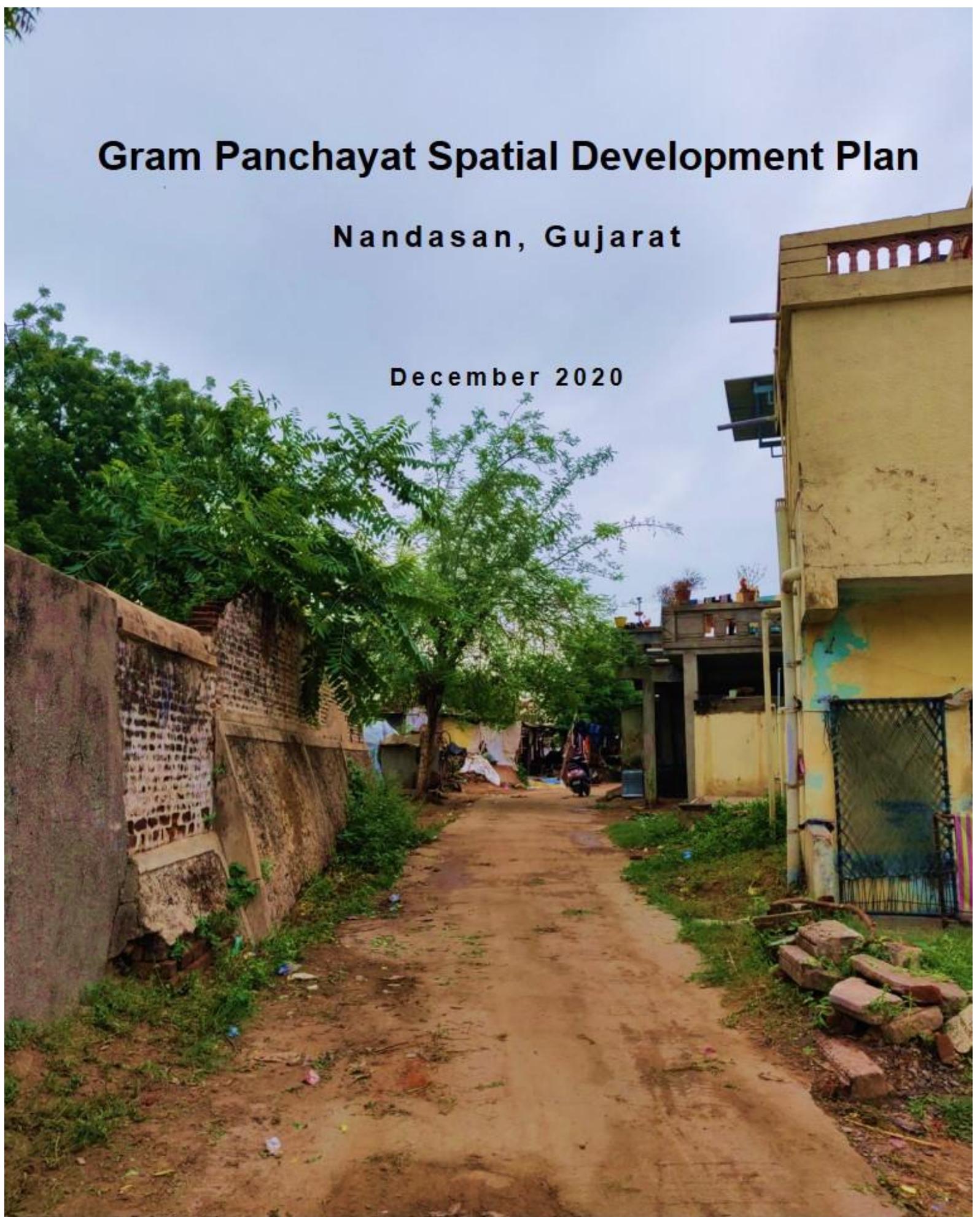


Gram Panchayat Spatial Development Plan

Nandasan, Gujarat

December 2020



Panchayats, Rural Housing & Rural
Development Department
Government of Gujarat

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Nandasan

GRAM PANCHAYAT SPATIAL DEVELOPMENT PLAN

FINAL REPORT



Panchayats, Rural Housing & Rural
Development Department
Government of Gujarat

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List of Abbreviations

APMC	Agricultural Produce Market Committee
CHC	Community Health Center
CPHEEO	Central Public Health and Environmental Engineering Organisation
DDO	District Development Officer
DILR	District Inspector Land Record
ELU	Existing Land Use
ESR	Elevated storage reservoir
FGDs	Focus Group Discussions
GIS	Geographical Information System
GoG	Government of Gujarat
GP	Gram Panchayat
GPSDP	Gram Panchayat Spatial Development Plan
Ha	Hectare
HH	Household
HWY	Highway
ITI	Industrial training institute
Km	Kilometer
KVK	Krishi Vigyan Kendra
m	meter
MoHFW	Ministry of Health and Family Welfare
MoPR	Ministry of Panchayati Raj
MorD	Ministry of Rural Development
mt.	meter
HH	Household
NH	National Highway
NIC	National Informatics Center
NRSC	National Remote Sensing Center
PHC	Primary Health Center
PLU	Proposed Land Use
Pph	Person per hectare
PSP	Public and Semi-Public
SC	Schedule Cast
SEZ	Special Economic Zone
SH	State Highway
SIR	Special Investment Region
ST	Scheduled Tribe
STP	Sewage Treatment Plant
Sq.km	Square Kilometer

Sq.mt	Square Meter
TDO	Taluka Development Authority
UGVCL	Uttar Gujarat Vij Company LTD.
URDPFI	Urban and Regional Development Plans Formulation and Implementation
WFPR	Workforce Participation Rate

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INTRODUCTION

CHAPTER 1: BACKGROUND

1.1. Background

Rapid urbanization, increased migration from rural to urban areas and declining rural poverty have been the central themes for economic development in India until now. However, the COVID-19 pandemic, the lockdown and the resultant reverse migration of lakhs of daily wage labourers, employed mainly in the informal sector, in the past few weeks now pose a huge socio-economic problem and challenge to authorities. It will be a tough task to provide gainful employment to these people in rural areas.

The Government of India has taken substantive measures to reach out to rural India by utilizing Jan Dhan Yojana which credited direct cash transfers to the bank accounts of poor women. Under the aegis of PM-KISAN scheme cash transfers have been credited to the accounts of farmers. In this regard, the role of Gram Panchayats, as the third tier of governance and the tier closest to the people, becomes significant for assisting the people. Further, empowering the Gram Panchayats, the Constitution Article 243G mandates the Panchayats to be endowed with such powers and authority to enable them for the preparation of plans for economic development and social justice within their respective areas.

Therefore, it's a natural corollary for the Panchayats to be capacitated to take over the larger canvas of local economic development in all spheres amongst their constituent villages, much like the spatial developmental planning undertaken by the Urban Local Bodies in the country. This potential for rapid economic development is particularly high in those Panchayats which are located on the National or State Highways. Up till now, the rural communities have not been able to fully exploit the vantage position offered to these villages in terms of a high volume of traffic flow (cars, trucks etc.) along these arterial highways and potential for commercial development of land along with the National Highways (NHs) and State Highways (SHs). Frequently, entrepreneurs from nearby urban areas have instead exploited the potential through the mushrooming growth of motels, hotels, restaurants and entertainment spots.

Hence, the Ministry of Panchayati Raj has proposed to prepare a Gram Panchayat Spatial Development Plan (GPSDP) for the 32 villages for the pilot implementation. The agenda of preparing the spatial plan is to focus on economic development and social justice within their respective areas. However, in their present set up the panchayat neither have the means nor the capacity to undertake such an effort. Therefore, the ministry has identified 16 institutions to extend their support for the preparation of the Spatial Development Plan for Gram Panchayat for future development.

GPSDP is an integrated plan that will incorporate the spatially layers corresponding to attributes like physical features, landholding, land ownership, land use in Abadi area, physical and social infrastructure, etc.; built environment parameters like housing typology, building height, building age, etc.; economic

parameters like land-holding wise cropping pattern, etc. The plan will also incorporate non-spatial attributes like socio-economic condition, skill level, and governance dimensions. The outcome will be in the form of a broad zoning system, a road and infrastructure plan and brief development guideline for rural settlements. Primary surveys for physical verification and assessment of socio-economic condition will be part of the study, along with focus group discussions with stakeholders and key informant surveys. Later the Panchayat members through Panchayat meetings will verify the spatial proposals formulated by the institutional team. This would make the GPSDP a participatory plan.

1.2. Need for the Gram Panchayat Spatial Development Plan

Unplanned development, whether in rural areas, or in peri-urban areas, or the vicinity of the national and state highways, is normally being inefficient in the use of resources; especially the land. Land being the limited resource has pressure from social, economic and environmental needs, including urbanization, industrialization, mining, transportation, rural development, protection of environmentally sensitive zones and resource areas etc. To prevent the unwarranted conversion of rich agricultural land to urban uses, it becomes essential to prescribe land use norms and activities permissible for the rural areas. Proper planning of land and its resources allows for rational and sustainable use of land catering to various needs, including social, economic, developmental and environmental needs. Proper land use planning based on sound scientific, and technical procedures, and land utilization strategies, supported by participatory approaches empower people to make decisions on how to appropriately allocate and utilize land and its resources comprehensively and consistently catering to the present and future demands. There is a need for the scientific, aesthetic and orderly disposition of land resources, facilities and services to secure the physical, economic and social efficiency, health and well-being of communities.

To prevent unplanned development in the urban areas, spatial plans are prepared for cities and towns popularly known as Master Plans and Development Plans and notified under the respective State Town and Country Planning Acts. However, a similar initiative is not being taken so far for development in villages and their surrounding areas. There has been no serious attempt to prepare spatial plans for rural areas and considering the vast rural population of the country who have been deprived of the access to basic facilities. Similar planning initiative is crucial for rural areas as well; especially, now when during the COVID-19 pandemic, the lockdown and the resultant ‘reverse migration’ of lakhs of daily wage labourers, employed mainly in the informal sector. Similar to the urban areas, rural areas too should have a spatially integrated plan such as GPSDP that identifies land and infrastructure usage requirements for the villages, such as land allocation & usage, provisioning of infrastructure services, creating economically productive, for efficient, equitable, harmonious and sustainable growth of the villages.

GPSDP would be an overarching planning document and spatial layout which can be used for structuring land use and development within the jurisdiction of the Gram Panchayat (GP). It will outline a vision to

guide the growth and development of a rural area over the next 20-30 years. The Geographical Information System (GIS) technology would be an internal component of the GPSDP.

1.2.1 Objective

The objective of the study majorly focuses on planning for development in the rural areas which needs to be an envisioning process requiring a sound professional assessment of the ground situation and provide options for sustainable development within the bounds of demographic, physical, socio-economic, and jurisdiction aspects. The specific objective of the plan is to:

- Outline a vision to guide the growth and development of a rural area over the next 20-30 years
- Preparation of a GPSDP ensuring the following
 - Managing growth and change
 - Providing for orderly and predictable development
 - Protecting environmental resources
 - Setting priorities for developing and maintaining infrastructure and public facilities
 - Strengthening local identity
 - Creating a framework for future policy decisions
 - Promoting open, democratic planning
 - Guiding landowners, developers and government authorities

1.2.2 Scope of Work

The overall scope of work would include:

- Formulation of land use and land cover norms and standards specific to the rural areas
- Integrated development strategies with the nearest urban areas and plans including common development goals and a framework for their achievements
- Zoning and territorialisation
- Stronger cooperation between different levels of government administrations and agencies
- Unified efforts with industry and investors

CHAPTER 2: METHODOLOGY AND APPROACH

Preparation GPSDP is intended for the systematic development of the gram panchayats. Moreover, the plan is a tool to provide quality of life to the villagers through planned growth, provision of infrastructure and to spur overall economic growth of the area. This section outlines the overall approach and the adopted methodology for achieving the objectives of the project.

2.1. Approach

The overall approach for the preparation of GPSDP as explained below, this is followed by the adopted methodology along with the sequence of activities proposed to be taken up for achieving the objectives of the project.

Approach for the Preparation of GPSDP

1. Kick of Meeting
2. Reconnaissance Survey and Review of Existing Policies
3. Infrastructure Gap Identification
4. Future Growth Estimation
5. Consultation with Officials and Key Stakeholders
6. Project Phasing- Implementation strategy

2.2. Methodology

2.2.1 Project Initiation

2.2.1.1 Village Selection Criteria

This task involves the identification of the Gram Panchayats for which the GPSDP will be undertaken. For the State of Gujarat, two GPs-namely Tarapur in Anand District and Nandasan in the Mehsana District, have been identified for the preparation of the Spatial Development Plan. The selection of GPs has been done in consultation with the Panchayat, Rural Housing & Rural Development Department of Gujarat, based on the following parameters:

1. As per the Census 2011, GP population should be more than 10,000
2. GP should be located adjoining to a National highway or State Highway
3. GP should not be part of any Urban Development Authority, Area Development Authority, and any other special development authority like SIR, SEZ etc.

4. GP should not be in the influential area (periphery of 2-3 villages) of any major Urban Development Authority (UDA) and Area Development Authority (ADA) or Special development authority
5. GP should be an important center in the region

This task included a critical review of the study area and its surrounding region. Once the village selection is done, the region will be reviewed considering the major roads, major natural features, current economic activities and administrative units. While identifying the study area, the following shall also be dealt with:

- A general overview of the study area
- Understanding important landmarks, features and recent development trends
- Study of previous/other planning initiatives for the study area
- Study of relevant policies, laws and legislative framework
- Documentation of relevant maps: administrative, transportation etc.

2.2.1.2 Understanding and Conceptualization of the Study Area

This stage is a very initial phase which involves the understanding and conceptualization of the project area (Nandasan GP) in consultation with the panchayat. The objective of this stage was to initiate the project by finalizing the work plan, methodology and the familiarization of the project with the project area.

This stage also included the reconnaissance survey of the project area by the study team. The object of this survey was to understand the spatial geography, important landmark development, prominent physical features and other features of the project area and surroundings. This also helped in identifying the various spatial growth trends, economic drivers, potential economy generating locations for the selected villages.

2.2.2 Data Collection and Analysis

2.2.2.1 Primary Data Collection

Task 1: Field Visit (NANDASAN GP)

The field visits to the Gram Panchayat of Nandasan was undertaken for an overall background study through personal experiences. The objective of the visit was to interact with the officials and understand their vision for their GP in terms of socio-economic development for their village. The team had direct interaction with the GP's Taluka Development Officer (TDO), Sarpanch, Deputy Sarpanch, and Talati to get familiar with the basic profile of the Gram Panchayats, along with the distribution of the primary and

secondary economic activities. The scope of potential development in the GPs and challenges faced by the villagers were also be discussed during the field visits.

Task 2: Household Survey

The purpose of the survey is to understand the characteristic of the gram panchayat, level of availability of the social and physical infrastructure to the villagers, and the present status of the supporting infrastructure for employment.

Roughly five per cent of the households are considered as a sample size for the survey; therefore, the sample size for the survey in the Nandasan GP will 200. The household survey was undertaken with the help of Sarpanch and Talati.

Task 3: Stakeholder Consultation

To identify the critical issues of the study area, consultations with stakeholder are very crucial for gathering relevant information as well as for understanding the issues faced by the villagers. Therefore, the project team has carried out focus group discussions in the project area. These discussions were conducted with residents, and with the key stakeholders like DDO, TDO, Sarpanch, and Talati to take stock of the status and availability of services in the area. Apart from this, a series of informal interviews were also conducted with the residents to access the existing infrastructure conditions and analyze gaps in basic amenity provisions. The discussed with the key stakeholders like TDO, Sarpanch, and Talati were conducted during the field visits of both the GPs.

2.2.2.2 Secondary Data Collection

Data from various online sources and authorities are collected to undertake the following tasks:

Task 1: Preparation of the Base Map

Predominantly a Base Map provides all the administrative and revenue boundaries with major linkages in terms of roads and rail lines. It refers to the accurate spatial database within a data system that depicts the fundamental map elements such as; topography, political divisions, cadastral divisions, roads, water bodies etc. It acts as a reference map for integrating other spatial information with a higher level of accuracy.

The map is prepared using the GIS platform. The Base Map demarcates the spatial spread of built-up land, settlements, vacant land, scrubland, vegetation cover, land under agriculture use, roads, rail line, forests, rivers and other water bodies based on aerial/ satellite imagery and relevant secondary data.

For the preparation of the Base Map for Nandasan GP, the satellite image is procured from NRSC, and village revenue maps are procured from the DISL.

Task 2: Preparation of Existing Land Use Map

This task involves the assessment of the existing situation of the study area in terms of the current distribution of land under each uses and identify the land cover classified as agriculture land, water bodies, wasteland, forest land, vacant areas, and built-up area. Preparation of existing land use was prepared by undertaking a combination of scientific and digital analysis of satellite images, primary field survey and data from relevant sources.

Existing land use map is very crucial to understand the spatial pattern of land uses, the amount of development of various uses and intensity of development. Also, various relevant observations and analysis can be mapped based on the land use map.

There are major four features identified and adopted in the land use preparation of the study area. These are- physical features, natural features, and cover and land use. These features are further subdivided into the number of layers and categories.

Existing Land Use map for Nandasan GP is prepared and compiled by overlaying information from the following source:

- Satellite image and its interpretation
- Existing land use plans as available with various authorities
- Google earth image for the spread of the urban built form

Task 3: Existing Situation Analysis

Understanding the region holistically is very important to identify the thrust influencing the growth and existing situation of the study area. Hence a study of the features and significance of the area through a various lens becomes essential to develop the proposals for the future timeframe. Apart from these, the geographical profile is also studied at this stage through various secondary and primary data.

To understand the potentials and issues of the area, it is necessary to record and map the existing condition of the project area and then use them for the formulation of the proposals. Besides, various thematic maps are prepared for analysis of the existing situation and gap analysis for the various infrastructure is done at this stage for the preparation of the GPSDP.

