautions should be taken. As shown below in photograph the following measures were spread against coronavirus as per the Ministry of Health & Family welfare by Government of India in the villages.

We have inform them not to gather as regularly in the open area for unnecessary meetings, & to stay at home & stay safe.

FIG.65 Protective measures Against Covid-19

7.3 Any other steps taken by the students / villagers :

During interaction with the Talati, she told us that quarantine place and home quarantine facility were implemented during the lockdown. In the COVID-19 situation cleaning, fogging and sanitization were done in the village. We have spread awareness by Mask distribution & giving importance of social distance

Chapter 8.

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

8.1 Design Proposals : Observation and brief write up about each design from 8.1.1 to 8.1.6

1) **Pipe Culvert near School**
   - There is need of pipe culvert due to difficulty in travelling to primary school in monsoon season.
   - Proposed plan elevation, section & Design 3D is Given
2) **Smashan**
   - Smashan is in very bad condition & there is need of new smashan as suggested by sarpanch so we have designed a new smashan.
3) **Snangruh**
   - There is no snangruh available which should be made available so we have designed the snangruh
4) **Residential House Type A & Type B**
   - There are 40% of kuchha houses in thordi village which should be constructed new in pucca houses from PMGY so there are TYPE A & TYPE B design of residential houses for better facility.
5) **Public Garden**
   - There is no public garden available so a public garden is designed.
6) **5 LAKH Liter Sump**

   The population is about 2826 as per census 2011 & as per previous 30 years & future 30 years calculation the population will be 5728 which will posses 135 liters per person which is 773280 liters of water as there is 300000 liter capacity of sump available we have designed 500000 liters of sump for storage.

****All the drawings ,of proposed designs like plan, elevation, section and 3D model , have been added at the end of report of part 1 from page number 167 to 172. And all these drawings have also been added in their respective designs.**

8.1.1 Pipe Culvert near School

Scenario : As shown below there is water passing through which creates difficulty in travelling to higher secondary school.

FIG.66 EXISITNG LOCATION OF PIPE CULVERT

Proposed Design in Auto cad and Skechup :

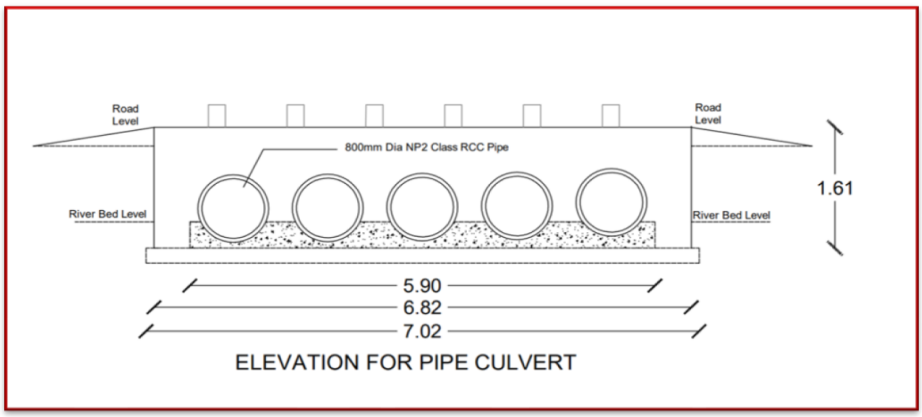


FIG.67 THORDI ELEVATION FOR PIPE CULVERT

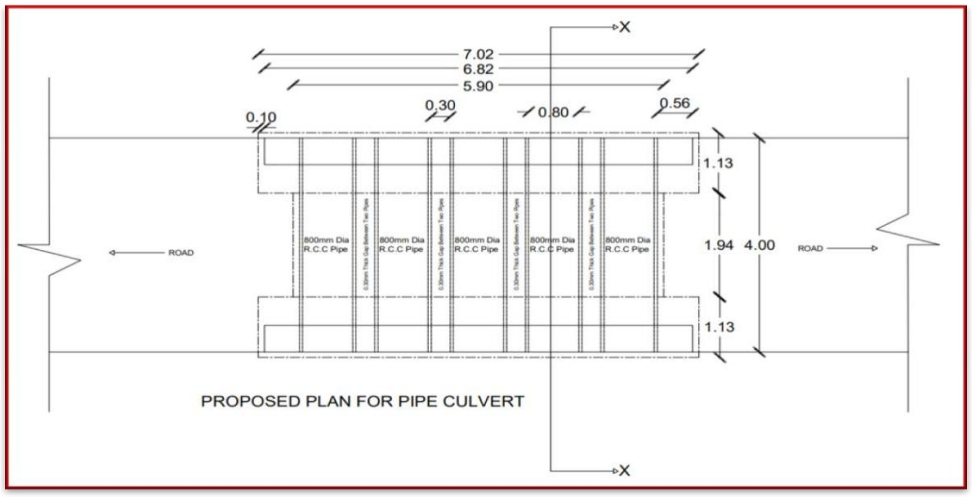


FIG.68 THORDI PROPOSED PLAN FOR PIPE CULVERT

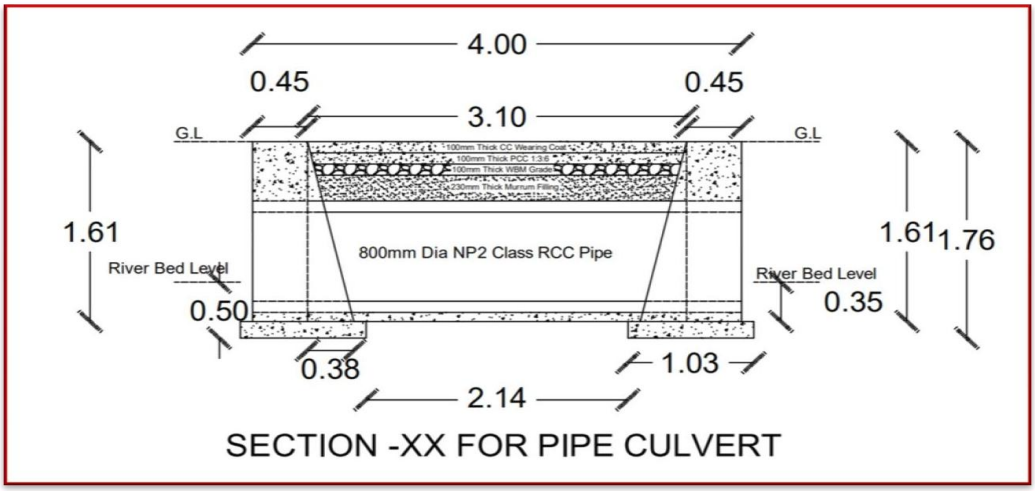


FIG.69 THORDI CULVERT SECTION X-X FOR PIPE CULVERT

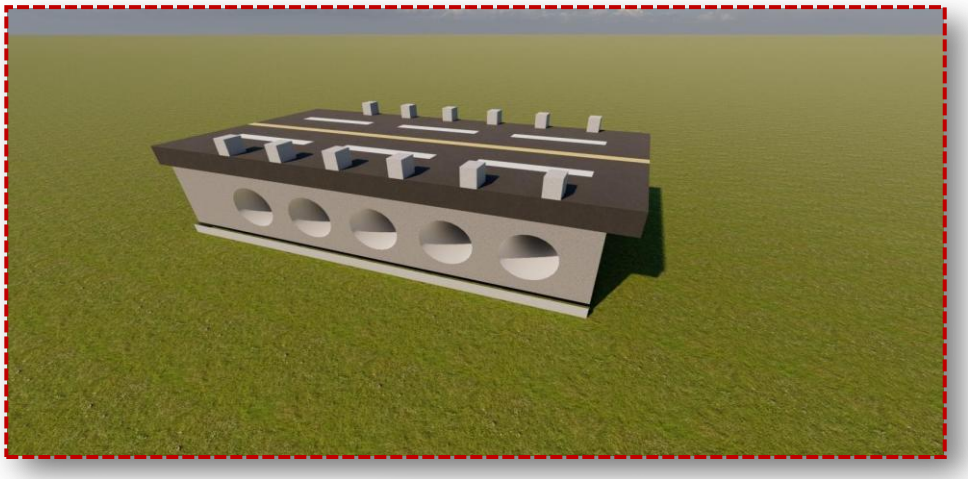


FIG.70 THORDI 3D ELEVATION OF PIPE CULVERT

Pipe Culvert : Measurement Sheet (T-20 Pipe Culvert measurement sheet)

SR. NO	Description	Length (m)	Width (m)	Height (m)	Nos	Total Quantity
1	Excavation for foundation	7.02	4.2	0.5	1	**14.742 (M^3)**
2	Cement concrete 1:3:6 formwork in (a) Foundation and plinth	6.82	2	1.03	1	**14.05 (M^3)**
3	Cement concrete M-200 (B) Walls, fom top of foundation level upto floor two level					
A.	RECTANGLE	6.82	0.45	1.61	1	4.94
B.	TRIANGLE	0.5	0.38	1.61	1	0.30
				Total	**5.24 (M^3)**	
4	Providing form work of ordinary timber planking (C) Vertical surface such as walls (any thickness) partitions.	7.02	2.30	-	3	**48.58 (SQ MT)**
5	Filling in Foundation	7.02	3.05	0.5	1	**10.70 (M^3)**
6	NP2 PIPE 800mm dia	4	-	-	5	**20 RMT**
7	100mm thick WBM Grade - I	7.02	0.1	3.1	1	**2.18 (M^3)**
8	Concrete M-200	7.02	0.1	3.1	1	**2.18 (M^3)**
9	Fe-500/500D TMT Bars reinforcement A)piers B) abutments C) R.C.C.Returns	0.11	-	-	-	**0.11 MT**
10	Fe-500/500D TMT Bars reinforcement. A) RCC Karb B) RCC Footpath C) R.C.C.Approch slab (D) Wearing Coat	0.12	-	-	-	**0.12 MT**
11	Guard stone	12	-	-	-	**12**

						NOS
12	A.C. pipes of 100mm diameter	9	-	-	-	**9 NOS**

Pipe Culvert : Abstract Sheet (T-21- Pipe Culvert)

Sr. no	Description	Quantity (m^3)	Rate	Per	Amount
1	Excavation for foundation	14.74	86.76	M^3	**1,278.84**
2	Cement concrete 1:3:6 formwork in (a) Foundation and plinth	14.05	2382.99	M^3	**33,481**
3	Cement concrete M-200 (B) Walls, fom top of foundation level upto floor two level	5.25	3714.78	M^3	**19,502.59**
4	Providing form work of ordinary timber planking (C) Vertical surface such as walls (any thickness) partitions.	48.58	149.98	M^2	**7,286.02**
5	Filling in Foundation	10.7	290.88	M^3	**3,112.42**
6	NP2 PIPE 800mm dia	20	1363.5	RMT	**27,270**
7	100mm thick WBM Grade - I	2.18	875.67	M^3	**1,908.96**
8	Concrete M-200	2.18	3362.29	M^3	**7,329.79**
9	Fe-500/500D TMT Bars reinforcement A)piers B) abutments C) R.C.C.Returns	0.11	45458.08	MT	**5,000.39**
10	Fe-500/500D TMT Bars reinforcement. A) RCC Karb B) RCC Footpath C) R.C.C.Approch slab (D) Wearing Coat	0.12	44181.44	MT	**5,301.77**
11	Guard stone	12	208.06	NOS	**2,496.72**
12	A.C. pipes of 100mm diameter	9	52.42	NOS	**471.78**
				GRAND TOTAL	**1,14,440.28**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive ofwater charges, contractor‘s profit, contingencies, utilities and labor charges.

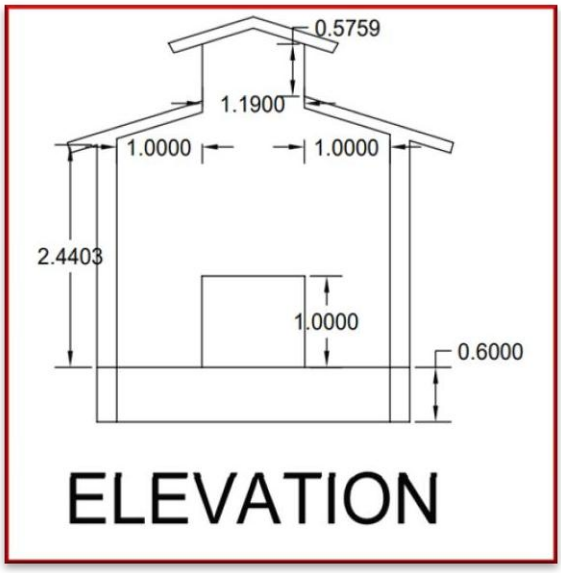
Total cost = ₹ 1,14,440.28/-

8.1.2 Smashan

Scenario : The present Smashan is in bery Poor Condition

FIG.71 THORDI OLD SMASHAN WHICH SHOULD BE CONSTRUCTED NEW

Proposed Design in Auto cad and Skechup :



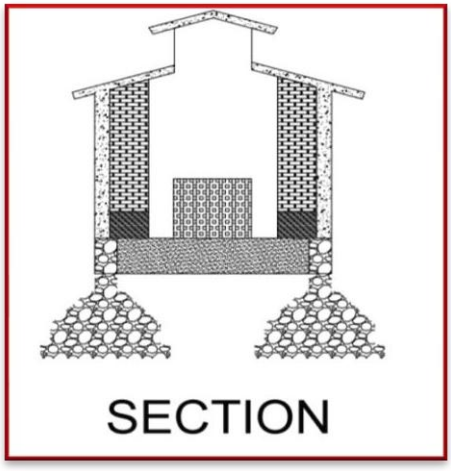


FIG.72 THORDI ELEVATION FOR SMASHAN

FIG.73 THORDI SECTION FOR SMASHAN

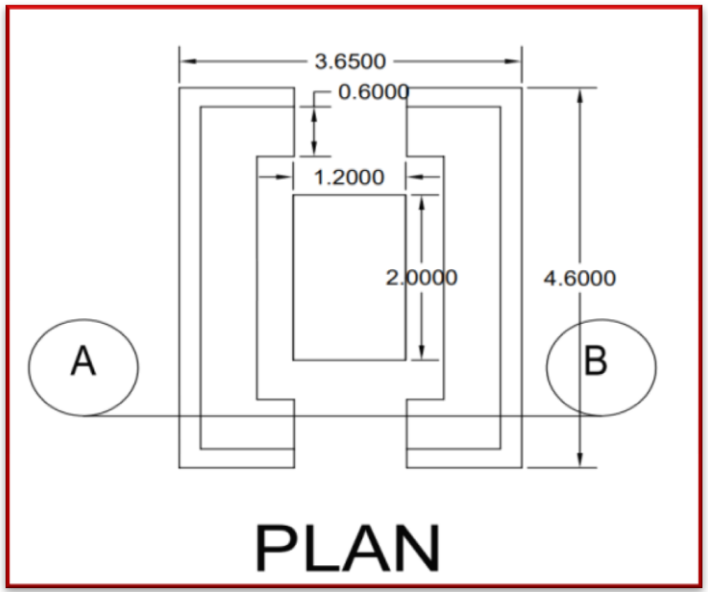


FIG.74 THORDI PLAN FOR SMASHAN

FIG.75 THORDI 3D ELEVATION FOR SMASHAN

Smashan : Measurement Sheet (T-22- Smashan measurement sheet):

SR.NO	DESCRIPTION	LENGTH (m)	WIDTH (m)	HEIGHT (m)	Nos.	Total Quantity
1	Excavation for foundation	0.9	0.9	1.2	4	**3.888 M^3**

2	Providing and laying cement concrete 1:3:6	0.9	0.9	0.15	1	**0.1215 M^3**
3	controlled cement concrete M-200 in : FOUNDATION	0.9	0.9	1.05	4	**3.402 M^3**
4	controlled cement concrete M-200 in : WALLS	9.5	0.12	2.4403	1	2.781942
	SLAB	1.25	0.12	4.8	2	1.44
	SLAB	1.4	0.12	4.8	2	1.6128
					Total	**5.83 M^3**
5	STEEL CASE IN MIDDLE	1	-	-	-	**1 Nos.**
6	TMT Bar FE 500/500D	1.41	-	-	1	**1.416 MT**

Smashan : Abstract Sheet (T-23- Smashan)

SR NO.	Description	Quantity	Rate	Per	Amount
1	Excavation for foundation	3.89	86.75	M^3	337.284
2	Providing and laying cement concrete 1:3:6	0.12	2382.99	M^3	289.5333
3	controlled cement concrete M-200 in : FOUNDATION	3.40	3424.82	M^3	11651.24
4	controlled cement concrete M-200 in : WALLS , slab	5.83	3424.82	M^3	19982.94
5	STEEL CASE IN MIDDLE	1	4500	-	4500
6	TMT Bar FE 500/500D	1.42	44181.44	MT	62560.92
				GRAND TOTAL	**99321.92**

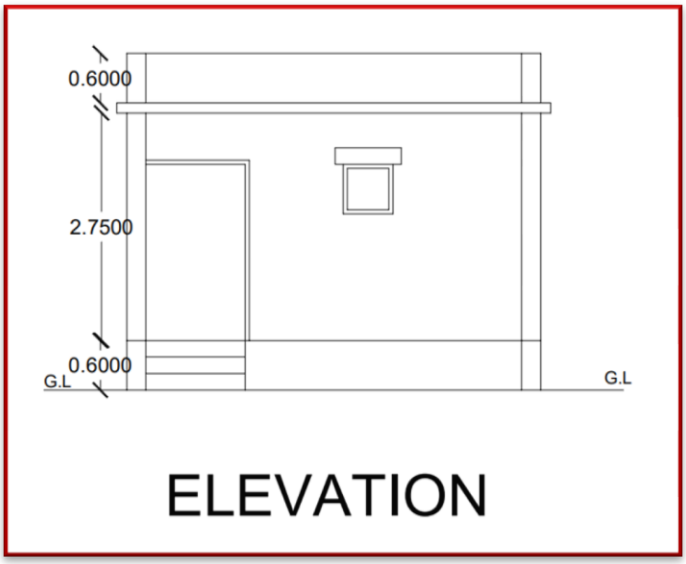
The rates of their respective works provided in the abstract sheet along with quantities are inclusive ofwater charges, contractor‘s profit, contingencies, utilities and labor charges.

Total cost = ₹ 99321.92/-

8.1.3 Snangruh

Scenario : The Present Snangruh is very far from the smashan & not in appropriate condition.

Proposed Design in Auto cad and Skechup :



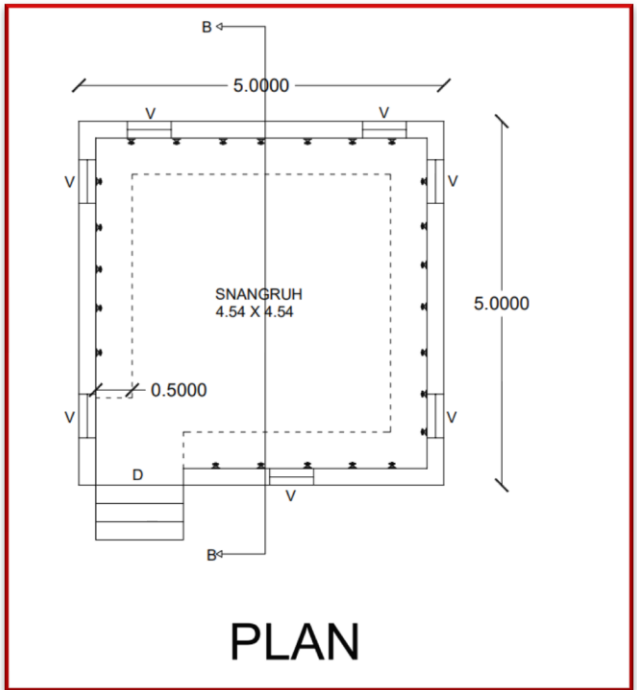


FIG.76 THORDI PLAN & ELEVATION FOR SNANGRUH

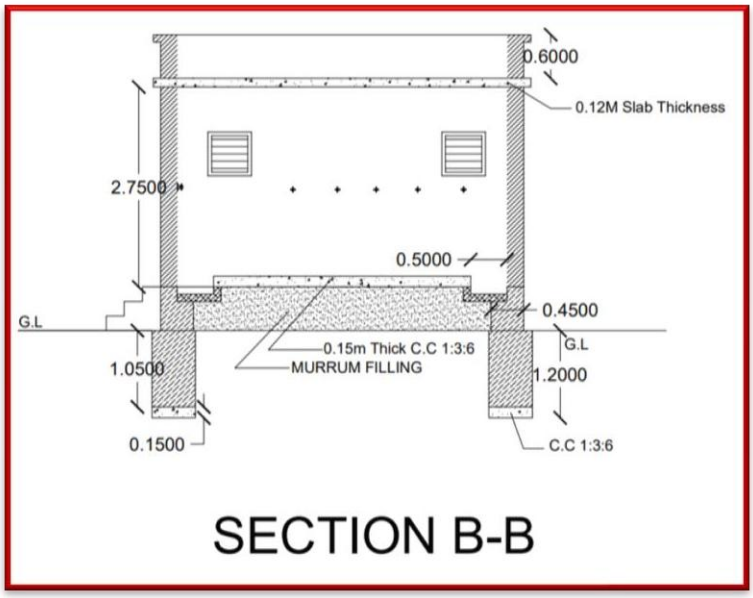


FIG.77 SECTION FOR SNANGRUH

FIG.78 3D ELEVATION FOR SNANGRUH

FIG.79 3D ELEVATION FOR SNANGRUH

Snangruh : Measurement Sheet (T-24- Snangruh measurement sheet)

SR.NO	DESCRIPTION	LENGTH (m)	WIDTH (m)	HEIGHT (m)	Nos.	Total Quantity
1	Excavation for foundation	19.08	0.6	1.2	1	**13.7376 M³**
2	cement concrete 1:3:6 (a) Foundation and plinth (INNER SIDE)	4.84	4.84	0.15	1	3.51384 M³
	FOUNDATION	19.08	0.6	0.15	1	1.71 M³
					TOTAL	**5.23 M3**
3	(ii) Uncoursed Rubble Masonary FOUNDATION	19.08	0.6	1.05	1	**12.02 M³**
4	(ii) Coursed Rubble Masonary.	19.08	0.45	0.6	1	**5.15 M³**
5	cement concrete 1:3:6 in (A) Wall / Copping	19.08	0.23	0.15	1	**0.65826 M³**

6	Filling in plinth	4.1	4.1	0.45	1	**7.56 M^3**
7	cement concreteM-200 (C) Slabs,	5.3	5.3	0.12	1	**3.3708 M^3**
8	TMT Bar FE 415 Reinforcement	309.6	-	-		**0.309 MT**
9	Brick work Conventional	19.08	0.23	3.15	1	**13.82 M^3**
10	Providing 15 mm thick cement plaster INNER SIDE	2.75	4.54	-	4	49.94
	deduction door	2.1	1.2	-	1	2.52
	deduction ventilation	0.6	0.6	-	7	2.52
					TOTAL	**61.23 SQ.MT**
11	20mm Thick Sand cement plaster on walls	4.07	-	4.07	4	**66.26 SQMT**
12	Wall painting with plastic emulsion paint	2.75	-	4.54	4	**49.94 SQMT**
13	Finishing Wall with Weather Proof Exterior Emulsion Paint	4.07	-	4.07	4	**66.2596 SQMT**
14	kota stone slab flooring (A) 25 mm thick	4.54	-	4.54	1	**20.6116 SQMT**
15	Kota stone slab 25 mm.	18.16	-	0.1	1	**1.816 SQMT**
16	coloured digital glazed tiles of he size 300mm x 200mm x 8mm	4.54	-	1.375	4	**24.97 SQMT**
17	Double coated Syntex of Equivalent PVC (ISI) Mark Water Tank of on Terrace. 1000 Liter Capacity	-	-	-	2	**2000 LIT**
18	PVC SWR Nahni Trap	2	-	-	1	**2 NOS.**
19	Gun metal check or non-return full-way wheel value. (c) 25mm dia	1	-	-	1	**1 NOS.**

20	(B) Brass chromium plated screws down Bib Tap. (i) 15mm dia.	24	-	-	1	**24 NOS.**
21	U.P.V.C. Pipe (SCH-40). (A) 15mm dia.	15	-	-	1	15
	(D) 40mm dia.	15	-	-	1	15
					TOTAL	**30 RMT**
22	U.P.V.C. SWR (A) 160mm dia.	10	-	-	1	10
	(B) 110mm dia.	10	-	-	1	10
					TOTAL	**20 RMT**
23	G.I. Rain water spout of 50mm dia. and 30cm. length.	2	-	-	1	**2 RMT**
24	Providing and fixing gun metal chek	1	-	-	1	**1 NOS.**
25	broken chine mosaic flooring	4.54	-	4.54	1	**20.6 SQMT**
26	Point wiring for Light / Bell with 2-1.5 sq.mm & earthwire of 1.5 sq.mm (Green) both are of ISI marked	10	-	-	1	**10 PTS.**

Snangruh: Abstract Sheet (T-25- Snangruh)

SR NO.	Description	Quantity	Rate	Per	Amount
1	Excavation for foundation	13.74	86.75	M3	1191.737
2	cement concrete 1:3:6 (a) Foundation and plinth	5.23	2382.99	M3	12465.52
3	(ii) Uncoursed Rubble Masonary FOUNDATION	12.02	1876.58	M3	22557.24
4	(ii) Coursed Rubble Masonary.	5.15	2457.33	M3	12659.18
5	cement concrete 1:3:6 in (A) Wall / Copping	0.66	2853.25	M3	1878.18
6	Filling in plinth	7.56	420.16	M3	3178.3

7	Cement concrete M-200 (C) Slabs, Landing, shelves,	3.37	3424.82	M3	11544.38
8	TMT Bar FE 415 Reinforcement	0.31	44.74	KG	13.82466
9	Brick work Conventional	13.82	3002.73	M3	41508.12
10	Providing 15 mm thick cement plaster INNER SIDE	44.9	148.77	SQ.MT	6679.773
11	20mm Thick Sand cement plaster on walls	61.22	207.05	SQ.MT	12675.52
12	Wall painting with plastic emulsion paint	49.94	50.09	SQ.MT	2501.495
13	Finishing Wall with Weather Proof Exterior Emulsion Paint	66.26	72.72	SQ.MT	4818.398
14	kota stone slab flooring (A) 25 mm thick	20.61	767.6	SQ.MT	15821.46
15	Kota stone slab 25 mm. Thick in risers of steps, dedo and pillars	1.82	670.64	SQ.MT	1217.882
16	coloured digital glazed tiles of he size 300mm x 200mm x 8mm /	24.97	899.91	SQ.MT	22470.75
17	double coated Syntex of Equivalent PVC (ISI) Mark Water Tank of on Terrace. 1000 Liter Capacity	2000	4.65	LTR	9300
18	PVC SWR Nahni Trap	2	354.51	NOS.	709.02
19	Gun metal check or non- return full-way wheel value. (c) 25mm dia	1	489.85	NOS.	489.85
20	Brass chromium plated screws down Bib Tap. 15mm dia.	24	219.17	NOS.	5260.08
21	U.P.V.C. Pipe (SCH-40). (A) 15mm dia.	15	85.75	RMT.	1286.25
	(D) 40mm dia.	15	174.73	RMT.	2620.95
22	U.P.V.C. SWR (A) 160mm dia.	10	927.18	RMT.	9271.8
	(B) 110mm dia.	10	530.25	RMT.	5302.5
23	G.I. Rain water spout of 50mm dia. and 30cm. length.	2	72.92	NOS.	145.84
24	Providing and fixing gun metal chek	1	771.64	NOS.	771.64
25	broken chine mosaic flooring	20.61	475.71	SQ.MT	9805.144
26	Point wiring for Light / Bell with 2-1.5 sq.mm & earthwire of 1.5 sq.mm (Green) both are of ISI marked	10	353.5	PTS.	3535
		GRAND TOTAL			**221679.8**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive ofwater charges, contractor‘s profit, contingencies, utilities and labor charges.

Total cost = ₹ 221679.8/-

8.1.4 Residential Houses Type A & Type B

Scenario : There are 40% kutcha houses in the village the villagers can make new pucca houses by their own or with the help of PMGGY. Type A

Length : 19.91m ; Width : 3.61m :

Height: 3.65m Carpet area : 71.87m^2

Proposed Design in Auto cad; Revit and Skechup :

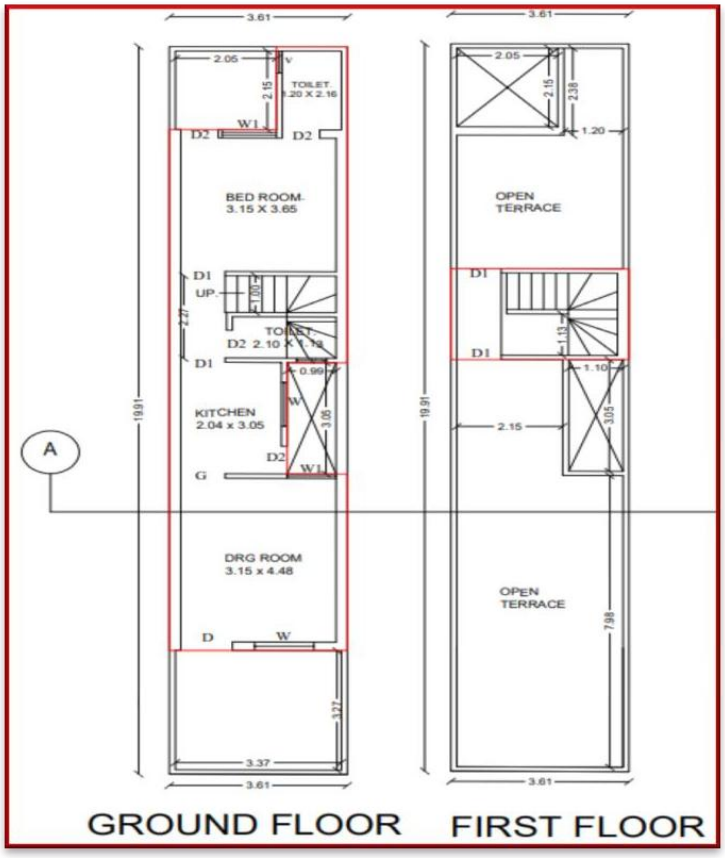


FIG.80 THORDI TYPE A PLAN FOR RESIDENTIAL HOUSE

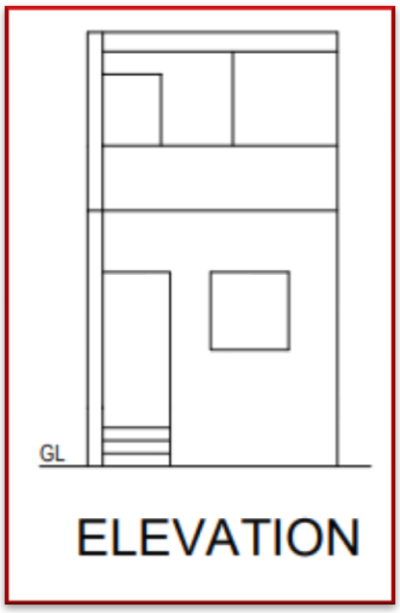


FIG.81 THORDI TYPE A ELEVATION

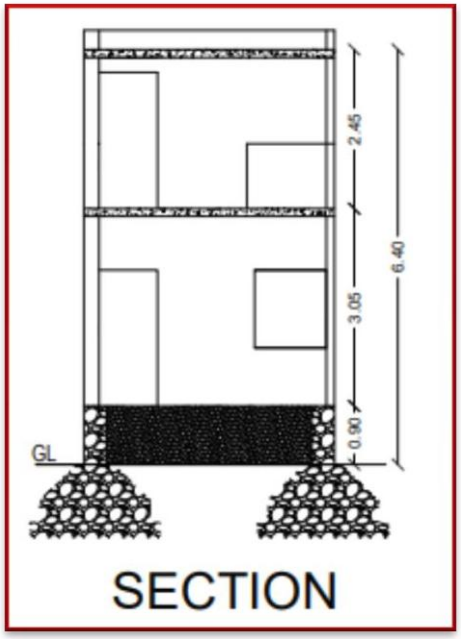


FIG.82 TYPE A SECTION FOR HOUSE

TYPE A

FIG.83 THORDI TYPE A 3D ELEVATION FOR HOUSE

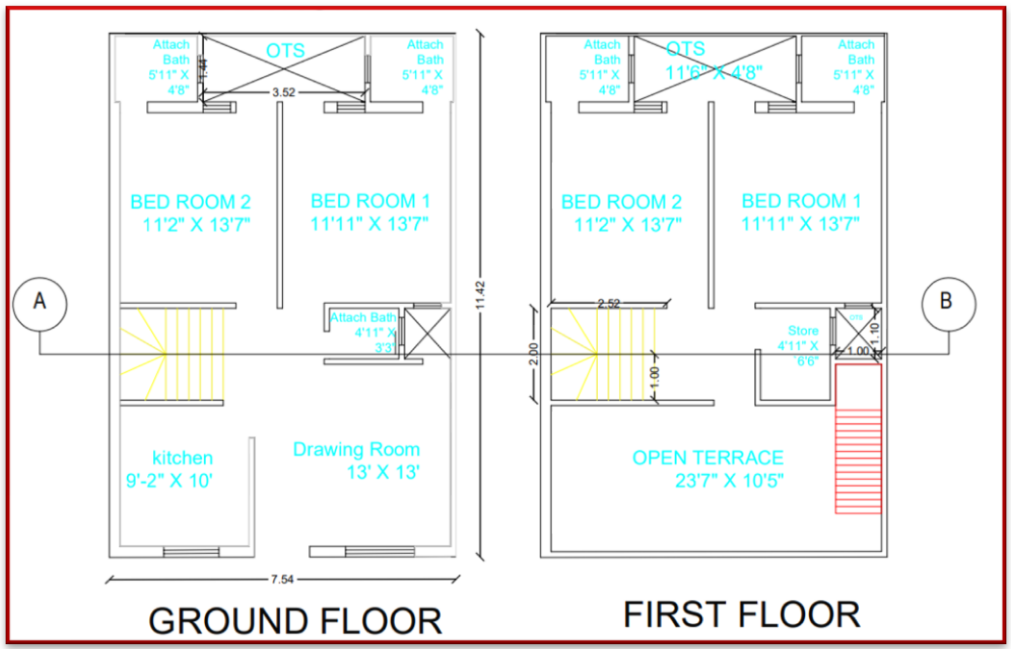


FIG.84 THORDI TYPE B PLAN FOR RESIDENTIAL HOUSE

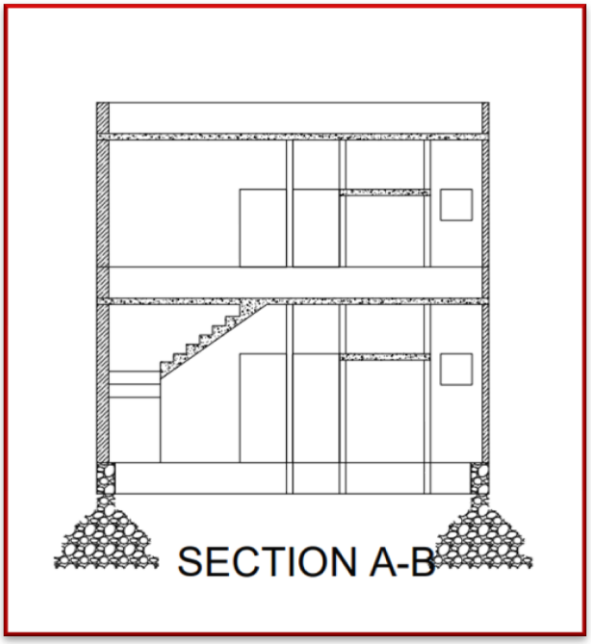


FIG.85 THORDI TYPE B SECTION

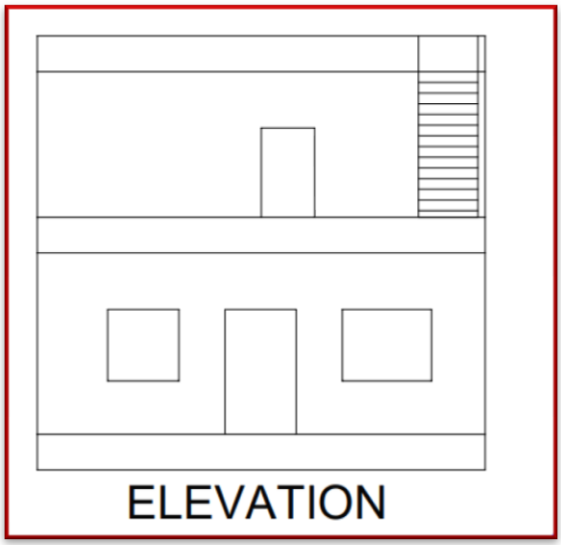


FIG.86 TYPE B ELEVATION FOR HOUSE

TYPE B

FIG.87 THORDI TYPE B 3D ELEVATION FOR HOUSE

Residential House TypeA: Measurement Sheet (T-26- RH Type A measurement sheet)