- This task has included the collection of all the secondary information from various departments and agencies for the project area. The information collected is covering aspects related to

demographics, socio-economic, land use, infrastructure, industrial and economic activities, environmental and natural built heritage. The assessment of past planning initiatives, policies, schemes etc. in force, details of reserved sites are also collected. This stage has included the following analysis and assessments:

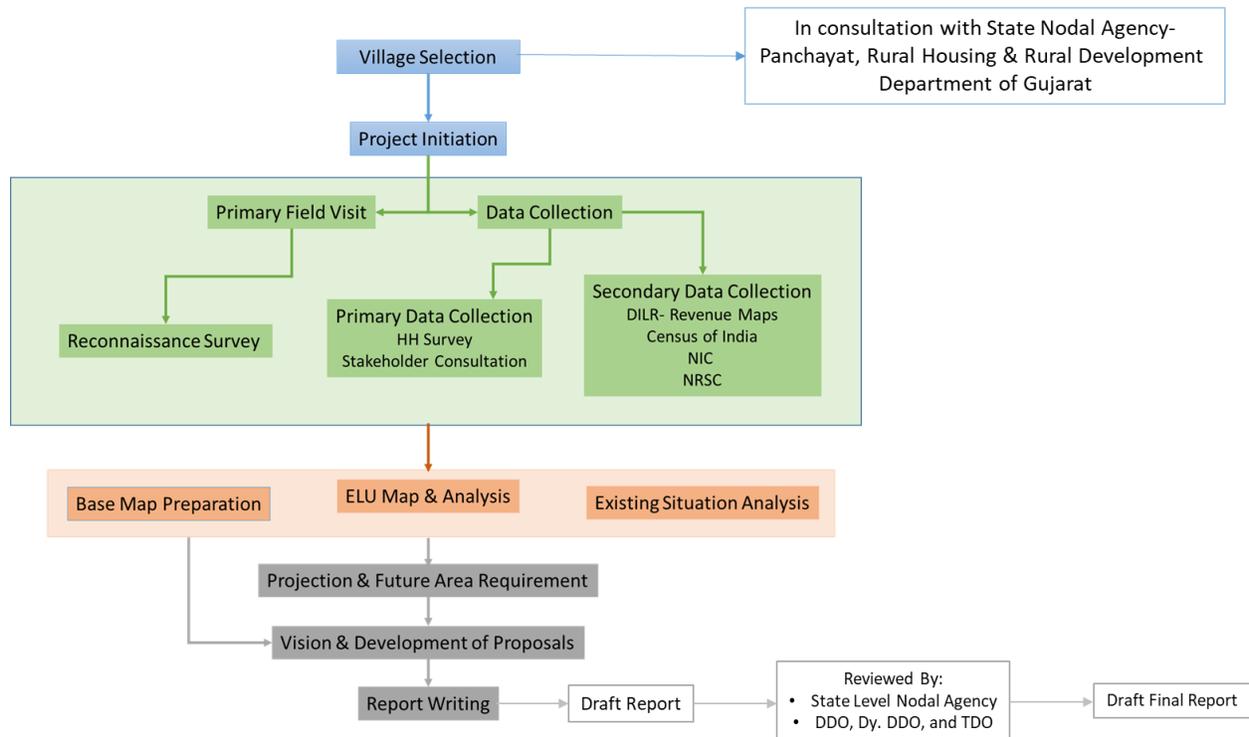
- **Demographic and Socio-Economic Analysis:** This includes the population growth trends, dependency ratio, workforce participation, occupational structure and expenditure & consumption pattern. Existing census information and village profiles are used to carry out the analysis. This section analyzes the demographic and socio-economic profiles at the levels of district, block and villages in order.
- **Identification of Existing Economic Drivers:** This section includes a detailed study of the key economic activities taking place in the project area. This would help in understanding the key economic generators and potential drivers for their future development in the region. It has also helped in identifying the agricultural area having high crop productivity, identify the significance of the manufacturing sector in terms of providing employment. This study was undertaken using the data collected from the panchayat office and Census of India.
- **Existing Infrastructure Assessment:** This includes a detailed assessment and mapping of the existing infrastructure situation in both the Gram Panchayat like- water supply network and coverage, water storage areas, sewage network and treatment system, educational and health care facilities, banks etc. the assessment was undertaken based on the data collected from the panchayat office and Census of India.
- **Open and Green Spaces and Natural Features:** This stage prepares the list of open and green spaces and natural resources in and near the GPs. This list is prepared based on the study of the satellite images, topographic maps and existing land use map. Slope profile and natural drainage pattern are studied to identify the issues like flood-prone areas and waterlogging spots in the region (if any).
- **Analysis of Housing Stocks:** Detail assessment of the distribution of the households w.r.t the income in the Gram Panchayats were undertaken for the preparation of GPSDP for Nandasan GP. This includes the study the number of households with the type of ownership, the character of the housing building in terms of kaccha and pucca houses, and level of availability of the physical infrastructure at the households' level. The study was done using the Census data, household surveys and panchayat data.
- **Analysis of Public Transportation:** The study includes an assessment of the existing transportation system available for the villagers to commute to their employment centers, along with the assessment of the inter-state travel infrastructure. Condition of the inter-village road was done, along the study related to the availability of bus stops, provision of local bus services, local transport services within the panchayat region etc. will also be conducted.

- **Strengths and Weakness Analysis:** Based on all the study and assessment done for different components, the strengths and weaknesses of the study area were outlined before develop planning proposals.

2.2.3 Visioning and Development of Proposals

This task includes the vision and development objectives for the study area based on the existing situation analysis carried out in the last task. Also, future population, infrastructure demands and area requirements for various activities and the provision of the infrastructure is calculated for the preparation of spatial development plan for Gram Panchayat. Development proposals for the Gram Panchayat are formulated based on the existing situation analysis, stakeholder consultations and future demand estimation.

Figure 1: Adopted Methodology Chart



CHAPTER 3: BASE MAP PREPARATION

Preparing the base map for Nandasan GP started with procuring the cadastral map of the village from the Mehsana District Inspector Land Record (DILR), Government of Gujarat. Besides, images such as topography sheets, satellite images and such other relevant maps had been used to extract information about the basic features of the land. The purpose of preparing the base map is to delineate the existing administrative boundary and demarcate the natural and physical features of the GP. The Base Map demarcated the administrative boundary, and parcels based on the revenue maps and water bodies (based on the data received from NRSC). Canals and other water bodies are verified with the satellite imagery and relevant secondary data. Required satellite images were received from NRSC.

3.1. Data Source

Base Map of Nandasan GP was prepared using the data mentioned in the table below. The table also presents the features extracted and their uses in the Base Map preparation process.

Table 1: Data Source for Base Map Preparation

Spatial Data	Source	Features
Cadastral Maps/ Revenue maps	DILR- Mehsana, Govt. of Gujarat	Village/survey boundaries, panchayat boundary, plot boundary along with survey numbers, water bodies. Spatial coordinates, major roads & railway line
Satellite Images	NRSC	For verification
Roads and water bodies	NRSC	Water bodies, canals, road network, railway line

3.2. Methodology

This section presents the methodology followed to prepare the Base Map for Nandasan GP

- Procurement of Revenue Maps or Cadastral Maps: The team had received scanned images of revenue maps, in two parts; later both the images were joined for georeferencing.
- Georeferencing of Revenue Maps: All images were converted to Tiff for geo-referencing and GCPs were identified on Satellite image and revenue maps. These images were registered using these GCPs. As the received DILR maps are hand draft maps, while geo referencing minor error in alignment were identified.
- Digitization of Revenue Plots and Survey Nos.: All lines of plots, roads and rivers, canals and other water bodies were digitized after that and a unique no. was assigned to each polygon.

- Edge Matching: The GIS team cleaned up all edges of villages after matching to make the single boundary between adjacent villages and plots.
- Quality Check and Cleaning & Editing of Maps: All maps were thoroughly checked for the digitization of all features and appropriate no. of the plot. The team cleaned and edited all maps at the end to finalize.

Figure 2: Digital Nandasan Revenue Maps Images in Two Parts



Source: DILR Mehsana, Gujarat

3.3. Final Base Map of Nandasan GP

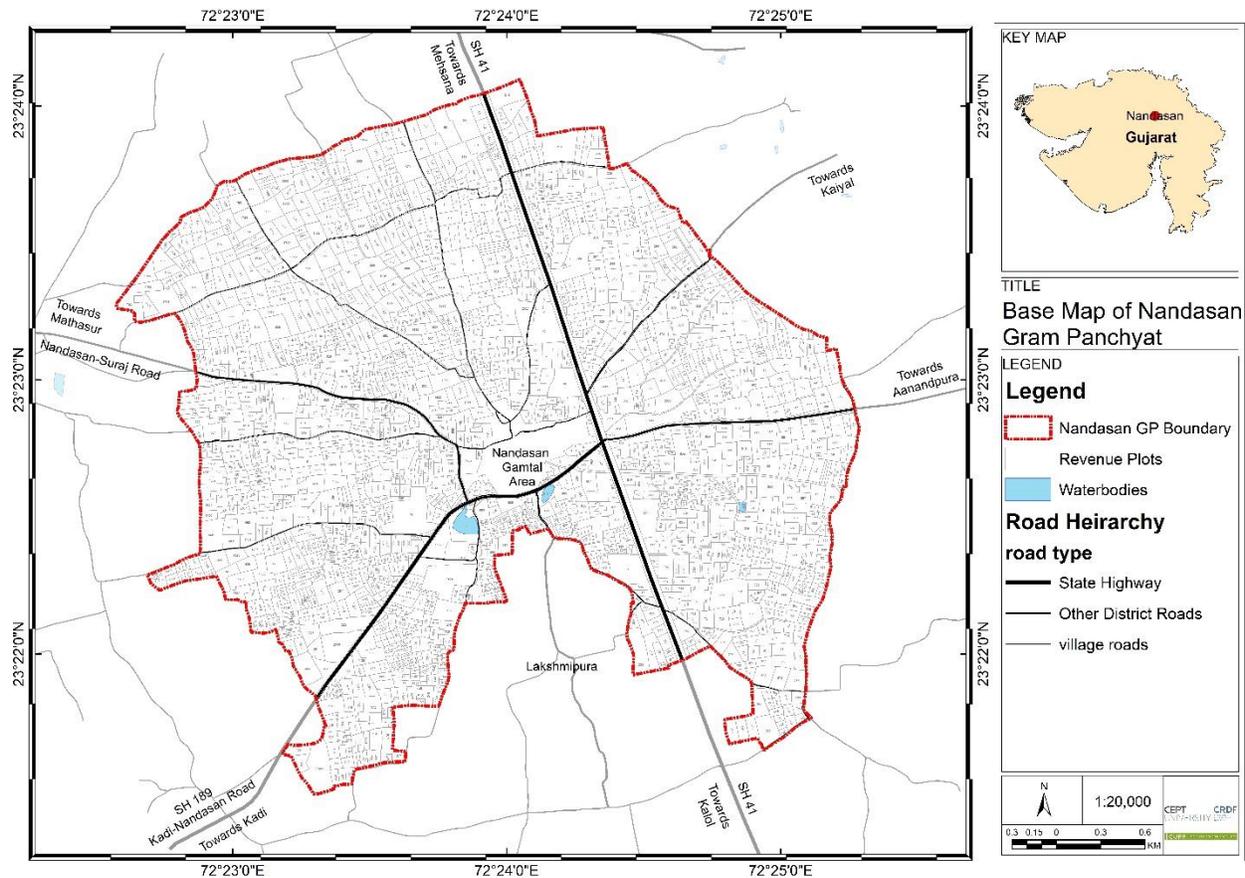
As per the Base Map, the final Planning Area is 13.05 sq.km, including 0.07 sq.km of water bodies, which 0.52% of the total GP area.

Table 2: Total Nandasan GP Area- As per the Base Map

Area as per Base Map (Area in sq.km)		
	Area(sq.km)	Area in Percentage
Total Water Bodies	0.07	0.52%
Lakes	0.07	---
Total Land Area	12.99	99.48%
Total Nandasan GP Area	13.05	---

Source: As per Procured Revenue Maps from Mehsana DILR Office

Map 1: Nandasan Base Map



Source: As per Procured Revenue Maps from Mehsana DILR Office

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EXISTING SITUATION ANALYSIS

is surrounded by Kalol Taluka in the South, Mehsana Taluka in the North, Detroj Rampura Taluka in the west, and Mansa Taluka towards the East. Kadi (12 km), Kalol (19 km), Mehsana (26 km), and Mansa (34 km) are the nearby towns to the GP. It is surrounded by Lakshmipura (A- 1 km), Lakshmipura (Nandasan- 1 km), Chandarda (3 km), Kherpur (3 km), Anandpura (4 km) are the villages.

4.1.1 Mehsana District at Glance

Mehsana district is situated in the north part of the Gujarat State. The district is in North Gujarat Agro-Climate Zone of Gujarat. The district lies between 23.5° to 24.10° N latitude and 72° 0' to 73° 0' E longitude situated. It is surrounded by the Banas Kantha district on the north, Sabarkantha district on the east, by Gandhinagar district on the south-east, Patan district on the west, and by Ahmadabad district on the south and south-west.

Mehsana district is part of t Gujarat state since the foundation of the state in 1960. In the year 1964, 25 villages of Kalol taluka were transferred to the Gandhinagar district. Further, in a997, the Patan District constructed from the five talukas of Mehasana - Patan, Siddhpur, Sami, Chanasma and Harij. Also, in 2001, the Mansa taluka of Gandhinagar district is separated from Vijapur taluka of Mehsana district.

Presently, the district comprises a total of 9 talukas, 10 towns and 597 villages. It covers total 4,401 sq.km of the area, which is 2.24% of the total geographical area of the state. The density of this district is 462 of population per sq. km against the density of Gujarat is 308 and ranks 16th in comparison to other districts of the state.

4.1.2 Influence of the Regional Development Growth

Mehsana district has witnessed substantial industrial development over the past few years, mainly due to its strategic location. Engineering industries and Food & Agro Processing are the major industries attracting investments in the district. It also has the presence of Chemical Industry named Nirma Ltd., Oil and Natural Gas Corporation Limited (ONGC) and Essar Group are some of the petroleum companies located in the district. Asia's second-largest dairy "Dudhsagar milk co-operative dairy" is located in sub-district Unjha of Mehsana district. McCain Foods also has set up a potato processing unit in the Mehsana district.

As per Industries Commissionerate of GOG, at present, there are more than 70 medium and large scale industries in the district, primarily operating in engineering, chemical, pharmaceuticals, and dairy product, oil and textile sectors. Majority of these industries are established in Kadi, Mehsana, Visnagar, Vijapur and Becharaji talukas. Apart from these, there are around 7,183 small scale industries operating in the district- mainly in chemicals, textile, rubber and plastic articles, metals, repairing services, food and agro-

processing and engineering sectors. Most of them are concentrated in Mehsana, Kadi, Vijapur and Visnagar talukas.

Figure 3: Establishment of Medium and Large Scale Industries in Mehsana District

Name of Company	Taluka	Production	Name of Company	Taluka	Production
Hitachi Appliances Ltd.	Kadi	Air-conditioners	Apco Industries	Kadi	Dyes
Amol Dicalite Ltd.	Kadi	Synthetic Fabrics	Hynoup Food and Oil Industries Ltd.	Kadi	Oil
Torrent Pharmaceuticals Ltd.	Kadi	Pharmaceuticals	M/s S.P.L Ltd. (Somany tiles)	Kadi	Tiles
Hester Pharma Ltd.	Kadi	Pharmaceuticals	Cadila Hospital Products Ltd.	Kadi	Hospital Equipments
Claris Lifesciences Ltd.	Kadi	Hydroxyethyl Starch	Mehsana District Cooperatives Milk Producers Union	Mehsana	Dairy product
Gujarat Ambuja Exports Ltd.	Kadi	Oil	Apollo Engineering	Mehsana	Road construction and Maintenance Equipments
Tirupati Agro Oils Ltd.	Kadi	Refined Edible Oil	Vimal Oil & Food Ltd.	Mehsana	Food products and Oil
Chokshi Tube Company Ltd.	Kadi	Seamless carbon and Alloy Steel Pipe	Nirma Ltd.	Mehsana	Soaps & Detergents
Madhusudan Ceramics	Kadi	Tiles	McCain Foods	Mehsana	Potato chips
Ashima Fabrics	Kadi	Cotton cloth			

Source: Mehsana District Profile Booklet 2006-07

*Indicative list

Source: Industrial Commissionerate, Government of Gujarat

Agriculture is the mainstay of the economy of the district; the economy of the district is dependent on agriculture as 53.29% of workers are engaged in agricultural activities. It is the main source of livelihood for the rural people of the district. Bajri, jowar, cotton and wheat are the principal crops grown in the district, whereas the medicinal shrubs, chilies, potatoes and off-season vegetables are the main cash crops. It is famous for the production of isabgul, cumin (jeera), ajwine and fennel seed (variyaali). As per the Census Handbook of Mehsana district, horticultural crops production and area which used for that production are continuously increasing in the last 4 years. Average production of vegetable crops is 252,028 M.T which is highest in all horticultural crops. The district is the largest producer of lemon in the state (24% of the total state production) and third-largest producer of Tomatoes in the state (9% share in the total vegetable production in the state)¹.

4.1.3 Regional Connectivity

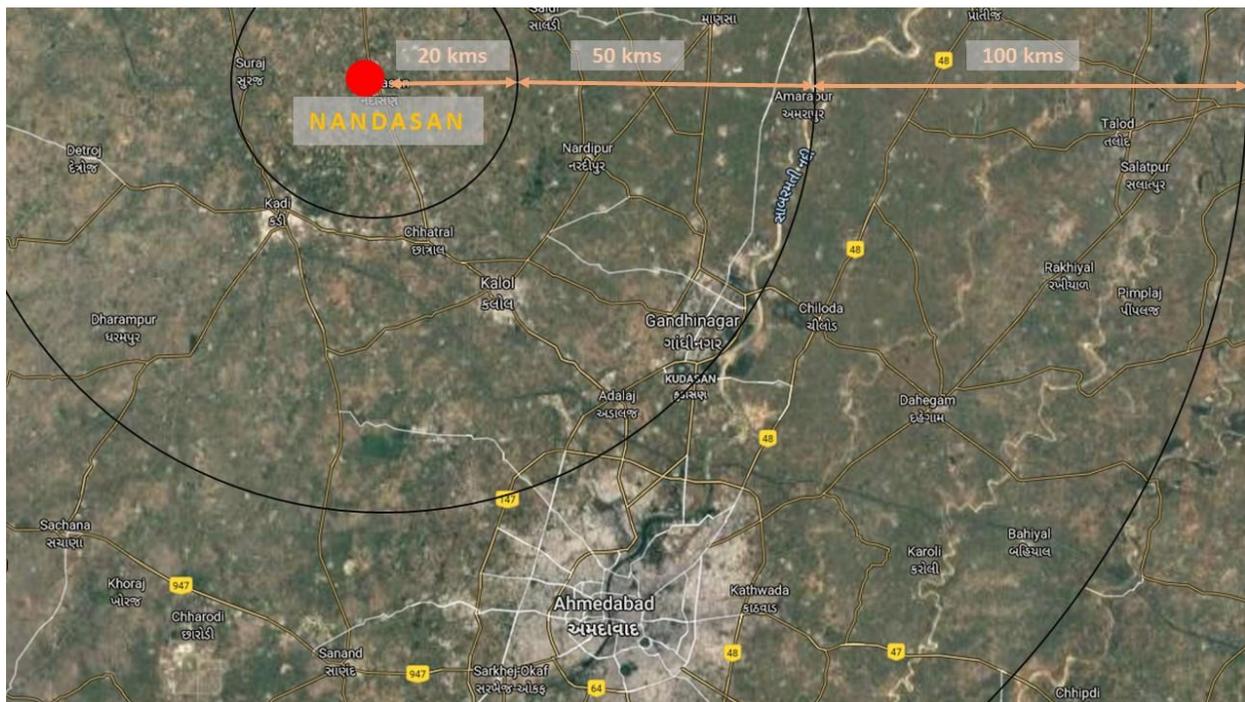
Transport and Communication facilities are considered as an administrative necessity as well as a public convenience. Moreover; a well-knit transportation system is pre-requisite for the social and economic development of any district. As regards the means of transportation, the district is well developed with national and state highways along with railway lines pass through the district.