SR.NO	DESCRIPTION	LENGTH (m)	WIDTH (m)	HEIGHT (m)	Nos.	Total Quantity
1	Excavation for foundation	66.07	0.9	0.5	1	**29.7315 M3**
2	Cement concrete 1:3:6 (a) Foundation and plinth	66.07	0.9	4	1	**237.852 M3**
3	concrete M-200 and: FOUNDATION	66.07	0.9	0.9	1	**53.5167 M3**
4	Brick work using (A) GROUND FLOOR	51.94	0.23	2.93	1	35.00
	(B) FIRST FLOOR STAIR CABIN	11.04	0.12	2.45	1	3.24576
	PARAPET	46.56	0.12	1	1	5.5872
	PARAPET STAIR CABIN	11.04	0.12	0.3	1	0.39744
	DEDUCTION DOOR	1.05	0.23	2.1	1	0.39744
	DEDUCTION DOOR 1	0.9	0.12	2.1	4	0.9072
	DEDUCTION DOOR 2	0.75	0.23	2.1	4	1.449
	DEDUCTION GAP	0.9	0.12	2.1	1	0.2268
	DEDUCTION WINDOW	1.2	0.23	1.2	2	0.6624
	DEDUCTION WINDOW 1	1.1	0.23	1.2	2	0.6072

	DEDUCTION VENTILATION	0.6	0.12	0.6	2	0.0864
					TOTAL	**39.90 M3**
5	Controlled cement concrete M-200 and					
	GROUND FLOOR SLAB	16.64	0.12	3.61	1	7.208448
	FIRST FLOOR SLAB	3.61	0.12	2.48	1	1.074336
	DEDUCT OTS	1.1	0.12	3.05	2	0.8052
	DEDUCT OTS 2	2.05	0.12	2.15	2	1.0578
					TOTAL	**6.42 M3**
6	TMT bars Fe-415 grade for all diameters	1.29	-	-	-	**1.29 MT**
7	30MM THICK FLUSH DOOR OF ISI MARK. D	1.05	-	2.1	1	2.205
	D1	0.9	-	2.1	4	7.56
	D2	0.75	-	2.1	4	6.3
					TOTAL	**16.065 SQMT**
8	Alluminium Window W	1.2	-	1.2	2	2.88
	W1	1.1	-	1.2	2	2.64
	VENTILATION	0.6	-	0.6	2	0.72
					TOTAL	**6.24 SQMT**
9	Vitrified tiles 8 to 10 mm thick , 24'' x 24''	19.91	-	3.61	1	71.8751
	DEDUCT TOILET	2.16	-	1.2	2	5.184
	DEDUCT TOILET	2.1	-	1.13	2	4.746
					TOTAL	**61.95 SQMT**
10	Ceramic tiles 6mm thick TOILET 1 FLOOR	2.1	-	1.13	1	2.373
	TOILET 1 LONG SIDE	1.2	-	2.1	2	5.04
	TOILET 1 SHORT SIDE	1.13	-	2.1	2	4.746
	TOILET 2 FLOOR	1.2	-	2.16	1	2.592
	TOILET 2 LONG SIDE	2.16	-	3.05	2	13.176
	TOILET 2 SHORT SIDE	1.2	-	3.05	2	7.32
					TOTAL	**35.25 SQMT**
11	broken China Mosaic Flooring for Terrace. ALL TERRACE	19.67	-	3.37	1	66.2879
	DEDUCT OTS 1	1.1	-	3.05	1	3.355
	DEDUCT OTS 2	2.05	-	2.15	1	4.4075
					TOTAL	**58.52 SQMT**
12	coloured glazed tiles of the size 300 mm x 200 mm x 8 mm		-			
	LONG SIDE	3.05	-	2.5	1	7.625
	SHORT SIDE	1.1	-	2.5	1	2.75

					TOTAL	**10.37 SQMT**
13	Cement plaster 20 mm thick	AS PER CALCULATION	-	SHEET		**204.70 SQMT**
14	Providing 15 mm thick cement plaster	AS PER CALCULATION	-	SHEET		**137.2 SQMT**
15	Finishing Wall with Weather Proof Exterior Emulsion Paint on Wall	AS PER CALCULATION	-	SHEET		**204.70 SQMT**
16	Applying Two Coats of (Putty) and two coats of primer	AS PER CALCULATION	-	SHEET		**137.2 SQMT**
17	Water closet (Anglow Indian) [I] In White Colour	1	-	-	-	**1 Nos.**
18	Water closet (European type W.C. Pan)	1	-	-	-	**1 Nos.**
	PLUMBING WORK	@	6%	-	-	6%
	ELECTRIC WORK	@	6%	-	-	6%

Residential House Type A : Abstract Sheet (T-27- RH Type A abstract sheet)

SR NO.	Description	Quantity	Rate	Per	Amount
1	Excavation for foundation	29.73	86.75	M3	2579.208
2	Cement concrete 1:3:6 (a) Foundation and plinth	**237.85**	**2382.99**	**M3**	**566798.9**
3	concrete M-200 and: FOUNDATION	**53.52**	**3424.82**	**M3**	**183285.1**
4	Brick work using (A) GROUND FLOOR	**39.90**	**3002.73**	**M3**	**119797.9**
5	Controlled cement concrete M-200	**6.42**	**3424.82**	**M3**	**21986.6**
6	TMT bars Fe- 415 grade for all diameters	**1.29**	**44181.44**	**MT**	**56994.06**
7	30MM THICK FLUSH DOOR OF ISI MARK	**16.06**	**3111.81**	**SQ.MT**	**49991.23**
8	Alluminium Window	**6.24**	**2032.12**	**SQ.MT**	**12680.43**
9	Vitrified tiles 8 to 10 mm thick 24'' x 24''	**61.94**	**764.57**	**SQ.MT**	**47361.37**

10	Ceramic tiles6mm thick	35.25	599.94	SQ. MT	21146.09
11	broken China Mosaic Flooring for Terrace.	58.52	475.71	SQ. MT	27841.12
12	coloured glazed tiles of the size 300 mm x 200 mm x 8 mm	10.37	899.91	SQ.MT	9336.566
13	Cement plaster 20 mm thick	204.70	207.05	-	42383.55
14	Providing 15 mm thick cement plaster	137.2	134.63	-	18471.24
15	Finishing Wall with Weather Proof Exterior Emulsion Paint on Wall	204.70	72.72	SQ. MT	14885.93
16	Applying Two Coats of Birla (Putty) and two coats of primer	137.2	47.87	SQ. MT	6567.764
17	Water closet (Anglow Indian) [I] In White Colour	1	1437.23	NOS	1437.23
18	Water closet (European type W.C. Pan)	1	4526.82	NOS .	4526.82
				TOTAL	**1208071**
	PLUMBING WORK	6%	1208071	-	72484.27
	ELECTRIC WORK	6%	1208071	-	72484.27
				GRAND TOTAL	**1353040**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive ofwater charges, contractor‘s profit, contingencies, utilities and labor charges.

Total cost = ₹ 1353

8.1.5 Public Garden

Scenario : There is no Public Garden in the Thordi Village as per the GAP Analysis we have provided the Garden Design

A public garden is defined by the American Public Gardens Association as: –An institution that maintains collections of plants for the purposes of public education and enjoyment, in addition to research, conservation, and higher learning.

Size is 24 X 18 meters

Proposed Design in Skechup :

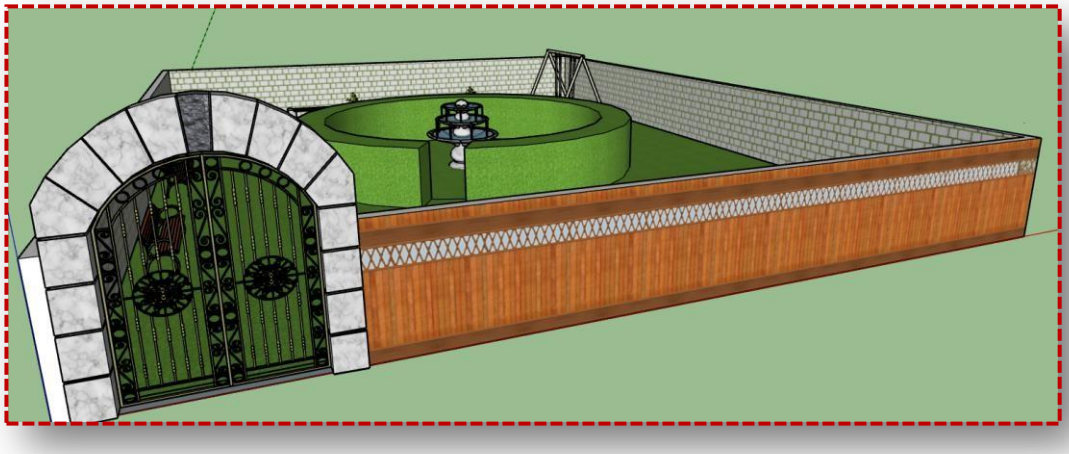


FIG.88 3D ELEVATION FOR PUBLIC GARDEN

Public Garden : Measurement Sheet (T-28- Public Garden measurement sheet)

SR. NO	DESCRIPTION	LENGTH (m)	WIDTH (m)	HEIGHT (m)	Nos.	Total Quantity
1	Excavationfor foundation	80.32	0.3	0.6	1	**14.4576 M3**
2	Brickwork (A) Modular	80.32	0.23	1.5	1	**27.7104 M3**
3	20mm thick sand faced cement plaaster	80.32	-	1.5	2	**240.96 SQMT**
4	Finishing wall with water proofing cement paint	80.32	-	1.5	2	**240.96 SQMT**
5	Filling in foundation and plinth	24	0.3	18	1	**129.6 M3**
6	Providing, Supplying & planting various types of decorative plants as per instruction of Engineer- incharge etc complete. Decorative Plants	500	-	-	1	**500 NOS.**

7	Providing, Supplying & planting guarden loan as per instruction of Engineer-in- charge etc complete.	24	-	18	1	**432 NOS.**
8	Providing, STEEL gate as per design with colour fitting, its elevation fixing all incl.	1	-	-	1	**1 NOS.**

Public Garden : Abstract Sheet (T-29- Public Garden abstract sheet)

SR NO.	Description	Quantity	Rate	Per	Amount
1	Excavation for foundation	14.4576	86.75	M3	1254.197
2	Brickwork (A) Modular	27.7104	2382.99	M3	66033.61
3	20mm thicksand faced cement plaster	240.96	207.05	SQ.MT	49890.77
4	Finishing wall with water proofing cement paint	240.96	36.76	SQ.MT	8857.69
5	Filling in foundation andplinth	129.6	290.88	M3	37698.05
6	Providing, Supplying & planting varioustypes of decorative plants as per instruction of Engineer-incharge etc complete. Decorative Plants	500	75	NOS.	37500
7	Providing, Supplying & planting guarden loan as per instruction of Engineer-in-charge etc complete.	432	150	SQ.MT	**64800**
8	Providing, STEEL gate as per design with colour fitting, its elevation fixing all incl.	1	20000	NOS.	**20000**
				GRAND TOTAL	**286034.3**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive ofwater charges, contractor‘s profit, contingencies, utilities and labor charges.

Total cost = ₹ 286034.3/-

8.1.6 Sump 5 lakh liter

Scenario : The population is about 2826 as per census 2011 & as per previous 30 years & future 30 years calculation the population will be 5728 which will posses 135 liters per person which is 773280 liters of water as there is 300000 liter capacity of sump available we have designed 500000 liters of sump for storage.

Proposed Design in Auto cad:

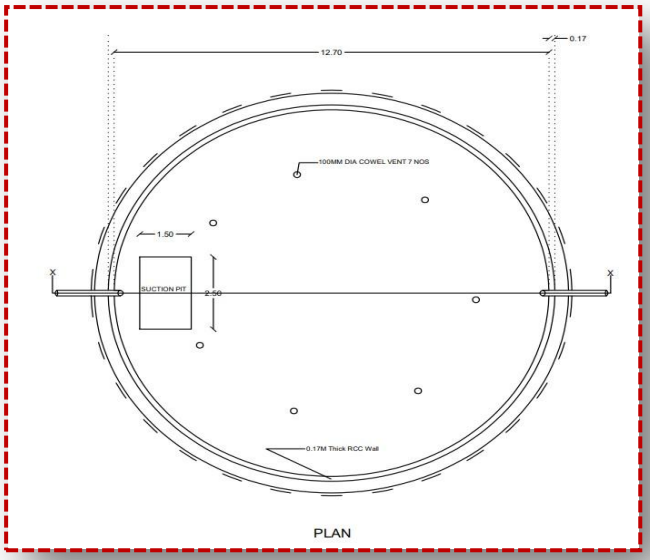


FIG.89 THORDI PLAN FOR SUMP

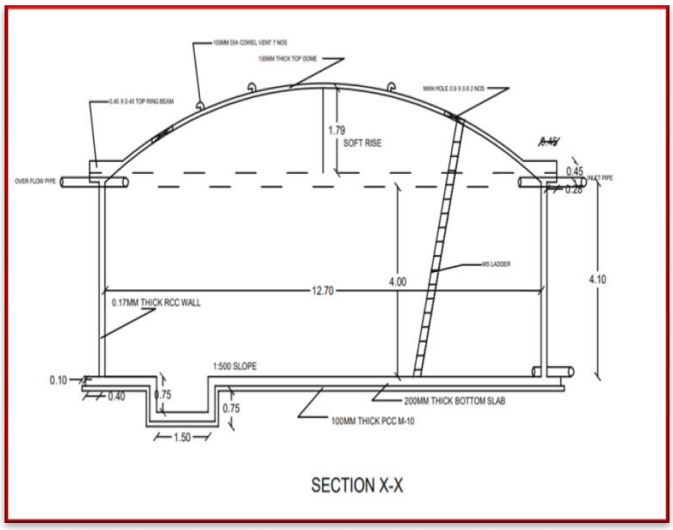


FIG.90 THORDI SECTION FOR SUMP

Sump : Measurement Sheet (T-30- SUMP measurement sheet)
AS PER GWSSB SOR 2020-21 SECTION 1-C ITEM NO.2-A-5 PG 50

SR.NO	DESCRIPTION	Nos.	Total Quantity
1	Preparing structural design of RCC Under Ground / Partially under ground / above high ground level Reservoir of required capacity as per relevant I.S.s and constructing the same, including excavation in all types of soil strata (including rock) including shoring strutting if required, for loose soil / to protect from collapse due to near by traffic load, casting 100 mm thick P.C.C. leveling course in M-10, Refilling the pit with proper soil and disposing of the surplus stuff within a lead of 50 meters. Including cement plaster in CM 1:2 with approved water proofing compound to inside water touching surface to container. Including all types of labour and material charges of lowering, laying, erecting / hosting and jointing of pipe assembly to inlet, outlet overflow, washout and bye pass arrangement as per hydraulic design. Providing and fixing accessories like MS / GI Ladder, CI Manhole frame and cover, water level indicator, adequate cowl type ventilators or lantern type ventilator with stainless steel jail. B.B. Masonry chambers for valves. Providing and applying three coats of cement paint / snowcem to the out side face of structure. It also includes satisfactory water tightness test as per relevant I.S. code and painting name of scheme and capacity on the tank as per direction of engineer in charge. List of Indian Standards for Design of GSR / SUMP:- The structural design of GSR shall be in accordance with provisions relevant I.Ss. (1) I.S. 3370 part I & II 2009 or latest revised (1.1) I.S. 3370 part III & IV 1965 or latest revised (2) I.S. 456 – 2000 or latest revised. (3) I.S. 1893 – 2000 – 1984 or latest revised. (4) I.S. 875, Part – 1 to 3, 1987 or latest revised. General Specifications: (1) Water depth in container shall be adopted as per data of tender. If water depth is not specified the suitable water depth / acceptable to field engineer in accordance with hydraulic requirement shall be adopted for capacity. (2) Shape of container (in plan) specified by in data shall be adopted in absence circular shape shall be adopted. (3) Size shall be fixed as per availability of space (land area) at site / acceptable engineer in charge. (4) Effect of overlapping of pressure bulbs on soil due near by structure and proposed sump should be considered. (5) Care shall be taken that no damage should occur to nearby existing structure. Compensation shall be paid for the same by agency. (6) The minimum concrete grade for RCC shall be M-30.	1	**1 NOS.**

	(7) HYSD Fe 415 / 500 grade reinforcing bars confirming to I.S. 1786 / 1139 shall be considered in design. CRS / TMT bars shall be provided. In saline atmosphere corrosion resistance stainless steel / HCR rebar shall be provided. Any other steel can be used with approval of C.E./ in situation of non availability in market without extra cost. (8) Minimum size (or thickness) of various components shall be provided as per tender criteria / specifications in absence as per I.S./ Std. practice of G.W.S.S.B. Minimum dimensions specified for various components in tender data / specifications shall be provided without fail. (9) The safe bearing capacity (SBC) shall be referred from SBC test report. In absence of report it shall be referred from data sheet. If poor soil is found / water table is met with during excavation SBC shall be scientifically ascertained and design shall be revise. No extra shall be paid for increase in quantity. (10) CI pipes and special shall only be used if type is not specified in tender. (11) The rate shall include cost of dewatering during excavation making all arrangement when water table meets within depth. (12) The structure shall be designed properly to resist uplift due to ground water table specified in data or actual ground water table meets with during excavation. If GWT / Uplift is mentioned in tender and during excavation it dose not meet 7.5% rate shall be reduced. (13) GI pipes railing shall be provided when sump is more than 2 meter above ground level. (14) Appearance of structure should be aesthetically good looking acceptable to authority. (15) Any charge in size, shape, depth below GL, height above GL, water depth, F.B., size of member etc can be permitted in exceptional case due to site condition or hydraulic design requirement by C.E. No extra shall be paid for change. (16) Any charge in data, dimensions, shape, water depth, reduction in size if permitted by competent authority and if it reduces quantity then payment shall be reduced prorate. (17) When capacity of GSR / Sump is > 20 lakh liters two or suitable compartments acceptable to executive engineer shall be designed and provided. (18) Agency shall engage qualified (at least graduate) consulting engineer for designing the structure and he / she shall visit the site for guidance of work. (19) 75% part rate shall be payable for concrete, reinforcement and plastering items of container until satisfactory hydraulic testing for water tightness is performed as per tender condition. Till the work shall be treated as incomplete. AS ABOVE WITHOUT WATER TABLE **5 lacs liter capacity**		

Sump : Abstract Sheet (T-31- Sump abstract sheet)

AS PER GWSSB SOR 2020-21 SECTION 1-C ITEM NO.2-A-5 PG 50

SR NO.	Description	Qty	Rate	Per	Amount
	Preparing structural design of RCC Under Ground / Partially under ground / above high ground level	1	1487903.00	NOS.	**1487903.00**

	Reservoir of required capacity as per relevant I.S.s and constructing the same, including excavation in all types of soil strata (including rock) including shoring strutting if required, for loose soil / to protect from collapse due to near by traffic load, casting 100 mm thick P.C.C. leveling course in M-10, Refilling the pit with proper soil and disposing of the surplus stuff within a lead of 50 meters. Including cement plaster in CM 1:2 with approved water proofing compound to inside water touching surface to container. Including all types of labour and material charges of lowering, laying, erecting / hosting and jointing of pipe assembly to inlet, outlet overflow, washout and bye pass arrangement as per hydraulic design. Providing and fixing accessories like MS / GI Ladder, CI Manhole frame and cover, water level indicator, adequate cowl type ventilators or lantern type ventilator with stainless steel jail. B.B. Masonry chambers for valves. Providing and applying three coats of cement paint / snowcem to the out side face of structure. It also includes satisfactory water tightness test as per relevant I.S. code and painting name of scheme and capacity on the tank as per direction of engineer in charge. List of Indian Standards for Design of GSR / SUMP:- The structural design of GSR shall be in accordance withprovisions relevant I.Ss. (1) I.S. 3370 part I & II 2009 or latest revised (1.1) I.S. 3370 part III & IV 1965 or latest revised (2) I.S. 456 – 2000 or latest revised. (3) I.S. 1893 – 2000 – 1984 or latest revised. (4) I.S. 875, Part – 1 to 3, 1987 or latest revised. General Specifications: (1) Water depth in container shall be adopted as per data of tender. If water depth is not specified the suitable water depth / acceptable to field engineer in accordance with hydraulic requirement shall be adopted for capacity. (2) Shape of container (in plan) specified by in data shall be adopted in absence circular shape shall be adopted. (3) Size shall be fixed as per availability of space (land area) at site / acceptable engineer in charge.				

	(4) Effect of overlapping of pressure bulbs on soil due near by structure and proposed sump should be considered. (5) Care shall be taken that no damage should occur to nearby existing structure. Compensation shall be paid for the same by agency. (6) The minimum concrete grade for RCC shall be M-30. (7) HYSD Fe 415 / 500 grade reinforcing bars confirming to I.S. 1786 / 1139 shall be considered in design. CRS / TMT bars shall be provided. In saline atmosphere corrosion resistance stainless steel / HCR rebar shall be provided. Any other steel can be used with approval of C.E./ in situation of non availability in market without extra cost. (8) Minimum size (or thickness) of various components shall be provided as per tender criteria / specifications in absence as per I.S./ Std. practice of G.W.S.S.B. Minimum dimensions specified for various components in tender data / specifications shall be provided without fail. (9) The safe bearing capacity (SBC) shall be referred from SBC test report. In absence of report it shall be referred from data sheet. If poor soil is found / water table is met with during excavation SBC shall be scientifically ascertained and design shall be revise. No extra shall be paid for increase in quantity. (10) CI pipes and special shall only be used if type is not specified in tender. (11) The rate shall include cost of dewatering during excavation making all arrangement when water table meets within depth. (12) The structure shall be designed properly to resist uplift due to ground water table specified in data or actual ground water table meets with during excavation. If GWT / Uplift is mentioned in tender and during excavation it dose not meet 7.5% rate shall be reduced. (13) GI pipes railing shall be provided when sump is more than 2 meter above ground level. (14) Appearance of structure should be aesthetically good looking acceptable to authority. (15) Any charge in size, shape, depth below GL,				

	height above GL, water depth, F.B., size of member etc can be permitted in exceptional case due to site condition or hydraulic design requirement by C.E. No extra shall be paid for change. (16) Any charge in data, dimensions, shape, water depth, reduction in size if permitted by competent authority and if it reduces quantity then payment shall be reduced prorate. (17) When capacity of GSR / Sump is > 20 lakh liters two or suitable compartments acceptable to executive engineer shall be designed and provided. (18) Agency shall engage qualified (at least graduate) consulting engineer for designing the structure and he / she shall visit the site for guidance of work. (19) 75% part rate shall be payable for concrete, reinforcement and plastering items of container until satisfactory hydraulic testing for water tightness is performed as per tender condition. Till the work shall be treated as incomplete. AS ABOVE WITHOUT WATER TABLE **5 lacs liter capacity**				
				GRAND TOTAL	**1487903.00**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive of water charges, contractor‘s profit, contingencies, utilities and labor charges.

Total cost = ₹ 1487903.00/-

8.2 Reason for Students Recommending this Design :

- Pipe Culvert - to provide flexibility in travelling to school
- Smashan- to provide flexibility to the public
- Snangruh - to provide facility to the public especially womens.
- Residential Houses- to provide pucca houses for a better living of the public
- Public Garden - to provide a source of refreshment and for good health.
- Sump – for the storage of water for population requirements

8.3 About designs Suggestions / Benefit of the villagers :

1. **Pipe Culvert :**

As to cross the water passing through for students to daily go to school & also for the vilagers an elevated structure is to be required for easy transportation. So it is required to Pipe Culvert at the location in the village.

2. **Smashan :**

In the Thordi village the smashan available is in very poor condition which requires new construction so a new design is designed.

3. **Snangruh :**

As per the hindu culture after the funeral bathing is required which is done in snangruh so to overcome this facility a snangruh is designed near smashan.

4. **Residential House:**

As there are 40% kutcha houses still existing in village thordi so by designing the Residential Houses there will be 100% pukka houses for a betterment in lifestyle.

5. **Public Garden :**

The design of public garden is necessary as per the GAP analysis & also they are resources for recreation, as well as education and research opportunities.

6. **Sump :**

The Thordi village has one ESR of 50000 liters & 2 sump of 1 lac litrs & as per the population forecst upto to 30 years the requirement will be of 680000 liters so a 5 lakh liter capacity UG Sump is designed for daily requirments of the village.

8.4 About Maintenance :

Building maintenance is work undertaken to keep, restore or improve every facility, i.e., every part of a building, its services and surrounds to a currently acceptable standard and to sustain the utility and value of the facility. If we want to keep anything in proper working condition, then it becomes very important to be maintained. If we take the example of our body and if we want to keep our body fit. it is essential to maintain it in proper working condition by having a regular checkup and consulting doctors. Same in case of a building, we have to look after its operations and if we feel like there is a problem arising in some area of the building. Then it has to be identified and try to resolve the problem in the initial stage itself by consulting the Engineer. So that it will not increase the cost for maintenance of the same in further.

The assets which are created by us are initially being maintained but after passing a few years they are neglected. So that lot of problems arises due to this negligence, and the capital which we have invested in creating the building or any structure is just becoming a useless junk.By neglecting and lack of maintenance of any structure its life decreases. So ultimately it has to demolish and removed in a short period of time. This is the reason due to which the historical monuments and old structures are degrading day by day. It‘s the National loss.

Types of Maintenance of Building:

i. Routine maintenance
ii. Prevention maintenance
iii. Remedial maintenance/measure or repair.

Routine maintenance of the structure is essential to keep it functional and protect it against early decay. A building is made of different parts in different locations and made of different materials. These are all susceptible to natural decay due to ageing. While designing, the life of the members is assumed with normal maintenance. For instance, a timber member is assumed to be painted at regular intervals.

Preventive maintenance comprises of activities which are essentially required to make the structure strong and sound and capable of resisting early decay or damage. Preventive mainte-nance of a structure means improving the quality of construction and makes it more durable and functional.

In spite of taking all possible preventive measures and providing routine maintenance, a structure may undergo decay and damage, which would require to be ameliorated by remedial measures.

Maintenance helps to:

- Prevent the process of decay and degradation.
- Maintain structural stability and safety.
- Prevent unnecessary damage from the weather or from general usage.
- Optimise performance.
- Determine the causes of defects and so help prevent re-occurrence or repetition.
- Ensure continued compliance with statutory requirements.

Common maintenance include:

- Plastering
- Paver block repairs
- Landscaping
- Gardening
- Sewage line clearance
- Tiling
- Plumbing

Chapter 9.

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

For future development of the Thordi village we are proposing the designs for Part II design in which following points should be considered,

1) Gram Panchayat Building

There is Panchayat Office in Thordi Village but is very poor condition so a new office is needed for the village.

2) Animal Water Drinking Facility

Animal water drinking facility will be available for the animals kept by villagers to make easy for feeding for them.

3) ATM

In Thordi Village there is no bank or ATM for ATM & Bank facility the villagers have to go to near village Tagdi 6KM. So for easy banking facility & Reqirments Atm should be constructed in village.

4) CLINIC with Maternity Ward

In Thordi Village there is only one clinic which is not sufficient for the village the villagers have to go nearby areas for the facility so a clinic is designed with ward & pharmacy store.

5) Pharmacy Store

There is no proper pharamacy store in the village Thordi & no such facility available so a pharmacy store is designed for easy access & usage.

6) Community Hall

There is no Hall in the village for public gathering so as per requirement Community Hall is Designed

These are the proposed designs for the future development of Thordi village for Vishwakarma Yojanaphase VIII , Part 2 design.

Chapter 10.

Conclusion of the Entire Village Activities of the Project :

The motive of Vishwakarma Yojana phase - VIII is to uplift the lifestyle of the rural areas to its certain extent up to the level of an ideal village situated at the nearby location of that particular jurisdiction. It is an effective government scheme to develop the rural areas under economical cost with good workability and efficiency during its usage. The project tends to improve the physical, social as well as socio-cultural aspects of the village by implementing and improvising various infrastructures with regards to lesser or least hindrance to its rural authenticity. Main Smart Aim: — Developing village with a rural soul but with all Smart urban amenities that a city may have. This will help in developing Smart villages in sustainable manner, reduce migration from villages and prevent the cities from the urban pressure. This should lead to some rethinking about the meaning of efficiency beyond the usual conceptions of economic or technical efficiency. Indeed, employment expansion is at least as important as growth in productivity. In a sense, both represent the utilization of labor as a resource. Why, then, does thinking about efficiency focus on one and neglect the other It is important to reflect on this question. The answer, which calls for change in both economics and politics, could make a real difference. With Gap Analysis, we conclude that some of different Smart Village facilities are required as basic or primary level which still lack in village. So, according to Gap Analysis of Thordi village, we observed condition of existing infrastructure facilities in village such as- Primary school, Aganwadi etc. Smart Village can solve their problem itself can become a smart village example to another village too. According to UDPFI norms, lacking in basic amenities And Smart Amenities can be suggested as

By the ideal village Rafala and smart village kankot we knew that village can be the better than the city or town. In cities of towns there are so many problems of pollution and congestion, but in villages Due to natural environment and technical and digital advancement villages can be better than cities or towns

In the Thordi village, the basic requirements like ESR, CC Road Paver Block etc. were existing. By implanting given design proposals, all the missing amenities can be provided which will stop the migration of rural people towards the urban area which will in turnreduce pressure on cities

Students who want to work towards preservation of rural soul of country can do many things for our own good and environment. By implanting given design proposals, we can say that all the missing amenities are provided will stop the migration of rural people towards the urban area. This can cause reduce the load on urban areas as well as pollution in both sector can be minimized gradually.