¹ Industrial Commissionerate, GOG

The linking of one place with others by road is very essential to provide good transport system. There exists a 51 km four-lane toll road with two service lanes on either side on Ahmedabad–Mehsana route. The district is connected with Ahmedabad (74 km), Gandhinagar (68 km), Vapi (458 km), Palanpur (72 km), Rajkot (299 km) and Surendranagar (143 km).

The district is well connected with other districts of the State like Patan, Porbandar and Ahmedabad by rail. It is further connected to Kandla port via a rail network through Ahmedabad and Gandhidham. A broad gauge rail line of 52 km is present in the district and existing length of meter gauge rail line is 105 km in the district. Total 57 villages are having railway facilities in Mehsana district. There are 17 stations on broad gauge line and 40 stations on meter gauge line. Ahmedabad-Delhi broad gauge line passes through the district.

Map 3: Regional Connectivity Map



Source: Google Satellite Image

CHAPTER 5: PROFILE OF THE NANDASAN GRAM PANCHAYAT

5.1. Introduction

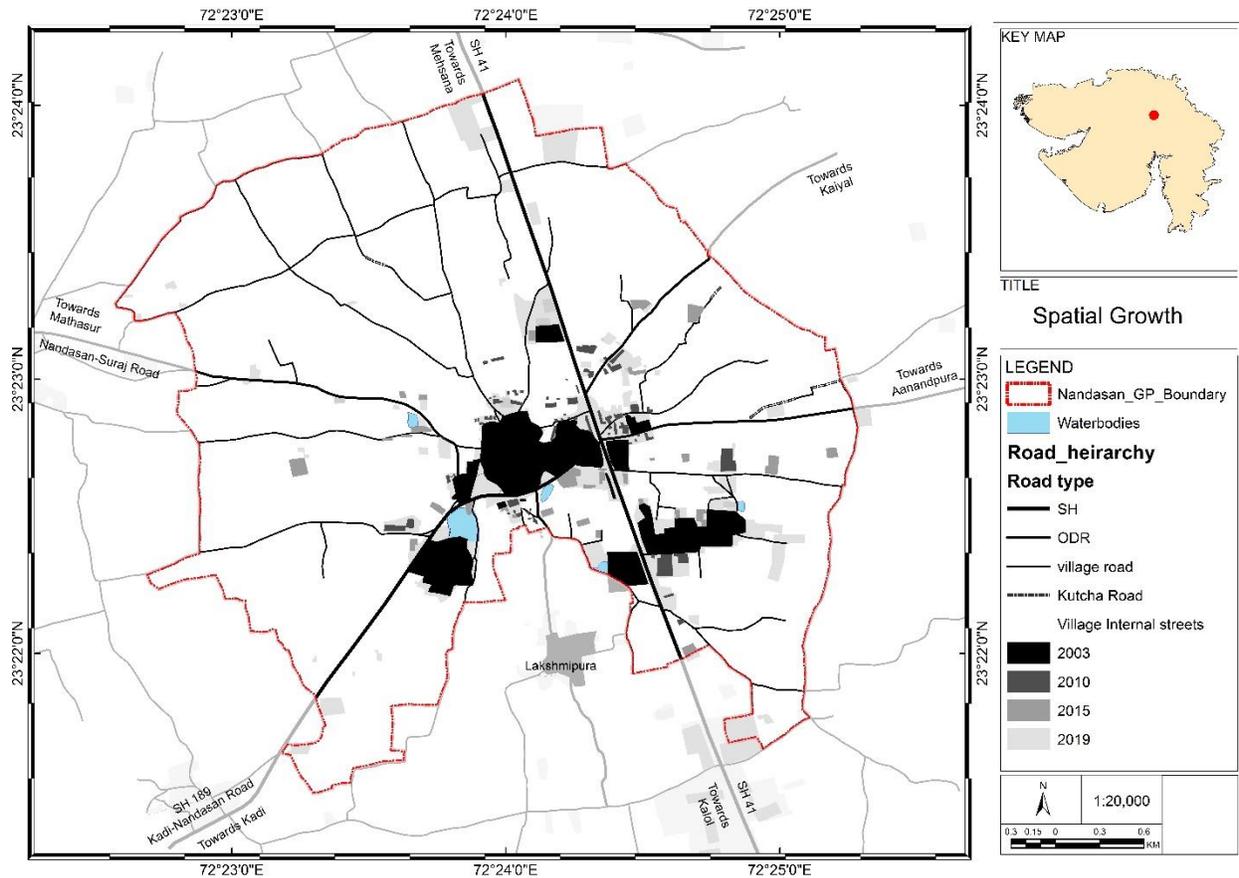
Nandasan is a gram panchayat in the Sub-District Kadi of the Mehsana District in the State of Gujarat. It is located around 26km south of the district capital of Mehsana, and 50 km from Gandhinagar which is the administrative capital of Gujarat. It is 12 km away from the sub-district headquarters Kadi. The geographical area of the GP is 1303 ha (13.03 sq.km). Kadi is the nearest town, located around 12 km south-west from Nandasan. Kalol, Mehsana, and Mansa are other nearby cities/towns. The village is accessible from the highway; in fact, the highway is dividing the village into two parts.

The gram panchayat is located along with State Highway 41 (SH 41). SH 41 is also known as Palanpur-Ahmedabad Highway, strategically located along the Dedicated Freight Corridor (DFC) alignment which is a crucial link between the city of Ahmedabad and Mehsana. The area offers connectivity to Kandla, Mundra and Pipavav Ports. The gram panchayat's strategic positioning along this linkage has enabled an increase in opportunities in the last decade and continues providing great potential in the future. Despite being close to the district, and the cities like Ahmedabad and Gandhinagar, the gram panchayat is not part of any of the UDA and ADA or any other special development authorities. In addition, the region has advantages of rich agriculture base and availability of large chunks of land.

5.1.1 Spatial Growth of Village

Over the period, Nandasan village grew along the SH 189, significant spatial growth in the village can be seen in at the junction of SH 189, SH 41 and Nandasan-Suraj Road; especially, especially on the north of the SH 189 and on the west of the SH 41. However, in the recent decades, the village is spatially expanded along the SH 41, towards its boundaries.

Map 4: Spatial Growth of Nandasan GP



Source: Google Satellite Time Series Data

5.1.2 Administrative Framework

The elected members and state government-appointed bureaucrats do rural administration. In Gujarat, rural development is managed according to the Panchayati Raj System. In the Panchayati Raj System, the administration is done in three tiers; Gram Panchayat (Village Panchayat), Taluka Panchayat, and Jilla Parishad (District Panchayat). At all the three levels, elected members and bureaucrats are working with clear roles, responsibilities and power. Nandasan village has its village panchayat.

In the year 1993 Government of India enacted a 73rd Constitutional Amendment regarding provisions of Panchayati Raj and in light of that constitutional amendment Government of Gujarat enacted amended Panchayati Raj Act from 15th April 1994. By this constitutional amendment, Panchayats are given constitutional status. Regular and timely election, the participation of women and backward classes, the formation of separate State Election Commission and rotation system in electing the heads of the various

committees are other significant amendments in the act. The decentralized planning process and active participation of people is the soul of the Panchayati Raj Act. The powers for decentralized planning, implementation and development are delegated to the Panchayats.

The primary functions of the District/Taluka Panchayats are providing facilities for primary education, health, drinking water, electricity, constructions and maintenance of roads, bridges etc., maintenance of gauchars, organizing relief work at the time of scarcity and drought situation, sanitation and social welfare. Arrangements for housing facilities for below poverty line people and rural development schemes are implemented by panchayats.

State Level Setup

At the state level, there is the Panchayat, Rural Housing & Rural Development Department chaired by Minister and Additional Chief Secretary. District Development Officers (DDOs) of District Panchayats are monitored by a state-level entity called Office of Development Commissioner, headed by the Development Commissioner. The Commissioner is an immediate boss of all the DDOs of the District Panchayats.

District Panchayat

The district Panchayat is the apex of the three-tier structure of the Panchayati Raj system. The district Panchayat consists of representatives of the Panchayat Samiti; all the members of the state legislature and the parliament representing a part or whole of the district; all district level officers of the medical, public health, public works, engineering, agriculture, veterinary, education and other development departments. A district panchayat constitutes the following committees

- Executive Committee for performing functions pertaining to finances, home guards and village defense and such other functions and duties of the panchayat as are not assigned to any other committee. The sub-committee formed from amongst its members from Executive Committee is not the competent authority to take any final decision on any matter.
- A Social Justice Committee for performing functions considered essential for securing social justice to the weaker section of the society including persons belonging to the Scheduled Castes and Schedule Tribe as may be prescribed.
- An education committee for performing the functions and duties pertaining to education and such other literary and cultural activities as the panchayat ay assign to it
- A public health committee for performing functions pertaining to public health, hospitals, health centers, sanitation, water supply, vaccination and family planning.
- A public works committee for performing functions pertaining to public works, communications, buildings, rural housing and relief against natural calamities.
- An appeal committee

- A committee for production, co-operation and irrigations
- A committee for woman and child development and youth activities.

The chairman of the District Panchayat is elected from amongst its members. The district development officer deputed by the state government becomes the development officer of the District Panchayat. The district Panchayat performs coordinating and supervisory functions. The district Panchayat also renders necessary advice to the state government with regards to the implementation of the various development schemes. It is also responsible for the maintenance of primary and secondary schools, hospitals, dispensaries, minor irrigation works etc. it also promotes local industries and art.

The administrative power of district panchayat comprises the duty of each district panchayat to make in the area within its jurisdiction and so far as the fund at its disposal will allow reasonable provisions. A district panchayat may with the sanction of the State Government incur expenditure on education or medical relief outside its jurisdiction if its finances permit.

A district panchayat may also make provision for carving out in the area within the limits of its jurisdiction, any other work or measure which likely to promote

- The health, safety, comfort or convenience
- Social, economic or cultural well-being of the inhabitants of the area.

A district panchayat may, subject to rules, grant loan out of its fund to a panchayat subordinate for the purpose of this act. Considering the power of District panchayat, it is lawful to undertake work upon terms and condition for construction, maintenance or repair of any work or the management of any institution on behalf of the Government.

Taluka Panchayat

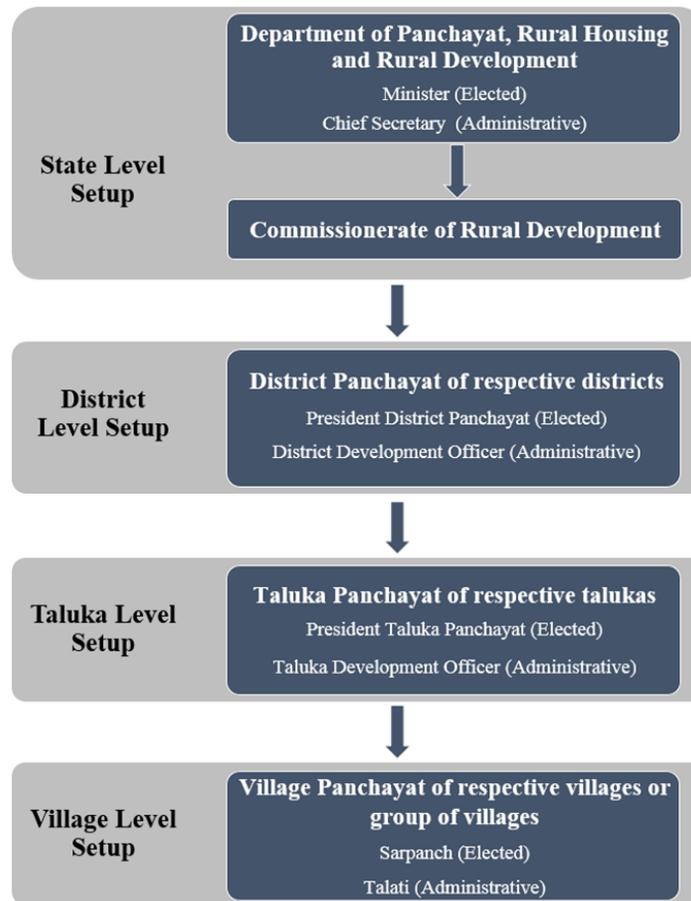
The Taluka Panchayat is the second tier of the Panchayati Raj. The Taluka Panchayat was envisaged as a single representative and vigorous democratic institution to take charge of all aspects of development in rural areas. A taluka panchayat constitutes an Executive Committee, for exercising powers and performing functions and duties of the taluka panchayat as the taluka panchayat may assign to it. The sub-committee formed from amongst its members from Executive Committee is not the competent authority to take any final decision on any matter.

The administrative power of taluka panchayat comprises the duty of each taluka panchayat to make in the area within its jurisdiction and so far as the fund at its disposal will allow reasonable provisions. A taluka panchayat may with the sanction of the district panchayat incur expenditure on education or medical relief outside its jurisdiction if its finances permit.

A taluka panchayat may also make provision for carrying out in the taluka any other work measure, scheme or project which is likely to promote;

- The health, safety, comfort or convenience
- Social, economic or cultural well-being, and
- Education including secondary education of the inhabitants of the taluka or part thereof.

Figure 4: Administrative Set-Up



Source: The Gujarat Panchayats Act, 1993

Village Panchayat

Village Panchayat is the lowest unit in the Panchayati Raj institution. Generally, for every village, there is a Gram Panchayat except some that have low population. For such villages, there is group Gram Panchayat between two or more villages. The Panchayat consists of representatives elected by the villagers.

A village panchayat may constitute an Executive Committee for performing of its function and duties as the panchayat may assign to it. A village panchayat constitute a committee called the social justice committee for performing function as are essential for securing social justice to the weaker sections of the society including persons belonging to the schedule castes and the scheduled tribes. The administrative power of panchayat comprises the duty of each panchayat to make in the area within its jurisdiction and so far as the fund at its disposal will allow reasonable provisions.

A panchayat also makes provisions for carrying out in the areas within the limits of its jurisdiction and any other work or measure which is likely to promote;

- The health. Safety, comfort or convenience
- Social, economic or cultural wellbeing, and
- Education including secondary education of the inhabitants of the areas.

The powers of panchayat to manage the institutions to execute work transferred to it by taluka district panchayat carried out by the necessary funds for such management or execution are placed at the disposal by the taluka panchayat or district panchayat. The president of elected representatives is known as Sarpanch. He/ she is responsible for the supervision and coordination of activities of the panchayat. He is the one who plays a major role in decision making and allows various departments to the appropriate elected members. Talati is the government-appointed employee to assist the Sarpanch in administration. He also keeps the Panchayat informed of various development programs and reports.

5.2. Connectivity and Accessibility

Road connectivity is one of the important components as it connects to major destinations. This section highlights the situation of road connectivity in the villages. The GP is located on the SH 41, actually at the junction of SH 41 and Kadi- Nandasan Road (SH 189). SH 41 is also known as Palanpur- Ahmedabad Highway, strategically located along the Dedicated Freight Corridor (DFC) alignment, which is a crucial link between the city of Ahmedabad and Mehsana. The area offers connectivity to Kandla, Mundra and Pipavav Ports.

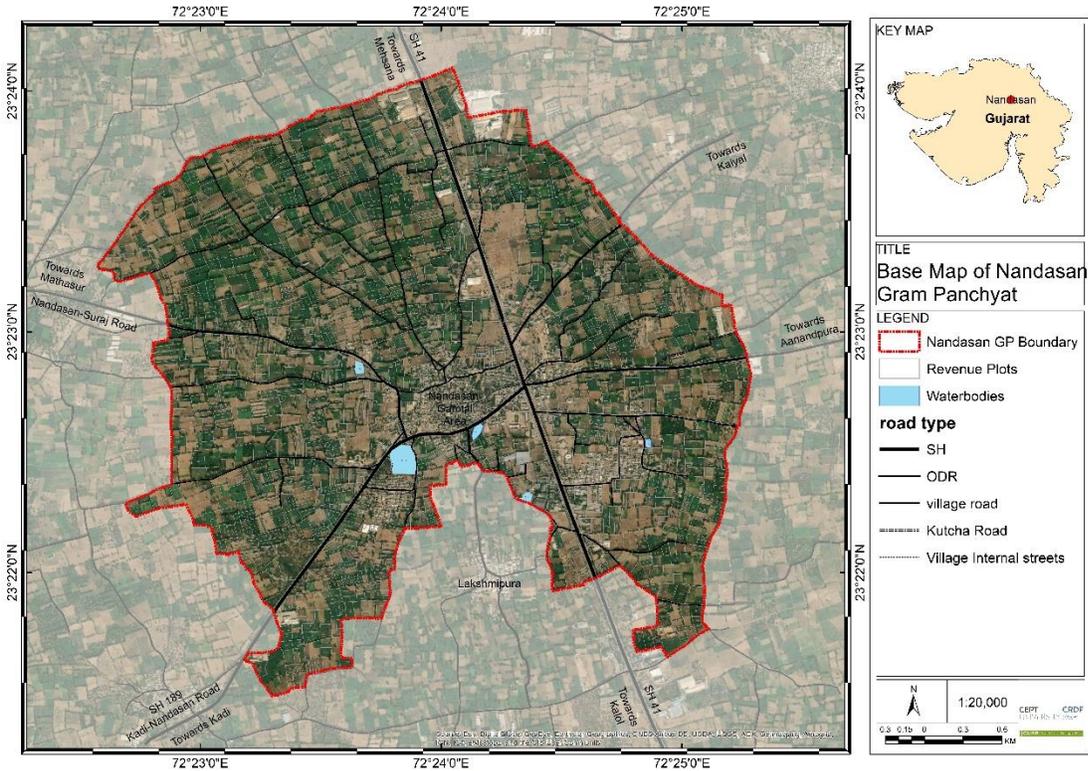
The village is easily accessible from the SH 41; in fact, the village is divided into two parts by the highway. Located on the highway and having access to the public and private transportation, the village is well connected with the rest of the district and the state. Villagers of Nandasan GP has access to the public and private bus service. The state public transport network connects the village with the district, with the surrounding towns and villages, and nearest railway station. However, there is no designated bus stop along with the SH 41. Navapura bus stop on the Kadi- Nandasan road (SH 189) is the nearest bus stop, approximately at the 1.9 km of distance. Other than, Irana bus stop (8.9 km), Mundarada bus stop (11.6 km), and Karannagar bus stop 11.7 km- Kadi GIDC) are three other bus stops easily accessible from the

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village via private transport facilities, such as shared auto, van, etc. Dangarwa railway station is the nearest railway stations to Nandasan, approximately 8 to10 away from the village.