Chapter 11.
References refereed for this project

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- IS 1893-1:2002 Critical foe Earthquake Resistant Design for Structure
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- Handbook on sustainable development goals and Gram Panchayat.
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- https://www.nsenergybusiness.com/news/gujarat-cng-terminal-bhavnagar-port/

Chapter 12.
Annexure attachment :

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

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VI
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VI

IDEAL VILLAGE SURVEY

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

Name of District:	Amreli
Name of Taluka:	Bagasara
Name of Village:	Rafala
Name of Institute:	Gyanmanjari Institute of Technology
Nodal Officer Name & Contact Detail:	Prof. Anish Gohil (Civil) 9460208775
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Devabhai Somabhai Chohan - Sarpanch
Date of Survey:	05/11/2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	2132	1103	1029	
2.	2011	831	412	419	170

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	4 to 5
2.	Forest Area (In hect.)	1 to 1.5
3.	Agricultural Land Area (In hect.)	1 to 1.5
4.	Residential Area (In hect.)	2 to 2.25
5.	Other Area (In hect.)	0.5 to 1 around the village
6.	Distance to the nearest railway station (in kilometers):	Bagasara - 10.8 Km

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Vishwakarma Yojana: Phase VI
Techno Economic Survey

7.	Name of Nearest Town with Distance:	Bagasara 8 Km
8.	Distance to the nearest bus station (in kilometers):	Bagasara 8 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.	Agriculture
	2.	Diamond
	3.	Shops.

Major crops grown in the village:	1.	cotton
	2.	Wheat
	3.	Khola (ચોમાસુ)

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

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	Other(Specify)**Lake/ Pond**	✓	✓		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	✓		10,000 Liter & 5000 Lit
	Underground Sump	Capacity:		✓	
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	✓		✓	80% village covered
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	✓			Kutcha Road.
	Main road				
	Internal streets	✓	✓		Block & R.C.C Road
	Nearest NH/SH/MDR/ODR Dist. in kms.	✓	✓		NH-351 SH-111
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO		✓	10.8 km
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	NO		✓	8 km
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	yes	✓		Rickshaw
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	yes	✓	✓	8hrs per farming

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	Power supply for Domestic Use	yes	✓		2 hrs.
	Power supply for Agricultural Use	yes	✓		8 hrs
	Power supply for Commercial Use	yes	✓		
	Road/ Street Lights	yes	✓		
	Electrification in Government Buildings/ Schools/ Hospitals	yes	✓		
	Renewable Energy Source Facilities (Y/ N)	NO	✗	✓	NO
	LED Facilities	yes	✓		

Suggestions if any:

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

Suggestions if any:

H.	Main Source of Irrigation Facility:				
	TANK/POND		✓		50 hectare from tube well & 50 hectre. from Irrigation
	STREAM/RIVER		✓		
	CANAL		✓		
	WELL		✓		
	TUBE WELL.		✓		
	OTHER (SPECIFY)	50 hectre			

Suggestions if any:

I.	Housing Condition:				
	Kutchha/Pucca (Approx. ratio)	20% 80%	kutchha Pucca		Ratio = 0.25

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	yes	✓		
	Sub-Centre				
	PHC				
	BLOCK PHC	NO			
	CHC/RH		✓		
	District/ Govt. Hospital	NO			
	Govt. Dispensary	NO			
	Private Clinic		✓		
	Private Hospital/	NO			
	Nursing Home	NO			
	AYUSH Health Facility		✓		
	sonography /ultrasound facility	NO			
	If any of the above Facility is not available in village than approx. distance from village: ..8.....kms. Bagasara				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	yes	✓		
	Primary School	yes	✓		
	Secondary school	yes	✓		In Bhalgam
	Higher sec. School	NO	✓		In Bagasara
	ITI college/ vocational Training Center	NO			In Bagasara
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	NO			In Amreli

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Vishwakarma Yojana: Phase VI
Techno Economic Survey

If any of the above Facility is not available in village than approx. distance from village: ...8....kms. Bagasara

Suggestions if any:

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

If any of the above Facility is not available in village than approx. distance from village: ...8....kms. Bagasara

Suggestions if any:

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

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Vishwakarma Yojana: Phase VI
Techno Economic Survey

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

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?	–	–	–	–
	2. Are there any beneficiaries in the village from the following programme?	–	–	–	–
	3. Janani Suraksha Yojana	–	–	–	–
	4. Kishori Shakti Yojana	–	–	–	–
	5. Balika Samriddhi Yojana	–	–	–	–
	6. Mid-day Meal Programme	–	–	–	–
	7. Intergrated Child Development Scheme (ICDS)	Good	–	yes	–
	8. Mahila Mandal Protsahan Yojana (MMPY)	Good	–	yes	–
	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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Vishwakarma Yojana: Phase VI
Techno Economic Survey

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

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

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VI
Techno Economic Survey

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

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

IX. Smart Village / Heritage Details

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

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

સરપંચ
શ્રી. પં. રકાળા

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

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VI

SMART VILLAGE SURVEY

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

Name of District:	RAJKot
Name of Taluka:	RAJKot
Name of Village:	Kaneot
Name of Institute:	GYANMANJARI INSTITUTE OF TECHNO.
Nodal Officer Name & Contact Detail:	Prof. Anish Gohil (CIVIL) 8460 208775
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Shailesh bhai Nandaniya
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	1451	761	690	257

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	915 Hectare, 22.242027° N 70.7174° E
2.	Forest Area (In hect.)	
3.	Agricultural Land Area (In hect.)	
4.	Residential Area (In hect.)	
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	12 KM Rajkot.

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Vishwakarma Yojana: Phase VIII
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7.	Name of Nearest Town with Distance:	11 KM Rajkot
8.	Distance to the nearest bus station (in kilometers):	11 KM Rajkot.
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. labour work (7.9%.) 2. agriculture - farming (13.6%.) 3. literature (73.4%.)

Major crops grown in the village:	1. wheat 2. cotton 3. bajara

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

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	Other(Specify)**Lake/ Pond**	✓	yes		—
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	1,04000	✓	
	Underground Sump	Capacity:	4,00,000	✓	
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	yes	yes		—
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	yes	✓		—
	Main road	yes	✓		—
	Internal streets	yes	✓		—
	Nearest NH/SH/MDR/ODR Dist. in kms.	yes	✓		—
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No	✓		—
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	yes	✓		—
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	yes	✓		—
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	yes More than (P.O.V.C.L)	✓		24 Hours

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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)	yes	✓		–
	LED Facilities	No		✓	–
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	NO	✓	–	–
	Location Condition	–	–	–	–
	Community Toilet (With bath/ without bath facilities)	Yes	–	–	–
	Solid & liquid waste Disposal system available	yes	✓	–	–
	Any facility for Waste collection from road	yes	✓	–	–
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND	yes	✓		–
	STREAM/RIVER	No	✓		–
	CANAL	yes	✓		–
	WELL	yes	✓		–
	TUBE WELL.	yes	✓		–
	OTHER (SPECIFY)	yes	✓		–
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	70 %-P 30 %-K	✓		–

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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	NO			–
	District/ Govt. Hospital	yes	✓		–
	Govt. Dispensary	yes	✓		–
	Private Clinic	yes	✓		–
	Private Hospital/	yes	✓		–
	Nursing Home	NO			–
	AYUSH Health Facility	yes	✓		–
	sonography /ultrasound facility	NO			–
	If any of the above Facility is not available in village than approx. distance from village: 1.K...kms. (Rajkot)				
	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			–
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	yes (private)	✓		–

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	If any of the above Facility is not available in village than approx. distance from village: ..1.8....kms. RAJKOT
Suggestions if any:	

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	good	village	yes	
	Public Library (With daily newspaper supply: Y/N)	good	village	yes	
	Public Garden	good	IN	yes	
	Village Pond	good		yes	
	Recreation Center	NO			NO
	Cinema/ Video Hall	NO			NO
	Assembly Polling Station	good	IN VILLAGE	yes	
	Birth & Death Registration Office	good		yes	
If any of the above Facility is not available in village than approx. distance from village: ...18....kms. RAJKOT					
Suggestions if any:					

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

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Credit Cooperative Society				
Agricultural Cooperative Society	good	IN VILLAGE	yes	1
Milk Cooperative Society	good		yes	1
Fishermen's Cooperative Society	good		yes	1
Computer Kiosk/ e-chaupal /			—	20
Mills / Small Scale Industries	—	—	—	20
Other Facility	A.T.M	IN VILLAGE	yes	1

Suggestions if any:

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

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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	yes	✓		–
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	yes yes yes	✓		– – –
3.	Any Other	NO	–	–	–

VII. DATA COLLECTION FROM VILLAGE

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

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

VIII. ADDITIONAL INFORMATION/ REQUIREME

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

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	- Rain water Harvesting - (illegible)	- -

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

S-B-PATEL
સરપંચશ્રી,
કણકોટ ગ્રામ પંચાયત

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

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VI

ALLOCATED VILLAGE SURVEY

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

Name of District:	Bhavnagar
Name of Taluka:	Bhavnagar
Name of Village:	Thordi
Name of Institute:	Gyanmanjari Institute of Technology
Nodal Officer Name & Contact Detail:	Prof. Vinodray Ujeniya Sir, Academic Conveyor and HOD Civil dep
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sangeetaben Sharma – Talati, Ushaben Lakhani – Sarpanch
Date of Survey:	27/10/2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	2826	1447	1379	474

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1484.18 hectors 21°.6470° N and 72°.1920° E
2.	Forest Area (In hect.)	
3.	Agricultural Land Area (In hect.)	
4.	Residential Area (In hect.)	
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	16.8 Km Bhavnagar

7.	Name of Nearest Town with Distance:	Bhavnagar – 15.8 Km
8.	Distance to the nearest bus station (in kilometers):	Bhavnagar – 17.9 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.	Bentonite Excavation
	2.	Labour Work
	3.	Agriculture farming

Major crops grown in the village:	1.	Cotton
	2.	Peanuts
	3.	Onions

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

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

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Techno Economic Survey

	Other(Specify)**Lake/ Pond**	3			
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	1	✓	Approx. 50,000 Lit
	Underground Sump	Capacity:	2	✓	
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	Yes			
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	✓	✓		
	Main road	✓	✓		
	Internal streets			✓	
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH 51 SH. 36			NH: 7.4 Km SH: 4.8 Km
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No			Bhavnagar Para 15.57 Km
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	No			Bhavnagar 15.8 Km
	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			Govt. (more than 6 hrs)

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	Power supply for Domestic Use	yes	✓		
	Power supply for Agricultural Use	yes	✓		
	Power supply for Commercial Use	yes	✓		
	Road/ Street Lights	yes			
	Electrification in Government Buildings/ Schools/ Hospitals	yes			
	Renewable Energy Source Facilities (Y/ N)	No			
	LED Facilities	yes			

Suggestions if any:

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

Suggestions if any:

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

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	60% Pucca 40% Kutchha			Ratio = 0.66

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	4	✓		
	Sub-Centre	NO			Required
	PHC	NO			
	BLOCK PHC	NO			
	CHC/RH	NO			
	District/ Govt. Hospital	YES			
	Govt. Dispensary	NO			
	Private Clinic	YES			
	Private Hospital/	NO			
	Nursing Home	NO			
	AYUSH Health Facility	YES			Gram Panchayat services
	sonography /ultrasound facility	NO			
	If any of the above Facility is not available in village than approx. distance from village: ..17....kms. (Bhavnagar)				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group		✓		
	Primary School		✓		
	Secondary school	2 schools	✓		
	Higher sec. School	1 school	✓		
	ITI college/ vocational Training Center	NO			Nearest in Bhavnagar 17.2 kms
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	NO			Nearest in Bhavnagar 17.2 Kms

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	If any of the above Facility is not available in village than approx. distance from village: 17.2 kms.
Suggestions if any:	

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

If any of the above Facility is not available in village than approx. distance from village: ..17.....kms. (Bhavnagar)

Suggestions if any:

M.	**Other Facilities**	Condition	Location	Available (YES)	Available (NO)
	Post-office	Good	Village	YES	
	Telecommunication Network/ STD booth	Good	Village	YES	
	General Market	Good	Village	YES	
	Shops (Public Distribution System)	Good	Village	YES	
	Panchayat Building	Poor	Village	YES	
	Pharmacy/Medical Shop	Poor	Village	YES	
	Bank & ATM Facility	Good	Village	YES	
	Agriculture Co-operative Society	Good	11	YES	
	Milk Co-operative Soc.	Good	11	YES	
	Small Scale Industries	Good	Village	YES	
	Internet Cafes/ Common Service Center/Wi Fi	—	—	—	NO
	Youth Club	—	—	—	NO
	Mahila Mandal	Good	Village	YES	

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Credit Cooperative Society				
	Agricultural Cooperative Society	Good	In Village	YES	
	Milk Cooperative Society	Good		YES	
	Fishermen's Cooperative Society	-		-	
	Computer Kiosk/ e-chaupal /	Good	In Village	YES	
	Mills / Small Scale Industries	V. Good		YES	
	Other Facility	A.T.M	Village	YES	-

Suggestions if any:

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

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

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

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	YES (Hard copy)	✓		—
2.	Recent Projects going on for Development of Village	Road Panchayat office		✓	Repairing
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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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

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

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	- Rain water harvesting - clean canal	

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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થોરડી ગ્રામ પંચાયત
તા. જી. ભાવનગર.

12.4 Gap Analysis of the Allocated Village : (T-32- Gap Analysis)

THORDI VILLAGE GAP ANALYSIS					
Village Facilities	**Planning Commision/UDPFI Norms**	**Village Name**	**Thordi Bhavnagar**		
		Population	**2826**		
		Existing	**Required**	**Smart Village/Cities/ Heritage future projection Design**	**Gap**
Social Infrastructure Facilities					
Education					
Anganwadi	Each or per 2500 Population	4	1	-	+3
Primary School	Each per 2500 Population	2	1	-	+1
Secondary School	Per 7,500 population	2	0	-	+2
Higher Secondary School	Per 15,000 population	1	0	-	+1
College	Per 125,000 population	0	0	-	0
Tech. Training Institute	Per 100000 population	0	0	-	0
Agriculture Research Center	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	0	0	-	0
Child Welfare and Maternity Home	Per 20,000 population	0	0	-	0
Multispeciality Hospital	Per 20,000 population	0	0	-	0

Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	1	1	-	0

Physical Infrastructure Facilities					
Transportation					
Pucca Village Approach Road	Each village	Adequate		Adequate	0
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	1	1	-	0
Drinking Water (Minimum 70 lpcd)		Adequate	1.6 lakh liter capacity		0
Over Head Tank	1/3 of Total Demand	Adequate	50000 liter capacity		0
U/G Sump	2/3 of Total Demand	1 lakh liter	Design as per population forecast upto 2041 so 6 lakh liter needed	5 lakh liter	-1
Drainage Network – Open		Adequate	0%	-	0
Drainage Network – Cover		Adequate	100%	-	0
Waste Management System		Adequate		-	0
Socio Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	0	0	0	0
Community hall and Public Library	Per 15000 Population	1	0	0	+1
Cremation Ground	Per 20,000 population	0	0	0	0
Post Office	Per 10,000 population	1	1	-	0
Gram Panchayat Building	Each individual/group panchaya	1	1	New Construction Needed	0
APMC	Per 100000 Population	0	0	-	0
Fire Station	Per 100000 Population	0	0	-	0
Public Garden	Per village	0	1	Design	-1
Police post	Per 40,000Population	0	0	-	0
Shopping Mall	-				
Electrical Design					
Electricity Network		Adequate	24 hrs	-	0
Any Smart VillageFacility					
Technology		RO WaterPlant	-		
		ESR cap	50000 litrer		
		Sump cap	1.00 lac liter		

12.5 Summary Details of All the Villages Designs in Table form Part-I :

SR.NO	VILLAGE NAME	BRANCH	PART I Design	Part II Design
1	THORDI	CIVIL	Pipe Culvert	Gram Panchayat Office
			Smashan	Cattle Trough
			Snangruh	ATM
			Residential House Type A & B	Clinic with Ward
			Public Garden	Pharmacy Store
			5 Lakh Liter Cap. Sump	Community Hall
2	MOTA SURKA	CIVIL	Public Toilet	Rain Water Harvesting
			Chabutara	ATM
			Anganwadi	Bus Stop
			Primary School	Post Office
			Dispencery	PHC
			Public Library	RCC Road
3	NAVA GAM (NANA)	CIVIL	Public Toilet	Open Air Theater
			Communication Hall	Recreation Garden
			Post Office	Agro Storage
			Water Tank	Design of E-Seva Kendra
			Dispensary	Design of Bio-Gas Plant
			Bus satation	R.C.C Road
4	NINGALA	CIVIL	R.C.C Pavement Road	General Market
			Public Washroom	Public Library
			Anganwadi	Pipe Culvert
			Sewer Line	Bank
			Public Ground	House Conditions
			P.H.C	Community Hall
5	THALSAR	CIVIL	Anganwadi	Community hall
			Primary School	ATM
			Public Toilet	Pharmacy Store
			U//G Sump	Public Garden
			R.C.C Road	Cyber café
			Entrance Gate	Super market

TABLE NO.33 SUMMARY DETAILS OF ALL VILLAGES

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

All the drawings and images are attached in their respective chapters along with designs and their listing are mentioned in the list of figures along with their page numbers. And we have added A3 sheets of proposed designs at the end of the Vishwakarma Yojana Phase VIII part 1 report.

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

RAFALA-IDEAL VILLAGE

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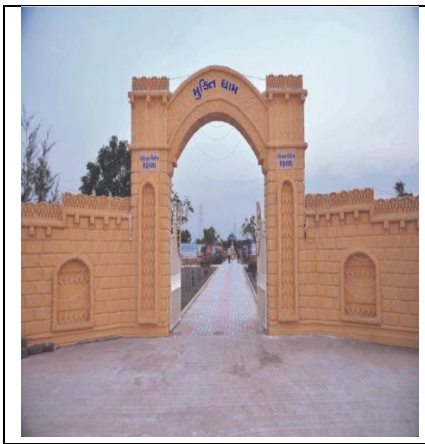
<td>  </td>
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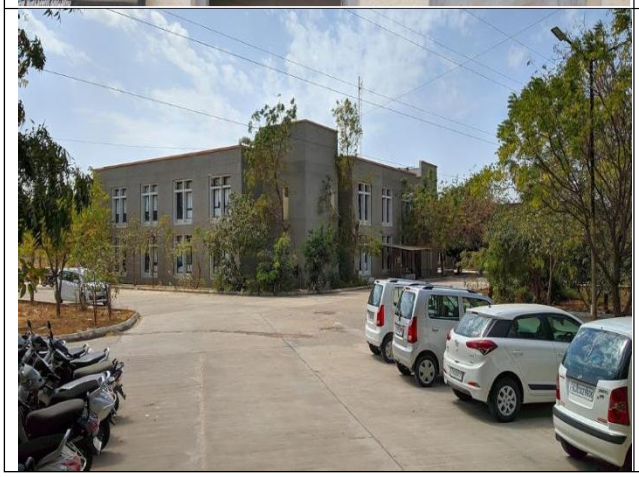
KANKOT- SMART VILLAGE



THORDI-ALLOCATED VILLAGE

12.8 Village Interaction with sarpanch/talati Report with the photograph :

VILLAGE INTERACTION WITH SARPANCH/TALATI LETTER

Vishwakarma Yojna Phase VI

Thordi Village, Bhavnagar Taluka, Bhvangar Dist.

Viilage Code:-364110

Subject:- Village Interaction Form with Sarpanch/Talati of Thordi village

I Sarpanch/talati of Kamrol village undersigned gives approval of doing Village Interaction aactivity under Vishwakarma Yojna phase VI An approach towards rurbanization by students of Gyanmanjri Institute of Technology named Jogendrasinh H Sarvaiya (171290106050) and Siddharth Patel (171290106045).

Date:- 30/03/2021

Sign:-

તલાટી કમ મંત્રી
થોરડી ગ્રામ પંચાયત
તા. જી. ભાવનગર.

થોરડી ગ્રામ પંચાયત
થોરડી

Seal of Gram Panchayat

12.9 Sarpanch Letter giving information about the village development :

- **Approval Letter for Proposed Designs approval:**

APPROVAL LETTER FOR PROPOSED DESIGN APPROVAL

Vishwakarma Yojna Phase VI

Thordi Village, Bhavnagar Taluka, Bhvangar Dist.

Viilage Code:-364110

Subject:- Approval of design proposal forThordi village

I Sarpanch/Talati of Thordi Village undersigned gives approval for following main design proposal given under Vishwakarma Yojna phase VI – rurbanization by students of Gyanmanjri Institute of Technology named Jogendrasinh H Sarvaiya (171290106050) and Siddharth Patel (171290106045).

Approved main design proposal as of part -1

1) Pipe Culvert
2) Smashan
3) Snangruh
4) Residential House Type A & Type B
5) Public Garden
6) Sump of 5 lakh Liter Capacity as Per Population Forecast.

Date:- 30/3/2021

Sign:-

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થોરડી ગ્રામ પંચાયત
તા. જી. ભાવનગર.

Seal of Gram Panchayat

- **Approval Letter For Swachhta & Covid Awareness Activity approval :**

APPROVAL LETTER FOR SWACHTTA & COVID AWARNESS ACTIVITY APPROVAL

Vishwakarma Yojna Phase VI

Thordi Village, Bhavnagar Taluka, Bhvangar Dist.

Viilage Code:-364110

Subject:- Approval of doing awareness activity for swachtta and covid for Thordi Village

I Sarpanch/Talati of Thordi Village undersigned gives approval for following main design proposal given under Vishwakarma Yojna phase VI – rurbanization by students of Gyanmanjri Institute of Technology named Jogendrasinh H Sarvaiya (171290106050) and Siddharth Patel (171290106045).

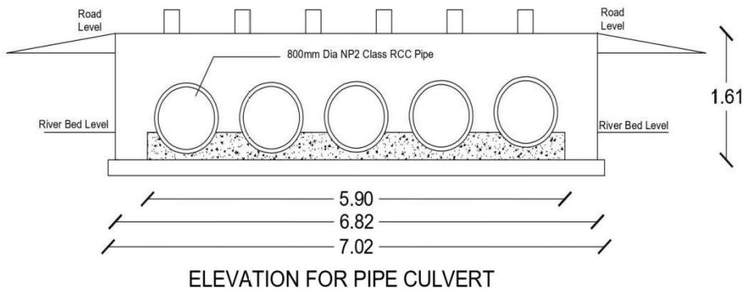
Date:- 30/3/21

Sign:-

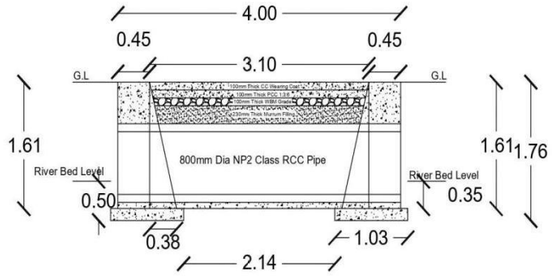
તલાટી કમ મંત્રી
થોરડી ગ્રામ પંચાયત
તા. જી. ભાવનગર.

Seal of Gram Panchayat

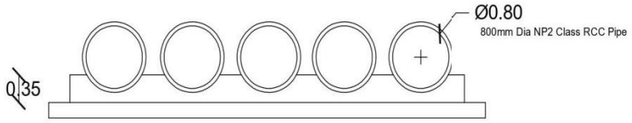
12.10 Design A3 Sheets:



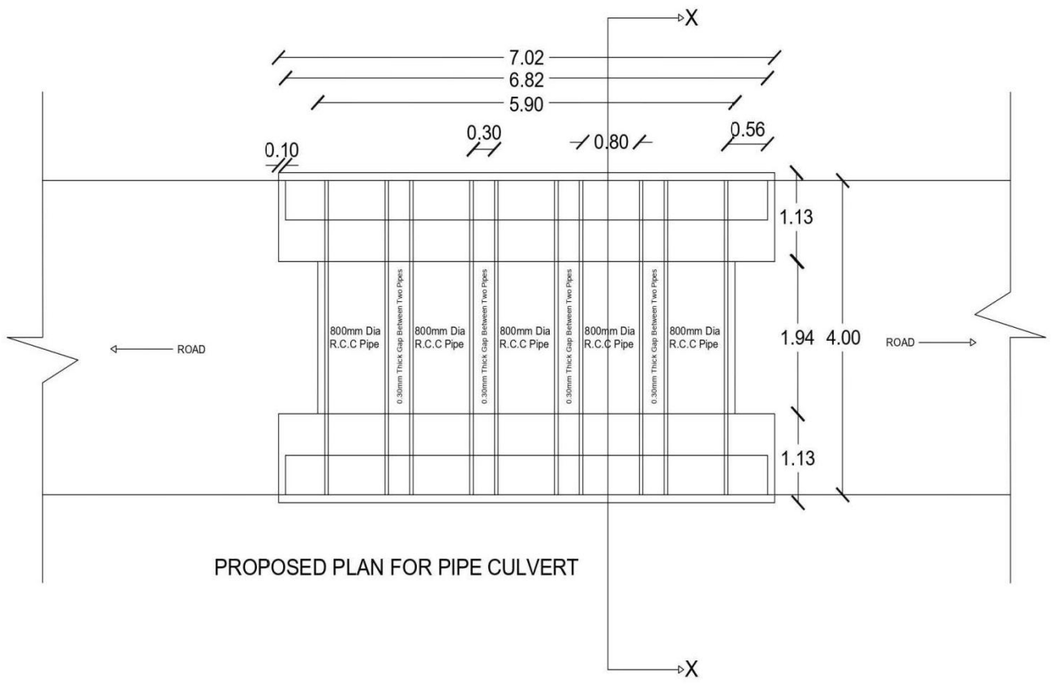
ELEVATION FOR PIPE CULVERT



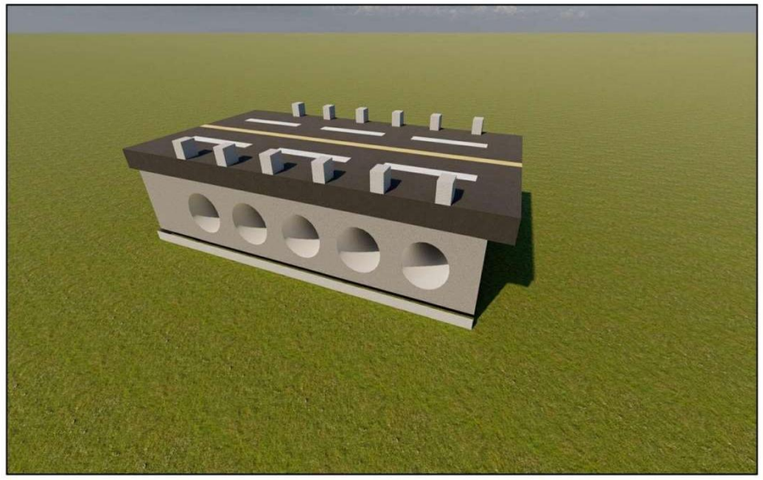
SECTION -XX FOR PIPE CULVERT



CREDDLE DETAIL SECTION FOR PIPE CULVERT



PROPOSED PLAN FOR PIPE CULVERT



GUJARAT TECHNICAL UNIVERSITY

- ALL DIMENSION ARE IN METERS
- DESIGN IS PREPARED ONLY FOR EDUCATIONAL PURPOSE AND CORRECTION OF ALL DATA MUST BE CHECK BEFORE USE
- MINIMUM GRADE OF CONCRETE IS M20 & STEEL CAN BE USED OF FE450 OR FE500

GYANMANJRI INSTITUTE OF TECHNOLOGY

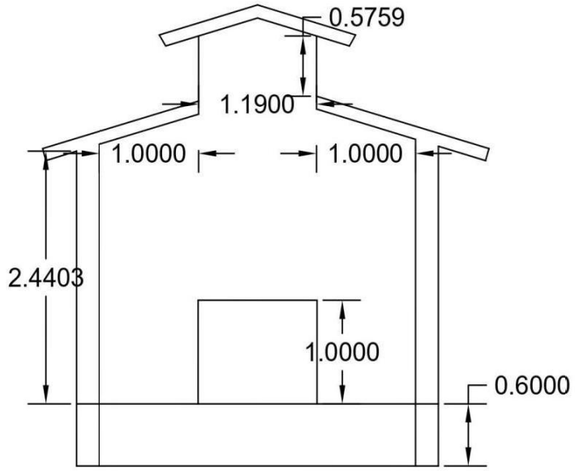
DESIGNED BY:-

JOGENDRASINH H SARVAIYA

SIDDHARTH D PATEL

PIPE CULVERT	
VISHWAKARMA YOJNA	
PROJECT NO	01
LOCATION	THORDI VILLAGE
DATE	03/01/2021
SCALE	1:100

SIGN



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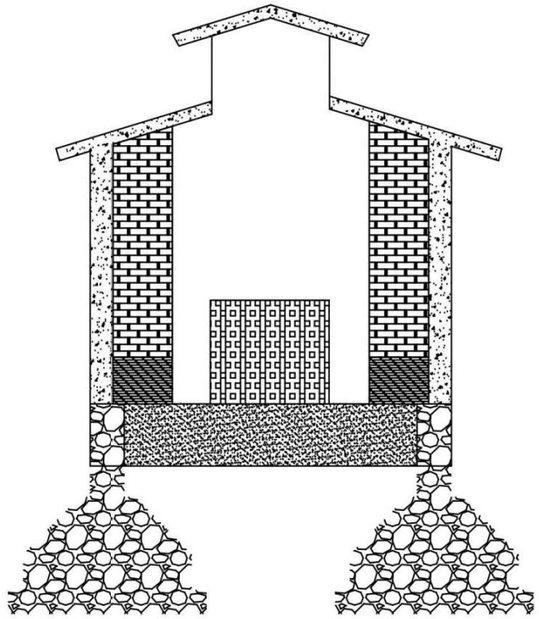

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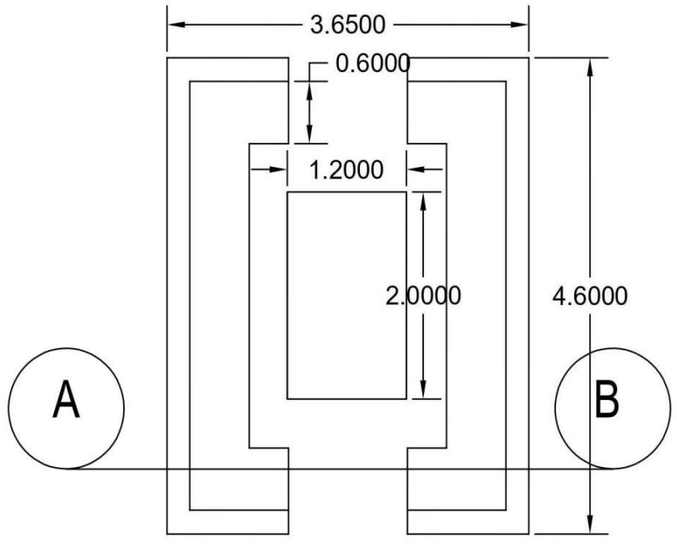


PLAN

GUJARAT TECHNICAL UNIVERSITY

- ALL DIMENSION ARE IN METERS
- OUTER WALLS ARE OF 0.12M
- DESIGN IS PREPARED ONLY FOR EDUCATIONAL PURPOSE AND CORRECTION OF ALL DATA MUST BE CHECK BEFORE USE
- MINIMUM GRADE OF CONCRETE IS M20 & STEEL CAN BE USED OF FE450 OR FE500

GYANMANJRI INSTITUTE OF TECHNOLOGY

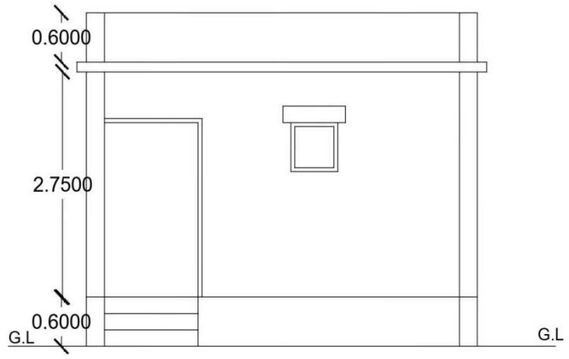
DESIGNED BY:-

JOGENDRASINH H SARVAIYA

SIDDHARTH D PATEL

SMASHAN	
VISHWAKARMA YOJNA	
PROJECT NO	04
LOCATION	THORDI VILLAGE
DATE	03/01/2021
SCALE	1:100

SIGN



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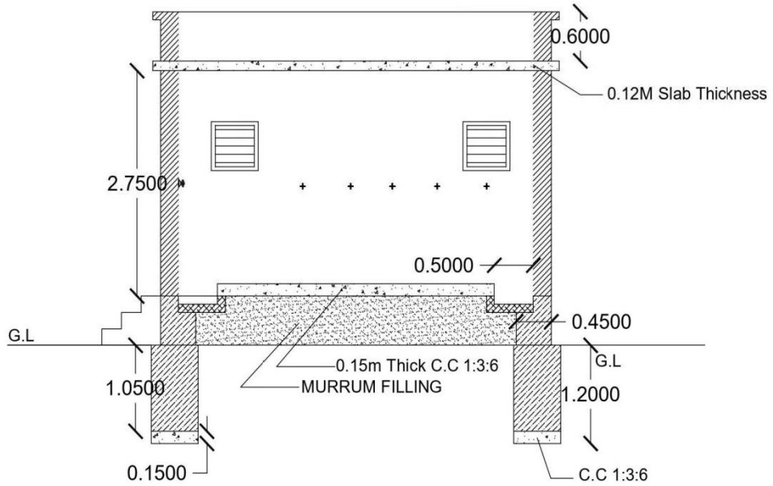
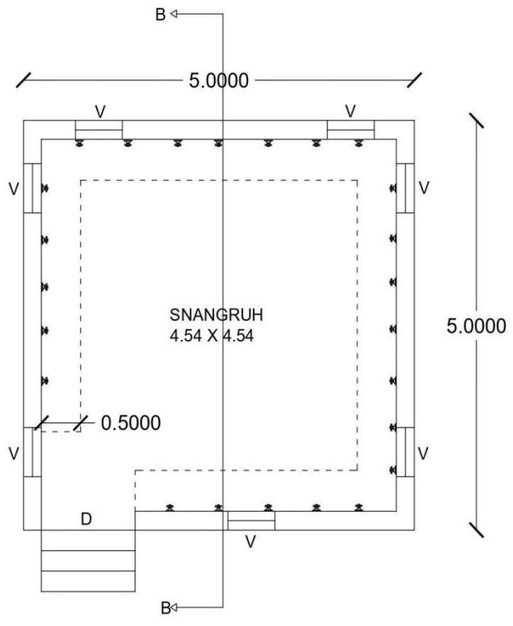


SECTION B-B



PLAN

GUJARAT TECHNICAL UNIVERSITY

- ALL DIMENSION ARE IN METERS
- ALL WALLS ARE OF 0.23Meters WIDE
- DESIGN IS PREPARED ONLY FOR EDUCATIONAL PURPOSE AND CORRECTION OF ALL DATA MUST BE CHECK BEFORE USE
- MINIMUM GRADE OF CONCRETE IS M20 & STEEL CAN BE USED OF FE450 OR FE500 UNLESS GIVEN

GYANMANJRI INSTITUTE OF TECHNOLOGY

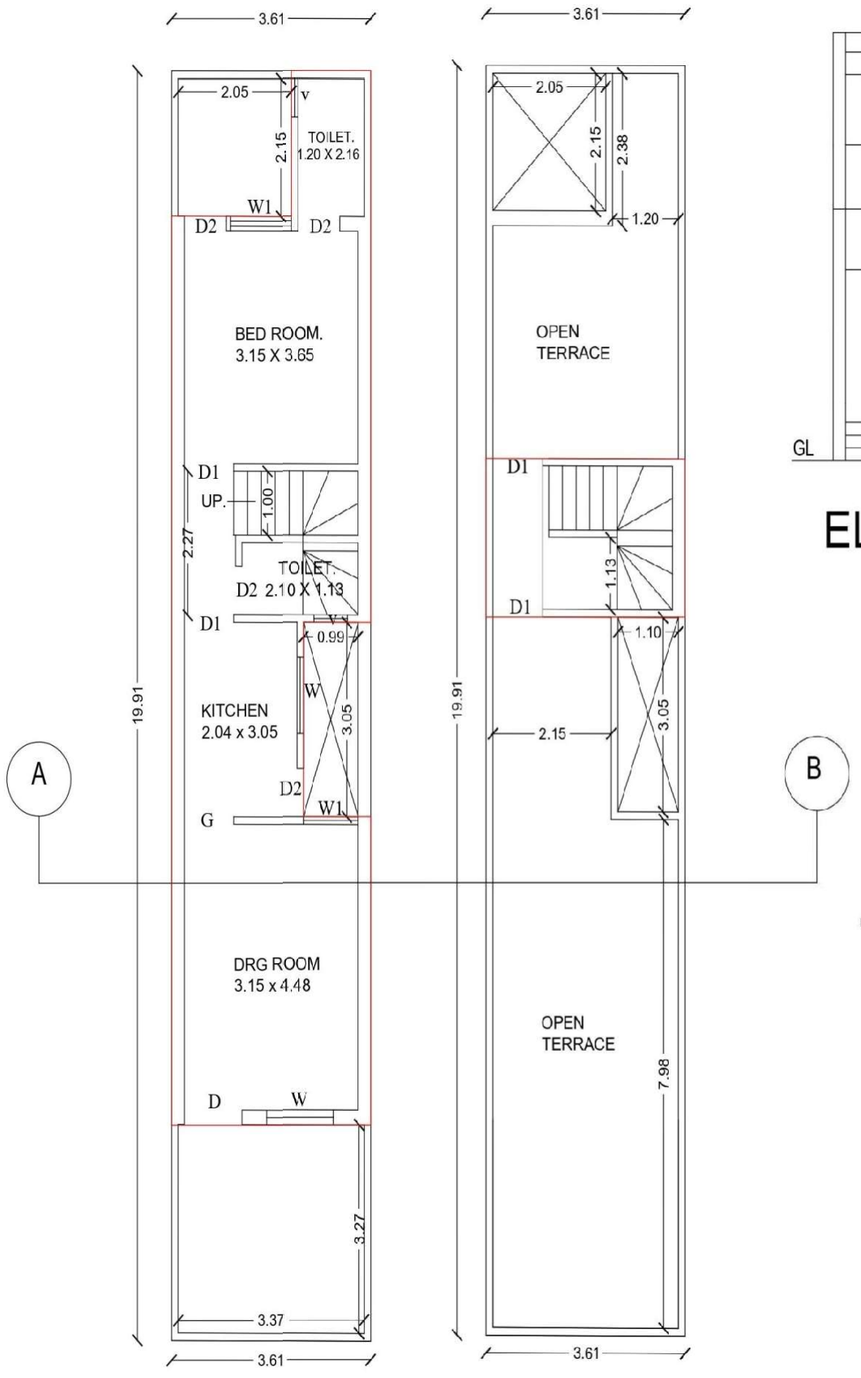
DESIGNED BY:-

JOGENDRASINH H SARVAIYA

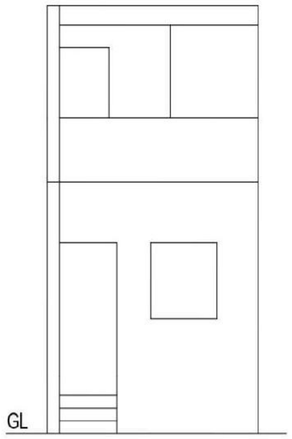
SIDDHARTH D PATEL

SNANGRUH	
VISHWAKARMA YOJNA	
PROJECT NO	05
LOCATION	THORDI VILLAGE
DATE	03/01/2021
SCALE	1:100

SIGN



GROUND FLOOR FIRST FLOOR



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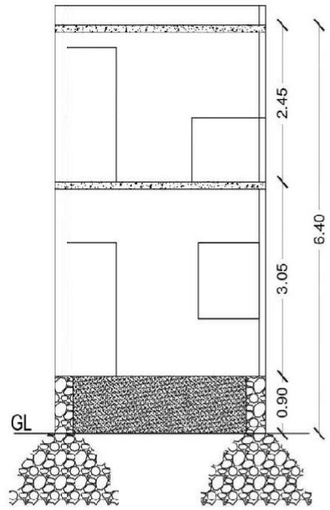

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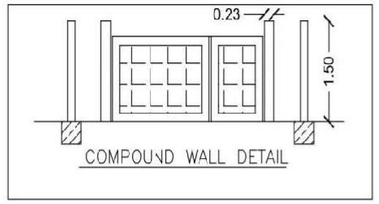
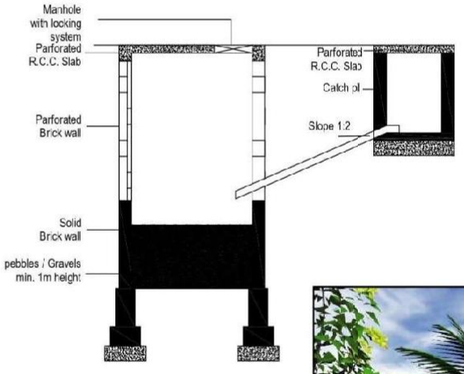


Compound wall details



RAIN WATER HARVESTING details

GUJARAT TECHNICAL UNIVERSITY

- ALL DIMENSION ARE IN METERS
- OUTER WALLS ARE OF 0.23M & INTERNAL ARE 0.12M
- DESIGN IS PREPARED ONLY FOR EDUCATIONAL PURPOSE AND CORRECTION OF ALL DATA MUST BE CHECK BEFORE USE
- MINIMUM GRADE OF CONCRETE IS M20 & STEEL CAN BE USED OF FE450 OR FE500

SCHEDULE OF DOORS & WINDOWS			STEEL STAIR
D - 1.05 X 2.10	W - 1.20 X 1.20		TRAID - 0.15
D1 - 0.90 X 2.10	W1 - 1.10 X 1.20		RISER - 0.14
D2 - 0.75 X 2.10	V - 0.60 X 0.60		

GYANMANJRI INSTITUTE OF TECHNOLOGY

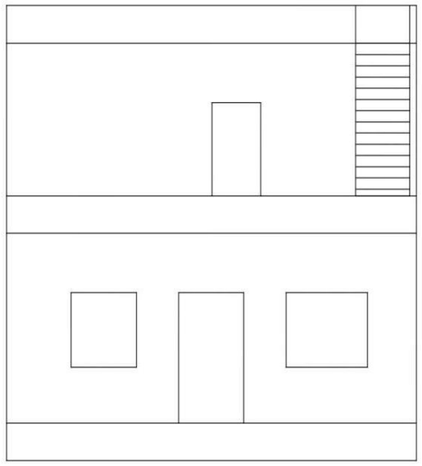
DESIGNED BY:-

JOGENDRASINH H SARVAIYA

SIDDHARTH D PATEL

RESIDENTIAL HOUSES TYPE A	
VISHWAKARMA YOJNA	
PROJECT NO	06 A
LOCATION	THORDI VILLAGE
DATE	03/01/2021
SCALE	1:100
BUILT UP	G.F+F.F = 51.02 + 8.97 = 60.00 SQ.MT

SIGN



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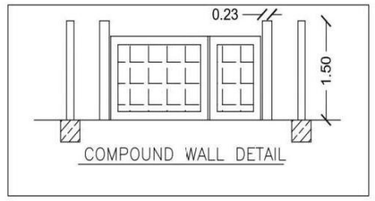
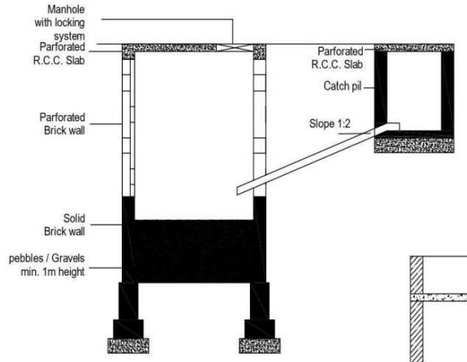
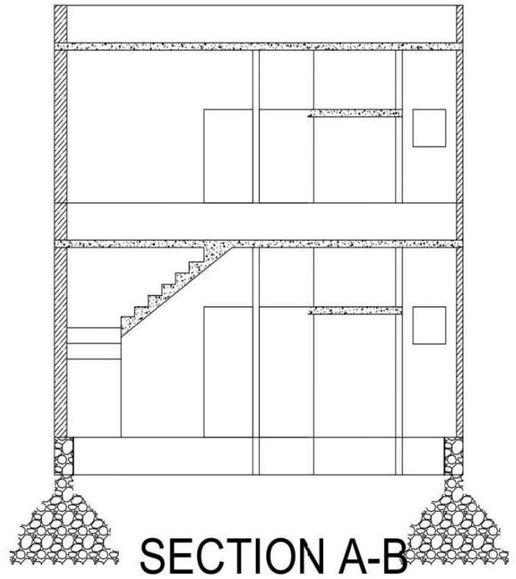


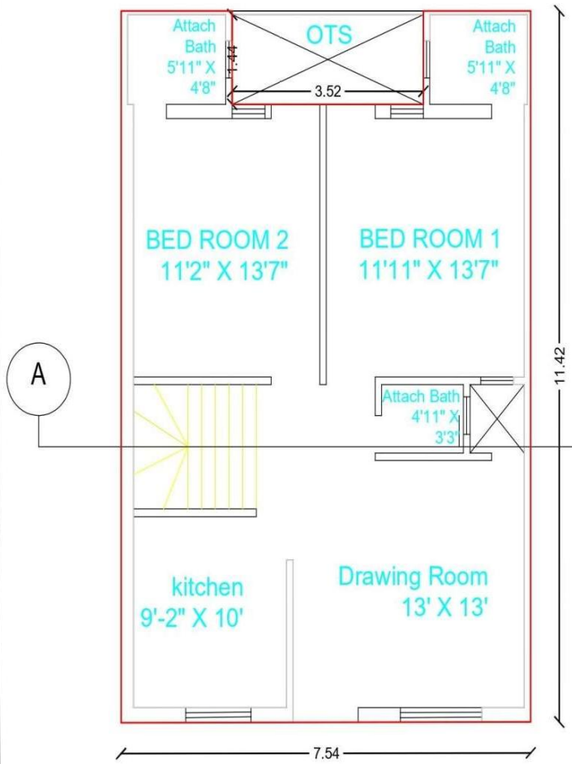
Compound wall details



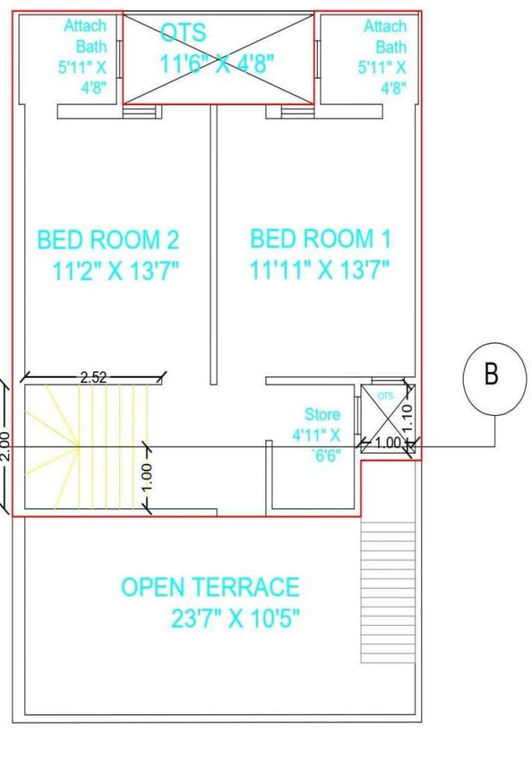
RAIN WATER HARVESTING details



SECTION A-B



GROUND FLOOR



FIRST FLOOR

GUJARAT TECHNICAL UNIVERSITY

- ALL DIMENSION ARE IN METERS
- OUTER WALLS ARE OF 0.23M & INTERNAL ARE 0.12M
- DESIGN IS PREPARED ONLY FOR EDUCATIONAL PURPOSE AND CORRECTION OF ALL DATA MUST BE CHECK BEFORE USE
- MINIMUM GRADE OF CONCRETE IS M20 & STEEL CAN BE USED OF FE450 OR FE500

SCHEDULE OF DOORS & WINDOWS		RCC STAIR
D - 1.08 X 2.10	W - 1.20 X 1.20	TRAID - 0.25
D1 - 0.90 X 2.10	W1 - 0.60 X 1.20	RISER - 0.18
D2 - 0.60 X 2.10	V - 0.60 X 0.60	

GYANMANJRI INSTITUTE OF TECHNOLOGY

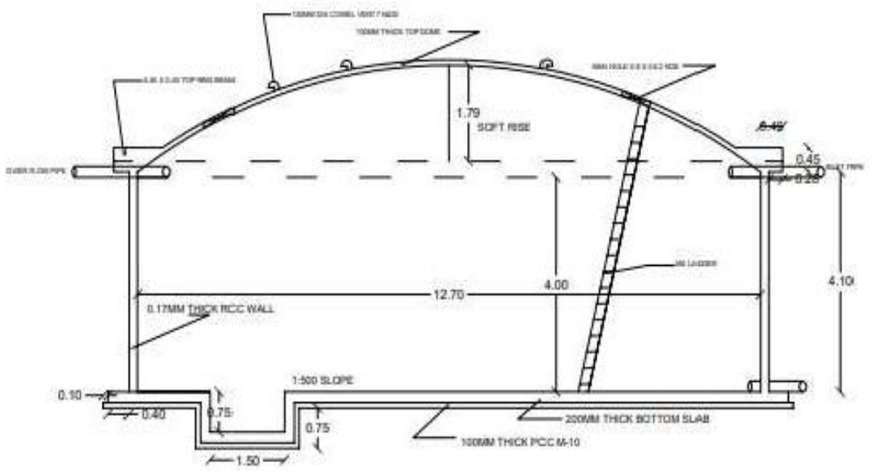
DESIGNED BY:-

JOGENDRASINH H SARVAIYA

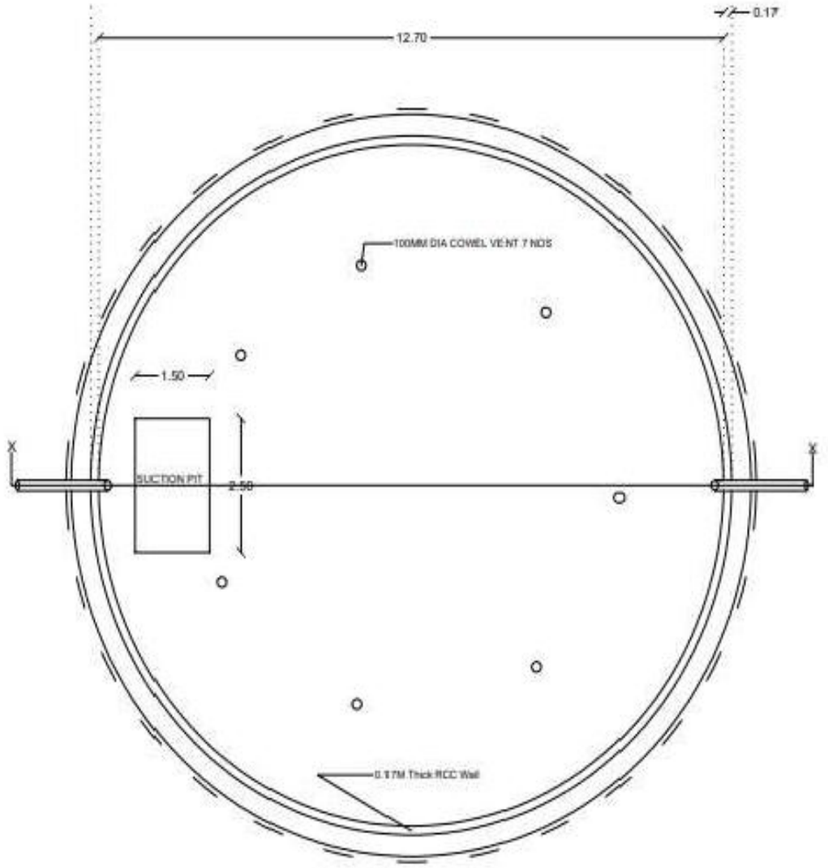
SIDDHARTH D PATEL

RESIDENTIAL HOUSES TYPE B	
VISHWAKARMA YOJNA	
PROJECT NO	06 B
LOCATION	THORDI VILLAGE
DATE	03/01/2021
SCALE	1:100
BUILT UP	G.F+F.F = 80.90 + 54.55 = 135.45 SQ.MT

SIGN



SECTION X-X



PLAN

NOTES:-

THIS DRAWING IS NOT TO SCALE

BOTTOM SLAB AND SIDE WALLS TO BE CAST MONOLITHIC

ALL INSIDE FACES TO RECIEVE 20MM THICK WATER PROOF PLASTER WITH WATER PROOFING CICOMPOUND C:M 1:2

ALL INLETS OUTLETS OVER FLOW PIPES MAN HOLE FRAME etc. TO BE LEFT IN POSITION BEFORE CONCRETING

ALL RING BARS SHALL BE OVER LAPPED BY 60D AT CLOSING END

ALL DIMENSION ARE IN METERS UNLESS MENTIONED

DESIGN CAN VARY AS PER SBC REPORT

GUJARAT TECHNICAL UNIVERSITY

- ALL DIMENSION ARE IN METERS
- DESIGN IS PREPARED ONLY FOR EDUCATIONAL PURPOSE AND CORRECTION OF ALL DATA MUST BE CHECK BEFORE USE
- MINIMUM GRADE OF CONCRETE IS M30 & STEEL CAN BE USED OF FE500

GYANMANJRI INSTITUTE OF TECHNOLOGY

DESIGNED BY:-

JOGENDRASINH H SARVAIYA

SIDDHARTH D PATEL

5 LAKH LITER SUMP	
VISHWAKARMA YOJNA	
PROJECT NO	02
LOCATION	THORDI VILLAGE
DATE	03/01/2021
SCALE	1:100

SIGN

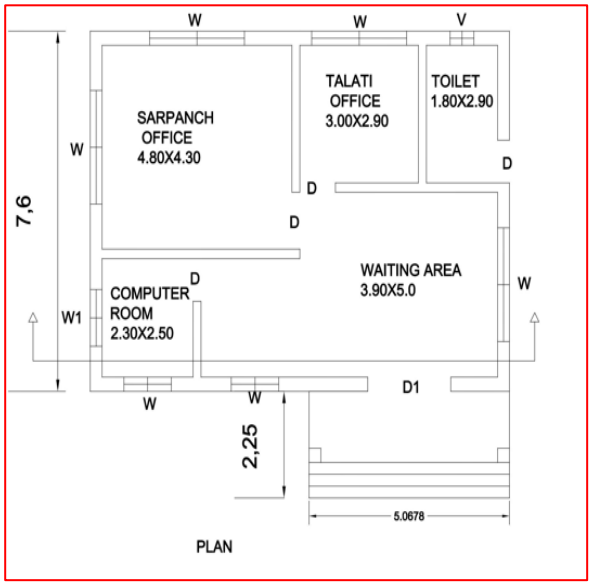
Chapter 13

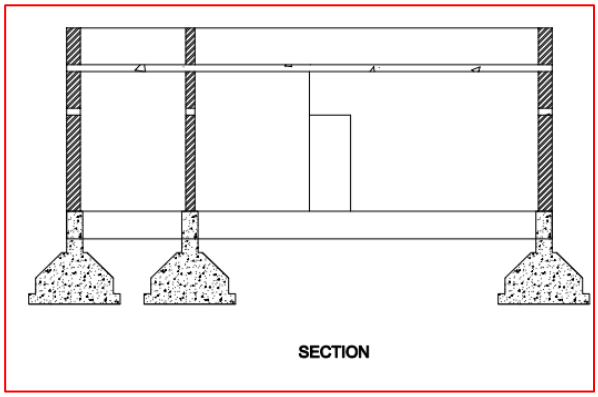
From the Chapter- 9 future designs of the aspects (Feasibility, Construction, Operation and maintenance of various design options in Rural Areas along with cost with AutoCAD designs / planning with any software

13.1 Design Proposals :

13.1.1 Gram Panchayat Building

There is Panchayat Office in Thordi Village but is very poor condition so a new office is needed for the village.





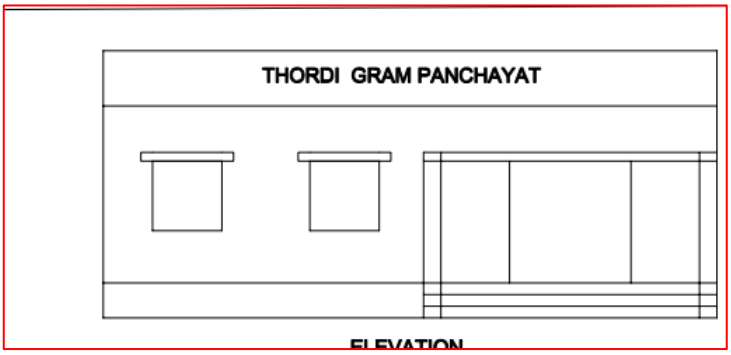


FIG.91 Gram Panchayat Building Plan, Elevation, Section

Thordi Panchayat Office : Measurement Sheet (T-34- Thordi Panchayat Office measurement sheet)

NO	DESCRIPTION	LENGTH (m)	WIDTH (m)	HEIGHT (m)	Nos.	Total Quantity
1	**Excavation**					
	Long wall	21.2	2	2	1	84.8
	Short wall	13.2	2	2	1	58.8
					Total	**137.8 m3**
2	**Pcc work**					
	Long wall	21.2	2	0.2	1	8.48
	Short wall	13.2	2	0.2	1	5.28
					Total	**13.76 m3**
3	**Brick masonry in foundation**					
Long wall	First step	20.9	1.70	0.35	1	12.43
	Second step	20.04	1.13	0.56	1	12.65
	Third step	19.26	0.35	0.3	1	2.02
Short wall	First step	12.9	1.7	0.35	1	7.67
	Second step	12.04	1.13	0.56	1	7.61
	Third step	11.26	0.35	0.3	1	1.18
					Total	**43.59 m3**
4	**Brick masonry upto slab level**					
	Outer wall					
	Long wall	21.2	0.3	3.05	1	19.39
	Short wall	13.2	0.3	3.05	1	12.07
	Inner wall					
Horizontal	Wall -1	5	0.2	3.05	1	3.05
	Wall -2	5	0.2	3.05	1	3.05
Vertical	Wall-1	3.10	0.2	3.05	1	1.89
	Wall-2	2.9	0.2	3.05	1	1.76
	Wall-3	2.5	0.2	3.05	1	15.2
					Total	**42.13 m3**
5	**Brick masonry upto plinth level**					
	Outer wall					
	Long wall	21.2	0.3	0.6	1	3.816
	Short wall	13.2	0.3	0.6	1	2.37
	Inner wall					
Horizontal	Wall -1	5	0.2	0.6	1	0.6

	Wall -2	5	0.2	0.6	1	0.6
Vertical	Wall-1	3.10	0.2	0.6	1	0.372
	Wall-2	2.9	0.2	0.6	1	0.348
	Wall-3	2.5	0.2	0.6	1	0.3
Deduction	D	2.10	0.3	2.1	1	1.323
(-)	D1	1.2	0.2	2.1	1	0.504
	D2	0.9	0.2	2.1	3	1.134
	W2	2.4	0.3	1.2	4	3.456
	W1	1.2	0.3	1.2	3	1.296
					Total	**34.42 m3**
6	**Inner Plaster work**					
Sarpanch office	H wall	4.8	-	3.05	2	29.28
	V wall	4.3	-	3.05	2	26.23
	Ceiling	4.8	4.3	-	1	20.64
Talti office	H wall	3	-	3.05	2	18.3
	V wall	2.9	-	3.05	2	17.69
	Ceiling	3	2.90	-	1	8.7
Help desk	H wall	2.3	-	3.05	2	14.03
	V wall	2.5	-	3.05	2	15.25
	Ceiling	2.3	2.5	-	1	5.75
Toilet	H wall	1.8	-	3.05	2	10.98
	V wall	2.9	-	3.05	2	17.09
	Ceiling	1.8	2.90	-	1	5.22
Waiting area	H wall	2.5	-	3.05	1	7.625
	V wall	2.5	-	3.05	2	15.25
	Ceiling	2.5	2.5	-	1	6.25
Waiting area-2	H wall	3.90	-	3.05	1	11.89
	V wall	5	-	3.05	2	30.5
	Ceiling	3.9	5.2	-	1	19.5
Deduction	D	2.1	-	2.1	1	4.41
(-)	D1	1.2	-	2.1	1	2.52
	D2	0.9	-	2.1	3	1.89
	W1	2.4	-	1.2	4	2.88
	W2	1.2	-	1.2	3	1.44
	V	0.6	-	0.6	1	0.36

					Total	**267.27 Sqmt**
7	**Outer Plaster**					
	Long wall	21.2	-	4	1	84.8
	Short wall	13.2	-	4	1	52.8
Deduction	Short wall	7.0	-	0.6	1	7.8
(-)	Long wall	10.0	-	0.6	1	6.0
					Total	**137.9 Sqmt**
8	**Flooring work**					
	Sarpanch office	4.8	4.3	-	1	20.64
	Talati	3	2.90	-	1	8.7
	Help desk	2.3	2.5	-	1	5.75
	Toilet	1.8	2.90	-	1	5.22
	Waiting area	2.5	2.5	-	1	6.25
	Waiting area-2	3.9	5.2	-	1	19.5
	Terrace	10.0	7.0	-	1	70
					Total	**136.06 Sqmt**
9	**Flush Door**					
	D	-	-	-	1	1
	D1	-	-	-	1	1
					Total	**2 Nos.**
10	**Aluminum section**					
	D2	0.9	0.2	2.1	3	1.134
	W1	2.4	-	1.2	4	2.88
	W2	1.2	-	1.2	3	1.44
	V	0.6	-	0.6	1	0.36
					Total	**5.82 Sqmt**

Thordi Panchayat Office: Abstract Sheet (T-35- Thordi Panchayat Office abstract sheet)

NO.	Description	Quantity	Rate	Per	Amount
1	**Excavation**	**137.8**	**125**	**m3**	**17,225**
2	**Pcc work**	**13.76**	**2400**	**m3**	**33,024**
3	**Brick masonry in foundation**	**43.59**	**3800**	**m3**	**165,642**
4	**Brick masonry upto slab level**	**43.59**	**3900**	**m3**	**1,70,001**

5	**Brick masonry upto plinth level**	**42.13**	**4025**	**m3**	**1,69,573.25**
6	**Inner Plaster work**	**267.27**	**225**	**Sqmt**	**60,135.75**
7	**Outer Plaster**	**137.9**	**350**	**Sqmt**	**48,265**
8	**Flooring work**	**136.06**	**540**	**Sqmt**	**73,472.4**
9	**Flush Door**	**2**	**3245**	**Nos.**	**6,490**
10	**Aluminum section**	**5.82**	**2042.22**	**Sqmt**	**11,885.72**
				Total	**7,55,714.12/-**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive ofwater charges, contractor‘s profit, contingencies, utilities and labor charges.

Total cost = ₹ 7,55,714.12/-

13.1.2 Cattle Trough (Avedo)

Cattle trough can be constructed for the animals in village which will impact Ample water being always available in the cattle watering troughs, they are reliable drinking water facility for all the domestic animals including cattle, sheep, goats, etc. in the village.