As Nandasan located conveniently along the SH 41, and due to its good connectivity with the rest of the district and state via public and private transport services villagers from the surrounding 10-15 villages come to Nandasan for the transport services as well.

Map 5: Nandasan GP-Connectivity Map



Source: As per Data Received from NRSC

CHAPTER 6: EXISTING LAND USE ANALYSIS

A reasonably accurate and updated existing land use map is an essential prerequisite for preparing a development plan for any area. Understanding and analysis of existing land use pattern are necessary for establishing development policies for future uses of lands. Appreciation of the existing land use pattern is necessary for the preparation of a development plan. In conventional practice is to depend on the available village cadastral maps and on the land use maps that are available from the responsible authorities. These maps are with the latest development but in hard copy. Also, there are chances to foreseen resolution errors. Because of this, it became necessary to obtain satellite images and correlate with other data sources.

6.1. Adopted Methodology

Existing land use map for Nandasan GP is prepared based on the land use data collected from the Revenue Department. 7/12 forms² details for each parcel were collected from the department website. Once the detail on each was completed, the base map was taken as a reference, and the procured details from the 7/12 documents were transferred into digital format (Note here that the existing land use survey is been done plot-wise). Land use map was updated and the details were verified with the satellite images and with the existing land use map for the planning area, which was received from NRSC. Any contradictions and variation found from the satellite images and the map from the authority were reconfirmed and accurately recorded.

Data Source for ELU

- Satellite Images as received from NRSC
- Canals and other water bodies – Base Map (refer chapter- chapter 3)
- Existing land use information from 7/12 documents – Revenue Department

For the ELU map, the planning area was divided into twelve main land use categories. Following table explains the features incorporated under each land use category. Existing land use map presents the existing land uses at the parcel/ plot level.

² The 7/12 document/ form is an extract from the Land Register of any district in Gujarat, which gives complete information about a particular piece of land. It contains important details such as the survey number, area, date from which the current owner's name was registered, current land use etc.

Table 3: Land Use Categories for Existing Land Use Map

Sr no.	Existing Land Use Categories	
1	Abadi Area/Gamtal	Original gamtal/ village area
2	Existing settlement	Expansion of the original village area- General residential, mixed-use, etc.
3	Industrial	Industrial- Household industries and APMC
4	Agriculture	Agriculture-related activities
5	Lake	---
6	Fallow land	---
7	Pasture Land	---
8	Waste Land	---
9	Roads/ Transportation	---
10	Cattle sheds	---
11	Crematorium	---
12	Private wells	---

6.2. Existing Land Use Map and Area Statement

As per the Base Map, the planning area is spread over an area of 13.05 sq.km. The existing land uses in the planning area can be classified into thirteen categories presented in the following table.

Table 4: Existing Land Use Area Statement

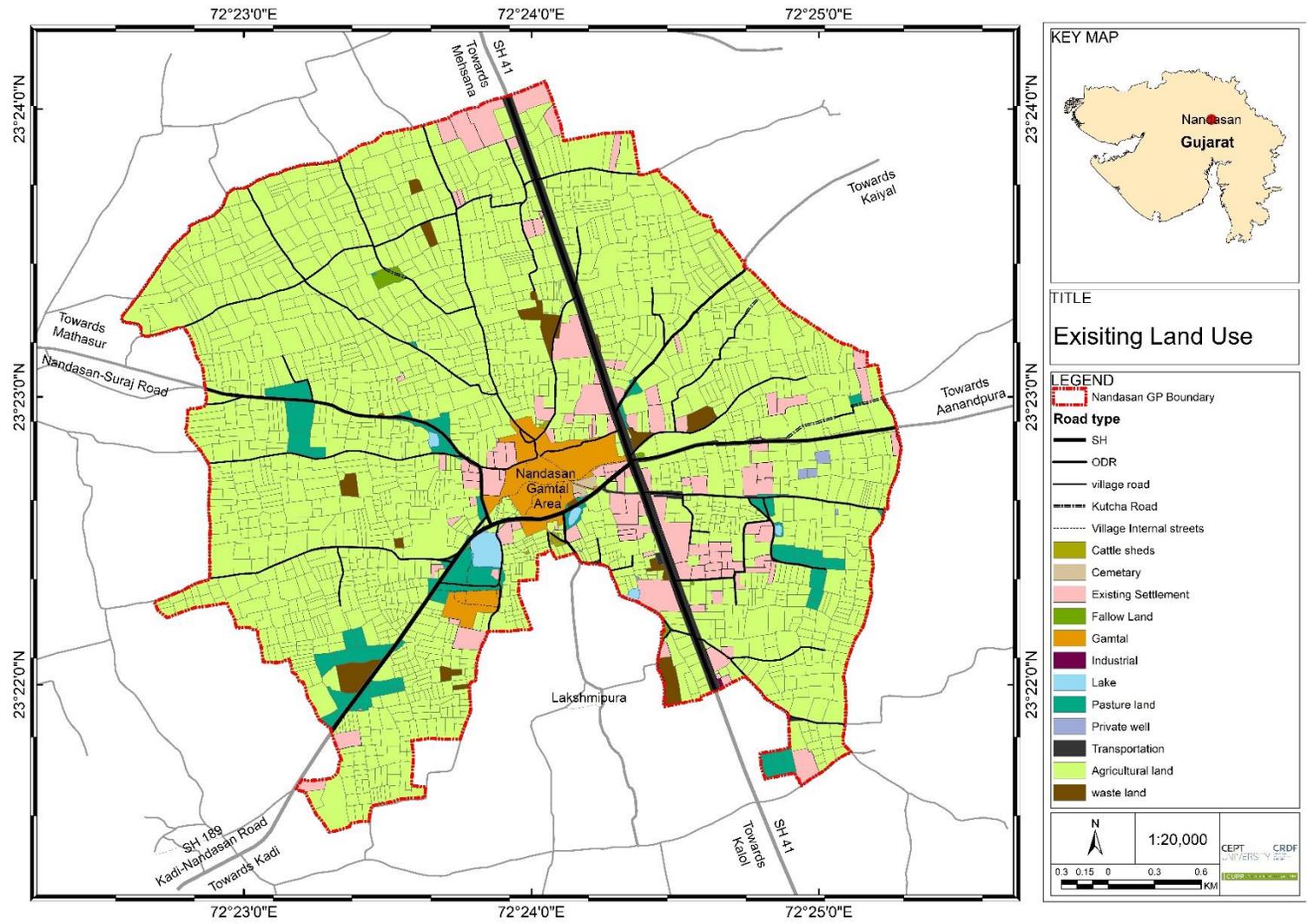
Sr. No	Land Use Categories	Area (in sq.km)	Area in %
1	Abadi Area/Gamtal	0.34	2.60%
2	Existing settlement	0.91	6.98%
3	Industrial	0.00	0.01%
4	Agriculture	10.43	79.88%
5	Lake (water bodies)	0.07	0.52%
6	Fallow land	0.03	0.21%
7	Pasture land	0.43	3.31%
8	Waste Land	0.18	1.41%
9	Roads/ Transportation	0.63	4.82%
10	Cattle sheds	0.01	0.05%
11	Crematorium	0.01	0.08%
12	Private wells	0.01	0.11%
Total		13.05	100.00%

Source: Revenue Records- 7/12 Documents, and Satellite Images by NRSC

As per the existing land use map, the majority (79.88%) of the planning area is falling under the agricultural land use category. The second-largest category is also related to the residential area, which is the existing settlement area (excluding gamtal or Abadi area), which covers around 6.98% of the total area of the GP. Abadi Area (Gamtal) area occupies around 2.60% of the total planning area. Around 0.52% of the GP is occupied with the water bodies, and only 0.01 % area is covered under industrial land use categories. Around 4.82 % are of the total GP area is under roads (ROW) and 3.31% of the total area is pasture land.

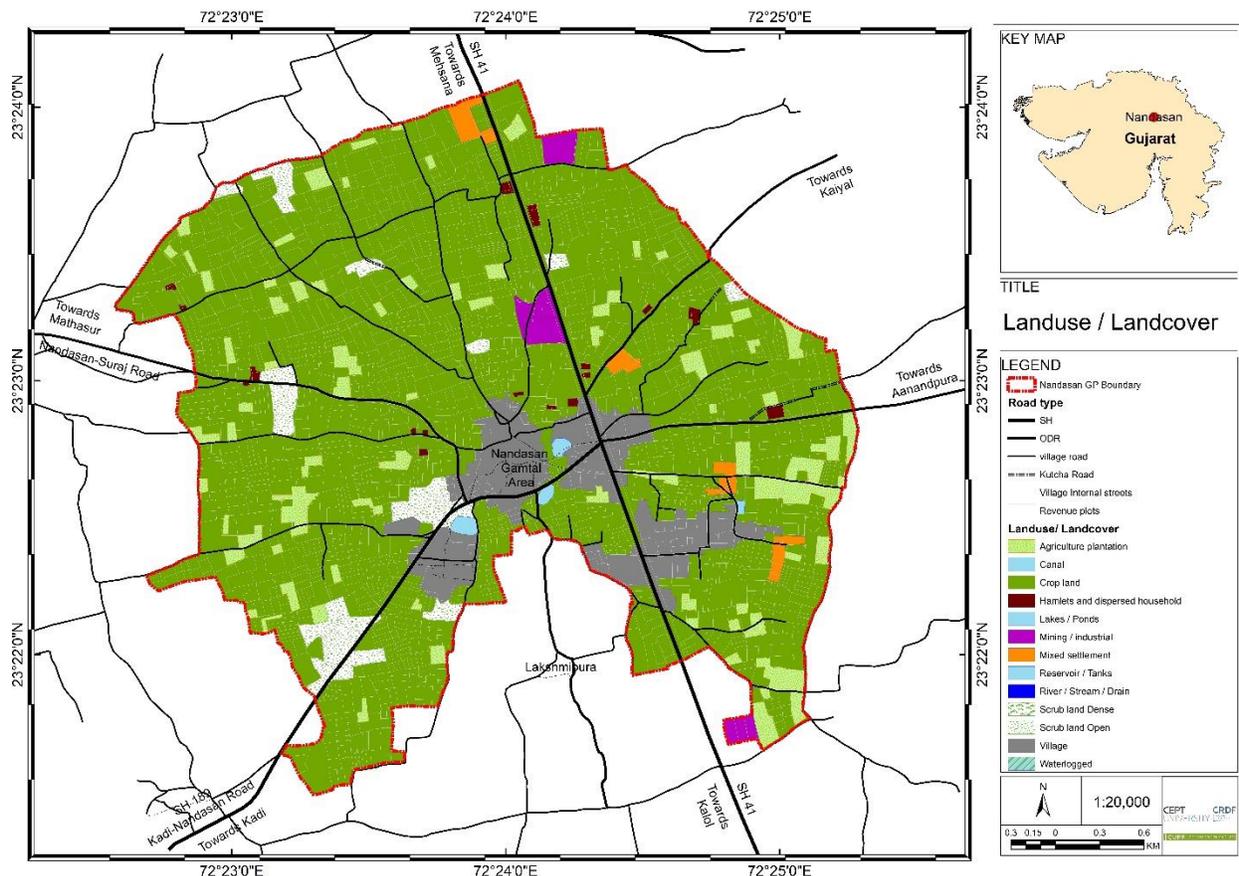
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Map 6: Existing land Use Map



6.2.1 Existing Land use Land Cover

This map is prepared based on the data received from NRSC of land use and land cover. As per this map, majority of the area is falling under crop land and the settlement area can be observed across all the major state highways especially along towards Kalol and Kadi-Nandasani road (SH 189).

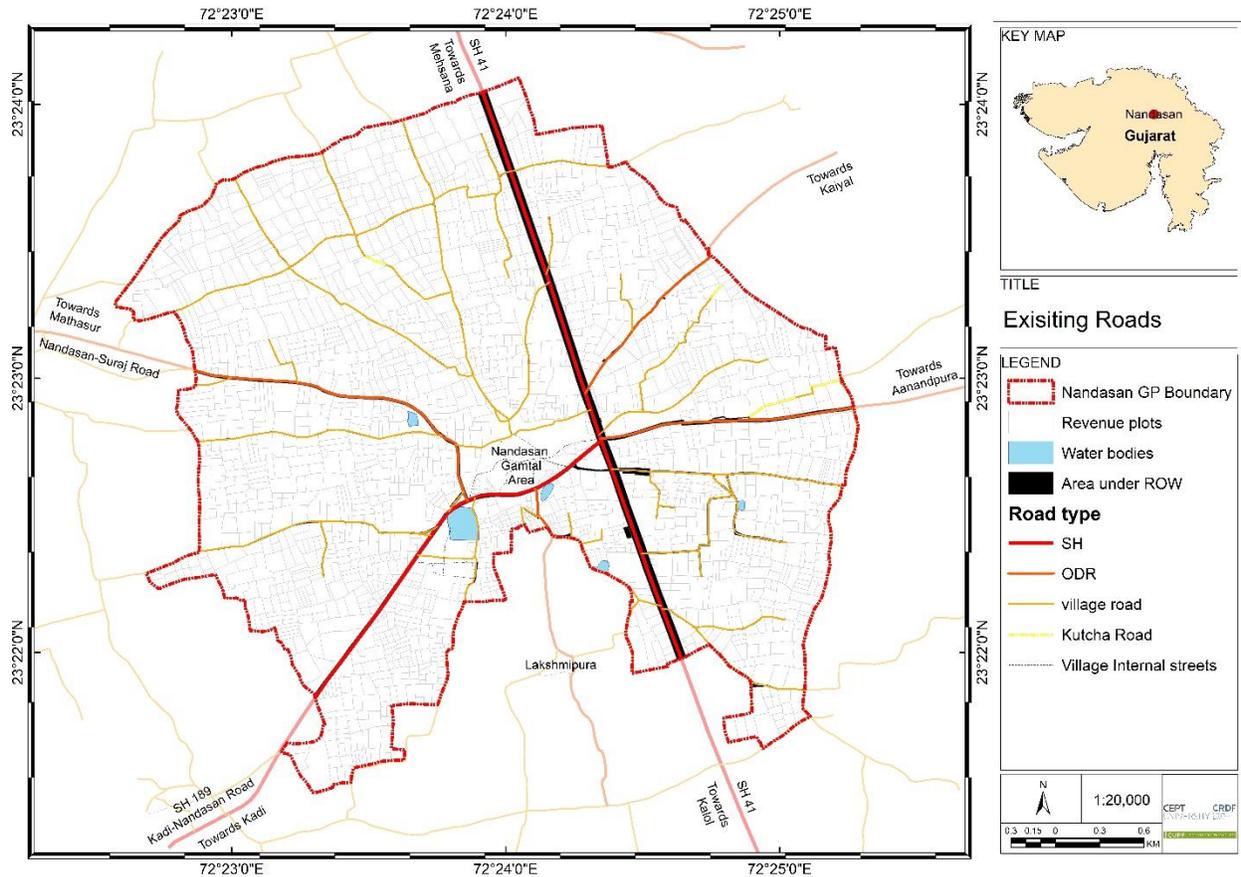


Source: As per Data Received from NRSC

6.3. Existing Road Network

Nandasani is a gram panchayat in the Sub-District Kadi of the Mehsana District in the State of Gujarat. It is located around 26km south of the district capital of Mehsana, and 50 km from Gandhinagar which is the administrative capital of Gujarat. It is 12 km away from the sub-district headquarters Kadi, which is the nearest town, located around 12 km south-west from Nandasani. Kalol, Mahesana, and Mansa are other nearby cities/towns.

Map 7: Existing Road Network

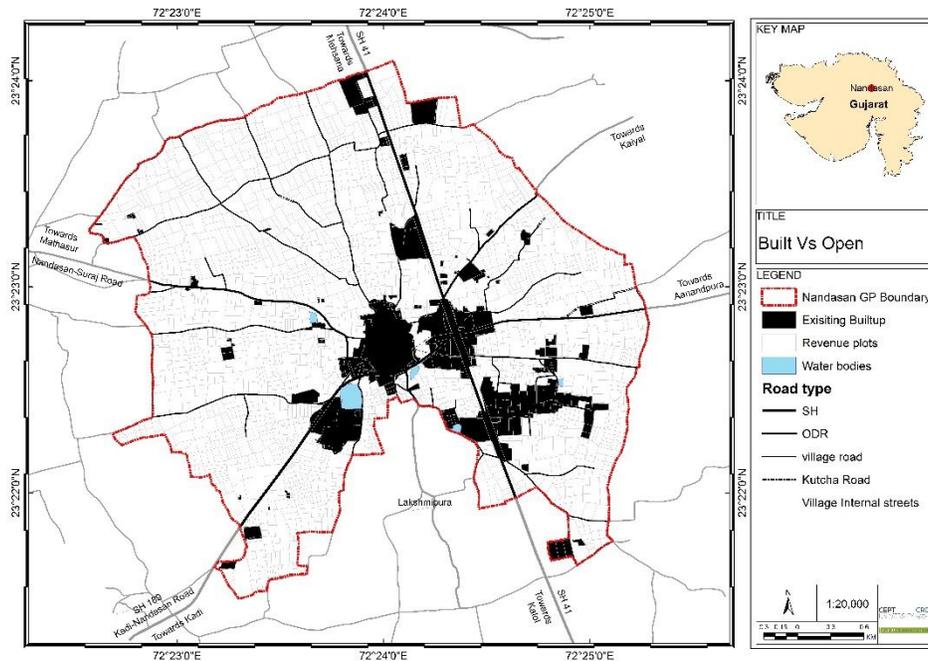


Source: As per Data Received from NRSC

The gram panchayat is located along with State Highway 41 (SH 41). The village is accessible from the highway; in fact, the highway is dividing the village into two parts. Apart from the highway network, the GP also has the advantage of the road network made of the district and other village roads, via which the GP is very well connected with surrounding villages and towns. The overall road network in Nandasani is developed in star and block pattern, where the roads are travelling from the village center to outwards connecting the village with the surrounding region. However, a ring road connecting all the road that are travelling from the village center towards the village boundary is missing. Though the majority of existing roads are paved roads (pacca); around 1.06 km (1064.90 mt) length of the road is kuchha (unpaved) which is needed be upgraded.