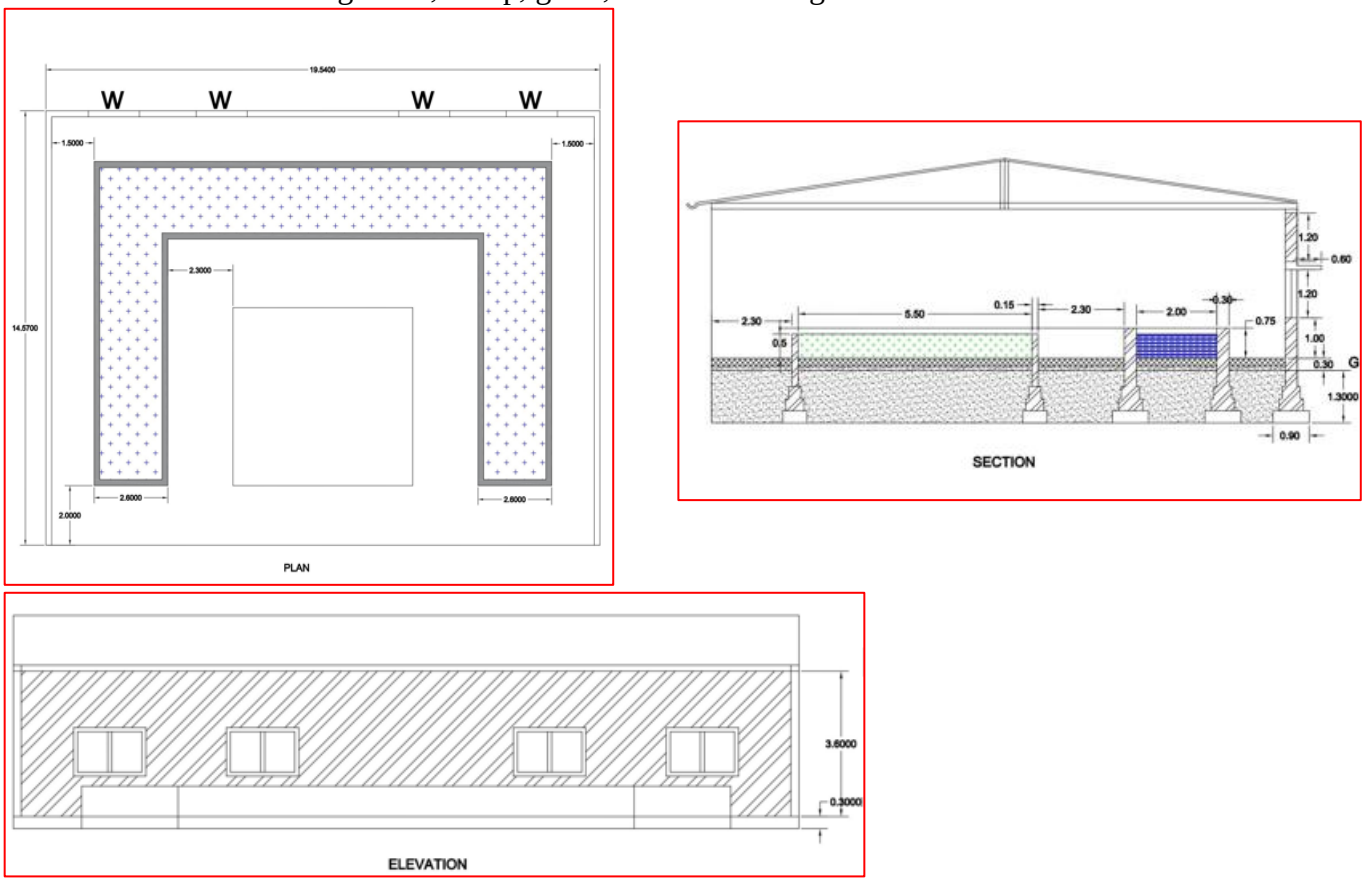


FIG.92 Cattle Trough Plan, Elevation, Section

Cattle Trough: Measurement Sheet (T-36- Cattle Trough measurement sheet)

NO	DESCRIPTION	LENGTH (m)	WIDTH (m)	HEIGHT (m)	Nos.	Total Quantity
1	**Excavation**	49.4	0.9	1	1	44.46
		71.2	0.9	1	1	64.08
		23.1	0.6	1	1	13.80
					Total	**122.4 m3**
2	**PCC in Foundation**	49.4	0.9	0.3	1	13.33
		71.2	0.9	0.3	1	19.22
		23.1	0.6	0.2	1	2.77
					Total	**35.32 m3**
3	**Brick masonry upto G.L and plinth**					
Long wall	First step	120.6	0.6	0.2	1	14.47
	Second step	120.6	0.5	0.2	1	16.06
	Third step	120.6	0.4	0.2	1	9.64
	Fourth step	120.6	0.3	0.1	1	3.61
	Fifth step	120.6	0.3	0.3	1	10.85
Short wall	First step	23.1	0.5	0.2	1	2.31
	Second step	23.1	0.4	0.2	1	1.84
	Third step	23.1	0.3	0.2	1	1.38
	Fourth step	23.1	0.15	0.2	1	2.31
	Fifth step	23.1	0.15	0.2	1	0.69
					Total	**61.54 m3**
4	**Sand filling upto G.L**					
	Q=(excavation-pcc-brickwork) =(122.4-35.22-61.54)	-	-	-	-	**25.64 m3**
5	**Brick work above G.L**	49.1	0.3	3.6	1	53.03

		71.2	0.3	0.75	1	16.02
		23.1	0.15	0.5	1	1.73
	Deduction (-) window	1.8	0.3	1.2	8	5.184
					Total	**65.60 m3**
6	**Sand filling in space between walls**					
	=total area-area of wall =300-52.52	-	247.48	-	0.3	**74.24 m3**
7	**Inside plaster**	48.8	-	3.6	1	175.68
	Tank outer wall	72.4	-	0.75	1	54.3
	Tank inner wall	70.6	-	0.75	1	52.95
	Remaining wall	46.2	-	0.5	1	23.1
	Deduction (-) window	1.8	-	1.2	4	8.64
					Total	**297.39 Sqmt**
8	**Roof**	20	15	-	1	**300 Sqmt**
9	**Outside plaster**	50	-	3.6	1	180
	Deduction (-) window	1.8	-	1.2	4	8.64
					Total	**171.36 Sqmt**
10	**Window**	-	-	-	**8**	**8 Nos.**

Cattle Trough: Abstract Sheet (T-37- Cattle Trough abstract sheet)

NO.	Description	Quantity	Rate	Per	Amount
1	**Excavation**	**122.4**	**125**	**m3**	**15,300**
2	**PCC in Foundation**	**35.32**	**2400**	**m3**	**84,768**
3	**Brick masonry upto G.L and plinth**	**61.54**	**3800**	**m3**	**2,33,852**
4	**Sand filling upto G.L**	**25.64**	**290.88**	**m3**	**7,458.16**
5	**Brick work above G.L**	**65.60**	**3900**	**m3**	**255,840**

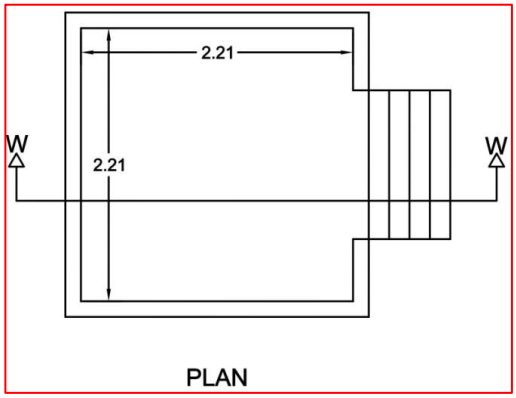
6	**Sand filling in space between walls**	**74.24**	**290.88**	**m3**	**21,594.93**
7	**Inside plaster**	**297.39**	**225**	**Sqmt**	**66,912.75**
8	**Roof**	**300**	**769.62**	**Sqmt**	**2,30,886**
9	**Outside plaster**	**171.36**	**350**	**Sqmt**	**59,976**
10	**Window**	**8**	**993.6**	**Nos.**	**7,948.8**
				Total	**9,84,536.64/-**

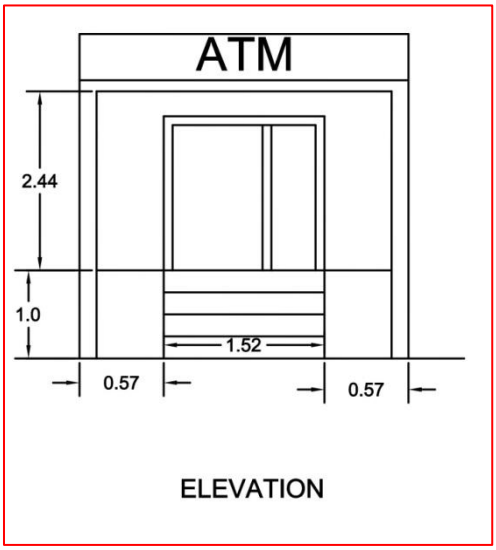
The rates of their respective works provided in the abstract sheet along with quantities are inclusive of water charges, contractor‘s profit, contingencies, utilities and labor charges.

Total cost = ₹ 9,84,536.64/-

13.1.3 ATM

In Thordi Village there is no bank or ATM for ATM & Bank facility the villagers have to go to near village Tagdi 6KM. So for easy banking facility & Requirements Atm should be constructed in village.





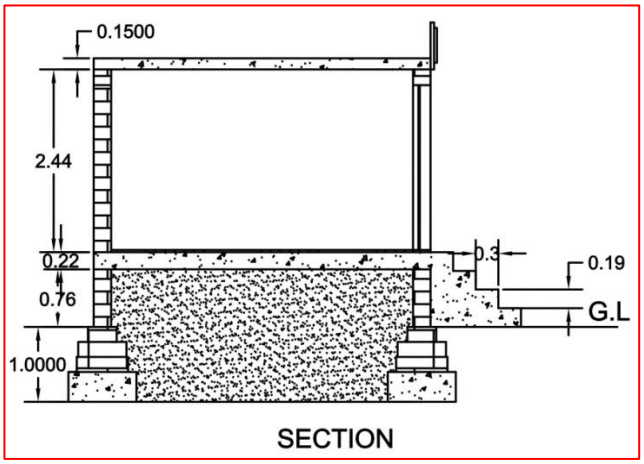


FIG.93 ATM Plan, Elevation, Section

ATM: Measurement Sheet (T-38- ATM measurement sheet)

NO	DESCRIPTION	LENGTH (m)	WIDTH (m)	HEIGHT (m)	Nos.	Total Quantity
1	**Excavation**	10.22	1.2	1.5	1	**18.40 m3**
2	**PCC in footing**	10.22	0.9	0.4	1	**1.22 m3**
3	**Brick work**					
	First step	10.22	1.2	0.4	1	1.22
	Second step	10.22	1.6	0.4	1	1.64
	Third step	10.22	2	0.4	1	2.04
					Total	**4.9 m3**
4	**Rcc stair**	0.1778	1.524	0.1778	4	**0.75 m3**
5	**Brick wall**	8.69	0.23	2.44	1	**4.87 m3**
6	**Slab**	2.67	2.67	0.15	1	**1.06 m3**
7	**Flooring**	2.21	2.21	-	1	**4.88 Sqmt**
8	**Inner plaster**	8.84	-	2.44	1	21.57
	Deduction(-) door	1.52	-	2.23	1	3.39
					Total	**18.18 Sqmt**
9	**Outer plaster**	9.76	-	3.35	1	32.69
	Deduction(-) door	1.52	-	2.23	1	3.39
					Total	**29.3 Sqmt**
10	**Inner plastic paint** Same as plaster	-	-	-	-	**18.18 Sqmt**
11	**Outer emulsion paint** Same as plaster	-	-	-	-	**29.3 Sqmt**
12	**Glass door**	-	-	-	**1**	**1 Nos.**

ATM: Abstract Sheet (T-39- ATM abstract sheet)

NO.	Description	Quantity	Rate	Per	Amount
1	**Excavation**	**18.40**	**125**	**m3**	**2,300**
2	**PCC in footing**	**1.22**	**2400**	**m3**	**2,928**
3	**Brick work**	**4.9**	**3800**	**m3**	**18,620**
4	**Rcc stair**	**0.75**	**3600**	**m3**	**2,700**
5	**Brick wall**	**4.87**	**3900**	**m3**	**18,993**

6	**Slab**	**1.06**	**4525**	**m3**	**4,796.5**
7	**Flooring**	**4.88**	**540**	**Sqmt**	**2,635.2**
8	**Inner plaster**	**18.18**	**225**	**Sqmt**	**4,090.5**
9	**Outer plaster**	**29.3**	**350**	**Sqmt**	**10,255**
10	**Inner plastic paint** Same as plaster	**18.18**	**119.45**	**Sqmt**	**2,171.60**
11	**Outer emulsion paint** Same as plaster	**29.3**	**72.72**	**Sqmt**	**2,130.70**
12	**Glass door**	**1**	**12000**	**Nos.**	**12000**
				Total	**83,620.5 /-**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive ofwater charges, contractor‘s profit, contingencies, utilities and labor charges.

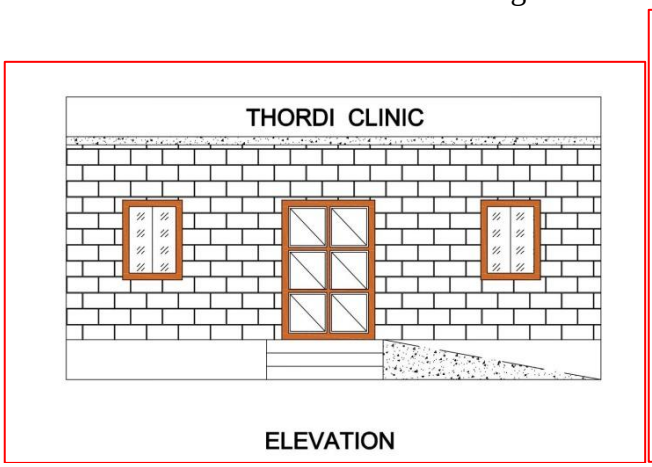
Total cost = ₹ 83,620.5/-

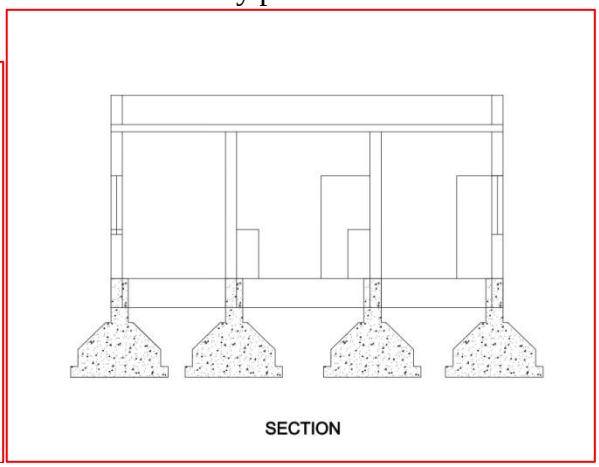
13.1.4 CLINIC with Maternity Ward

In Thordi Village there is only one clinic which is not sufficient for the village the villagers have to go nearby areas for the facility so a clinic is designed with maternity ward.

Death of women from complications of childbirth remains a major global health problem. In 2010, nearly 300,000 women died in childbirth, the vast majority in developing countries.

Common causes of maternal death in resource-limited settings include obstetrical hemorrhage, peripartum infections, eclampsia, and obstructed labor. The majority of these deaths can be prevented with timely access to emergency obstetrical care. However, in resource-limited settings, many deliveries occur at home, often aided by a traditional birth attendant or family member without the skills or the equipment to respond effectively to obstetric emergencies. The geographic distance between women’s homes and the nearest health facility can also magnify the problem. In a setting like rural Lesotho, where women must traverse mountainous terrain to reach a facility with obstetric services, the delay can be significant. If a woman experiences a complication with rapid onset, even a delay of several hours can be fatal. Such emergencies often cannot be easily predicted.





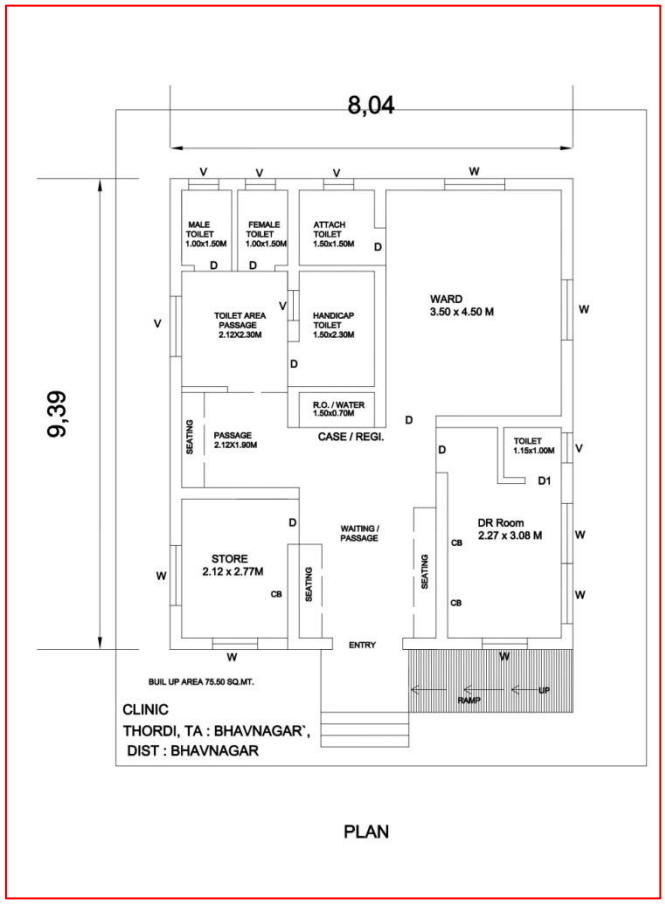


FIG.94 Clinic with Maternity Ward Plan, Elevation, Section

CLINIC with Maternity Ward: Measurement Sheet (T-40- CLINIC with Maternity Ward measurement sheet)

NO	DESCRIPTION	LENGTH (m)	WIDTH (m)	HEIGHT (m)	Nos.	Total Quantity
1	**Excavation for foundation up to 1.5 Meter depth**	65.3	0.23	1.5	1	**22.53 m3**
2	**cement concrete 1:3:6:(a) Foundation and plinth**	65.3	0.23	0.2	1	**3.00 m3**
3	**cement concrete 1:1.5:3(a) Foundation footing base of columns and mass concrete**	1.2 m3	-	-	20	**7.32 m3**
4	**Providing and laying ordinary cement concrete 1:1.5:3 COLUMN (2) Having cross sectional area more than 0.08 Sq. M. and up to 0.18 Sq.M**	4	0.3	0.3	20	**7.2 m3**
5	**Brick work(b) Conventional**					
	Of size 0.23	53.33	0.23	3.05	1	37.41
	Of size 0.12	6.85	0.12	3.05	1	2.51
	Deduction (-) entry	1.4	0.23	2.1	1	0.68

	D	0.9	0.23	2.1	5	2.17
	D	0.9	0.12	2.1	2	0.45
	D1	0.72	0.12	2.1	1	0.18
	window	1.2	0.23	1.2	8	2.65
	ventilation	0.6	0.23	0.6	5	0.41
					Total	**33.38 m3**
6	**cement concrete 1:2:4 (a) Wall caps/copings**	65.3	0.23	0.1	1	**1.51 m3**
7	**Filling available excavated earth Excavation-foundation = 22.53 - 3- 7.32**	-	-	-	-	**12.21 m3**
8	**cement concrete 1:1.5:3 BEAM (2) Having cross sectional area more than 0.05 Sq. M. and up to 0.08 Sq. M**	50.94	0.3	0.3	1	**4.58 m3**
9	**R.C.C. LINTEL**					
	WINDOW	1.2	0.45	0.2	8	0.86
	VENTILATION	0.6	0.45	0.2	4	0.22
	ENTRY	1.2	1.25	0.2	1	0.3
					Total	**1.38 m3**
10	**cement concrete 1:1.5:3 R.C.C work in : (3) Slabs having more than 10 cm. And up to 13 cm. Thickness**	8.04	9.39	0.15	1	**11.32 m3**
11	**Providing TMT bar reinforcement for R.C.C. work**	**As per bar schedule**	-	-	-	**2584 kg**
12	**Providing and fixing of Polished Kotah Stone Frame for Doors & Window** (FOR D)	5.1	0.23	-	5	5.86
	D	5.1	0.13	-	2	1.33
	D1	4.92	0.23	-	1	1.13
	W	4.8	0.23	-	8	8.83
	V	2.4	0.23	-	5	2.76
					Total	**19.91 Sqmt**
13	**Providing and fixing 35mm thick panelled, glazed door**	-	-	-	8	**8 Nos.**
14	**Providing and fixing window having extruded aluminium Colour anodized section frame** for window	1.2	-	1.2	8	11.52
	ventilation	0.6	-	0.6	5	1.8
	For entry	1.4	-	1.2	1	1.68
					Total	**15 Sqmt**
15	**Inner plaster** (wall)	93.66	-	3.05	1	285.66

	Ceiling	8.04	-	9.39	1	75.50
	Deduction (-) door D	0.9	-	2.1	14	26.46
	D1	0.72	-	2.1	2	3.02
	window	1.2	-	1.2	8	11.52
	ventilation	0.6	-	0.6	6	1.8
	entry	1.4	-	1.2	1	1.68
					Total	**165.68 Sqmt**
16	**Outer plaster**	34.86	-	4	1	139.44
	Deduction (-) entry	1.4	-	1.2	1	1.68
	ventilation	0.6	-	0.6	4	1.44
	window	1.2	-	1.2	8	11.52
						124.8 Sqmt
17	**Providing and lying Vitrified tiles 8 to 10mm thick, 24"X24"**	8.04	-	9.39	1	**75.49 Sqmt**
18	**Finishing wall with weather proof exterior emulsion paint** same as outer plaster	-	-	-	-	**124.8 Sqmt**
19	**Inner plastic paint** same as inner plaster	-	-	-	-	**165.68 Sqmt**
20	**Providing and Laying blacken china mosaic flooring for terrace using 12mm to 20 broken pieces of glazzed tiles**	8.04	-	9.39	1	**75.49 Sqmt**

CLINIC with Maternity Ward: Measurement Sheet (T-41- CLINIC with Maternity Ward measurement sheet)

NO.	Description	Quantity	Rate	Per	Amount
1	**Excavation for foundation up to 1.5 Meter depth**	**22.53**	**125**	**m3**	**2,816.25**
2	**cement concrete 1:3:6:(a) Foundation and plinth**	**3.00**	**2400**	**m3**	**7,200**
3	**cement concrete 1:1.5:3(a) Foundation footing base of columns and mass concrete**	**7.32**	**4500**	**m3**	**32,940**
4	**Providing and laying ordinary cement concrete 1:1.5:3COLUMN (2) Having cross sectional area more than 0.08 Sq. M. and up to 0.18 Sq.M**	**7.2**	**4500**	**m3**	**32,400**
5	**Brick work(b) Conventional**	**33.38**	**3900**	**m3**	**1,30,182**
6	**cement concrete 1:2:4 (a) Wall caps/copings**	**1.51**	**3200**	**m3**	**4,832**
7	**Filling available excavated earth Excavation-foundation = 22.53 - 3- 7.32**	**12.21**	**290.88**	**m3**	**3,551.645**
8	**cement concrete 1:1.5:3 BEAM (2) Having cross sectional area more than 0.05 Sq. M.**	**4.58**	**4500**	**m3**	**20,610**

	and up to 0.08 Sq. M				
9	**R.C.C. LINTEL**	**1.38**	**4200**	**m3**	**5,796**
10	**cement concrete 1:1.5:3 R.C.C work in : (3) Slabs having more than 10 cm. And up to 13 cm. Thickness**	**11.32**	**4200**	**m3**	**47,544**
11	**Providing TMT bar reinforcement for R.C.C. work**	**2584**	**55**	**kg**	**1,42,120**
12	**Providing and fixing of Polished Kotah Stone Frame for Doors & Window**	**19.91**	**2645**	**Sqmt**	**52,661.95**
13	**Providing and fixing 35mm thick panelled, glazed door**	**8**	**4520**	**Sqmt**	**36,160**
14	**Providing and fixing window having extruded aluminium Colour anodized section frame**	**15**	**2042.22**	**Sqmt**	**30,633.3**
15	**Inner plaster**	**165.68**	**225**	**Sqmt**	**37,278**
16	**Outer plaster**	**124.8**	**350**	**Sqmt**	**43,680**
17	**Providing and lying Vitrified tiles 8 to 10mm thick, 24"X24"**	**75.49**	**540**	**Sqmt**	**40,764.6**
18	**Finishing wall with weather proof exterior emulsion paint** same as outer plaster	**124.8**	**72.72**	**Sqmt**	**9,075.456**
19	**Inner plastic paint** same as inner plaster	**165.68**	**119.45**	**Sqmt**	**19,790.48**
20	**Providing and Laying blacken china mosaic flooring for terrace using 12mm to 20 broken pieces of glazzed tiles**	**75.49**	**475.71**	**Sqmt**	**35,911.35**
				Total	**7,35,947 /-**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive ofwater charges, contractor's profit, contingencies, utilities and labor charges.

Total cost = ₹ 7,35,947/-

13.1.5 Pharmacy Store

There is no proper pharamacy store in the village Thordi & no such facility available so a pharmacy store is designed for easy access & usage. The increased need for medical care and prescription drugs, coupled with scarcity of primary care physicians in rural areas, exacerbates many barriers to accessing necessary health care. Maximizing the use of pharmacists as part of the health care delivery system is among several state strategies to meet the unique health care needs of rural and underserved communities.

Pharmacists are often the first line of contact for patients in rural communities and provide important advice on the safe use of prescription and over-the-counter medications to remedy symptoms until patients can schedule an appointment with their physician.

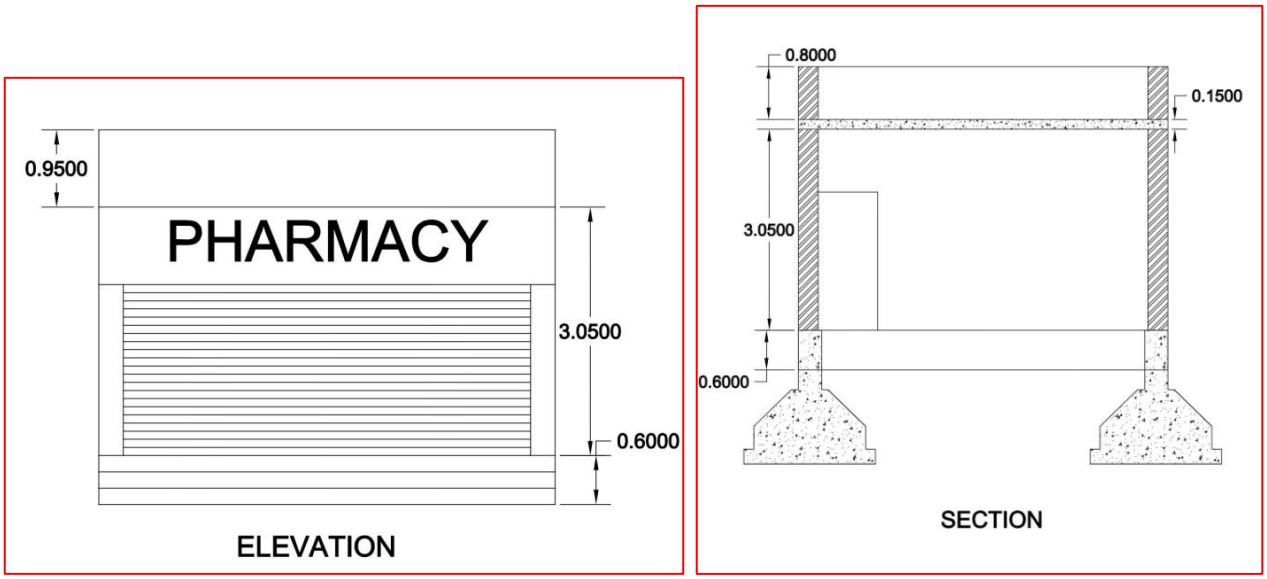


FIG.95 Pharmacy Store Plan, Elevation, Section

Pharmacy Store: Measurement Sheet (T-42- Pharmacy Store measurement sheet)

NO	DESCRIPTION	LENGTH (m)	WIDTH (m)	HEIGHT (m)	Nos.	Total Quantity
1	**Earth work**	17.2	2	2	1	68.8
		9.2	2	2	1	36.8
					Total	**105.6 m3**

2	**PCC Work**	17.2	2	0.2	1	6.88
		9.2	2	0.2	1	3.68
					Total	**10.56 m3**
3	**Brick masonry upto plinth level**					
Long wall	First step	16.9	1.7	0.35	1	10.05
	Second step	16.04	1.13	0.56	1	10.15
	Third step	15.26	0.35	0.9	1	4.8
Short wall	First step	9.5	1.7	0.35	1	5.65
	Second step	10.36	1.13	0.56	1	6.55
	Third step	11.14	0.35	0.9	1	3.5
					Total	**15.70 m3**
4	**Brick masonry above plinth level**					
	Long wall	7.6	0.3	3.05	1	6.95
	Short wall	5	0.3	3.05	1	4.57
	Partition wall	5	0.2	3.05	1	14.57
	Deduction (-)					
	Door	0.9	0.2	2.1	1	0.37
	Window	1.8	0.3	1.2	1	0.64
					Total	**13.56 m3**
5	**Brick masonry on parapet**					
	Long wall	15.2	0.3	0.8	1	3.64
	Short wall	10.6	0.3	0.8	1	2.54
					Total	**6.18 m3**
6	**Inner plaster**					
	Pharmacy	5	-	3.05	2	30.5
		5.3	-	3.05	2	32.33
	Ceiling	5	-	5.30	1	26.5

	Store	5	-	3.05	2	30.5
		1.8	-	3.05	2	10.98
	Ceiling	5	-	1.80	1	9
	Deduction (-)					
	Door	0.9	-	2.1	1	1.89
	Window	1.8	-	1.2	1	2.10
					Total	**135.82 Sqmt**
7	**Exterior plaster**					
	Front side	5.6	-	4	2	44.8
	Side wall	7.6	-	4	2	60.8
	Deduction (-)					
	Shutter	5	-	2.1	1	10.5
	Window	1.8	-	2.1	1	3.78
					Total	**91.32 Sqmt**
8	**RCC slab**	7.6	5.6	0.15	1	**6.384 m3**
9	**Flooring**					
	Pharmacy area	5	5.3	-	1	26.5
	Store area	5	1.8	-	1	9
	Terrace floore	7	5	-	1	35
					Total	**70.5 Sqmt**
10	**Inner plastic paint** same as inner plaster	-	-	-	-	**135.82 Sqmt**
11	**Outer Emulsion Paint** same as outer plaster	-	-	-	-	**91.32 Sqmt**
12	**Steel shutter paint**	5	-	2.1	**2**	**21 Sqmt**
13	**Window**	-	-	-	**1**	**1 Nos.**

Pharmacy Store: Abstract Sheet (T-43- Pharmacy Store abstract sheet)

NO.	Description	Quantity	Rate	Per	Amount
1	**Earth work**	**105.6**	**125**	**m3**	**13,200**
2	**PCC Work**	**10.56**	**2400**	**m3**	**25,344**

3	**Brick masonry upto plinth level**	**15.70**	**3800**	**m3**	**59,660**
4	**Brick masonry above plinth level**	**13.56**	**3900**	**m3**	**52,884**
5	**Brick masonry on parapet**	**6.18**	**4025**	**m3**	**24,874.5**
6	**Inner plaster**	**135.82**	**225**	**Sqmt**	**30,559.5**
7	**Exterior plaster**	**91.32**	**350**	**Sqmt**	**31,962**
8	**RCC slab**	**6.384**	**4200**	**m3**	**26,812.8**
9	**Flooring**	**70.5**	**540**	**Sqmt**	**38,070**
10	**Inner plastic paint** same as inner plaster	**135.82**	**119.45**	**Sqmt**	**16,223.7**
11	**Outer Emulsion Paint** same as outer plaster	**91.32**	**72.72**	**Sqmt**	**6,640.79**
12	**Steel shutter paint**	**21**	**45.25**	**Sqmt**	**950.25**
13	**Window**	**1**	**993.6**	**Nos.**	**993.6**
				Total	**328175.1/-**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive of water charges, contractor‘s profit, contingencies, utilities and labor charges.

Total cost = ₹ 3,28,175.1/-

13.1.6 Community Hall

There is no Hall in the village for public gathering so as per requirement Community Hall is Designed. Community centres or community halls are public locations where members of a community tend to gather for group activities, social support, public information, and other purposes. They may sometimes be open for the whole community or for a specialized group within the greater community.

Community centres generally perform many of the following functions in their communities:

- As the place for all-community celebrations at various occasions and traditions.
- As the place for public meetings of the citizens on various issues.
- As the place where politicians or other official leaders come to meet the citizens and ask for their opinions, support or votes ("election campaigning" in democracies, other kinds of requests in non-democracies).
- As a place where community members meet each other socially.
- As a place housing local clubs and volunteer activities.
- As a community venue for entertainment.