6.4. Settlement Pattern

Map 8: Built vs Open



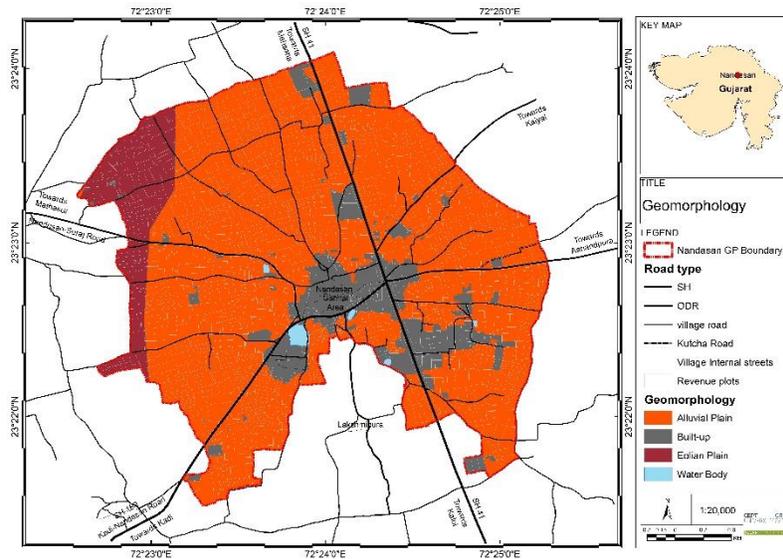
Source: As per Data Received from NRSC

It is clear from the above map, that the settlement (built development) is concentrated in the area that is situated at the junction of the SH41, SH 189 and Nandasani-Suraj Road. Also, concentrated developed along the highways and Nandasani-Suraj Road can be seen. Other than these, few can be seen.

6.5. Geomorphology

Map of geomorphology is prepared based on the received details from NRSC. It is very clear from the map that the village soil is fertile and good for agricultural activities. Majority village area soil falls under Alluvial Soil categories which consist of various proportions of sand, silt and clay. Such soil as a whole is very fertile. Also, the area towards the west and west-north boundary fall under Aeolian plains. In fact, in some part of the village fall under the deep alluvial plain category of soil.

Map 9: Geomorphology Map of Nandasan GP

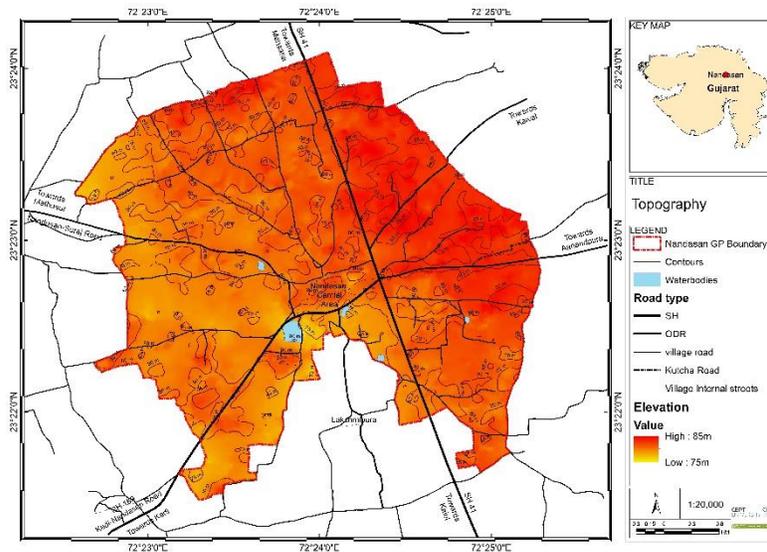


Source: As per Data Received from NRSC

6.6. Topography

Map of topography is prepared based on the received details from NRSC. It is very clear from the map that it is flat terrain in the GP, without much variation in the topology, with mostly 5 to 10-meter variation. Though it is flat terrain, contours slope from north-east to east-south towards north-west to west-south direction.

Map 10: Topography Map

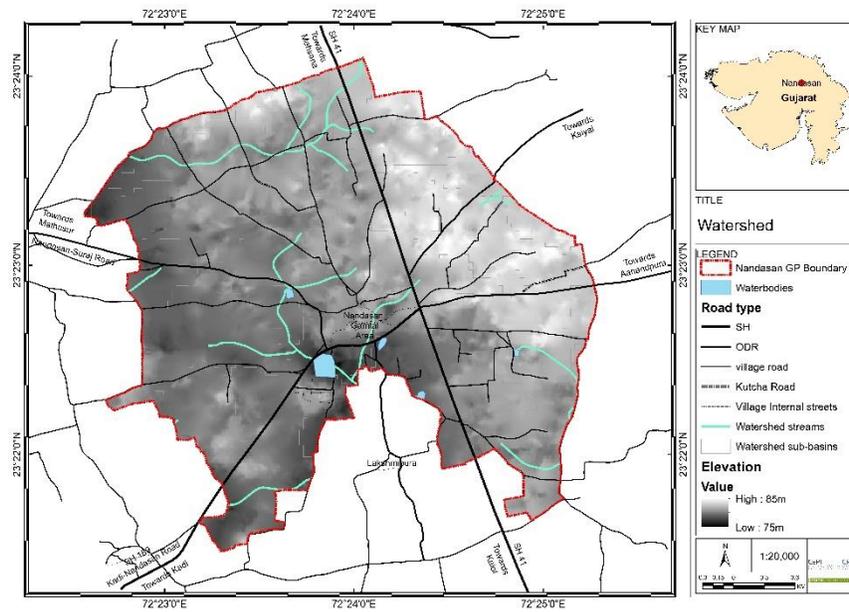


Source: As per Data Received from NRSC

6.7. Watershed

As suggested in the topography map, overall terrain is flat, the same can also be seen the watershed map. However, the area situated around the lake (in the south) is prominently falling under low lying area and there is a change of waterlogging in this area during monsoons.

Map 11: Watershed Map of Nandasan GP

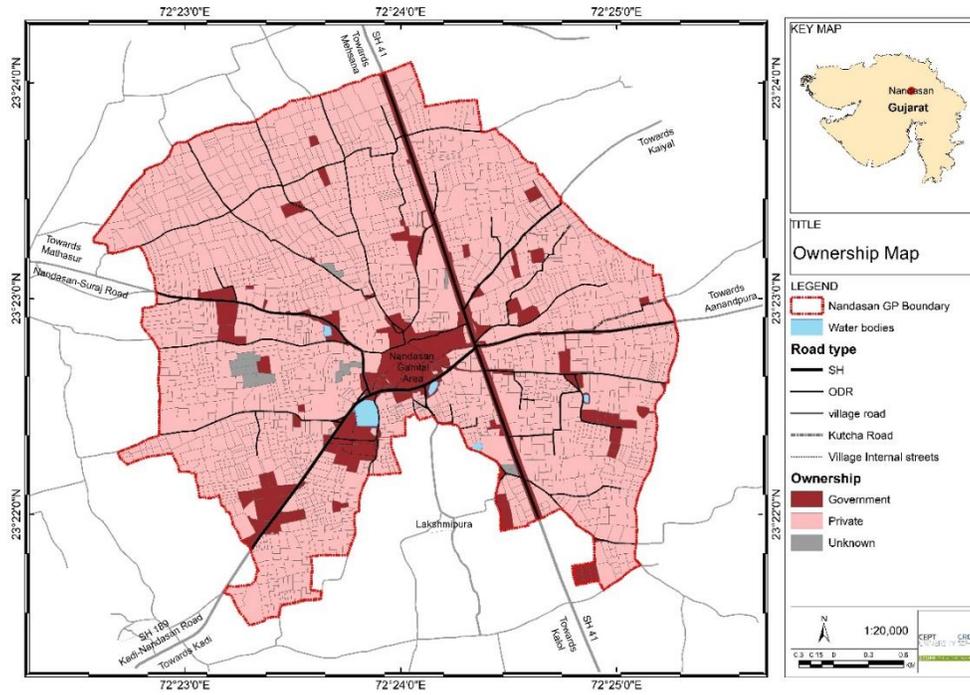


Source: As per Data Received from NRSC

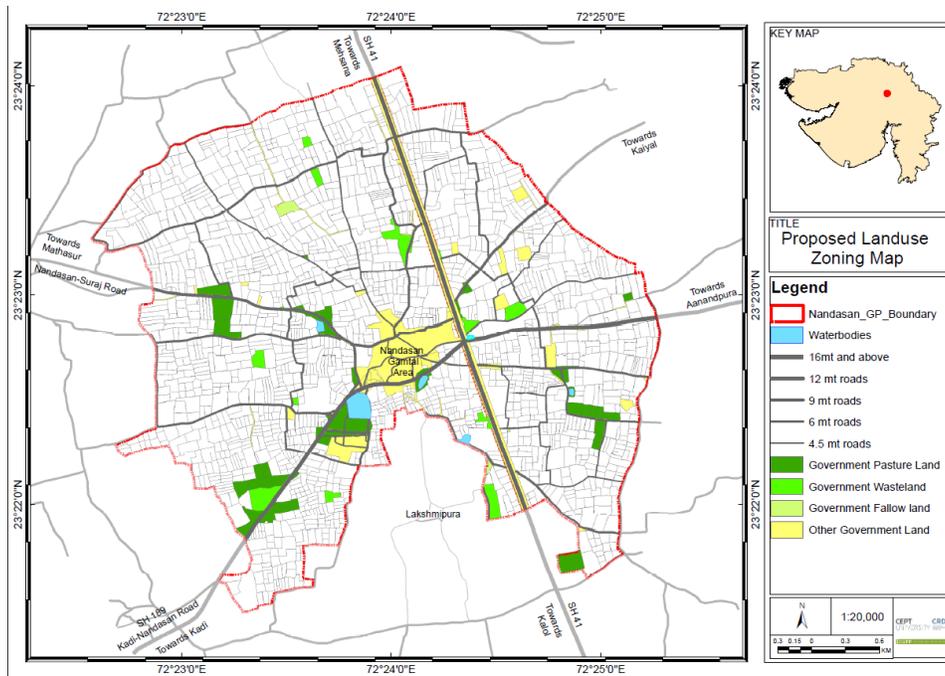
6.8. Land Ownership

Approximately 1.80 sq.km, which is 13.81% of the total land, is under government-owned land (including lakes, canals, and roads); out of which 0.39 sq.km land is government pasture land, .022 sq.km is government fallow land and 0.16 sq.km is government waste land. Ownership of 0.12 sq.km of land is unknown, and approximately 11.13 sq.km (85.29%) of the land is under private ownership. The land ownership pattern is shown in the map below.

Map 12: Land Ownership Map



Source: As per the Revenue Record
Map 13: Government Land Ownership Map



CHAPTER 7: ANALYSIS OF EXISTING SITUATION IN GRAM PANCHAYAT AREA

Census 2011 data, village profile 2020, HH survey and the primary survey data for Nandasan GP had been considered as the base for the analysis of the GP. In addition, Census 1991 and 2001 data were used to calculate the decadal growth rate for Nandasan. Parameters like demography, socio-economic, social amenities and utilities were analyzed for the GP.

7.1. Demographic Profile

Following parameters have been assessed under the demographic profile:

- Demography
 - Population Distribution (2011)
 - Decadal Growth Rate (1991-2001, and 2001-2011)
 - Scheduled Caste and Scheduled Tribe Population (2011)
 - Sex Ratio (2011)
 - Literacy Rate (2011)

7.1.1 Population Distribution

When it comes to the population, as per the Census 2011, Nandasan GP population is 13,440; while Nandasan Taluka rural population and the District rural population are 48.2 thousand and 3.16 lakhs, respectively. It means, that the GP hold 27.84% of the total rural population of Kadi Taluka. GP comprises total of 1305 ha (13.05 sq.km.) area and so the current population density in the GP is 10.29 pph (1,029 per sq.km).

Table 5: Population Distribution

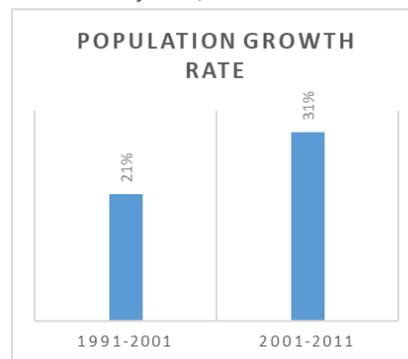
Population Distribution				
Year	Gujarat (Rural)	Mehsana (Rural)	Kadi (Taluka Rural)	Nandasan GP
2001	31,740,767	283,029	54,520	10,222
2011	34,694,609	316,536	48,278	13,440
Population Share				
Spatial Unit	Total Population (2001)	Population share to the Upper Spatial Unit	Total Population (2011)	Population share to the Upper Spatial Unit
Mehsana (Rural)	283,029	---	316,536	---
Kadi (Rural)	54,520	19.26%	48,278	15.25%
Nandasan GP	10,222	18.75%	13,440	27.84%

Source: Census of India

7.1.2 Population Growth Rate

Overall, the population in the Nandasani GP is growing with the increasing growth rate. Between the year 2001 and 2011, the total population in the GP grew by 31%, which is comparatively 10% higher growth rate than the growth rate during the 1991-2001 decade, which was 21%.

Figure 5: Population Growth Rate- As per the Census of India, 2011



7.1.3 Scheduled Caste and Scheduled Tribes Population

Out of the total population of the GP, only 8.65% (1,163) population is Schedule Caste. As per the Census 2011, the GP has a negligible percentage of Schedule Tribe population. Out of the total population, only 0.05% population belongs to the Scheduled Tribe.

Table 6: Share of Schedule Caste and Schedule Tribe Population-

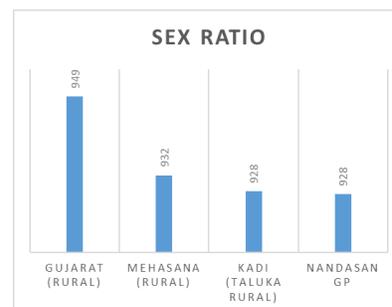
Spatial Unit	Total Pop	SC Pop	SC Pop (in %)	ST Pop	ST Pop (in %)
Mehsana (Rural)	316,536	118,710	37.50%	3,144	0.99%
Kadi (Rural)	48,278	24,638	51.03%	685	1.42%
Nandasani GP	13,440	1,163	8.65%	7	0.05%

Source: Census of India

7.1.4 Sex Ratio

Sex ratio describes the number of females per 1000 of males. At present, in the GP houses a number of 928 females to that of 1,000 males, which is similar to the sex ratio in the district and taluka but comparatively less than that of in the state.

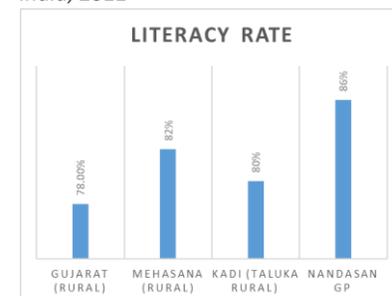
Figure 6: Sex Ratio- As per the Census of India, 2011



7.1.5 Literacy Rate

Development is a dynamic process and it requires an educated, skilled, and competent workforce. Literacy plays an important role in providing skilled workforce as well as literate consumer demands more for a better lifestyle. Literacy rate refers to the number of literate population to the total.

Figure 7: Literacy Rate- as per Census of India, 2011



As per the Census 2011, the literacy rate in the GP is 86%, which means out of the total population 13,440 people in Nandasani GP, 9,876 are literate. The literacy rate amongst, the state, district, taluka and at Nandasani GP levels, the GP has the highest number of literates.

7.1.6 Digital Literacy

As per the National Digital Literacy Mission, “Digital Literacy is the ability of individuals and communities to understand and use digital technologies for meaningful actions within life situations”. The basic definition of digital literacy is which focuses on the understanding and the use of digital technology; the person who fulfils these criteria is considered as an e-literate.

Average desired level for digital connectivity is one e-literate person per household. As per the HH survey, out of the total of 200 surveyed households, more than 50% of households have at least one e-literate person; this includes the use of phones and computers. This number is because of a recent shift in the pattern of usage of mobile phones especially smartphones with internet. Most of the smartphone users are using the technology to stay connected with the family and for work purposes as well. The data documented here have been acquired through primary survey and discussions with the panchayat authorities

7.2. Cultural Profile

Nandasan village is not a tribal village as per the census 2011, the village comprises a negligible number of tribal population. The majority population in the village follow Islam (85%), and remaining are following Hinduism, Jainism, and other religion. Majority of the population speaks Gujarati and Hindi languages. The village has religious place places like Masjids, Jain Derasar, and Meldi Maa Temple. There is no gathering space or public place anywhere in the village; people generally gather within the individual farmlands during functions and festivals.

Table 7: Cultural Profile

Details	Nandasan GP
Languages Spoken	Gujarati and Hindi
% of population following Religion	Majority (85%) are Muslim, remaining are Hindu, and negligible other
Type of Castes	SC, Raval, Muslim, and vaghri
Pilgrimage Centers	No.
Tourist Centers	No
Monument Places of Heritage	No
Source: Primary Survey, Household Survey and FGDs	

7.3. Socio-Economic Profile

7.3.1 Workforce Participation Rate

Workforce participation rate (WFPR) refers to the percentage of the total number of workers to the total population. Total workers’ population is the sum of the main workers and marginal workers. The WFPR for the district rural and taluka rural are around 43%. As per Census 2011, Nandasan GP has 4,092 of total workers, meaning almost 30.42% of the total population is the working population and around 70% of people are not active in any economic activities. The WFPR of the GP has decreased from 35.62% in 1991 to 32.45% by the 2011 census year. The decreasing trend in the participation rate indicates that the many working populations migrate outside the village for better livelihood opportunities.