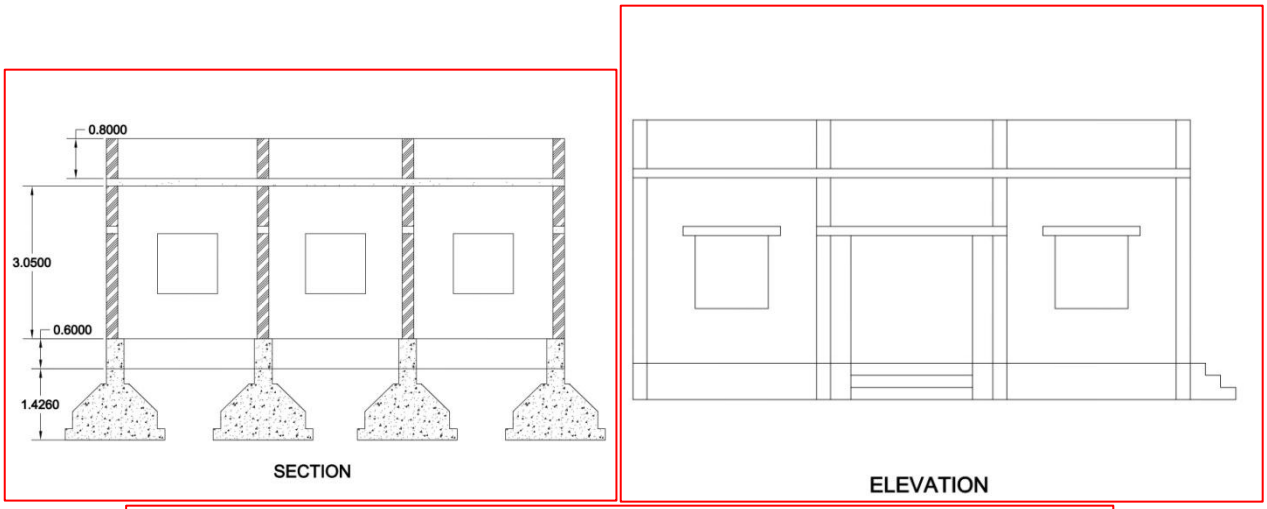


FIG.96 Community Hall Plan, Elevation, Section

Community Hall: Measurement Sheet (T-44- Community Hall measurement sheet)

NO	DESCRIPTION	LENGTH (m)	WIDTH (m)	HEIGHT (m)	Nos.	Total Quantity
1	**Excavation for foundation up to 1.5 Meter depth**	72	0.3	1.2	1	**26.00 m3**
2	**cement concrete 1:3:6:(a) Foundation and plinth**	46	0.3	0.6	1	**8.40 m3**
3	**cement concrete 1:1.5:3(a) Foundation footing base of columns and mass concrete**	45	0.3	0.45	1	**6.10 m3**

4	**Providing and laying ordinary cement concrete 1:1.5:3COLUMN (2) Having cross sectional area more than 0.08 Sq. M. and up to 0.18 Sq.M**	0.3	0.3	3.1	14	**3.90 m3**
5	**Brick work(b) Conventional**					**22.1 m3**
		28.78	0.23	3.05	1	20.19
	Deduction (-) door D	2	0.23	2.1	1	0.97
	D2	1.2	0.23	2.1	1	0.58
	window	1.2	0.23	1.2	8	2.65
					TOTAL	**15.99 m3**
6	**cement concrete 1:2:4 (a) Wall caps/copings**	28.78	0.23	0.1	1	**0.66 m3**
7	**Filling available excavated earth Excavation-foundation = 26 - 8.4- 6.1**	-	-	-	-	**11.5 m3**
8	**cement concrete 1:1.5:3 BEAM (2) Having cross sectional area more than 0.05 Sq. M. and up to 0.08 Sq. M**	39.24	0.3	0.3	1	**3.53 m3**
9	**cement concrete 1:2:4 R.C.C. LINTEL**	1.2	0.45	0.2	9	0.97
		2	0.45	0.2	1	0.18
					Total	**1.15 m3**
10	**cement concrete 1:1.5:3 R.C.C work in : (3) Slabs having more than 10 cm. And up to 13 cm. Thickness**	9.16	5.23	0.13	1	**6.23 m3**
11	**Providing TMT bar reinforcement for R.C.C. work**	**As per bar schedule**	**-**	**-**	**-**	**2134 kg**
12	**Providing and fixing of Polished Kotah Stone Frame for Doors &**	6.1	0.23	**-**	1	1.40

	Window (FOR D)					
	D1	5.3	0.23	-	1	1.22
	W	4.8	0.23	-	8	8.83
					Total	**11.45 Sqmt**
13	**Providing and fixing 35mm thick panelled, glazed door**	-	-	-	2	**2 Nos.**
14	**Providing and fixing window having extruded aluminium Colour anodized section frame**	1.2	-	1.2	8	**11.52 Sqmt**
15	**Inner plaster** (wall)	27.4	-	3.05	1	83.57
	Ceiling	8.7	-	5	1	43.5
	Deduction (-) door D	2	-	2.1	1	4.2
	D2	1.2	-	2.1	1	2.52
	window	1.2	-	1.2	8	11.52
					Total	**108.83 Sqmt**
16	**Outer plaster**	28.78	-	4	1	115.12
	Deduction (-) door D	2	-	2.1	1	4.2
	D2	1.2	-	2.1	1	2.52
	window	1.2	-	1.2	8	11.52
					Total	**96.88 Sqmt**
17	**Providing and lying Vitrified tiles 8 to 10mm thick, 24"X24"**	8.7	-	5	1	**43.5 Sqmt**
18	**Finishing wall with weather proof exterior emulsion paint** same as outer plaster	-	-	-	-	**96.88 Sqmt**
19	**Inner plastic paint** same as inner plaster	-	-	-	-	**108.83 Sqmt**
20	**Providing and Laying blacken china mosaic flooring for terrace using 12mm to 20 broken pieces**	9.16	-	5.23	-	**47.91 Sqmt**

Community Hall: Abstract Sheet (T-45- Community Hall abstract sheet)

NO.	Description	Quantity	Rate	Per	Amount
1	Excavation for foundation up to 1.5 Meter depth	26.00	125	m3	3,250
2	cement concrete 1:3:6:(a) Foundation and plinth	8.40	2400	m3	20,160
3	cement concrete 1:1.5:3(a) Foundation footing base of columns and mass concrete	6.10	4500	m3	27,450
4	Providing and laying ordinary cement concrete 1:1.5:3COLUMN (2) Having cross sectional area more than 0.08 Sq. M. and up to 0.18 Sq.M	3.90	4500	m3	17,550
5	Brick work(b) Conventional	22.1	3900	m3	86,190
6	cement concrete 1:2:4 (a) Wall caps/copings	0.66	3200	m3	2,112
7	Filling available excavated earth Excavation-foundation = 22.53 - 3- 7.32	11.5	290.88	m3	3,345.12
8	cement concrete 1:1.5:3 BEAM (2) Having cross sectional area more than 0.05 Sq. M. and up to 0.08 Sq. M	3.53	4500	m3	15,885
9	R.C.C. LINTEL	1.15	4200	m3	4,830
10	cement concrete 1:1.5:3 R.C.C work in : (3) Slabs having more than 10 cm. And up to 13 cm.	6.23	4200	m3	26,166

	Thickness				
11	**Providing TMT bar reinforcement for R.C.C. work**	**2134**	**55**	**kg**	**1,17,370**
12	**Providing and fixing of Polished Kotah Stone Frame for Doors & Window**	**11.45**	**2645**	**Sqmt**	**30,285.25**
13	**Providing and fixing 35mm thick panelled, glazed door**	**2**	**4520**	**Sqmt**	**9,040**
14	**Providing and fixing window having extruded aluminium Colour anodized section frame**	**11.52**	**2042.22**	**Sqmt**	**23,526.37**
15	**Inner plaster**	**108.83**	**225**	**Sqmt**	**24,486.75**
16	**Outer plaster**	**96.88**	**350**	**Sqmt**	**33,908**
17	**Providing and lying Vitrified tiles 8 to 10mm thick, 24"X24"**	**43.5 Sqmt**	**540**	**Sqmt**	**23,490**
18	**Finishing wall with weather proof exterior emulsion paint** same as outer plaster	**96.88 Sqmt**	**72.72**	**Sqmt**	**7,045.114**
19	**Inner plastic paint** same as inner plaster	**108.83 Sqmt**	**119.45**	**Sqmt**	**12,999.74**
20	**Providing and Laying blacken china mosaic flooring for terrace using 12mm to 20 broken pieces**	**47.91 Sqmt**	**475.71**	**Sqmt**	**22,791.27**
				Total	**5,11,880.6 /-**

The rates of their respective works provided in the abstract sheet along with quantities are inclusive ofwater charges, contractor‘s profit, contingencies, utilities and labor charges.

Total cost = ₹ 5,11,880.6/-

13.2 Recommendations / why about new proposals of Designs :

Gram panchayat office is design as the old office is very poor condition & a new design was needed. The Work of the Gram Panchayat includes:

- Maintenance and construction of water resources, roads, drainage, School buildings and CPR (common property resources).
- Levy and collect local taxes.
- Execute government schemes related to employment.

Cattle Trough is not available in village so for villagers having animals have facility. Hence reliable drinking water facility for all the domestic animals including cattle, sheep, goats, etc. in the village. Villagers are very much satisfied with this initiative.

ATM is not in the village so a specific atm can be constructed for the villagers for convenient transfers. It provides service for 24*7 also it provides access to bank accounts from anywhere.

Clinic with maternity ward is needed in village as if a woman experiences a complication with rapid onset, even a delay of several hours can be fatal. Such emergencies often cannot be easily predicted.

Pharmacy store is not available so for easy hospitality it is designed. Pharmacists are often the first line of contact for patients in rural communities and provide important advice on the safe use of prescription.

Community Hall is needed for the villagers meeting & other festive options, As the place for all-community celebrations at various occasions and traditions, for public meetings of the citizens on various issues, where community members meet each other socially, For housing local clubs and volunteer activities.

13.3 Benefit of the Villagers about new path technology / Designs proposed by the students There are following structures need to build up to Progress of village and their people:

Physical Infrastructure Facilities should need such as: Higher secondary school, closed drainage system, panchayat building, sanitation facilities, Child Welfare center etc.

Social Infrastructure Facilities should need such as: Police station, hospitals, community Housing, General market, etc.

Socio-Cultural Infrastructure Facilities should need such as: Govt. grocery shop, Community hall, Library, Auditorium, Recreational activities, pick up stand etc.

Sustainable Infrastructure Facilities should need such as: Green building, organic waste controller, Natural Resources (petrol) Solar system, Biogas plant, Rain Water Harvesting, etc. If these structures available in the village, Villager can easily get the advantages of the system and they not need to depend on other town, good drainage system and sanitation facility in village ensure the good health and well-being of people.

****All the drawings ,of proposed designs like plan, elevation, section and 3D model , have been added at the end of report of part 2 from page number 232 to 237. And all these drawings have also been added in their respective designs.**

Chapter 14

Technical Options with Case Studies

14.1 Civil Engineering

Civil engineering is a professional engineering discipline that deals with the design, construction, and maintenance of the physical and naturally built environment, including public works such as roads, bridges, canals, dams, airports, sewerage systems, pipelines, structural components of buildings, and railways.

FIG.97 Civil engineering

Civil engineering is traditionally broken into a number of sub-disciplines. It is considered the second-oldest engineering discipline after military engi neering, and it is defined to distinguish no n-military engineering from military engineering. Civil engineering can take place in the public sector from municipal public works departments through to federal government agencies, and in the private sector from locally based firms to global Fortune 500 companies.

HISTORY

Civil engineering as a discipline

Civil engineering is the application of physical and scientific principles for solving the problems of society, and its history is intricately linked to advances in the understanding of physics and mathematics throughout history. Because civil engineering is a broad profession, including several specialized sub-disciplines, its history is linked to knowledge of structures, materialsscience,geography,geology, soils, hydrology, environmental science, mechanics, project management, and other fields.

Throughout ancient and medieval history most architectural design and construction was carried out by artisans, such as stonemasons and carpenters, rising to the role of master builder. Knowledge was retained in guilds and seldom supplanted by advances. Structures, roads, and infrastructure that existed were repetitive, and increases in scale were incremental.

One of the earliest examples of a scientific approach to physical and mathematical problems applicable to civil engineering is the work of Archimedes in the 3rd century BC, including Archimedes Principle, which underpins our understand ing of buoyancy, and practical solutions such as Archimedes' screw. Brahmagupta, an Indian mathematician, used arithmetic in the 7th century AD, based on Hindu-Arabic numerals, for excavation (volume) computations.

Civil engineering profession

Engineering has been an aspect of life since the beginnings of human existence. The earliest practice of civil engineering may have commenced between 4000 and 2000 BC in ancient Egypt, the Indus Valley Civilization, and Mesopotamia (ancient Iraq) when humans started to abandon a nomadic existence, creating a need for the construction of shelter. During this time, transportation became increasingly important leading to the development of the wheel and sailing.

Until modern times there was no clear distinction between civil engineering and architecture, and the term engineer and architect were mainly geographical variations referring to the same occupation, and often used interchangeably. The construction of pyramids in Egypt (circa 2700–2500 BC) were some of the first instances of large structure constructions. Other ancient historic civil engineering constructions include the Qanat water management system (the oldest is older than 3000 years and longer than 71 km,) the Parthenon by Iktinos in Ancient Greece (447–438 BC), the Appian Way by Roman engineers (c. 312 BC), the Great Wall of China by General Meng T'ien under orders from Ch'in Emperor Shih Huang Ti (c. 220 BC) and the stupas constructed in ancient Sri Lanka like the Jetavanaramaya and the extensive irrigation works in Anuradhapura. The Romans developed civil structures throughout their empire, including especially aqueducts, insulae, harbors, bridges, dams and roads.

Leonhard Euler developed the theory explaining the buckling of columns.

FIG.98 Leonhard Euler

In the 18th century, the term civil engineering was coined to incorporate all things civilian as opposed to military engineering. In 1747, the first institution for the teaching of civil engineering, the École Nationale des Ponts et Chaussées was established in France; and more examples followed in other European countries, like Spain. The first self-proclaimed civil engineer was John Smeaton, who constructed the Eddystone Lighthouse. In 1771 Smeaton and some of his colleagues formed the Smeatonian Society of Civil Engineers, a group of leaders of the profession who met informally over dinner. Though there was evidence of some technical meetings, it was little more than a social society.

FIG.99 Double Bridge

In 1818 the Institution of Civil Engineers was founded in London, and in 1820 the eminent engineer Thomas Telford became its first president. The institution received a Royal Charter in 1828, formally recognising civil engineering as a profession. Its charter defined civil engineering as the art of directing the great sources of power in nature for the use and convenience of man, as the means of production and of traffic in states, both for external and internal trade, as applied in the construction of roads, bridges, aqueducts, canals, river navigation and docks for internal intercourse and exchange, and in the construction of ports, harbours, moles, breakwaters and lighthouses, and in the art of navigation by artificial power for the purposes of commerce, and in the construction and application of machinery, and in the drainage of cities and towns.

Civil engineering education

The first private college to teach civil engineering in the United States was Norwich University, founded in 1819 by Captain Alden Partridge. The first degree in civil engineering in the United States was awarded by Rensselaer Polytechnic Institute in 1835. The first such degree to be awarded to a woman was granted by Cornell University to

FIG.100 Column temple

Nora Stanton Blatch in 1905.

In the UK during the early 19th century, the division between civil engineering and military engineering (served by the Royal Military Academy, Woolwich), coupled with the demands of the Industrial Revolution, spawned new engineering education initiatives: the Class of Civil Engineering and Mining was founded at King's College London in 1838, mainly as a response to the growth of the railway system and the need for more qualified engineers, the private College for Civil Engineers in Putney was established in 1839, and the UK's first Chair of Engineering was established at the University of Glasgow in 1840.

EDUCATION

Civil engineers typically possess an academic degree in civil engineering. The length of study is three to five years, and the completed degree is designated as a bachelor of technology, or a bachelor of engineering. The curriculum generally includes classes in physics, mathematics, project management, design and specific topics in civil engineering. After taking basic courses in most sub-disciplines of civil engineering, they move on to specialize in one or more sub-disciplines at advanced levels. While an undergraduate degree (BEng/BSc) normally provides successful students with industry-accredited qualification, some academic institutions offer post-graduate degrees (MEng/MSc), which allow students to further specialize in their particular area of interest.

PRACTICING ENGINEERS

In most countries, a bachelor's degree in engineering represents the first step towards professional certification, and a professional body certifies the degree program. After completing a certified degree program, the engineer must satisfy a range of requirements including work experience and exam requirements before being certified. Once certified, the engineer is designated as a professional engineer (in the United States, Canada and South Africa), a chartered engineer (in most Commonwealth countries), a chartered professional engineer (in Australia and New Zealand), or a European engineer (in most countries of the European Union). There are international agreements between relevant professional bodies to allow engineers to practice across national borders.

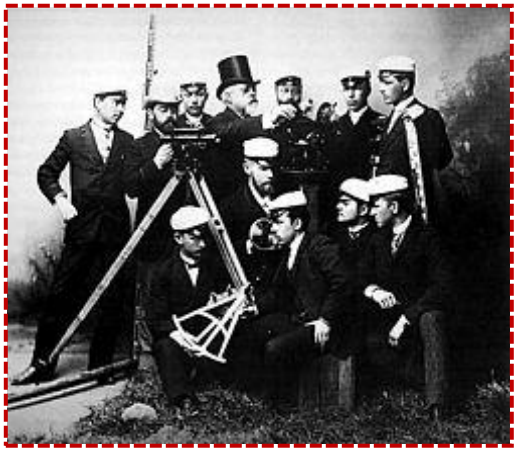


FIG.101 Surveing Students

The benefits of certification vary depending upon location. For example, in the United States and Canada, "only a licensed professional engineer may prepare, sign and seal, and submit engineering plans and drawings to a public authority for approval, or seal engineering work for public and private clients." This requirement is enforced under provincial law such as the Engineers Act in Quebec. No such legislation has been enacted in other countries including the United Kingdom. In Australia, state licensing of engineers is limited to the state of Queensland. Almost all certifying bodies maintain a code of ethics which all members must abide by.

Engineers must obey contract law in their contractual relationships with other parties. In cases where an engineer's work fails, they may be subject to the law of tort of negligence, and in

extreme cases, criminal charges. An engineer's work must also comply with numerous other rules and regulations such as building codes and environmental law.

FIG.102 Suspension Span

SUB-DISCIPLINES

There are a number of sub-disciplines within the broad field of civil engineering. General civil engineers work closely with surveyors and specialized civil engineers to design grading, drainage, pavement, water supply, sewer service, dams, electric and communications supply. General civil engineering is also referred to as site engineering, a branch of civil engineering that primarily focuses on converting a tract of land from one usage to another. Site engineers spend time visiting project sites, meeting with stakeholders, and preparing construction plans. Civil engineers apply the principles of geotechnical engineering, structural engineering, environmental engineering, transportation engineering and construction engineering to residential, commercial, industrial and public works projects of all sizes and levels of construction.

Coastal engineering

Coastal engineering is concerned with managing coastal areas. In some jurisdictions, the terms sea defense and coastal protection mean defense against flooding and erosion, respectively. The term coastal defense is the more traditional term, but coastal management has become more popular as the field has expanded to techniques that allow erosion to claim land.

Construction engineering

Construction engineering involves planning and execution, transportation of materials, site development based on hydraulic, environmental, structural and geotechnical engineering. As construction firms tend to have higher business risk than other types o f civil engineering firms do, construction engineers often engage in more business-like transactions, for example, drafting and reviewing contracts, evaluating logistical operations, and monitoring prices of supplies.

FIG.103 surge barrier

Earthquake engineering

Earthquake engineering involves designing structures to withstand hazardous earthquake exposures. Earthquake engineering is a sub-discipline of structural engineering. The main objectives of earthquake engineering are to understand interaction of structures on the shaky ground; foresee the consequences of possible earthquakes; and design, construct and maintain structures to perform at earthquake in compliance with building codes.

Environmental engineering

Environmental engineering is the contemporary term for sanitary engineering, though sanitary engineering traditionally had not included much of the hazardous waste management and environmental remediation work covered by environmental engineering. Public health

engineering and environmental health engineering are other terms being used. Environmental engineering deals with treatment of chemical, biological, or thermal wastes, purification of water and air, and remediation of contaminated sites after waste disposal or accidental contamination. Among the topics covered by environmental engineering are pollutant transport, water purification, waste water treatment, air pollution, solid waste treatment, recycling, and hazardous waste management. Environmental engineers administer pollution reduction, green engineering, and industrial ecology. Environmental engineers also compile information on environmental consequences of proposed actions.

FIG.104 Creek with water pollution

Forensic engineering

Forensic engineering is the investigation of materials, products, structures or components that fail or do not operate or function as intended, causing personal injury or damage to property. The consequences of failure are dealt with by the law of product liability. The field also deals with retracing processes and procedures leading to accidents in operation of vehicles or machinery. The subject is applied most commonly in civil law cases, although it may be of use in criminal law cases. Generally the purpose of a Forensic engineering investigation is to locate cause or causes of failure with a view to improve performance or life of a component, or to assist a court in determining the facts of an accident. It can also involve investigation of intellectual property claims, especially patents.

Geotechnical engineering

Geotechnical engineering studies rock and soil supporting civil engineering systems. Knowledge from the field of soil science, materials science, mechanics, and hydraulics is applied to safely and economically design foundations, retaining walls, and other structures. Environmental efforts to protect groundwater and safely maintain landfills have spawned a new area of research called geo-environmental engineering.

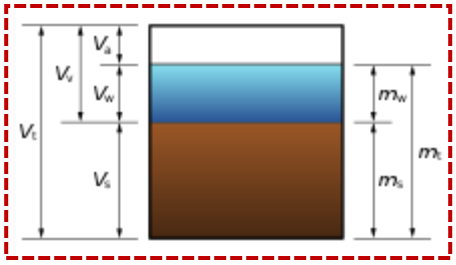


FIG.105 weight & volume of air, soil, water and voids

Identification of soil properties presents challenges to geotechnical engineers. Boundary conditions are often well defined in other branches of civil engineering, but unlike steel or concrete, the material properties and behavior of soil are difficult to predict due to its variability and limitation on investigation. Furthermore, soil exhibits nonlinear (stress-dependent) strength, stiffness, and dilatancy (volume change associated with application of shear stress), making studying soil mechanics all the more difficult. Geotechnical engineers frequently work with professional geologists and soil scientists.

Materials science and engineering

Materials science is closely related to civil engineering. It studies fundamental characteristics of materials, and deals with ceramics such as concrete and mix asphalt concrete, strong metals such as aluminum and steel, and thermosetting polymers including polymethylmethacrylate (PMMA) and carbon fibers.

Materials engineering involves protection and prevention (paints and finishes). Alloying combines two types of metals to produce another metal with desired properties. It incorporates elements of applied physics and chemistry. With recent media attention on nanoscience and nanotechnology, materials engineering has been at the forefront of academic research. It is also an important part of forensic engineering and failure analysis.

FIG.106 Site draft

Site development and planning

Site development, also known as site planning, is focused on the plann ing and development potential of a site as well as addressing possible impacts from permitting issues and environmental challenges.

Structural engineering

Structural engineering is concerned with the structural design and structural analysis of buildings, bridges, towers, flyovers (overpasses), tunnels, off shore structures like oil and gas fields in the sea, aerostructure and other structures. This involves identifying the loads which act upon a structure and the forces and stresses which arise within that structure due to those loads, and then designing the structure to successfully support and resist those loads. The loads can be self weight of the structures, other dead load, live loads, moving (wheel) load, wind load, earthquake load, load from temperature change etc. The structural engineer must design structures to be safe for their users and to successfully fulfill the function they are designed for (to be serviceable).

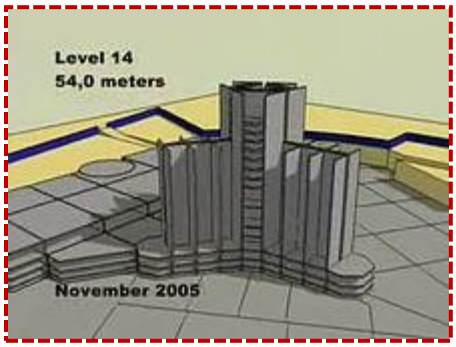


FIG.107 Site draft

Due to the nature of some loading conditions, sub-disciplines within structural engineering have emerged, including wind engineering and earthquake engineering.

Design considerations will include strength, stiffness, and stability of the structure when subjected to loads which may be static, such as furniture or self-weight, or dynamic, such as wind, seismic, crowd or vehicle loads, or transitory, such as temporary construction loads or impact. Other considerations include cost, constructability, safety, aesthetics and sustainability.

FIG.108 Surveying

Surveying

Surveying is the process by which a surveyor measures certain dimensions that occur on or near the surface of the Earth. Surveying equipment such as levels and theodolites are used for accurate measurement of angular deviation, horizontal, vertical and slope distances. With computerisation, electronic distance measurement (EDM), total stations, GPS surveying and laser scanning have to a large extent supplanted traditional

instruments. Data collected by survey measurement is converted into a graphical representation of the Earth's surface in the form of a map. This information is then used by civil engineers, contractors and realtors to design from, build on, and trade, respectively. Elements of a structure must be sized and positioned in relation to each other and to site boundaries and adjacent structures.

Although surveying is a distinct profession with separate qualifications and licensing arrangements, civil engineers are trained in the basics of surveying and mapping, as well as geographic information systems. Surveyors also lay out the routes of railways, tramway tracks, highways, roads, pipelines and streets as well as position other infrastructure, such as harbors, before construction.

Transportation engineering

Transportation engineering is concerned with moving people and goods efficiently, safely, and in a manner conducive to a vibrant community. This involves specifying, designing, constructing, and maintaining transportation infrastructure which includes streets, canals, highways, rail systems, airports, ports, and mass transit. It includes areas such as transportation design, transportation planning, traffic engineering, some aspects of urban engineering, queueing theory, pavement engineering, Intelligent Transportation System (ITS), and infrastructure management.

Municipal or urban engineering

Municipal engineering is concerned with municipal infrastructure. This involves specifying, designing, constructing, and maintaining streets, sidewalks, water supply networks, sewers, street lighting, municipal solid waste management and disposal, storage depots for various bulk materials used for maintenance and public works (salt, sand, etc.), public parks and cycling infrastructure. In the case of underground utility networks, it may also include the civil portion (conduits and access chambers) of the local distribution networks of electrical and telecommunications services. It can also include the optimizing of waste collection and bus service networks. Some of these disciplines overlap wit h other civil engineering specialties, however municipal engineering focuses on the coordination of these infrastructure networks and services, as they are often built simultaneously, and managed by the same municipal authority. Municipal engineers may also design the site civil works for large buildings, industrial plants or campuses (i.e. access roads, parking lots, potable water supply, treatment or pretreatment of waste water, site drainage, etc.)

FIG.109 circle

Water resources engineering

Water resources engineering is concerned with the collection and management of water (as a natural resource). As a discipline it therefore combines elements

FIG.110 lake

of hydrology, environmental science, meteorology, conservation, and resource management. This area of civil engineering relates to the prediction and management of both the quality and the quantity of water in both underground (aquifers) and above ground (lakes, rivers, and streams) resources. Water resource engineers analyze and model very small to very large areas of the earth to predict the amount and content of water as it flows into, through, or out of a facility. Although the actual design of the facility may be left to other engineers.

FIG.111 Hover dam

Hydraulic engineering is concerned with the flow and conveyance of fluids, principally water. This area of civil engineering is intimately related to the design of pipelines, water supply network, drainage facilities (including bridges, dams, channels, culverts, levees, storm sewers), and canals.

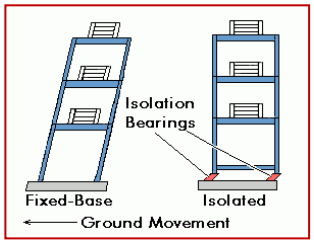
Hydraulic engineers design these facilities using the concepts of fluid pressure, fluid statics, fluid dynamics, and hydraulics, among others.

Civil engineering systems

Civil engineering systems is a discipline that promotes the use of systems thinking to manage complexity and change in civil engineering within its wider public context. It posits that the proper development of civil engineering infrastructure requires a holistic, coherent understanding of the relationships between all of the important factors that contribute to successful projects while at the same time emphasizing the importance of attention to technical detail. Its purpose is to help integrate the entire civil engineering project life cycle from conception, through planning, designing, making, operating to decommissioning.

14.1.1 Advanced Earthquake Resistant

Earthquake-resistant or a seismic structures 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.



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

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

1.Base Isolation

2.Energy Dissipation Devices

A base isolated structure is supported by a series of bearing pads which are placed between the building and the building's foundation. A variety of different types of base isolation bearing pads have now been developed. The bearing is very stiff and strong in the vertical direction, but flexible in the horizontal direction.
The second of the major new techniques for improving the earthquake resistance of buildings also relies upon damping and energy dissipation, but it greatly extends the damping and energy dissipation provided by lead-rubber bearings. As we've said, a certain amount of vibration energy is transferred to the building by earthquake ground motion.

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.),

FIG 112 Sesmic Retrofitting

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.

FIG 113 Sesmic Retrofitting

The need of retrofitting of existing earthquake vulnerable buildings may arise due to one or more than one of the following reasons i.e. (a) the buildings have been designed according to a seismic code, but the code has been upgraded in later years; (b) buildings designed to meet the modern seismic codes, but deficiencies exist in the design and /or construction; (c) essential buildings must be strengthened like hospitals, historical monuments and architectural buildings; (d) important buildings whose service is assumed to be essential even just after an earthquake ; (e) buildings, the use of which has changed through the years ; (f) buildings that are expanded, renovated or rebuilt. The problems faced by the structural engineer in case of earthquake vulnerable buildings are to obtain sufficient records of buildings such as architectural and structural drawings, structural design calculations, material properties, details of foundation and geotechnical reports, records of at least natural period of the buildings in order to evaluate the increased stiffness of buildings since strengthening techniques most often stiffen the structure reducing its natural period.

The method of retrofitting principally depends on the horizontal and vertical load resisting system of the structure and the type of materials used for parent construction. It also relies on the technology that is feasible and economical. The understanding of mode of failure, structural behaviour and weak and strong design aspects as derived from the earthquake damage surveys exercise considerable influence on selection of retrofitting methods of buildings. Usually the retrofitting method is aimed at increasing the lateral resistance of the structure. The lateral resistance includes the lateral strength or stiffness and lateral displacement or ductility of the structures. The lateral resistance is often provided through modification or addition of retrofitting elements of an existing structure in certain areas only.

Nowadays, seismic retrofit through isolation strategy represents a consolidated technique of protection against design earthquakes. This technique is also applied on existing structures extensively, due to the fact that it usually does not require any interruption of the building use and occupants evacuation. If applicable, it rapidly allows the seismically retrofitting of a building installed with seismic devices with low horizontal stiffness between the structure and the

foundation decoupling, in fact, this allows the motion of the superstructure from the ground one. In this paper an application on an existing RC building of the seismic isolation is presented. The chosen building was built in the '90s only for vertical loads and realized without any detailing rule for structural ductility. The seismic retrofitting requirement stems from the fact that only recently, after the National seismic hazard maps update in 2003, the considered area has been upgraded to a medium-low seismic intensity zone, while at construction time no seismic classification was in existence by law. The case study peculiarity is that the seismic retrofitting has required an addition to seismic devices at the base, with related interventions such as the application of a bracing system consisting of two elastic steel frames. This intervention is required for stiffening the superstructure and, therefore, minimizing the higher vibration modes effects. The paper presents the main results obtained with a FEM model, implemented for simulating the initial and the design state when the interventions are considered. Finally, some results of non-linear dynamic time-history analyses are illustrated and commented for verifying superstructure elements and seismic devices.

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

The construction industry is repeatedly criticised for being inefficient and slow to innovate. The basic methods of construction, techniques and technologies have changed little since Roman times. But the application of innovation in the construction industry is not straight forward.

Every construction project is different, every site is a singular prototype, construction works are located in different places, and involve the constant movement of personnel and machinery. In addition, the weather and other factors can prevent the application of previous experience effectively.

The term 'advanced construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, desig n procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies. Incorporating advanced construction technology into practice can increase levels of quality, efficiency, safety, sustai nability and value for money. However, there is often a conflict between traditional industry methods and innovative new practices, and this is often blamed for the relatively slow rate of technology transfer within the industry.

SR. NO.	USE OF TECHNIQUE/ EQUIPMENT	WORK ACTIVITY	ADVANTAGES
10	Form vibrator	Casting of slab	Better compaction, less honeycombing of the concrete
11	Tower hoist bucket	Transporting material e.g. bricks, sand, cement	Shifting of material vertically with speed and extra quantity
12	Travelling belt conveyor/trolley	Slab concreting	Labour required to transport wet concrete is reduced, speed and quality increases
13	Dumpers	Transporting building material	Unloading operation is easy, and can be done as and when required. Speed increases
14	Admixtures and plasticizers	Concreting and water-proofing	Increases the workability strength, reduces the curing period and improves the quality
15	Loaders	Shifting of material and refilling	Reduces the labour for loading of trucks. Speed increases
16	Road rollers	Compacting the filling material	Compaction is achieved as specified which is not possible manually
17	Plate/earth vibratory compactors	Compacting the filling material in building plinth	Rapid and better compaction than manual process of *dhummas*. Larger area can be covered
18	Pneumatic tools (Jack hammer)	Excavation in rock	Excavates the hard rock with ease where normal chisels do not work. Increases the output remarkably
19	Excavators	Excavation and levelling	Excavates, dumps and levels the soft strata as desired. Completes the work of three manual shifts in one shift
20	Bull-dozer	Dismantling and excavating	Dismantles and disposes off the excavated stuff as and when required
21	Vacuum de-watering system for concreting	Factory flooring for achieving better compressive strength	Saves cement, curing period is reduced

FIG. 114 Adverse Practice in Construction

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

training and careful commissioning.

The term 'advanced construction technology' covers a wide range of modern techniques and practices that encompass the latest developments in materials technology, design procedures, quantity surveying, facilities management, services, structural analysis and design, and management studies. Incorporating advanced construction technology into practice can increase levels of quality, efficiency, safety, sustainability and value for money. However, there is often a conflict between traditional industry methods and innovative new practices, and this is often blamed for the relatively slow rate of technology transfer within the industry. The adoption of advanced construction technology requires an appropriate design, commitment from the whole project team, suitable procurement strategies, good quality control, appropriate training and careful commissioning. Advanced construction technologies are commonly described as including (amongst many others)
Advanced forms of:
o Materials.
o Cladding systems.
o Computer aided design and computer aided manufacturing (CAD/CAM).
o Computer numerical control.
o Construction Innovation Hub.
o Construction plant.
o Modern methods of construction.
o Modular construction.
o Offsite manufacturing.
o Prefabrication and preassembly.
o Research and development.
o Building information modeling (BIM).

14.1.4 Engineering Aspects Of Soil mechanics - Environmental Impact Assessment

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

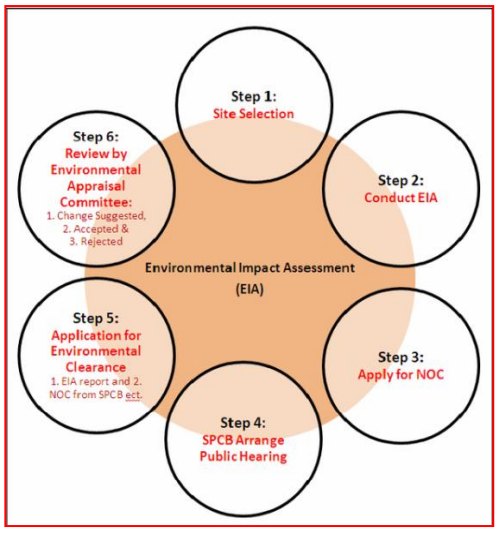


FIG.115 EIA

The study involved environmental impact assessment of upgrading of existing flow station dealing with different civil engineering works such as road network, housing, water supply, to name a few. Data was collected from Federal Environmental Protection Agency (FEPA), Department of Petroleum Resources (DPR) Port Harcourt, Nigerian Meteorological Department (NMD), Lagos, Rivers State Ministry of Environment and Natural Resources (RSMENR), Port Harcourt, Ahoada West Local Government Area (AWLGA), Akinima, Rivers State and the Internet. Data collected was used to get an overview of the existing Environment. Relevant test of existing water, soil, noise and air samples were carried out. Comparisons were made with results of the test carried out and data of the area collected. Formal and informal interviews were also carried out with some of the inhabitants of the area. All these were done with the aim of assessing the impact the infrastructure had on the environment, and projection of the likely impact of the upgrading exercise. The study revealed that civil engineering infrastructure development projects impacted greatly on the environment especially in areas of noise pollution, water pollution, decrease in size of available land, etcetera. Based on the findings, recommendations were made for the elimination of the negative effects in some cases; and for amelioration of the effects in situations where it will be impossible to completely eradicate such effects.

Construction work involving excavation of soil should not be done at the peak of dry season in order to avoid excessive release of dust into the atmosphere thereby increasing suspended particulates above threshold limit

The efficiency of gas flares should be improved towards total combustion through regular maintenance for release of smokeless flares and reduction of the quantity of gas being flared, which is the ultimate goal of the upgrading exercise.

Bush burning around the flow station should be avoided in order to prevent fire outbreak, which could lead to unexpected emergencies.

Water Quality

a) Construction and land preparation should not be done at the peak of the rainy season because of flood discharge and over land run off.
b) Dredged spots during pipe laying construction should not be piled up too close to water and farmlands.
c) Good toileting system should be facilitated by appropriate latrine design and maintenance at the flow station.
d) Liquid waste, sanitary wastes and chemical waste should not be discharged into water stream.
e) Dredges slots should not be prevented from entering farmland directly.
f) Suitable portable water should be provided for the communities in order to enhance high standards and personal and community hygiene.
g) Good horse keeping should be maintained during fuelling / re-fuelling of machineries to minimize oil spill.

The aim of research was to identify and determine the environmental impact of civil Engineering infrastructural development projects. This was done through the utilization of the

project by a Nigerian oil firm. The project was the upgrading of a flow station in Ahoada local Government Area, Rivers state. An Assessment of the existing environment was done through desktop; field and laboratory methodologies. Positive and negative impacts were deduced and comparison was made between the results of the assessment and national and international guidelines on the environment. From the assessment of the flow station environment, it was found that the environmental impacts can be managed within reasonable standards and acceptable limits by applying appropriate mitigating measures.

14.1.5 Water supply sewerage system waste water sustainable development techniques.

The uncontrolled disposal to the environment of municipal, industrial and agricultural liquid, solid, and gaseous wastes constitutes one of the most serious threats to the sustainability of human civilization by contaminating the water, land, and air and by contributing to global warming. With increasing population and economic growth, treatment and safe disposal of wastewater is essential to preserve public health and reduce intolerable levels of environmental degradation. In addition, adequate wastewater management is also required for

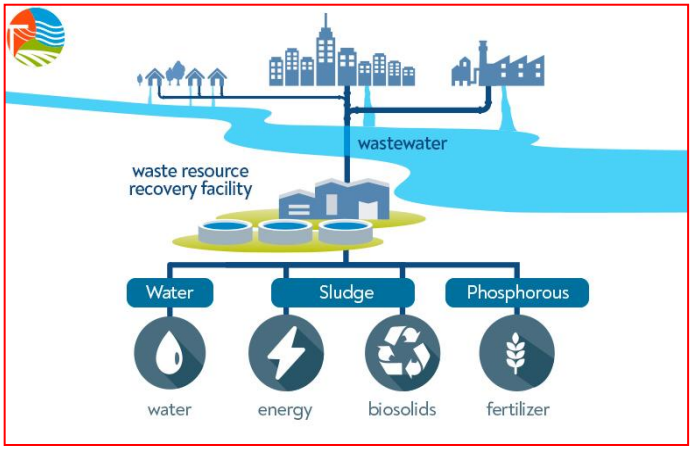


FIG.116 Waste water Sustainable Development

preventing contamination of water bodies for the purpose of preserving the sources of clean water. Effective wastewater management is well established in developed countries but is still limited in developing countries. In most developing countries, many people lack access to water and sanitation services. Collection and conveyance of wastewater out of urban neighborhoods is not yet a service provided to all the population, and adequate treatment is provided only to a small portion of the collected wastewater. In slums and peri-urban areas throughout the world, it is common to see raw wastewater flowing in the streets. The inadequate water and sanitation service is the main cause of diseases in developing countries. In the year 2011, the population of the planet was 7 billion. Population growth forecasts indicate rapid global population growth that will reach 9 billion in 2030. The forecasts also indicate that: o Most of the population growth will occur in developing countries, while the population of developed countries will remain constant at about 1 billion; and o A strong migration from rural to urban areas will take place. Considering the expected population growth and the order of priorities in the development of the water and sanitation sector in developing countries—water supply and sewerage first, and only then wastewater treatment—as well as the financial difficulties in these countries, it cannot be assumed that the current low percentage of the coverage of wastewater treatment in these countries will increase in the future, unless a new, innovative strategy is adopted and affordable wastewater treatment options are used.

Water resources are essential for every development activity, not only in terms of available quantity but also in terms of quality. Population growth and urbanization are increasing the number of users and uses of water, making water resources scarcer and more polluted. Changes in rainfall patterns threaten to worsen these effects in many areas. Water scarcity, due to

physical lack or pollution, has become one of the most pressing issues globally, a matter of human, economic and environmental insecurity. Wastewater, whose value had not been appreciated until recently, is increasingly recognized as a potential 'new' source of clean water for potable and non-potable uses, resulting in social, environmental and economic benefits. This paper discusses the potential of recycled wastewater (also known as reused water) to become a significant source of safe water for drinking purposes and improved sanitation in support of the Sustainable Development Goals.

The Sustainable Development Goals (SDGs) are the most recent attempt by the international community to mobilize government, private and non-governmental actors at national, regional and local levels to improve the quality of life of billions of people in the developed and developing worlds. The goals are an ambitious, challenging and much-needed action plan for "people, planet and prosperity" until the year 20301.

Of the 17 SDGs, the sixth goal is to "ensure availability and sustainable management of water and sanitation for all". The achievement of this goal, even if partially, would greatly benefit humankind, given the importance of clean water for overall socio-economic development and quality of life, including health and environmental protection. In 2000, the Millennium Development Goals (MDGs) aimed at reducing by half the proportion of the population without sustainable access to safe drinking water and sanitation by 2015. This objective, however, did not take into consideration water quality or wastewater management aspects, which represented a main limitation for its achievement2. This omission has been rectified in the Sustainable Development Goals (SDGs), where one of the goals (SDG 6) calls for clean water and sanitation for all people by ensuring "availability and sustainable management of water and sanitation for all". Among other aspects, it considers improvement of water quality by reducing by half the amount of wastewater that is not treated, and increasing recycling and safe reuse globally.

Problems concerning water sanitation stem from the rise in urban migration and the practice of discharging untreated wastewater. The uncontrolled growth in urban areas has made planning and expansion of water and sewage systems very difficult and expensive to carry out. In addition, many of those moving to the city have low incomes, making it difficult to pay for any water system upgrades.

The uncontrolled disposal to the environment of municipal, industrial and agricultural liquid, solid, and gaseous wastes constitutes one of the most serious threats to the sustainability of human civilization by contaminating the water, land, and air and by contributing to global warming With increasing population and economic growth, treatment and safe disposal of wastewater is essential to preserve public health and reduce intolerable levels of environmental degradation. In addition, adequate wastewater management is also required for preventing contamination of water bodies for the purpose of preserving the sources of clean water.

- Most of the population growth will occur in developing countries, while the population of developed countries will remain constant at about 1 billion; and

- A strong migration from rural to urban areas will take place.

Chapter 15

Smart and/or Sustainable features of Chapter 8 & 13 designs, Impact on society. (For Allocated village development, villagers happiness, comfortable and for enhancement of the village) (With the Smart village development Concept As Per Your Idea And Village Visit, modern technology with innovation). with doing small changes, Period, Amount Expenditure and Benefit –

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

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

NO.	DESIGN NAME	PERIOD	AMOUNT EXPENDITURE	BENIFITS
1	PIPE CULVERT	Immediate	114440.28	For the easy transport to school
2	SMASHAN	Immediate	99321.92	For the cremation ceremony
3	SNANGRUH	Immediate	221679.80	For the cremation ceremony
4	RESIDENTIAL HOUSE	Immediate	1353040.00	For providing pucca house under gruh yojna
5	PUBLIC GARDEN	1 year	286034.3	As a recreational area for the villagers
6	SUMP 5 LAKH LITER	3-5 years	1487903.00	For the storage of water
7	GRAM PANCHAYAT	Immediate	755714.12	For providing services to villagers by sarpanch & talati
8	ANIMAL WATER DRINKING FACILITY	Immediate	984536.64	For providing easy access to water for animals for the farmers who are depended on animal farming.
9	ATM	Immediate	83620.50	For the purpose of easy banking service & funds
10	CLINIC WITH MATERNITY WARD	Immediate	735947.00	For the purpose of providing immediate treatment
11	PHARMACY STORE	Immediate	328175.10	For providing easy availability of medicines
12	COMMUNITY HALL	1 year	511880.60	For the purpose of group gathering, events etc.

We have also created a video on village thordi its link is as below

https://www.youtube.com/watch?v=E16s47Ei4aM

Chapter 16

Survey By Interviewing With Talati And/Or Sarpanch

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

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

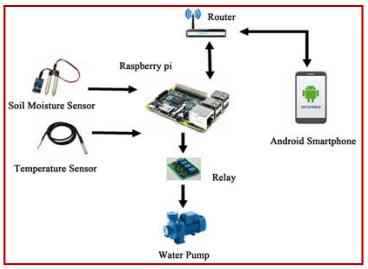
સરપંચશ્રી
થોરડી ગ્રામ પંચાયત

તલાટી કમ મંત્રી
થોરડી ગ્રામ પંચાયત
તા. જી. ભાવનગર.

Chapter 17

Irrigation / Agriculture Activites And Agro Industry, Altenate Technics And Solution

1. Monitoring and controlling crop irrigation systems via smartphone



Mobile technology is playing an important role in monitoring and controlling crop irrigation systems. With this modern technology, a farmer can control his irrigation systems from a phone or computer instead of driving to each field. Moisture sensors in the ground are able to communicate information about the level of moisture present at certain depths in the soil.

2. Ultrasounds for livestock

Ultrasound is not only for checking on baby animals in the womb. It also can be used to discover what quality of meat might be found in an animal before it goes to the market. The testing of DNA helps producers to identify animals with good pedigrees and other desirable qualities. This information can also be used to help the farmer to improve the quality of his herds.

3. Usage of mobile technology and cameras

Some farmers and ranchers use apps like 'Foursquare' to keep tabs on employees. They also put up cameras around the farm. Livestock managers are wiring up their barn feedlots and pastures with cameras that send images back to the central location like an office or home computer. They can keep a closer eye on the animals when they are away or home for the night.

4. Crop Sensors

Crop sensors help apply fertilisers in a very effective manner, maximising uptake. They sense how your crop is feeling and reduce the potential leaching and runoff into ground water.

Instead of making a prescription fertiliser map for a field before you go out to apply it, crop sensors tell application equipment how much to apply in real time.

Optical sensors are able to see how much fertiliser a plant may need, based on the amount of light reflected back to the sensor.

Optical Sensors use light to measure soil properties. The sensors measure different frequencies of light reflectance in near-infrared, mid-infrared, and polarized light spectrums. Sensors can be placed on vehicles or aerial platforms such as drones or even satellites. Soil reflectance and plant color data are just two variables from optical sensors that can be aggregated and processed. Optical sensors have been developed to determine clay, organic matter, and moisture content of the soil. Vishay, for example, offers hundreds of photodetectors and photodiodes, a basic building block for optical sensors. Electrochemical Sensors provide key information required in precision agriculture: pH and soil nutrient levels. Sensor electrodes work by detecting specific ions in the soil. Currently, sensors mounted to specially designed "sleds" help gather, process, and map soil chemical data.

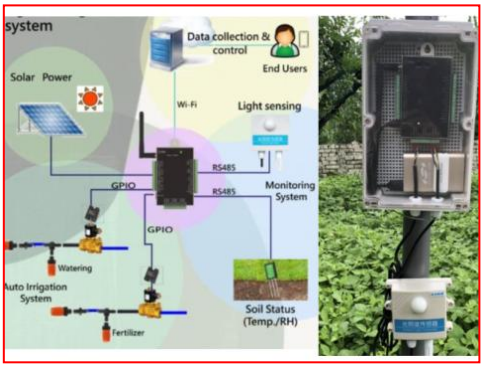


FIG.117 SMART IRRIGATION

Mechanical Sensors measure soil compaction or "mechanical resistance." The sensors use a probe that penetrates the soil and records resistive forces through use of load cells or strain gauges. A similar form of this technology is used on large tractors to predict pulling requirements for ground engaging equipment. Tensiometers, like Honeywell FSG15N1A, detect the force used by the roots in water absorption and are very useful for irrigation interventions

Many smartphone applications have begun to incorporate Internet of Things (IoT) ideals, data aggregation, and speedy processing to bring up-to-date, actionable information to small farmers regarding seeding, weeding, fertilizing, and watering. These applications gather data from handheld sensors, remote sensors, and weather stations, creating in-depth analyses and valuable recommendations. Several applications have been developed specifically targeting the small-scale farmer:

- **Disease Detection and Diagnosis:** Photos taken of suspect plants can be forwarded to experts for analysis.
- **Fertilizer Calculator:** Soil sensors and leaf color can determine what nutrients are needed.
- **Soil Study:** Capturing soil images, as well as pH and chemical data from sensors, allows farmers to monitor and adjust to changing soil conditions.
- **Water Study:** Determining Leaf Area Index from photos and brightness logging can help farmers determine water needs.
- **Crop Harvest Readiness:** Camera photos with UV and white lights accurately predict ripeness.

The problems faced by the Indian sugar industry are as follows:
(1) The sugarcane cultivated in India is of poor quality giving low yield per hectare and low sucrose

(2)The cost of production is quite high because of various reasons.
(3) The supply of raw materials to sugar factories is irregular.

India has inadequate infrastructure and services because of low investment. Farming equipment and infrastructure are scarce outside the provinces of Punjab and Haryana.Because many of the farms are small, the farmers cannot afford irrigation systems that would increase

productivity. Most big farms are family-owned and run and do not take advantage of economies of scale - the concept that the cost per unit falls as output quantities increase, because the problem of land absenteeism in big farms which hinders the development of land to increase productivity because the tenant who cultivates the land has little.

Low investment in big and small of farms leads to lower production, inefficiency and higher costs, one of the causes of food inflation in India.According to the World Bank, India's large agricultural subsidies are hampering productivity-enhancing investment such as agricultural research and extension, as well as investments in rural infrastructure, and the health and education of the rural people.Though trade reforms in the 1990s helped to overregulation of the agricultural domestic trade increased costs, price risks and uncertainty, undermining the sector's competitiveness. The government in trvenes in labour, land, and credit markets.The average size of land holdings is small The average size of land holdings is less than20,000 m² and subject to fragmentation due to land ceiling acts and, in some cases, family disputes. Such small holdings are often overmanned, resulting in disguised unemploymentand low productivity of labour.

Water Quantity Estimation

The quantity of water required for municipal uses for which the water supply scheme has to be designed requires following data:

1. Water consumption rate (Per Capita Demand in litres per day per head)
2. Population to be served.

Quantity= Per capita demand x Population

Water Consumption Rate

It is very difficult to precisely assess the quantity of water demanded by the public, since there are many variable factors affecting water consumption. The various types of water demands, which a city may have, may be broken into following classes:

Water Consumption for Various Purposes:

	Types of Consumption	Normal Range (lit/capita/day)	Average	%
1	Domestic Consumption	65-300	160	35
2	Industrial and Commercial Demand	45-450	135	30
3	Public Uses including Fire Demand	20-90	45	10
4	Losses and Waste	45-150	62	25

TABLE NO.46 Water Consumption Rate

Chapter 18

Social Activities – Any Activates Planned By Students e.g Teaching Learning activities, awareness camp, business idea for SELF HELP GROUP OR ANY OTHER Technics And Solution

Top ten social activities in India are

1. To help illiterate to become literate
2. To help Physical challenged
3. To help Mentally challenged children
4. To help in Rural Girl Education
5. To help in bring Transgenders on main stream
6. To help Street Children for there education and shelter
7. To help young widows to get re married.
8. To help teenagers to bring out of bad habits and addiction.
9. To create awareness on human trafficking
10. Last and Most important to bring drainage facility in Rural Areas

Gujarat has stood first in the implementation of social welfare schemes for the year 2013-14 under the Centre's 20-point programme. Swarnim Jayanti Gram Swarojgar Yojna (458 per cent), activities for generating income by Self help Group (SHG) (1037 per cent), Antyodaya Anna Yojna (AAY) (103 per cent), Food Security for the Below Poverty Line (BPL) (102 per cent) and Housing scheme for the urban poor (409 per cent) are amongst those schemes.National Rural Drinking Water programme (207 per cent), family welfare schemes for the Scheduled Cast (SC) community (627 per cent), post -matriculation scholarship for SC students (102 percent) and Integrated Child Development Schemes (ICDS) (100 per cent) are also part of the list.

VACCINATION AWARNESS PROGRAMME (covid-19)

In rural parts, it is important to first make communities aware about what vaccination is and its purpose. The lack of such rudimentary information makes people vulnerable to rumors and misinformation. The villagers are not ready or are not having belief in the vaccination and are diverted by the rumors so giving the villagers the awareness about a non harmful & the safety of vaccination & As

FIG.118 vaccination

large and diverse India is, vaccine equity is a challenge within the country as well. During the first wave of the pandemic, the rural areas were relatively less affected compared to the urban regions. Eventually, the rural regions saw a significant surge in cases, especially in the second wave. An analysis conducted by the State Bank of India states that the share of rural districts in COVID-19 cases is 52.9 percent as of May 2021. Even in the first wave, the peak was at 53.7 percent of cases. It is a worrying trend, as rural areas also see lower rates of testing and poor reporting.

The primary reason for this urban-rural divide is logistical constraints—infrastructure, supply chain, and skilled personnel, especially in the poorer states. For the vaccination drive to be effective, the poorer states need resources and capacity building to improve the health infrastructure, which includes a very important component – i.e., Cold Chain. While the vaccines in use currently do not have extreme cold chain requirements, the nationwide distribution of cold chain points in India is uneven. As of December 2020, India has 29,000 cold chain points across the country. A detailed analysis by the IDFC Institute in March 2021 reveals that six states with 34 percent of India's population have 52 percent of the entire country's cold chain points instead of the government machinery, if sarpanchs, being local persons, take up this task in their hands and convince the villagers, vaccination would be a success in villages too.

FIG.119 Vaccination awarness

When the vaccination of people above the age of 60 years and those 50 and above with comorbid conditions began in India on 1 March 2021, there were few takers among the older population. Despite mobilization efforts to encourage people to get vaccinated by the government health staff -- medical officer, auxiliary nursing midwives, ASHAs or community health volunteers -- and anganwadi workers, there was low or sometimes no coverage in certain areas in the first weeks of March. To increase acceptance, the state government took a decision to work with gram panchayat (village council) representatives to address vaccine hesitancy in the community. The Director Medical Health Services asked district nodal officers to conduct meeting at village level with the help of the PHC medical officers and gram panchayat members.

One of the biggest challenges of rolling out the vaccination is rural parts is the limited access to technology and even further limited knowledge among the communities in using technology. Questions like "what is CO-WIN dashboard?", "how do I register?", "how do I book my appointment?", "where is my nearest vaccination centre?", etc. are rampant. This puts rural communities at a much bigger disadvantage compared to urban communities, where technology usage is high and conventional medial messages are concentrated. It is vital to bridge this gap by facilitating registrations for community members. This can be done by setting up registration kiosks at the village level and using key influencers such as Gram Panchayat members, Anganwadi sevikas, ASHA workers, etc. to mobilise people to get themselves registered. This will be a key strategy till walk in vaccination registrations are allowed by the government for all age categories. Taking vaccination to rural India is complex. However, it can be achieved with decentralised planning and a community based approach. It is important to educate people that adoption of CAB and vaccination is the sure shot and only way towards normalcy.

Chapter 19

Thordi SAGY Questionnaire Survey form with the Sarpanch Signature (Scanned copy attachment in the soft copy report and Original copy in hardbound report)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Thordi Gram Panchayat: Thordi Ward No.

Block: Bhavnagar District: Bhavnagar

State: Gujarat L S Constituency: Bhavnagar

1. Family Identity and Size

Name of Head of Household	Harendrasinh Gohil							Male/ Female	3/1
SECC Survey ID:		Family Size	5	Over 18	4	6 to 18	1	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]	Adhaar Card (Y/ N)	Bank A/C (Y/N)	Social Security Pension[5]
Harendrasinh	37	M		Marri.	Graduate	Y	Y	-
Hetal	33	F		11	10th	Y	Y	-

3. Children from 6 years and up to 18 years

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

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

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	Yes	Yes
Children	No	No

9. House & Homestead Data

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

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

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

11. Source of Lighting and Power

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

12. Landholding (Acres)

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

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	✓
Weaving	
Other Artisan(mention)	
Other Trade & Business (mention)	

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

15. Agriculture Inputs

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

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

Name	Unit	Quantity
Cotton	kg	400 kg
vegetable	kg	
Bajari	kg	

17. Livestock Numbers

Cows: 3	Bullocks: 2	Calves: —
Female Buffalo: 2	Male Buffalo: —	Buffalo Calves: —
Goats/ Sheep: —	Poultry/ Ducks: —	Pigs: —
Any other: Type —		No. —
Shelter for Livestock: ~~Pucca~~ / Kutcha / ~~None~~		
Average Daily Production of Milk(Litres): 10 litre		

18. What games do Children Play

Cricket Hide & Seek

19. Do children play musical instrument (mention)

No

Schedule Filled By:

22/6/21

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

I. Basic Information

a. Gram Panchayat: Thordi

b. Block: Bhavnagar

c. District: Bhavnagar

d. State: Gujarat

e. Lok Sabha Constituency: Bhavnagar

f. Number of Wards in the Gram Panchayat: 9

g. Number of Villages in the Gram Panchayat: 1

h. Names of Villages: Thordi, Bhavnagar, Gujarat

Demographic Information

Number of Households 2826 Total Population 12826 Male 1447 Female 1379

SC HHs 133 ST HHs – OBC HHs 203 Other HHs 138

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	Y	
b.	Nearest Primary Health Centre (PHC)	N	20 km
c.	Nearest Community Health Centre (CHC)	N	20 KM
d.	Nearest Post Office	Y	
e.	Nearest Bank Branch (Any)	N	2 km
f.	Nearest Bank with CBS Facility	N	2 km
g.	Nearest ATM	N	1 Km
h.	Nearest Primary School	Y	
i.	Nearest Middle School	Y	
j.	Nearest Secondary School	Y	
k.	Nearest Higher Secondary School / +2 College	N	20 km
l.	Nearest Graduate College	N	20 km
m	Nearest ITI / Polytechnic Centre	N	20 km
n	Kisan Seva Kendra	Y	

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
o	Agriculture Credit Cooperative Society	Y	
p	Nearest Agro Service Centre	N	2 km
p	MSP based Government Procurement Centre	N	8 km
q	Milk Cooperative /Collection Centre	N	2 km
r	Veterinary Care Centre	N	6 km
s	Ayurveda Centre	N	10 km
t	E – Seva Kendra	Y	
u	Bus Stop	Y	
v	Railway Station	N	20 km
w	Library	N	15 km
x	Common Service Centre	Y	

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 1 Public 1 Private _____

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

V. Education, ICDS

a. Number of Angan Wadi Centres: 2

b. Number of villages without Angan Wadi Centres _____

Names of such villages: _____

c. Schools (Number)

Primary Private: 2 Primary Govt.: 1

Middle Private: 1 Middle Govt.: –

Secondary Private: 1 Secondary Govt.: –

Higher Secondary Private: 1 Higher Secondary Govt: –

VI. Public Distribution System

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

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	Thordi	
b.	Hand Pump Coverage in Villages:	Covered ✓ / Not Covered	Thordi	
c.	Coverage under Covered Drains:	Covered ✓ / Not Covered	Thordi	
d.	Coverage under Open Drains:	Covered ✓ / Not Covered ✓	Thordi	
e.	Villages with Household' Electricity Connection (Numbers)	Connected ✓ / Not Connected	Thordi	

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	2569 Hectar	d.	Pasture / Grazing Land	34 hect.	g.	Check Dam	1
b.	Irrigated Land	1026 hectar	e.	Forests/ Plantations		h.	Wells/Bore Wells	3
c.	Un-irrigated Land	595 hect.	f.	Other Common Land		i	Tanks /Ponds	1

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

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

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

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	
b)	Number of Households receiving pension (old age, widow, disability)	
c)	Number of eligible Households who are not receiving pension	
d)	Number of Households eligible for Ration Card	
e)	Number of eligible HHs having ration cards	
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	
h)	Number of active Job Card holders under MGNREGA	
i)	Number of Job Card holders who completed 100 days of work during 2013-14	0
j)	Number of shops selling alcohol	—
k)	Number of BPL families	
l)	Number of landless households	
m)	Number of IAY beneficiaries	
n)	Number of FRA[2] beneficiaries	—
o)	Number of Community Sanitary Complexes	
p)	Number of Households headed by single women	
q)	Number of Households headed by physically handicapped persons	
r)	Total number of Persons with Disability in the village	
s)	Number of SHGs	—
t)	Number of active SHGs	—
u)	Number of SHG Federations	—
v)	Number of Youth Clubs	—
w)	Number of Bharat Nirman Volunteers	—

Name and Signature of Surveyor and Respondent'

Jogendrasinh Sarvaiya. Siddharth Patel. Surveyor	હે - સહી-મુદ્રા સરપંચશ્રી થોરડી ગ્રામ પંચાયત PRI Respondent (Preferably Gram Panchayat Chairperson)	તલાટી કમ મંત્રી થોરડી ગ્રામ પંચાયત તા. જી. ભાવનગર. Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	23/6/21 Date of Survey

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: Thordi

b. Ward Number: _____

c. Gram Panchayat: Thordi

d. Block: Bhavnagar

e. District: Bhavnagar

f. State: Gujarat

g. Lok Sabha Constituency: Bhavnagar

h. Number of Habitations / Hamlets in the Gram Panchayat: 1

i. Names of Habitations / Hamlets: Thordi

Demographic Information

Number of Households 474 Total Population 2826 Male 1447 Female 1379

SC HHs 133 ST HHs - OBC HHs 203 Other HHs 138

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	Y	
b.	Nearest Middle School	Y	
c.	Nearest Secondary School	Y	
d.	Kisan Seva Kendra	Y	
e.	Milk Cooperative /Collection Centre	N	2 Km
g.	Health Sub Centre	Y	
h.	Bank	N	2 Km
i.	ATM	N	1 Km
j.	Bus Stop	N	2 Km
k.	Railway Station	N	20 Km

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

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	N	20 K m
m	Common Service Centre	Y	
n	Veterinary Care Centre	N	20 km

ii. Road Connectivity

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

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

iii. Drinking Water Facilities

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

If 3 mention the name of the habitations not covered:

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

If 3 mention the name of the habitations not covered:

iv. Coverage of Habitations under Waste Management System

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

If 3 mention the name of the habitations not covered:

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

If 3 mention the name of the habitations not covered:

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

If 3 mention the name of the habitations not covered: 2

v. Coverage of Habitations under Electrification

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

If 3 mention the name of the habitations not covered: 1

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

If 3 mention the name of the habitations not covered: 1

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): 1 (Private School)

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

vii. Education, ICDS

a. Number of Anganwadi Centres: 1

c. Schools (Number)

Primary Private: 2 Primary Govt.: 1

Middle Private: 1 Middle Govt.: 1

Secondary Private: 1 Secondary Govt.: 1

Higher Secondary Private: 1 Higher Secondary Govt: 0

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	2569 Hect	d.	Pasture / Grazing Land	346 Hect.	g.	Check Dam	1
b.	Irrigated Land	1026 Hect.	e.	Forests/ Plnatations		h.	Wells/Bore Wells	3
c.	Un-irrigated Land	598 Hect	f.	Other Common Land		I	Tanks /Ponds	1

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

Name and Signature of Surveyor and Respondent'

Jogendrasinh Sarvaiya Siddharth Patel.	સરપંચશ્રી થોરડી ગ્રામ પંચાયત	તલાટી-કમ મંત્રી થોરડી ગ્રામ પંચાયત તા. જી. ભાવનગર.	23/6/21
Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

Chapter 20

TDO -DDO-Collector email sending Soft copy attachment in the report

8/3/2021 Gmail - Development scenario of Thordi village, Bhavnagar.

Gmail JOGENDRASINH SARVAIYA <jogendrasinhsarvaiya33@gmail.com>

Development scenario of Thordi village, Bhavnagar.
1 message

JOGENDRASINH SARVAIYA <jogendrasinhsarvaiya33@gmail.com> Tue, Aug 3, 2021 at 3:44 PM
To: tdo-bhavnagar@gujarat.gov.in, collector-bav@gujarat.gov.in
Cc: Vishwakarma Yojana <rurban@gtu.edu.in>

Respected Sir/Madam
We are the students of Gyanmanjari Institute of technology, Bhavnagar affiliated to Gujarat Technological University-GTU. GTU has been assigned to Vishwakarma Yojanaa-VY in which students survey various village and Designs various amenities To Deliver it to them making them ideal for living better life as per requirements & village problem statements.
As a part of Vishwakarma Yojana's guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about Thordi Village profile of issues for development and our design work for them which is as below.

Designs:

Village: Thordi	Population: 2820 as per census 2011	
Key issue	**Remark**	**Given design**
Financial	For easy access to money	A.T.M
Health	For easy access to health treatment & medicines	Clinic with Maternity ward & pharmacy store
House facility	For pucca house	Residential house under PMGY
Smashan snangruh	For cremation facilty	Smashan, snangruh
Drinking water	For storage as per population forecast	Water sump
Community place	Common hall	Community hall
Path to school	For access to school in rainy season as the passage has high water flow	Pipe culvert
Avedo	For animal water drinking facility	Avedo
Gram panchayat office	For panchayat work	Gram panchayat office
Public garden	For recreation, as well as education	Public garden

Expenditure of designs

Sr.no	Design Name	Period (Months)	Amount of expenditure	Benefit
1	Pipe culvert	4-5	114440.28	To connect to higher secondary school & that road
2	Smashan	2	99321.92	cremation facilty
3	Snangruh	2	221679.8	cremation facilty
4	Residential houses type A & B under PMGY	6	1353040	Basic need of home for better living
5	Public garden	2	286034.3	Recreational area
6	Sump 5 lakh liter cap	4	1487903.00	Drinking Water storage
7	Gram panchayat building	6	755714.12	Panchayat office work
8	Animal water drinking facility (avedo)	3	984536.64	For animals water drinking
9	ATM	3	83620.50	Easy access to banking facility & money
10	Clinic with Maternity ward	6	735947.00	For easy treatment
11	Pharmacy Store	3	328175.10	For easy treatment
12	Community hall	4	511880.60	To organize events & gathering

https://mail.google.com/mail/u/0?ik=242aa76c2c&view=pt&search=all&permthid=thread-a%3Ar3884043573666396170&simpl=msg-a%3Ar38790... 1/2

8/3/2021 Gmail - Development scenario of Thordi village, Bhavnagar.

please find here with attachment
1. Detailed Project Report of Thordi Village.

report thordi vishwakarma phase viii.pdf

JOGENDRASIN H SARVAIYA & SIDDHARTH PATEL
UG CIVIL ENGINEER
GYANMANJARI INSTITUTE OF TECHNOLOGY
GUJARAT TECHNICAL UNIVERSITY

Chapter 21

Comprehensive report for the entire village

Vishwakarma yojna is a initiative towards urbanization of villages buy the government of gujarat Vishwakarma Yojana would provide “Design to Delivery” solution for development of villages in ‘Rurban’ areas. The developmental work in villages that could undertaken as per the need of the village in particular includes Physical infrastructure facilities (Water, Drainage, Road, Electricity, Solid waste Management, Storm Water Network, Telecommunication & Other), Social infrastructure facilities (Education, Health, Community Hall, Library, Recreation Facilities & other) and renewable energy (Rain water harvesting, Biogas plant, Solar Street lights & Other) for Sustainable development. Under this scheme, the villages of “Rurban” area will be adopted by the engineering colleges under the Gujarat Technological University. The Engineering colleges would study the identified villages and make the recommendations on the application of technology to achieve integrated and comprehensive development, through project preparation and management.