Figure 8: Workforce Participation Rate- Census of India, 2011

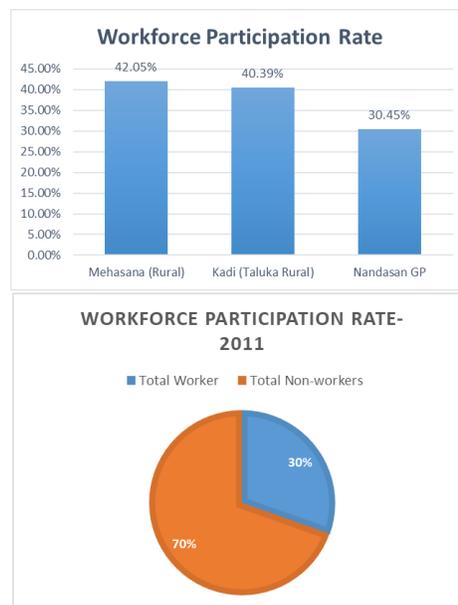


Table 8: Change in Workforce Participation Rate

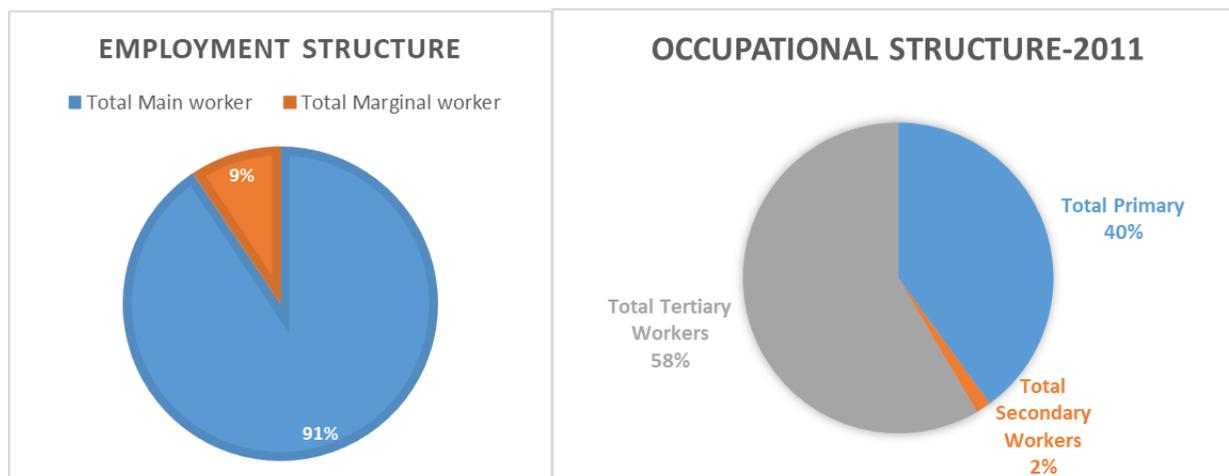
	1991	2001	2011	1991 (In %)	2001 (In %)	2011 (In %)
Total Population	12,149	10,222	13,440	---	---	---
Total Worker	3,171	4,317	4,092	35.62%	33.74%	32.45%
Total Non-workers	8,978	5,905	9,348	64.38%	66.26%	67.55%

Source: Census of India

7.3.2 Employment Structure

Employment structure refers to the reference period for determining a person as a worker or non-worker is one year preceding the data of enumeration. Based on the reference period work is divided into two categories- Main Workers and Marginal Workers. Main workers are that who are employed for at least for six months, and the rest are marginal workers. Employment structure indicates a high percentage of main workers in the GP as compared to marginal workers. Around 91% of workers in Nandasan have employment for six or more months per year.

Figure 9: Employment and Occupational Structure – As per the Census of India, 2011



7.3.3 Occupational Structure

Occupational structure refers to the aggregate distribution of occupations according to skill level and economic functions. It shaped by various factors like the structure of the economy (the relative weight, of different industries), technology, and administrative responsibility, labour market, etc. Primary and non-primary

Table 9: Change in Occupational Structure in Nandasan GP

	2001	2011	2001	2011
Total Worker	4,317	4,092	42.23%	30.45%
Total Primary worker	2,127	1,635	49.27%	39.96%
Total secondary workers	118	64	2.73%	1.56%
Total Tertiary workers	2,072	2,393	48.00%	58.48%

Source: Census of India

(Secondary + Tertiary sectors) are two main occupational structure classified by Census of India. As per the census 2011 data, Nandasan comprises 40% of primary workers, 58% tertiary and only 2% of secondary workers; however, there is a continuous decline in the share of the primary workers in the village (56% in 1990 to 49% in 2001 to 40% in 2011).

7.3.4 Economic Activities

Primary survey of the village reveals that the majority of workers are involved with the agriculture activities either as laboures or as cultivators. As per the Sarpanch and primary field visit, around 40% to 50% people are depending on agriculture as the main source of income, and remaining 60% to 50% working population is involved in various activities such as industrial laboring jobs, vegetable vendors, daily wages, auto and shared van driving, etc.

Agriculture Activities

Around 40 to 50% of workers are engaged with agricultural activities, where 613 are cultivators (owner or co-owner) while 864 are Agricultural labourer. There is a double and triple cropping pattern adopted by the farmers, with the major crops sown in are Dangar, Paddy, Bajari, Juvar, Castor (Eranda), Cotton, and Wheat. Private bore wells are the main source for the irrigation. The farmers with no private bore well, buy the water for irrigation from the other farmers with private bore wells. Power supply for agricultural activity is available in this village. The nearest APMC market in Kadi around 12 km distance; with good connectivity and transport facilities, accessing the APMC is convenient. Apart from this, normally all farmers have a private godown within their farms for short term storage for their produces.

Nearest KVK (Krishi Vigyan Kendra) is in Mehsana, which is around 26 km at distance. Being agricultural activities are a mode of livelihood for more than 40% workers in the village, it would be better to have a center within the village so the farmers can get proper guidance regarding technology generation, technology assessment and refinement and dissemination in the field of agriculture and allied sectors.

Other Economic Activities

As per the Sarpanch, around 10 to 15% workers are industrial laboures and go to the Industrial establishment at Chhatral towards Mehsana at 11 km distance, and tiles factory established within 2 km from the village; at daily bases. Around 10 to 15% of workers are auto and private van (eco, jeep) drivers, involved with the private transportation sector. Some workers sell fruits (mainly lemon and cucumbers) along the state highway, work at panchayat office, teaching, small businesses like provision stores etc. remaining are depended on activities like wood cutting, carpentry work, tailoring, vehicle repairing (mechanics), etc.

Very few villagers are involved with animal husbandry and chicken farming (poultry). There is a government dairy in the village where they sell milk. However, the number of households involved in home-based economic activity is significantly low. As per the discussion with the stakeholders, the strategic location of the village along the highway, helps daily labours and people depends on daily wages- one can always get work at daily bases along the highway such as loading-unloading of trucks, selling fruits and vegetables, at a commercial establishment, labour work at construction site etc. Recently, supermarket type shopping area coming up along the highway, the villagers are hopeful to get employment opportunity with the development of such markets.

As per the panchayat, there is no skill development centers (Kaushlya Vardhan Kendra (KVK) or ITI) in the village for students and young work pool; such center is required in the village so the young work pool can be trained and absorbs in the surrounding industrial establishment/ various economic activities. The nearest skill training center, vocational training center and ITI are at 8 km distance.

7.4. Social Infrastructure Assessment

Social infrastructure is the basic requirement of human life; therefore, availability and adequacy of infrastructure services have a larger role in the wealth and well-being of citizens; as well as in strengthening economic development in the region. Hence, provision of the social infrastructure is defined as basic services that any developing region requires to sustain its growth and development.

This section outlines the status of existing social infrastructure facilities and services in the Nandasan GP. Here presented analysis is done based on the Census 2011 and Village Profile data provided by the Nandasan Panchayat. Social infrastructure is the basic physical and organizational structures needed for the operation of a society, or the services and facilities necessary for an economy to function. For the provisions of amenities, URDPFI guidelines are considered as the basis for estimation of gaps and additional requirements.

7.4.1 Educational Facilities

Nandasan GP has four levels of educational facilities ranging from the junior kinder garden to the college level.

Pre-Primary School (Anganwadi):

Generally, pre-primary schools refer to the Anganwadi. As per URDPFI guidelines, one Anganwadi is required for every 2,500 of population. The total Anganwadi available within the panchayats are 7. As per the standards, at present only 5 Anganwadies are required, which means the availability of Anganwadi in the GP is in surplus.

Primary + Middle School (Standards I to VIII):

Generally, Primary Middle School refers to the grade of education from 1st to 8th. As per URDPFI guidelines, one school is required for every 5,000 of population. The total schools available within the panchayats are 3 (2 Govt. + 1 Private). As per the standards, at present only 3 schools are required, which means, at present, no additional school require in Nandasan GP.

Secondary School (Standards IX to X):

Generally, Secondary School refers to the grade of education from 9th to 10th. As per URDPFI guidelines, one school is required for every 7,500 of population. The total school available within the panchayats is 1 (private school) and as per the standards, there is a requirement of 2 schools; this means, there is a deficiency of 1 school in the village. As a result, the number of students travels to a nearby school at 2 km of distance for the study.

Senior Secondary School (Standards I to VIII):

11th and 12th grades of education referred to senior secondary schools. As per URDPFI guidelines, one senior secondary school is required for every 15,000 of population. The total senior secondary school available within the village is 1 (private school). As per the standards, at present only 1 school are required.

College:

Generally, college refers to graduate-level education. As per URDPFI guidelines, one college served per unit for every 125,000. There are no colleges in the village. The nearest college is at the 8 km of the distance. For the higher study, students travel to Mehsana or go to Ahmedabad city.

Table 10: Status of the Educational Facilities in Nandasan GP

Type of School	Population 2011	Existing No. Facility	Required	Surplus/ Deficit
Pre-Primary School (Aanganwadi)	13,440	7	5	2
Primary Schools (primary + middle) I-VIII		3	3	0
Secondary Schools (IX to X)		1	2	-1
Senior Secondary (XI-XII)		1	1	0
Colleges		0	0	0

Source: Census of India, Primary Survey, Village Profile, 2020 and URDPFI Guidelines

7.4.2 Health Facilities

This section is focusing on existing health facilities available and need of the health facilities in the village According to the norms given by Indian Public Health Standards there should be one Primary Health Center for every 30,000 of population, followed by two sub-centers and dispensaries. Based on these norms the demand and sufficiency of the health facilities are worked out. The health facilities in the villages are provided on various levels, e.g. Primary Health Sub-Centers (PHSC), Primary Health Centers (PHC) and Community Health Centers (CHC).

Health Facilities Relevance to Villages

A Sub-Health Center (Sub-center) is the most peripheral and the first point of contact between the primary health care system and the community, while a Primary Health Center (PHC) is a referral Unit for 6 Sub Centers, equipped with 4-6 beds, manned with a Medical Officer In-charge and 14 subordinate paramedical staff members. Community Health Center (CHC) is a 30-bed hospital/referral unit for 4 PHCs with specialized services. As per the Indian Public Health Standards (by Ministry of Health and Family Welfare (MoHFW)), one sub-center is required for a population 5,000 people, one Primary Health Center (PHC) for 30,000 of population, one Community Health Center (CHC/Rural Hospital) for a population of one lakh, and one Maternity & Child Welfare Center is required per 15,000 of population.

Figure 10: Hierarchy of Health Centers in India



Source: MoHFW Guidelines

The services at the Sub-Health Center is provided by an appointed Female Health Worker and Male Health Worker at each Sub-Center, whose responsibility is to provide vaccination and regular health check-ups to the village residents. The female health worker looks after the kids, pregnant women for delivery, family planning, and is responsible for vaccinations of the entire village. She is supposed to visit every household once a month. The male health worker looks primarily into diseases like leprosy, malaria, TB, water borne diseases etc. A PHC is supposed to have a medical officer, who should be a doctor, a male and a female supervisor, a pharmacist, lab technician and an ambulance.

Table 11: Status of the Health Facility in Nandasan GP

Type of Facility	Population 2011	Existing No. Facility	Required	Surplus/ Deficit
Sub Health Center	13,440	2	3	-1
Primary Health Center (PHC)		0	0	0
Community Health Center (CHC)		1	0	1
Maternity & Child Welfare Center		0	1	1

Source: Primary Survey and Village Profile, 2020, and MoHFW Guidelines

Sub-Health Center:

As per the Indian Public Health Standards (by Ministry of Health and Family Welfare (MoHFW)), one sub-center is required for a population 5,000 people, which means, with 13,440 of population total 3 Sub-Centers are required in the village. At present, there is only 2 sub-health center in the village and 1 additional required.

Maternity and Child Welfare Center:

As per the standards, one such center is required for a population of 15,000 people, which means, with 13,440 of population total 1 center is required in the village. Currently, there is no such center located in the village.

Primary Health Center:

As per the Indian Public Health Standards (by Ministry of Health and Family Welfare (MoHFW)), one sub-center is required for a population 30,000 people, which means, with 13,440 of population, no 1 PHC is required in the village. Currently, there is no PHC located in the village.

Community Sub-Center:

As per the Indian Public Health Standards (by Ministry of Health and Family Welfare (MoHFW)), one Community Center (CHC) is required for a population 1 lakh people, which means, with 13,440 of population, presence of the CHC within the panchayat jurisdiction is not required. Currently, there is 1 CHC located in the village.

Table 12: List of the Available Health Facilities in Nandasan GP

Sr. No.	Particulars	Status of Availability	If no facilities in the Village, then the nearest place of availability
1	Sub Health Center	Yes	1
2	Primary Health Center	No	Available at Kadi- 13 km
3	Community Health Center	Yes	1
4	Maternity Home, Government, Private, Institutional	No	Available at Kadi- 13 km
5	Government, Panchayat Hospital	No	Available at Kadi- 13 km
6	Private, Institutional Hospital	No	Available at Kadi- 13 km
7	Private Allopathic Clinic	No	Available at Kadi- 13 km
8	Government/Private Ayurvedic Clinic	No	Available at Kadi- 13 km
9	Government/Private Homeopathic Clinic	No	Available at Kadi- 13 km
10	Naturopathy Clinic	No	Available at Kadi- 13 km
11	Doctor of Medicine	No	Available at Kadi- 13 km
12	Surgical doctor	No	Available at Kadi- 13 km
13	Gynecologist	No	Available at Kadi- 13 km
14	Pediatrician	No	Available at Kadi- 13 km
15	Orthopedic	No	Available at Kadi- 13 km
16	Ophthalmologist	No	Available at Kadi- 13 km
17	Ear, Nose, Throat Doctor	No	Available at Kadi- 13 km
18	Dermatologist	No	Available at Kadi- 13 km

Sr. No.	Particulars	Status of Availability	If no facilities in the Village, then the nearest place of availability
19	Orthopedic	No	Available at Kadi- 13 km
20	Total number of nurses in the village	Yes	5
21	Number of trained midwives	Yes	2
22	Is there an Asha worker in the village?	Yes	5
23	Service of doctors for delivery under Chiranjeevi scheme	Yes	1
24	Ambulance facility in the village	No	Available at Kadi- 13 km
25	Is there 108 Mobile van's station	Yes	1
26	Presence of Pharmacy/Medical Stores	Yes	3
27	Blood Bank facility	No	Available at 25 km
Source: Primary Survey and Village Profile, 2020			

7.4.3 Social Cultural Facilities

As per URDPFI guidelines, one recreational center or a neighbourhood park is required for every 15,000 of population, and for other socio-cultural facilities; facility center is required per every 100,000 of population. As per the Village Profile and the Sarpanch, the GP has one community hall and a sports field. There is no playground or public garden in the village for recreational purposes.

7.4.4 Financing Facilities

Generally, banking facility refers to Co-operative Commercial, Agricultural Credit Societies, and other Credit Societies. Financial services have further divided into four categories such as Co-operative Commercial, Agricultural Credit Societies, and other credit societies included in the Banking Facility for Project Area. As per URDPFI guidelines, one bank is required per 15,000 of the population; which means, a total of 1 bank are required in the GP. However, at present, there is a total of 3 banks in the village. ATM facilities are available in this village. Besides, National Bank, Commercial Bank, Cooperative Bank and Agricultural Credit Society are available in this village.

Table 13: Status of the Financial Facilities in Nandasan GP

Panchayat	Population 2011	Banking facility		
		Existing facility	Required	Surplus/ Deficit
		2011		
Nandasan	13,440	3	1	2
Source: Census of India, Primary Survey, Village Profile, 2020 and URDPFI Guidelines				

7.4.5 Communication Facilities

Post office and telecommunication are the various means of communication facilities available in the project area. Analysis of the communication facilities had been done using URDPFI guidelines. However,

with the extensive use of mobile services, in the current scenario availability of telecommunication became insignificant; hence, this aspect of socio-physical infrastructure is not included here. At present, there is one sub-post office in Nandasan, which is being accessed by villagers from surrounding villages as well. In absence of post office, villagers have to travel to Kadi for certain activities such as speed post.

7.4.6 LPG Facilities

As per the panchayat report, 90% HHs in the village have LPG facilities. Though the LPG gas cylinder center is not located in the GP, but twice a week LPG gas cylinder distributors visit the village for cylinder supply, villagers need to register for the cylinder with the distributors one day in advance. Recently around 10% of HH has installed PNG pipeline service for more convenience (as per the Sarpanch and Talati). Remaining household still uses kerosene and wood as cooking fuel; the majority of such households fall under BPL category.

Table 14: List of the Additional Facilities Available at Nandasan GP

Sr. No.	Particulars	Status of Availability
1	Provision of Police station/Out Post	Yes
2	Crematorium	Yes
3	Public Library	No
4	Public Playground	No
5	Community Hall	Yes
6	Open Air Theatre	No
7	A place for social Ceremonies	Yes
8	Fertilizer, Seeds and Pesticide Store	Yes
9	Farm Tools Shop	Yes
10	Reasonable price shop	Yes
11	Petrol Pump/Diesel Pump	Yes
12	CNG/LPG Gas Pump	Yes
13	Cooking Gas Cylinder agency	Yes
14	Cold storage	No
15	ATM Service	Yes
16	PNG (Piped Natural Gas) service	Yes
17	Primary Veterinary Treatment Center	Yes
18	Veterinary clinic	Yes
19	Service of Veterinary Doctor	Yes
20	Livestock Inspector/Stockman service	Yes
21	Drinking water supply for cattle	Yes
22	Convenience for purchasing animal feeds for	Yes
23	Private Dairy	Yes
Source: Primary Survey and Village Directory, 2020		

7.5. Housing Profile

This section of the report reviews the housing profile in the GP. Census 2011 housing data had used to analyze the profile.

7.5.1 Housing Stock

As per the Census 2011, Nandasan GP has 2,605 houses that accommodate the total 13,440 populations, which means the average HH size in the village is 5.16. Currently, 93.9% of houses in the village are either in good or in livable condition and only 6.2% of houses are in dilapidated condition. As per the HH survey, the majority of houses in the village are one-story building followed by ground plus one story.