The main objective of the rural development programme is to raise the economic and social level of the rural people. Rural development implies both the economic betterment of people as well as greater social transformation. Rural Development refers to the process of improving or uplifting the living conditions of the people living in rural areas. The people of India live mostly in rural areas (villages). Therefore, it is in the heart of the villages that the nation lives. Indeed, ―the soul of India is in the toil of the rural areas‖. The welfare of India depends upon the prosperity of the villages. A healthy and dynamic agricultural sector is an important foundation of rural development, generating strong linkages to other economic sectors. Rural livelihoods are enhanced through effective participation of rural people and rural communities in the management of their own social, economic and environmental objectives by empowering people in rural areas, particularly women and youth, including through organizations such as local cooperatives and by applying the bottom-up approach. Close economic integration of rural areas with neighbouring urban areas and the creation of rural off-farm employment can narrow rural-urban disparities, expand opportunities and encourage the retention of skilled people, including youth, in rural areas.

There is considerable potential for rural job creation not only in farming, agro processing and rural industry but also in building rural infrastructure, in the sustainable management of natural resources, waste and residues. Rural communities in developing countries are still faced with challenges related to access to basic services, economic opportunities and some degree of incoherence with regard to planning. Urban is that area where the population density is more and new facilities are provided to the people.Urban area is the region surrounding a city. Most of inhabitants of urban areas have non-agricultural jobs. Urban areas have municipality, corporation, cantonment board or notified town area committee etc. According to census 2011, there are 7,939 towns, 4,040 statutory town and 3,895 census towns. Rural: All the areas which are not characterized as urban area is called rural area. In which the population is very low compared to urban areas. Mainly they depend on agricultural activities. According to census 2011, there are 6, 40,868 villages in India. The area where more than 75% of male population is associated with agricultural activity is known as rural area.In part 2 as per the survey & poor condition of gram panchayat office a new panchayat office is designed. For providing facility of drinking water for the animals kept by villagers an animal drinking water facility design is created, for easy money service or banking service an atm is designed for the village

Migration of the people from rural areas to urban areas causes some burden on the urban areas. If the vision of the founders ofthis nation is to be respected and implemented, then we all need to have the responsibility to make ourvillages smart, which means self-sufficient, efficient, healthy and educated villagers. To make the villages smart means to make the country self-reliant, stronger and secured. India lives in its villages. Villages are the food basket of the nation. Village Panchayats are the centers of grass root democracy. However, the holistic development of rural India is still under tremendous pressure owing to the declining farm output, increasing trend of distressed migration, absence of basic amenities and emerging problems of environmental pollution and conflicts. The smart village concept is needed for a sustainable and a secured future of the villages.

We were allocated thordi village situated in Bhavnagar Taluka in Bhavnagar District of Gujarat State, India. It is located 16 KM towards South from District headquarters Bhavnagar. 208 KM from State capital Gandhinagar. Thordi pin code is 364110 and postal sub post office is situated at Ghogha.There is a humidity in the weather. The latitude 21.6470° N, 72.1920° E are the coordinate of the Thordi. The village location is good & has many percepts of development & employment.

We have started the techno economic survey in which our allocated village was thordi, smart village was kankot at Rajkot & Ideal village was Rafala at Bagasra. We found the kankot village with major facilities from basic to urban type facilities which was good for the villagers & in rafala village also known as the golden village we found facilities with good ideas & thoughts for better life living & thinking process for the social as family.

On the basis of survey data we have observed that there are some physical infrastructures like closed type of drainage system in Thordi. There are nearly 474 houses out of which 60% of the houses are pucca while 40% of the houses are kutchha. There is one government Primary school, two secondary school each government & private and four anganwadi three government & one privarte. There is piped water supply for every house with two sump & 1 ESR & pump house. there are five checkdam for agricultural usage & three lakes. Also there is a post office.Village is connected with 24 hour electricity supply.

There is need of internal road development as well as there are more kutchha houses so a well designed plan for house is necessary. Also there is a bridge needed to connect the new government higher secondary school as the path is closed during the rainy season. Also there are no street light to enlighten the paths. There are no such facilities of dustbin at every connecting points. There is no pipeline connected for gas. There is a need of repairs to old structures like Gram panchayat office. There is a need of new smashan, & snanghat. So we can plan on laying CC road with Paving blocks on side in internal roads, we can design a pipe culvert bridge for connection of school., design for houses, new smashan & snan-gahat design

We have designed 6 designs in part 1 i.e

1) Pipe culvert
2) Smashan
3) Snangruh
4) Residential houses under PMGY
5) Public garden
6) Sump 5 lakh liter cap

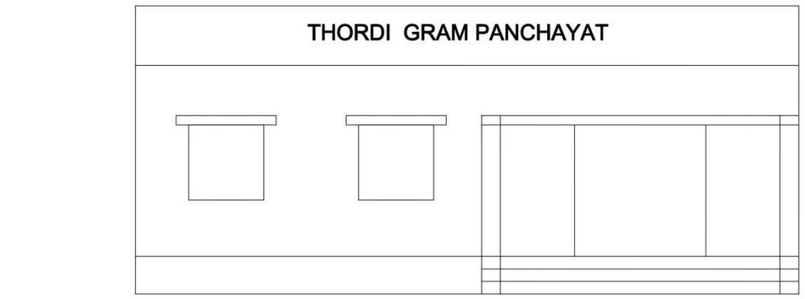
Pipe culvert was needed as there was path closed during the rainy season which led to gov higher secondary school.
Smashan was needed as the existing smashan was in very poor condition.
Snangruh is also needed after cremnation ceremony.
Residential house are kuchha house about 40% so under pradhan mantra gruh yojna they can have government help & can built pucca houses.
Public garden have always enjoyed the respect of the communities in which they are located. They are resources for recreation, as well as education and research opportunities.
The population is about 2826 as per census 2011 & as per previous 30 years & future 30 years calculation the population will be 5728 which will posses 135 liters per person which is 773280 liters of water as there is 300000 liter capacity of sump available we have designed **500000 liters of sump** for storage.

As per the interaction with the sarpanch a big trouble faced was the walkway to school which was flooded by water so there was a need of higher stage structure with drainage path so a pipe culvert is designed for the need. Also as per the survey the condition of smashan & panchayat office was very poor so a new construction was needed. There was no facility of snanghat so a design of it is constructed, There are 40% kuchha house in the village so using the pradhan mantra gruh yojna pucca houses can be made so residential house of 2 different types are designed. As an recreational area public garden is designed for the villagers. As per the population & the poplutaion of the village the requirement of water is calculated & 5 lakh liter sump is designed

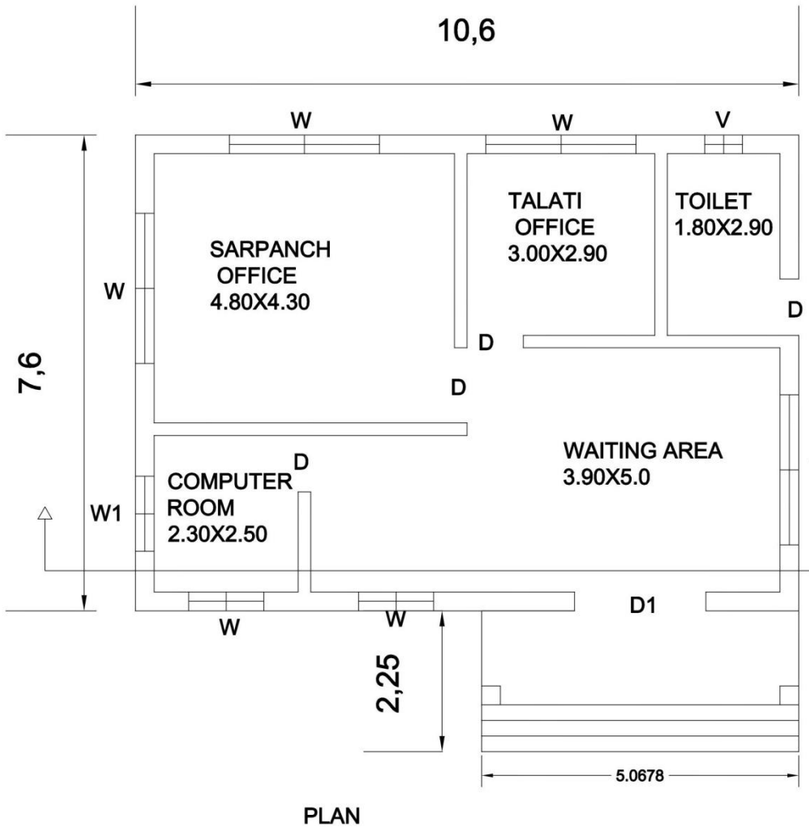
In part 2 we have surveyed the villagers income, facility etc. & SAGY (saansad adarsh gram yojna) details & other 6 designs are created as i.e

7) Gram panchayat building
8) Cattle Trough (avedo)
9) ATM
10) Clinic with Maternity ward
11) Pharmacy Store
12) Community hall

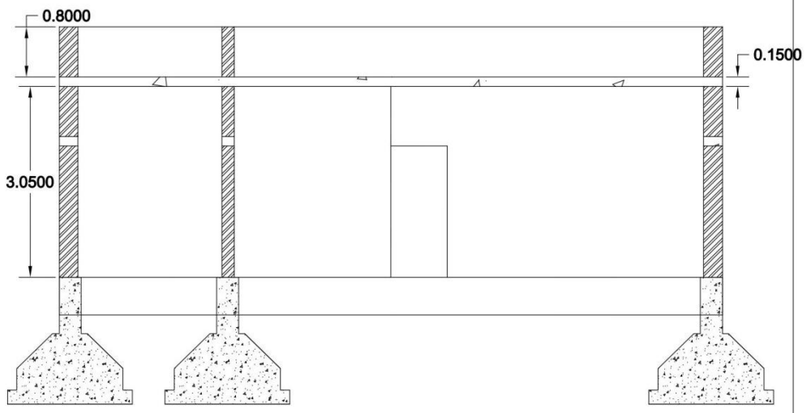
Gram panchayat building is in very poor condition so a new office is designed for the villagers easy access & work.
Cattle Trough Animal water drinking facility is designed which will help the villagers who have animals for easy drinking facility & clean good water facility with storage.
ATM is necessary in village for Today, consumers are used to seeing ATMs in convenience stores, petrol stations or even at the local pub! These ATMs are important because they play a vital role in providing their communities with easy access to cash, without having to travel miles. Saving time and money! Research by, ACS Local Shop Report 2017 has found that even with the contactless card era, 76% of convenience customers still pay by cash! Having an onsite ATM will also increase footfall. 80% of users will revisit an ATM site at least once a week.
Clinic with maternity ward is necessary village for easy access for facility & also a maternity ward plays an important role in providing facility for women for short distance access living in the village.
Pharmacy store is necessary for avoiding the long route traveling to urban area for the medicines & drugs & also for emergency the pharmacy store plays a vital role.
Community Hall in village is facility that is available to the public in a particular area for community-related recreational activities. Community centers provide classes and events such as physical, creative or social activities.



ELEVATION



PLAN



SECTION

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W1	1.2 * 1.2
D	0.9 * 2.1
D1	2.1 * 2.1
V	0.6 * 0.6

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- ALL DIMENSIONS ARE IN METER.
- OUTER WALLS ARE OF 0.23 M & INTERNAL WALLS ARE OF 0.12M.
- DESIGN PREPARED ONLY FOR EDUCATIONAL PURPOSE AND CORRECTION OF ALL DATA MUST BE CHECK BEFORE USE.
- MINIMUM GRADE OF CONCRETE IS M20 & STEEL CAN BE USED OF FE450 OR FE 500.

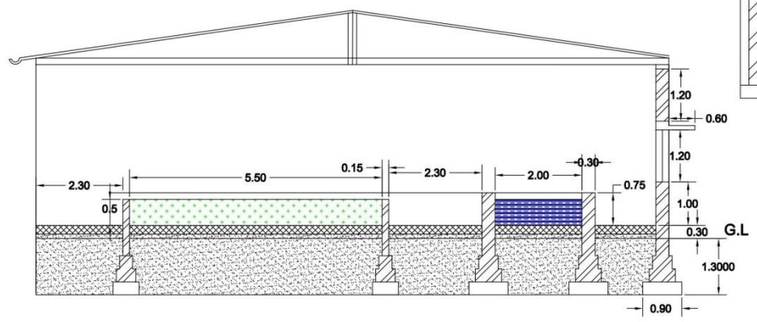
GYANMAJARI INSTITUTE OF TECHNOLOGY

DESIGNED BY:-

JOGENDRASINH H SARVAIYA
SIDDHARTH D PATEL

GRAM PANCHAYAT OFFICE	
VISHWAKARMA YOJNA	
PROJECT NO	7
LOCATION	THORDI VILLAGE
DATE	02/05/2021
SCALE	1:100
BUILT UP	88.16 SQ MT

SIGN



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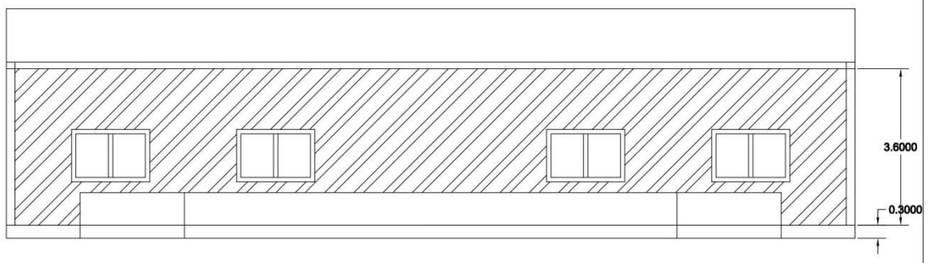

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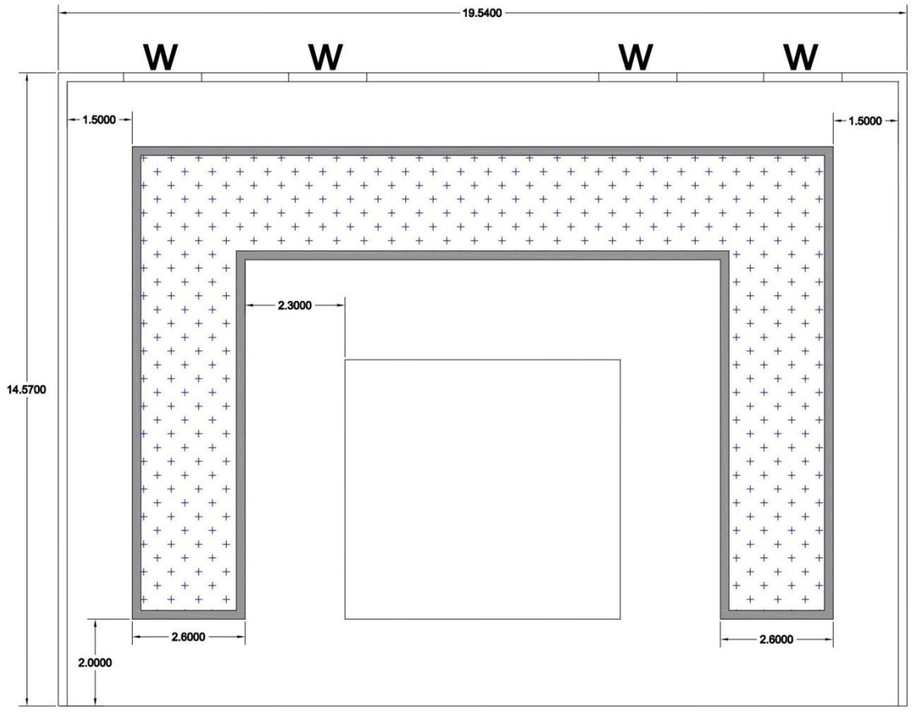

PLAN

SCHEDULE OF OPENING	
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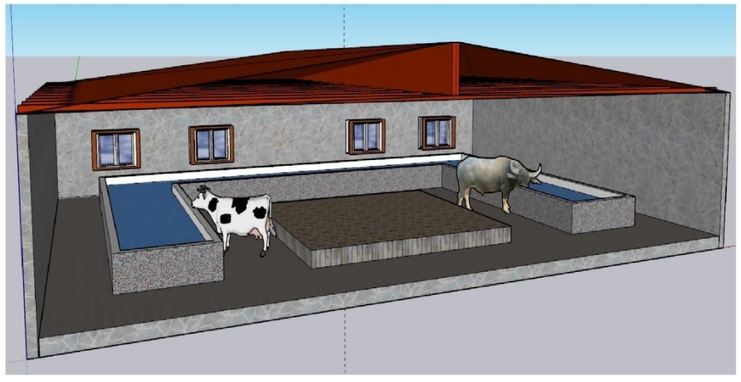

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- MINIMUM GRADE OF CONCRETE IS M20 & STEEL CAN BE USED OF FE450 OR FE 500.

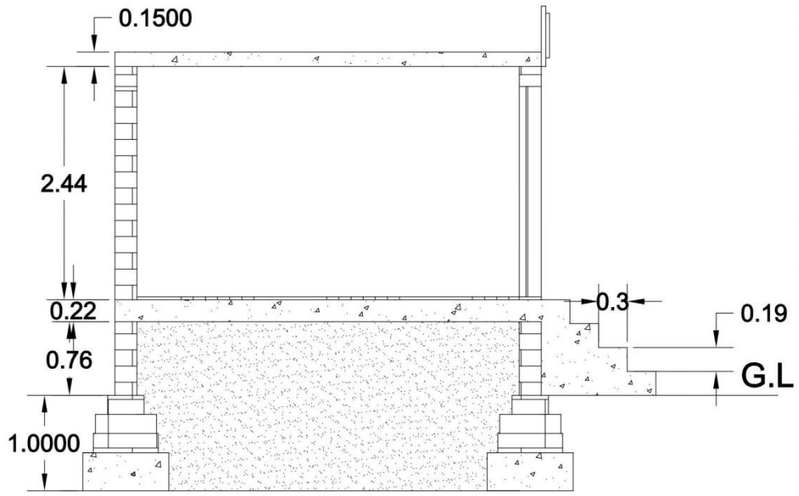
GYANMAJARI INSTITUTE OF TECHNOLOGY

DESIGNED BY:-

JOGENDRASINH H SARVAIYA
SIDDHARTH D PATEL

Animal drinking water facility	
VISHWAKARMA YOJNA	
PROJECT NO	10
LOCATION	THORDI VILLAGE
DATE	02/05/2021
SCALE	1:100
BUILT UP	284.17 SQ MT

SIGN



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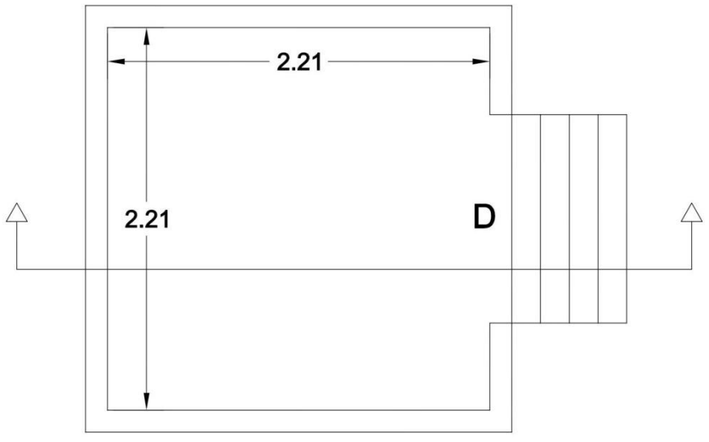

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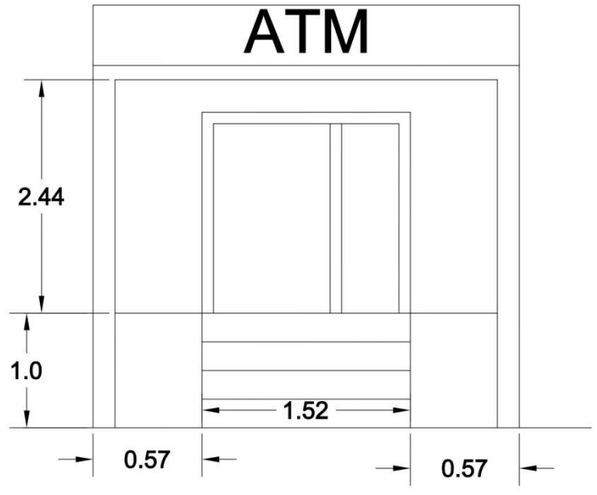

ELEVATION

GUJARAT TECHNICAL UNIVERSITY

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- MINIMUM GRADE OF CONCRETE IS M20 & STEEL CAN BE USED OF FE450 OR FE 500.

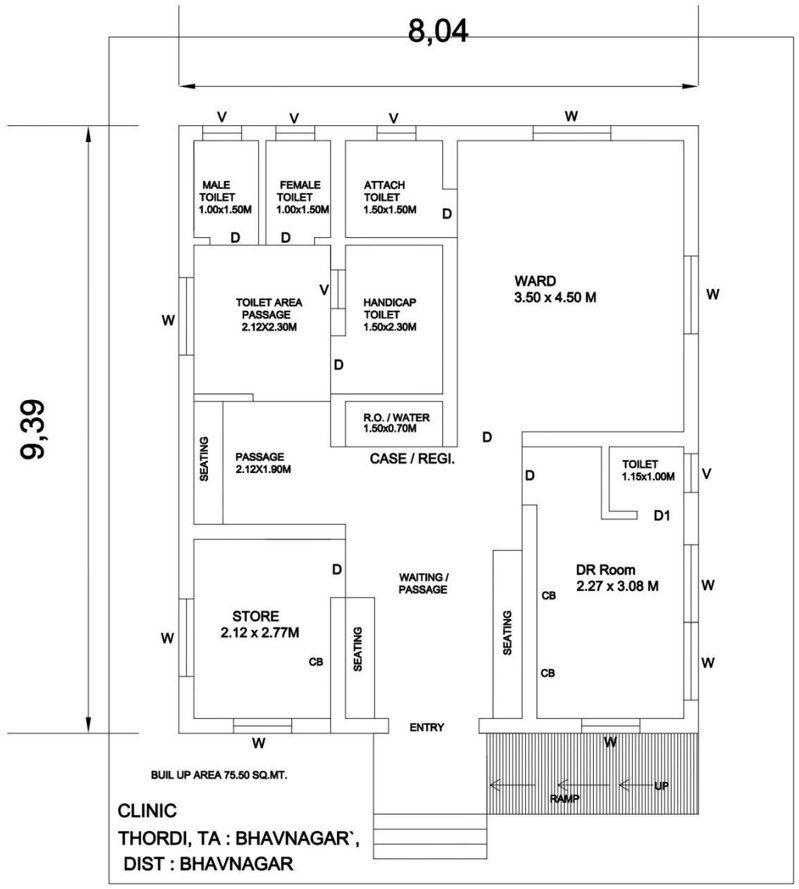
GYANMAJARI INSTITUTE OF TECHNOLOGY

DESIGNED BY:-

JOGENDRASINH H SARVAIYA
SIDDHARTH D PATEL

ATM	
VISHWAKARMA YOJNA	
PROJECT NO	09
LOCATION	THORDI VILLAGE
DATE	02/05/2021
SCALE	1:100
BUILT UP	7.13 SQ MT

SIGN



PLAN

SCHEDULE OF OPENING	
ITEM	SIZE
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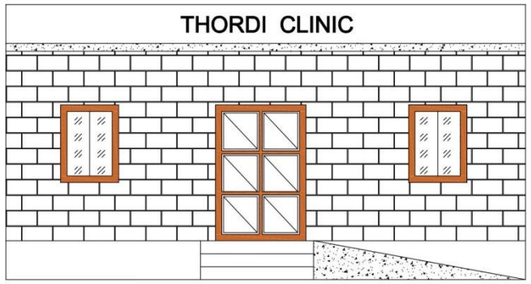
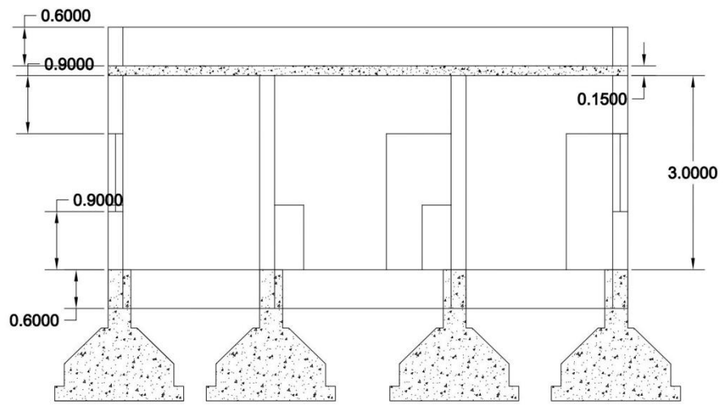
V	0.6 * 0.6
D	0.9 * 2.1
D1	0.72 * 2.1



ELEVATION



SECTION

GUJARAT TECHNICAL UNIVERSITY

- ALL DIMENSIONS ARE IN METER.
- OUTER WALLS ARE OF 0.23 M & INTERNAL WALLS ARE OF 0.12M.
- DESIGN PREPARED ONLY FOR EDUCATIONAL PURPOSE AND CORRECTION OF ALL DATA MUST BE CHECK BEFORE USE.
- MINIMUM GRADE OF CONCRETE IS M20 & STEEL CAN BE USED OF FE450 OR FE 500.

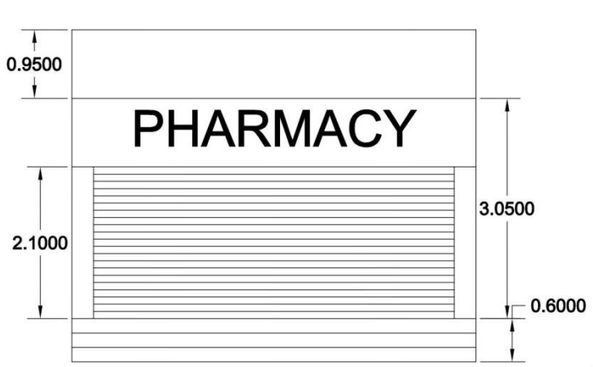
GYANMAJARI INSTITUTE OF TECHNOLOGY

DESIGNED BY:-

JOGENDRASINH H SARVAIYA
SIDDHARTH D PATEL

CLINIC with Maternity Ward	
VISHWAKARMA YOJNA	
PROJECT NO	10
LOCATION	THORDI VILLAGE
DATE	02/05/2021
SCALE	1:100
BUILT UP	75.45 SQ MT

SIGN



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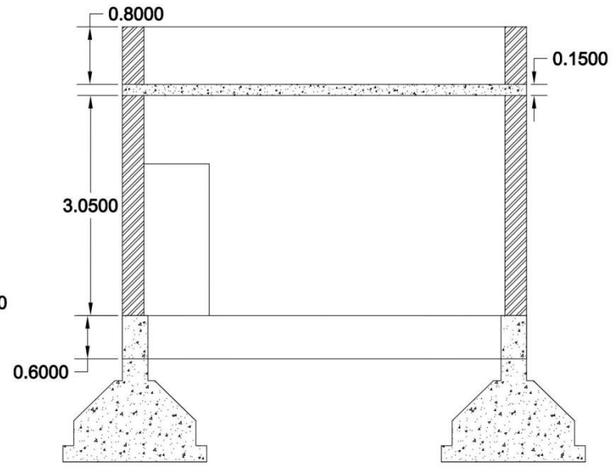
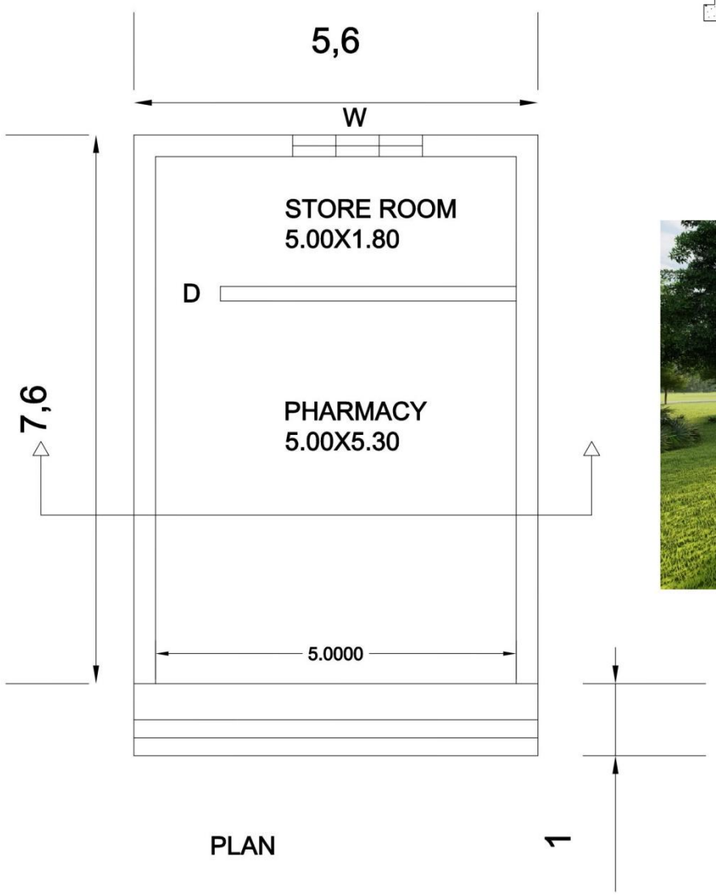


SECTION



PLAN

SCHEDULE OF OPENING	
ITEM	SIZE
W	1.2 * 1.2
SHUTTER	5.0 * 2.1
D	0.9* 2.1

GUJARAT TECHNICAL UNIVERSITY

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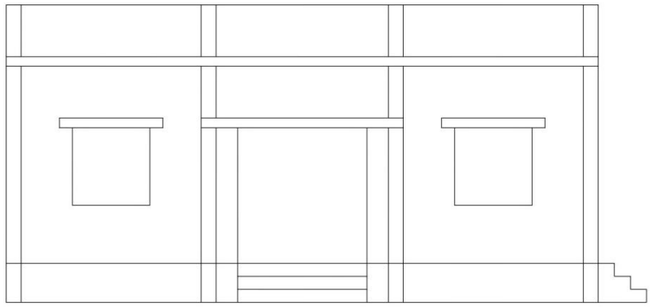
GYANMAJARI INSTITUTE OF TECHNOLOGY

DESIGNED BY:-

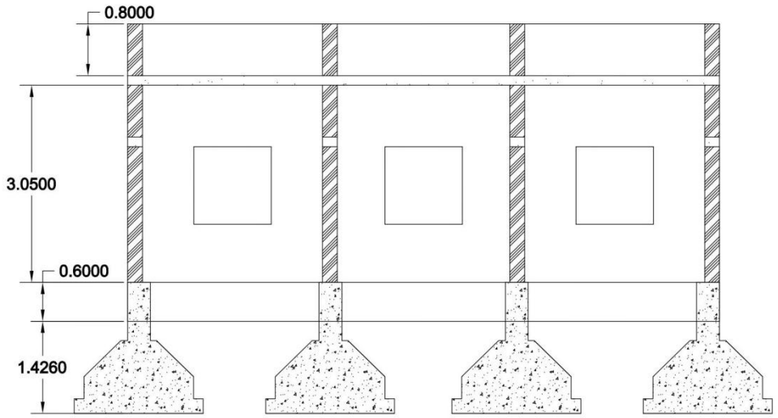
JOGENDRASINH H SARVAIYA
SIDDHARTH D PATEL

PHARMACY STORE	
VISHWAKARMA YOJNA	
PROJECT NO	11
LOCATION	THORDI VILLAGE
DATE	02/05/2021
SCALE	1:100
BUILT UP	42.56 SQ MT

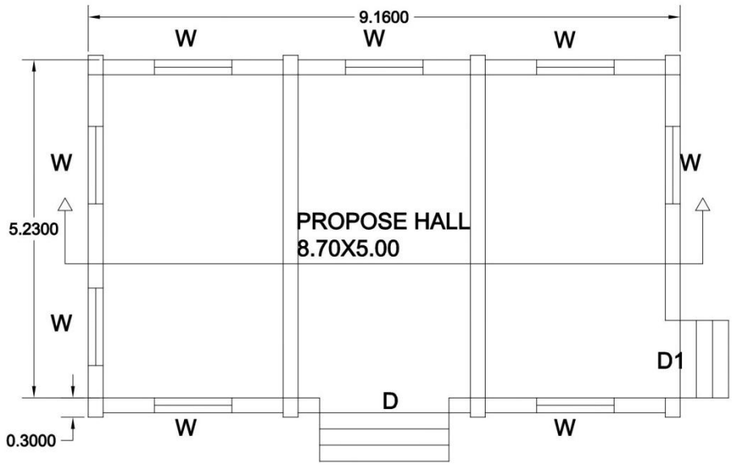
SIGN



ELEVATION



SECTION



PLAN

SCHEDULE OF OPENING	
ITEM	SIZE
W	1.2 * 1.2
D	2.0* 2.1
D1	1.2 * 2.1

GUJARAT TECHNICAL UNIVERSITY

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GYANMAJARI INSTITUTE OF TECHNOLOGY

DESIGNED BY:-

JOGENDRASINH H SARVAIYA
SIDDHARTH D PATEL

COMMUNITY HALL	
VISHWAKARMA YOJNA	
PROJECT NO	12
LOCATION	THORDI VILLAGE
DATE	02/05/2021
SCALE	1:100
BUILT UP	50.01 SQ MT

SIGN