Figure 11: Status of the Housing Condition in Nandasan GP- Census 2011

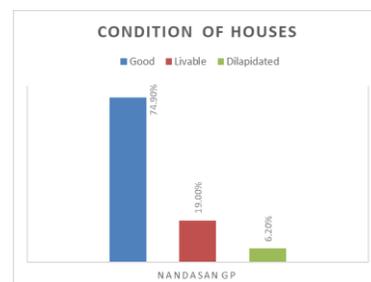


Table 15: Analysis of Housing Stock

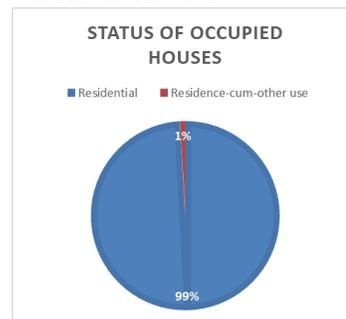
Spatial Unit	Population	No. of HH	HH Size
Mehasana (District Rural)	1,520,734	316,536	4.80
Kadi (Taluka Rural)	260,003	54,520	4.77
Nandasan GP	13,440	2,605	5.21

Source: Census of India, 2011

7.5.2 Status of Occupied Houses

In 2011, out of a total number of occupied housing units in the GP, almost 99% of units are exclusively residential and only 1% is used for residence-cum-other uses. Out of total residential housing units, majority units are in good condition (74.4%) and livable (18.5%), while only 6.2% are in non-living condition.

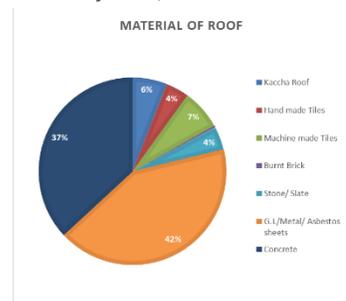
Figure 12: Status of the Occupied Houses- Census 2011



7.5.3 Construction Material of Houses

As per the Census 2011, 82% of houses in Nandasan are permanent houses, 12% are semi-permanent, and 6% of houses are temporary houses, mainly in the slums and unauthorized areas.

Figure 13: Material of Roof- As per Census of India, 2011



Material of Roof

Almost 94% of households in the project area have permanent roofs. 42% of households have roofs made of G.I and Metal sheets, followed by

concrete roofs (37%). Only 6% of households have kaccha roofs made of a material like bamboos, wood, mud, plastic sheets, thatch grass, etc., especially in the slums and other low-income group areas.

Figure 14: Material of Wall- As per Census of India, 2011

Material of Wall

Majority of houses (82%) in the GP are pucca houses with walls either made of burnt bricks (72%) or concrete (10%). At the same time, 18% of the total households in the village are kaccha houses, where the majority of the kaccha houses are made of mud or unburnt bricks.

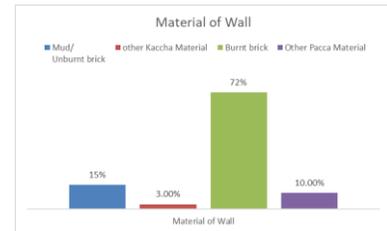


Figure 15: Material of Wall- As per Census of India, 2011

Material of Floor

In the village, cement is predominantly used material for flooring. Almost 61% of households in Nandasan GP have permanent flooring made of cement, followed by the mosaic tile flooring (21%). As per the Census of India, only 15% of houses are with flooring made of mud, especially in the slums.

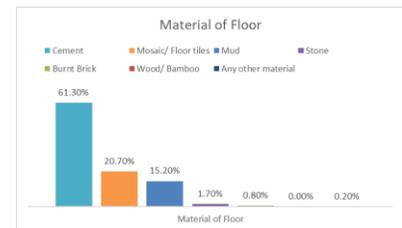
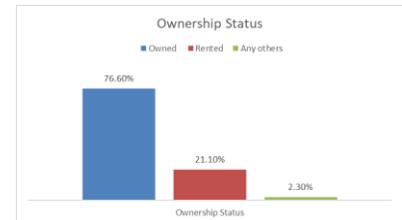


Figure 16: Ownership Status of Houses- As per Census of India, 2011

Ownership Status of Houses

Out of the total number of households in Nandasan, 77% of households are owned HHs, 21% are rented and only 2.3% is used for other accommodations.

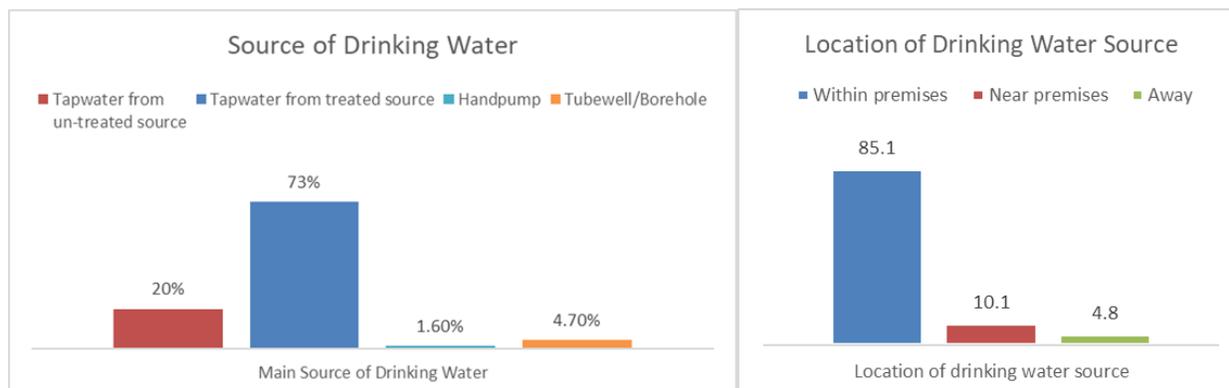


7.5.4 Services

Source of Drinking Water

Majority of the households in the GP have a source of drinking water within their premises (95%) or nearby their premises (15%), such as tape water (from the treated source or untreated source). 5% of households, who do not have sources within their premises or nearby their premises and have to go a little far.

Figure 17: Source of Drinking Water- As per the Census of India, 2011

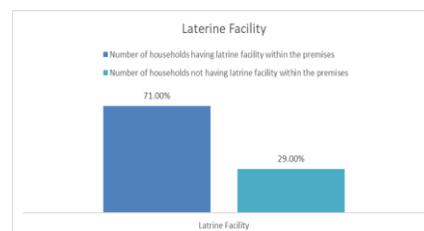


In Nandasan, Panchayat is responsible for supplying water. Majority of the households receive water supply through water pipeline. Around 73% of houses use tap water from the treated source as a main source of the drinking water, and only 20% of households use tap water supplied from the un-treated source. Around 5% of households use tube well or bore well water for drinking purpose.

Type of Latrine Facility

As per the census 2011, around 71% of households in the GP have latrine facility within the premises; which means, around 29% of households in the project area do not have the latrine facility within their premises and do open defecation. Septic tank is the most common type of treatment for in-premises latrine facility found in the project area.

Figure 18: Type of Latrine Facility- As per the Census of India, 2011



Type of Bathroom and Drainage Connectivity

Table 16: Type of Bathroom and Drainage Facilities in Nandasan GP

Number of households having bathing facility within the premises			Wastewater outlet connected to		
Yes		No	Closed drainage	Open drainage	No drainage
Bathroom	Enclosure without roof				
71.65%	9.6%	18.8%	68.3%*	6.5%	25.1%

Source: Census of India, 2011
 Note:
 * As per the primary survey and Village profile- 80% households in the village is now connected with the closed sewage pipe network

Over 80% of households in the GP have bathing facilities within their premises. The majority of them have covered bathrooms. As per the Census, around 25% of households are not connected with any kinds of drainage system (covered or open drainage) and 68% household in the village is connected to the closed drainage system. In fact, as per the primary survey and village profile, at present, 80 % of households in the village is now connected with the closed sewage pipe network.

Table 17: List of Additional Services and Facilities Available at HH Level

Sr.no	Type of Services	Level of Availability	Source
Additional List of Services Available at HH Level			
1	Main Source of Light	96% HH- Electricity 4% HH- Kerosene	Census of India & Primary Survey
2	Cooking Fuel	72.4% HH-LPG Remaining Kerosene and Fire Wood	HH survey, Primary Survey & FGDs
List of Available Facilities at HH Level			
1	Television	44% HH	HH Survey
2	Mobile and Telephone	64% HH	Census of India, 2011
		58% HH	HH Survey
3	Refrigerator	40% HH	HH Survey
Source: HH Survey, Primary Survey, FGDs and Census of India, 2011			

7.6. Inter Village Road and Connectivity

Road connectivity is one of the important components as it connects to major destinations. This section highlights the situation of road connectivity in the village. The gram panchayat is located along with State Highway 41 (SH 41). SH 41 is also known as Palanpur- Ahmedabad Highway, strategically located along the Dedicated Freight Corridor (DFC) alignment which is a crucial link between the city of Ahmedabad and Mehsana. The gram panchayat’s strategic positioning along this linkage has enabled an increase in opportunities in the last decade and continues providing great potential in the future.

The village is easily accessible from the SH 41; in fact, the village is divided into two parts by the highway. Located on the highway and having access to the public and private transportation, the village is well connected with the rest of the district, the state and with the surrounding towns and villages, and nearest railway station. As Nandasan located conveniently along the SH 41, and due to its good connectivity with the rest of the district and state via public and private transport services, villagers from the surrounding 10-15 villages come to Nandasan for the transport services as well.

Also, being one of the most crucial highways, lot of heavy vehicular traffic noticed on the SH 41; hence, recently, the flyover was constructed on the highway and access to the village is provided through the exit lane; this has reduced the chance of accidents on the road. However, in the process of constructing the flyover, state transport bus stop/s along the highway was removed and never gotten installed again. As a

result, the availability of bus frequency is reduced as compared to the same before the construction of the flyover. Earlier, villagers were able to catch a bus going towards Mehsana or Ahmedabad at every 5 minutes; with the removal of the bus stop, many buses do not stop at the entrance to the village and by-pass using the flyover. Apart from the bus service, auto, shared van and other private transport facilities are easily available along the highway.

The village is also accessible from the Kadi-Nanadasan road (SH 189). The approach road connecting the village with the Kabi Nandasan Road is an asphalt road with 2 lanes. Navapura bus stop on the Kadi-Nandasan road (SH 189) is the nearest bus stop, approximately at the 1.9 km away. The overall road network and the transport services are sufficing the dependency of the village on the nearby centers for health, education and economic purposes.

The road condition of the internal village road is good. Almost 70% of the internal village roads are paved and pucca roads and still, 30% of roads are either semi-pucca or kaccha. The panchayat is aiming to upgrade the kaccha roads into pucca using the fund available under various schemes (ATVT, MP and MLA Funds, Taluka Grants, 14th and 15th Finance Commission, 15 per cent Vivekadhin Yojana, etc.).

Streetlight:

Nandasan GP does have streetlights along with the inter-village road network, which is a basic requirement for increase safety and visibility during the night time. As per the panchayat, 90% of the internal roads have streetlights.

7.6.1 Issues with the Inter Village Roads and Connectivity

- 30% of roads are kaccha roads (Length of kaccha road- 1.06 km)
- Waterlogging issue in the low-lying areas
- 10% inter-village road do not have streetlights facility
- Various activities along the highway take place throughout the day (such as loading and unloading of materials, drop-off and pick-up of the passenger by private and public transport vehicles, the crossing of the highway (as the village is divided into 2 parts by the HWY), selling of fruits and vegetables, etc.), which involves pedestrian activity along the HWY, in absence of pedestrian pathway, chances of accidents are higher.
- In absent of official bus stop along the SH 41, pick-up and drop-off of passengers by the public and private transport vehicles occur haphazardly and create a chaotic situation. Besides, the absence of the official parking spot for autos, vans (Eco) and tractors make the situation worst.

7.7. Physical Infrastructure

This section evaluates the level of availability of utilities (physical infrastructure- water supply, sewage, power, etc.) based on the village profile 2020, FDGs, and the primary survey.

7.7.1 Water Supply System

Water is supplied in the village through pipe network by the panchayat. The almost entire village is covered under the pipe network (93% HHs). There is a total of 4 bore wells and 4 ESR with a total of 1.75 lakh liter water storage capacity. Each bore well is connected with the pipe network via sumps/ ESRs. Out of the 4 bore wells, one bore well is also connected with the Narmada Canal. Currently, with these infrastructures, the panchayat can provide water 2 hrs, each morning and evening (total 4 hrs). Besides, sump with 2 lakh liter capacity has been proposed. At present, total 3,432 tap water connection is established in the village against total 2,605 HHs. The supplied water quality is potable. Present, water network is developed in pieces and mill process, while the new laying of the pipeline is in a planned manner. As some part of the network is around 20 years old and as and when required the panchayat administrate repairing and upgradation of the network. As per the panchayat, with the current infrastructure they can supply water total 4 hrs a day for which they need to run the electric motor for 6 to 8 hrs, but in future, if demand increases then addition bore well with canal connection would be required.

Table 18: Status of Water Supply System in Nandasan GP

Parameters	Values
No. of Borewells	4
The capacity of Sump/ ESR	1.75 lakh lit (3 with 50 thousand capacity and 1 with 25 thousand lit capacity)
% of HH covered under pipe network	93%
Age of network	Around 15 years
Water supply timing	4 hrs (2 hrs, each morning and evening)
Water quality	Potable
Source: Primary Survey	

7.7.1.1 Issues with the Water Supply System

- Out of 4 sumps, one is not working
- In case of any bore well breakdown, difficult to supply water in respective areas, as none bore wells are interconnected with the pipe network

7.7.2 Sewerage and Drainage System

Currently, both open and close drainage system is available in the village, mostly close. Around 80 to 85% village is covered under the sewage network. Wastewater from bathrooms and kitchen is directly connected with the close drainage network, and through the network, the untreated wastewater from the households is discharged into the water bodies/ lake; as a result, the lake water is contaminated. In the area around the Meldi Mata Temple, underground sewage network is laid out but it is not connected with the main trunk line and so collected water from the HHs in the area is discharged on the road. Presently, toilets are connected with the septic tanks; almost all the households with toilets have septic tanks. However, they are not maintained well; they get clean on a required basis.

Presently there is not stormwater drainage network in the village. During monsoons, rainwater following the natural contours and flows towards the lake and eventually mixes with the lake water, which is contaminated by the sewage water.

7.7.2.1 Issues with the Sewerage System

- Collected wastewater from kitchen and bathroom is being discharged into the lake via closed drainage network. Wastewater discharged into the lake without treatment hence, as a result, the lake water is now contaminated.
- Underground sewage network is not completed- in some areas, the sewage network is not connected with the main trunk and the collected wastewater is get discharged on the road, creating an unhygienic environment.
- Soak pits are not maintained at a regular basis, they only get clean when as and as required basis.
- There is no stormwater drainage system in the village. Following the natural contours, rainwater flows towards the lake and eventually mixes with the lake water, which is contaminated by the sewage water.

7.7.3 Solid Waste Management

Solid waste management is directly related to health and hygiene. It is also an indicator of the socio-cultural condition of the village and town. In Nandasan GP, panchayat is responsible for solid waste management facility. As per the panchayat, there is a no door-to-door collection system in the village. Community bins are installed in the village and its moral responsibilities of the villagers to dump their solid waste at the community bins. Every 2 to 3 days the waste from the community bins get collected for the disposal. However, there is no proper system of the disposal of the waste as well. The collected waste is being dumped on the dumping site without segregation; in fact, identified dumping site is a government wasteland. Once the site is full of the waste, the collected garbage is then disposed of by burning. Due to the absence of a formalized solid waste management system in the village, waste management in the

village is highly inefficient which is reflected clearly from the streets, open spaces and water bodies which are accumulated with waste.

7.7.3.1 Issues with the Solid Waste Management System

- Absence of door to door collection of waste.
- No formal system of disposal of the collected solid waste. Collected waste from the community bins is directly dumped into an open field without any segregation treatment. Eventually, all the collected waste is being disposed of by burning.

7.7.4 Electricity

GEB (Gujarat Electricity Board) is responsible for electricity supply to the village. The village has 24 hours of power supply for residential, industrial, and commercial purposes. The village also gets power supply for the agricultural purpose. There is no issue of a power cut, and in case of a power cut occur due to any fault, within 2 to 3 hours it gets restored. As there is not GEB office in the village, for the electricity bill payment villager need to go to Kalol, which is around 26 km away. As a part of the solution, villagers make payment to the panchayat and every fifteen days, panchayat representative deposits the amount at the GEB office in Kalol; however, this is a paid service.

Table 19: Electricity Supply- Nandasan GP

Particulars	Availability
Is the village electrified?	Yes
Number of electrical connections for residential purposes	2,500
Number of connections for industrial purpose	250
Number of agricultural connections	35
Does the village get three-phase electricity?	Yes
Does the village get 24 hours of electricity for residential purposes?	Yes
Is the streetlight electrified?	Yes
Does the village have solar streetlights?	Yes- Now Replaced by CFL
Source: Village Profile, 2020	

7.7.4.1 Issues with the Electricity Supply

- As there is not GEB office in the village, for the electricity bill payment villager need to go to Kalol, which is around 26 km away or can opt for the paid service provided by the panchayat.

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PLANNING PROPOSALS

CHAPTER 8: VISION AND KEY CONSIDERATIONS FOR PLANNING PROPOSALS

The objective of preparing a Nandasan Gram Panchayat Spatial Development Plan is to integrate the planning of land and its resources allow for rational and sustainable use of land catering to various needs, including social, economic, developmental and environmental needs. For the integrated land use planning based on the holistic approach, it is necessary to appropriately allocation and utilize land and its resources comprehensively and consistently catering to the present and future demands. Hence, it is necessary to understand the strengths and emerging concerns of the planning area along with its future requirements. This chapter presents the key considerations for the planning area to achieve the goal of integrated land-use planning.

8.1. Strengths, Emerging Concerns and Opportunities

Knowing the strengths and weaknesses of the planning area gives better understanding of the region. It identifies the areas where the most attention needed and helps in strategically plan and allocate the resources to fulfill the demand of the region. This section of the chapter highlights the strengths and the weaknesses of the Nandasan GP based on the existing situation analysis presented in the previous chapters.

Strengths

- **Strategic Location:** - Nandasan GP is strategically located along the SH 41; in fact, the highway divides the village into two part. SH 41 is also known as Palanpur- Ahmedabad Highway, strategically located along the Dedicated Freight Corrido (DFC) alignment which is a crucial link between the city of Ahmedabad and Mehsana. The gram panchayat's strategic positioning along this linkage has enabled an increase in opportunities in the last decade and continues providing great potential in the future.
- **Private and Public Transport Facility:** - Located on the highway and having access to the public and private transportation, the village is well connected with the rest of the district, the state and with the surrounding towns and villages, and nearest railway station. Along the highway, one can easily have access to the public and private transport facilities such as public transportation buses, buses operated by private transporters, auto service, shared van and chakkada services. In addition, even tractor and tempo services are easily available along the highway for purpose of transferring agricultural or any industrial products to either Kadi APMC or other parts of the state. Due to its good connectivity with the rest of the district and state via public and private transport services, villagers from the surrounding 10-15 villages come to Nandasan for the transport services as well. In fact, due to the high demand of the auto and van services along the highway, around 10 to 12% Nandasan working population is involved in driving the autos and vans (Ecos).

- Industrial Establishments: - Nandasand is just 12 km away from the sub-district headquarter- Kadi, which is also a well-known city for the industrial establishment, and Chhatral GIDC is just 10 km away. In addition, there are a significant number of industries have been established along with the SH 41. Around 10 to 15% of the workforce of Nandasan is absorbed by these industrial establishments.

Emerging Concerns and Weaknesses

- High Dependency on Agricultural Activity: - Though around 40 to 50 % of the workforce is involved with agricultural activities there is a lack of knowledge amongst farmers regarding new technology in farming. Nandasan has black soil, and it would be more beneficial for farmers if they make a little adjustment in existing cropping pattern. However, there is no KVK (Krishi Vigyan Kendra) center in the village to guide farmers and demonstrates technology generation, technology assessment and refinement and dissemination in the field of agriculture and allied sectors. The nearest KVK center is in Mehsana, which is around 26 km away.
- Chaotic Situation along the Highway: - Being one of the most crucial highways, lot of heavy vehicular traffic noticed on the SH 41; hence, recently, the flyover was constructed on the highway and access to the village is provided through the exit lane; this has reduced the chance of accidents on the road. Nevertheless, in the process of constructing the flyover, state transport bus stop/s along the highway were removed and never gotten installed again. As a result, the availability of bus frequency is reduced as compared to the same before the construction of the flyover. Earlier, villagers were able to catch bus going towards Mehsana or Ahmedabad at every 5 minutes; with the removal of the bus stop, many buses do not stop at the entrance to the village and by-pass using the flyover.

Various activities along the highway take place throughout the day (such as loading and unloading of materials, drop-off and pick-up of the passenger by private and public transport vehicles, a crossing of the highway (as the village is divided into 2 parts by the HWY), selling of fruits and vegetables, etc.), which involves pedestrian activity along the HWY, in absence of pedestrian pathway, chances of accidents are higher. Moreover, in absence of official bus stop along the SH 41, pick-up and drop-off of passengers by the public and private transport vehicles occur haphazardly and create a chaotic situation. In addition, the absence of the official parking spot for autos, vans (Eco) and tractors make the situation worst.

- Inadequate Physical Infrastructure: - At present, the level of the available physical infrastructure in the village is moderate, except SWM. The water supply system is barely meeting the present demands (In case of any bore well breakdown, difficult to supply water in respective areas, as none bore wells are interconnected with pipe network), the sewage network is not fully completed and collected wastewater is being discharged into the lake without treatment; as a

result, the lake water is now contaminated; and in the absence of a formalized solid waste management system in the village, waste management in the village is inefficient.

Opportunities

- Due to the good connectivity with the rest of the district and state via public and private transport services, villagers from the surrounding 10-15 villages come to Nandasan for the transport services as well. For the villagers from the surrounding villages, Nandasan is the center for many activities including paying electricity bills (using the paid service by the Nandasan Panchayat), access to the transport facilities, post office, access to tempos and tractor services to transfer agricultural products etc.
- Lately, commercial activities are coming up along the highway, within the close proximity to Nandasan. Recently, D-Mart supermarket and private hospital have developed in the area, and the villagers are happy to use these facilities. In future, there is a scope of development of mixed-use and commercial activities along the highway within the proximity to the village, this would provide better employment opportunity to Nandasan citizens as well as folks from the surrounding villages. These would help in reducing the high dependency on the primary sector.

8.2. Vision

Vision Statement

Nandasan GPSDP is a spatial plan to ensure integrated rural development. The plan is a vision “to have a systematic development of the village to provide quality of life to the villagers through planned growth, provision of infrastructure and to spur overall economic growth of the area”.

8.3. Key Considerations for Planning Proposals

For the planning proposals, spatial growth pattern, various projections, area requirements to accommodate additional housing demand and economic activities, and availability of land for development are key considerations considered, which are explained below in this section.

8.3.1 Population Estimation

Projections are an extrapolation of historical data (population v/s time) into the future. Accuracy of population projection generally considered directly proportional to the size of the existing population/ employment and the historical rate of growth, and inversely proportional to the length of the time projection. This section comprises the estimation and projection of population for the planning area

(Nandasan GP). Projection is done for horizon the year 2041, for which the Spatial Development Plan is being prepared for the planning area.

Data Source

Various data sources have been used for extracting population details for the planning area. The population distribution for the year 1991, 2001, and 2011 has been sourced from Census of India publications for the projections.

Adopted Methodology

Population projections for Nandasan GP were carried out using three mathematical projection methods. As they are mathematical methods and projections are based on the historical trend, the average of the three methods considered as a forecast population for 2041 for the further projections required for the development of planning proposals. Following three population forecasting methods:

- Arithmetic Method- This method is based upon the assumption that the decadal increase in population is constant.
- Geometric Increase Method- In this method, it is assumed that the percentage increase in population from decade to decade remains constant.
- Incremental Increase Method- The method refers to the difference between the absolute population increases during the two successive decades.

Table 20: Population Estimation

Methods	Census 1991	Census 2001	Census 2011	Projected Pop for 2021	Projected Pop for 2031	Projected Pop for 2041
Arithmetic Method (AM)	8,437	10,222	13,440	15,942	18,443	20,945
Geometric Method (GM)	8,437	10,222	13,440	16,909	21,272	26,762
Incremental Increase Method (IIM)	8,437	10,222	13,440	17,551	23,270	24,163
Average of AM, GM and IIM**	---	---	---	16,800	20,995	23,956
Source: Census of India						
Note:						
** Considered as the projected population for Nandasan GP.						

The geometric method estimates the GP population for the horizon year the most, and Arithmetic method calculates it the least, which is almost 5,817 less than the Geometric method. As all three methods use historical data for the mathematical estimations, the average of the three methods is considered as the

forecast population for the planning area; therefore, projected population for Nandasan GP by 2041 is 30,685.

8.3.2 Employment Estimation

Employment generation is one of the major objectives of any development plan. While employment generation and balanced development will continue to be amongst the major objectives of the Development Plan for the planning area, the present context makes it necessary to have a more comprehensive strategy while determining the objectives in view of the expressed concerns. A comprehensive understanding of the future growth of the local economy is imperative for formulating an appropriate development strategy for the planning area. More specifically, such an understanding would help identify probable locations for employment centers and propose corresponding improvements to the transport network and other infrastructure services to meet future requirements.

Salient Features of Employment Projection

As per Census 2011, the workforce participation rate (WFPR) in the project area is 30.45%. While estimating employment for the planning area, it is assumed that the WFPR will increase by 1 to 2 %; hence, considered WFPR for calculating employment in the project area is 31 % and 32% for 2031 and 2041, respectively.

Table 21: Employment Projection

COMPONENTS	2011	2031	2041
Population	13,440	20,995	23,956
WFPR	30.45%	31%	32%
Total Workers	4,092	6,508	7,666
DISTRIBUTION OF WORKERS- ASSUMING 15% going outside Nandasan			
Total Workers		5,532	6,516
DISTRIBUTION OF WORKERS**			
Primary Sector (%)	39.96%	40%	38.00%
Secondary Sector (%)	1.56%	1.00%	1%
Tertiary Sector (%)	58.48%	59%	61%
Total Primary Workers	1,635	2,213	2,476
Total Secondary Workers	64	55	65
Total Tertiary Workers	2,393	3,264	3,975
Source: Census of India			
**Assuming 15% working outside Nandasan (Currently 10 to 15% working outside of Nandasan -Primary Survey)= 1,150 workers			

As per the Census 2011, the ratio of primary, secondary, and tertiary sectors is 39.46%, 1.56%, and 58.48% respectively. However, over the periods, changes in the occupational structure highlights that the share

of the primary workers in the project area is decreasing, and the share of non-primary workers is increasing, especially the tertiary worker. Based on the past trend, here for the employment estimation, it is assumed that the share of primary, secondary and tertiary works by 2041 will be 31%, 1% and 61%, respectively. Based on these assumptions, around 7,666 workers are estimated in the planning area by the year 2041; based on the present trend, it is assumed 15% of the workers will be commuting daily outside the GP for employment; hence, for the further estimation, considered total workers by 2041 is 6,216. Out of which, 4,040 are foreseen to be employed in non-primary sectors.

Area Required for Economic Activities

It is assumed that 40% of secondary workers will work in the industrial sector, while the rest of 60% will be accommodated in commercial and mixed land uses. The total estimated secondary workers are 65, out of which around 26 workers are assumed to be working in the industrial area, and 39 workers will be working in the commercial and other economic activity areas. Also, assuming the required area per secondary worker in the industrial sector is 30 sq.mt/person; therefore, the total area required for industrial land use is 0.08 hectares. Further, it is assumed that the total required area per secondary jobs in commercial and mixed-use sectors is 15 sq.mt; hence, the total required commercial and other economic activity areas for secondary workers is 0.06 hectares.

Table 22: Area Requirement for Economic Activities

Area Statement for Industrial Land Use		Population 2041	Area Unit
Projected Secondary Workers		65	---
Number of Secondary Workers in Industrial Sector		26	40%
Area Statement for Industrial Land Use			
Projected Secondary Workers		65	
Number of Secondary Workers in Industrial Sector		26	40%
Assuming about 30 sq.mt area per industrial jobs		782	sq.mt
Area required for industrial jobs		0.001	sq.km
		0.08	ha
Note: Assumed 40% of the total secondary worked will be in Industrial sector remaining 60% will be working in commercial and mixed-use areas.			
Area Statement for Commercial And Mixed Land Use			
Number of Secondary Workers in Commercial and Mixed Land Use Sectors		39	60%
Assuming about 15 sq.mt area per Commercial/ Mixed use Jobs		586.45	sq.mt
Area Required for Commercial Jobs (Secondary Workers)		0.06	ha
Projected Tertiary Workers		3,975	---
Assuming about 15 sq.mt area per Tertiary Jobs		59,623	sq.mt
Area Required for Tertiary Jobs		5.96	ha
Total Area Required Commercial and Economic Activity		6.02 (0.06)	Ha (sq.km)

Total foreseen tertiary workers in the project area are 3,975. It is believed all the tertiary jobs will be in commercial and economic zone. Besides, for tertiary workers, assumed total required area per person is 15 sq.mt; therefore, the total area requirement for tertiary workers is 5.96 hectares. Area required for commercial and mixed land use is calculated by taking into account of the total area of tertiary workers and 60% of secondary workers; hence, the total area estimated for commercial and mixed land uses is 6.06ha (0.06 sq.km).

8.3.3 Housing Demand

Housing is one of the necessities of human sustenance deserves special attention in any kind of planning and policy level intervention. This section foresees the housing demand for the planning area. For this exercise, the following assumptions are adopted with the reference to the Census 2011 Housing profile for Nandasan GP:

- Dilapidated houses account for 6.2% of total housing stock for the project area
- Household size 5.2

Table 23: Household Size

	1991	2001	2011	Ave. HH Size
Household Size	5.08	5.43	5.16	5.2

Source: Census of India

Also, for 2041 projection 5.2 household size is considered, based on the historical data. The projected housing stokes for 2041 is 4,893 for the planning area. As per the census data, presently total housing stoke in the GP is 2,767; which means additional residential area required to accommodate additional 2,126 houses by the horizon year.

Table 24: Housing Demand

	2011	2021	2031	2041
Population	13,440	16,800	20,995	23,956
Avg. Household Size	5.16	5.2	5.2	5.2
No. Houses Required	2,605	3,231	4,038	4,607
6.5% Dilapidated Houses	162	200	250	286
Total No. of Houses Required	2,767	3,431	4,288	4,893

Source: Census of India

Residential Area Requirement based on Housing Demand

As per the housing projection, the GP will be required 2,126 (4,893-2,767=2,126) additional houses by 2041. Based on the ground situation, 84 sq.mt of area per unit is considered. Total estimated residential

requirement is 22 ha by 2041, to accommodate additional 2,396 houses; out of which 16 ha area will be required by 2031 to accommodate the demand of additional houses.

Table 25: Residential Area Requirement based on the Housing Demand

Parameters	2031	2041
Additional No. of Houses Required	1,521	2,126
Area Per Housing Unit (sq.mt)*	84	84*
Total Residential Area required (on sq.mt)	127,792	178,594
Assumed Additional 10 % Open Area Required**	12,779	17,859
Assumed Additional 15% circulation area (Roads)**	19,169	26,789
Net Area Requirement	159,740	223,243
Required Residential Area (sq.km)	0.16	0.22
Required Residential Area (ha)	16 ha (0.16 sq.km)	22 ha (0.22 sq.km)
Note: *As per the Sarpanch the size of the new housing is 84 sq.mt; which is cross-checked and confirmed with a satellite image. ** As per URDPFI Guidelines Source: Sarpanch Interview, and URDPFI Guidelines		

8.3.4 Environmental Consideration- Land Suitability Analysis

The topology of the region presents a unique challenge towards attaining the perfect balance between resource conservation and utilization. The incorporation of effective environmental conservation and sustainability features will be an important aspect in the preparation of the Development Plan. Efficient measures towards conserving the natural surroundings should be adopted since the balance between natural and man-made surroundings significantly enhances the quality of life of residents. Hence, a no-development buffer of 10 meters around the Full Tank Level of the water bodies is considered. Further, land suitability analysis was done to identify the non-developable and developable areas within the Gram Panchayat Area.

8.3.4.1 Land Suitability Analysis

Conventional land-use development decisions are usually guided by single-dimensional criteria, most commonly short-term economic gain, not ecological, social, or even economic advantages over the long run. Suitability analysis is a process of determining the fitness of a specific land parcel to support a well-defined activity or land use. The basic premise of suitability analysis is that each aspect of the landscape has intrinsic characteristics that are in some degree either suitable or unsuitable for the activities being planned and that these relationships can be revealed through detailed evaluation and assessment. The primary objective of this suitability analysis is to identify eco-sensitive and developable zones.

Eco-sensitive zone or non-developable areas are strictly not to be disturbed and no other use is allowed in these areas except those permitted under the relevant legislation. There are bound to be exception such as settlements by tribes and other indigenous people living within protected zones.

Non-Development Area:

Following areas are considered as the non-developable area

- Water Bodies- River, lakes, canals and other water bodies
- In the case of the village- Pasture Land (Gauchar land)
- Green Buffer- no development buffer of 10 meters around the Full Tank Level of the water bodies

Table 26: Total Non-Developable Land in Nandasan

Parameter	Area(sq.km)
Total Water Bodies	0.07
Water Body Buffer Area (10 mts)	0.02
Pasture Land (Gauchar Land)	0.43
Total Non-Developable Area	0.54

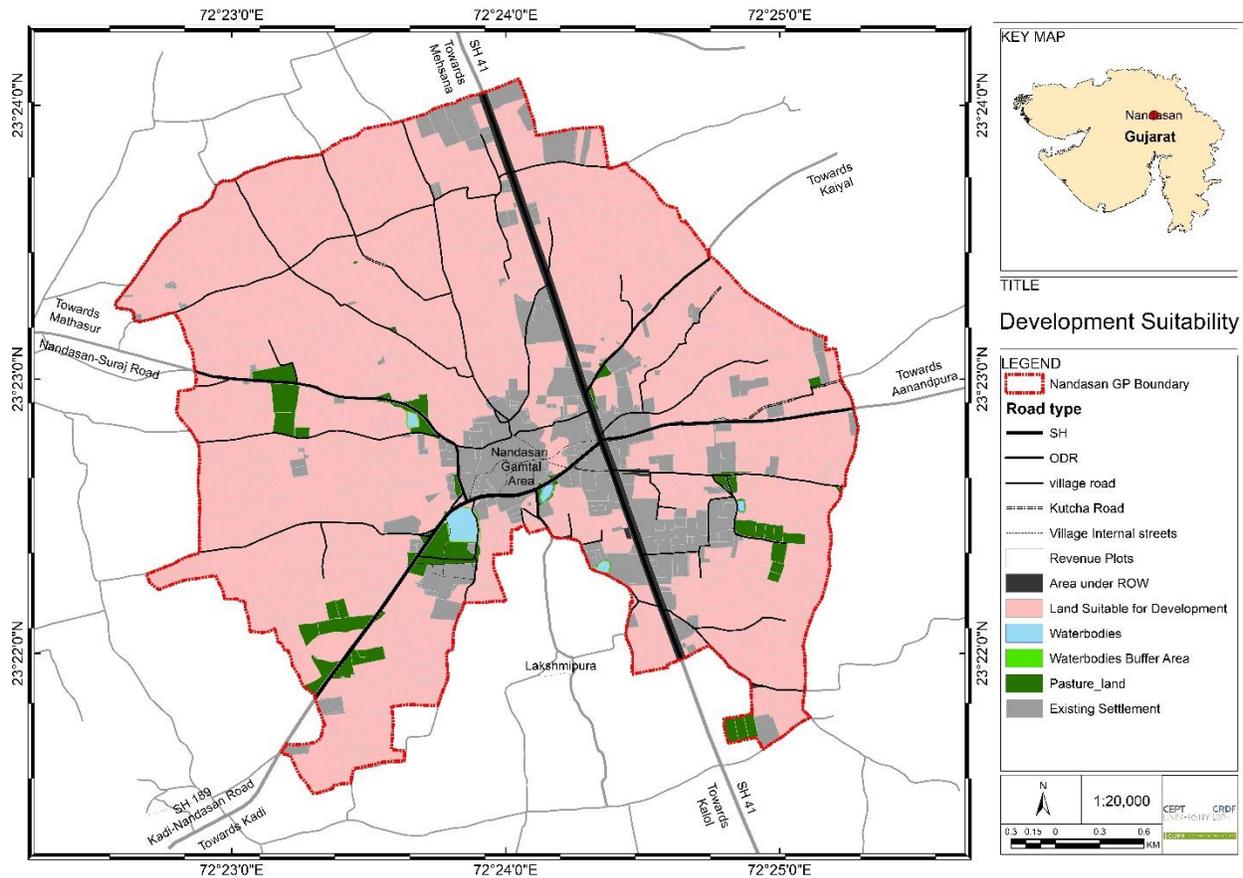
8.3.5 Land Available for Development

Out of a total of 13.05 sq.km of the planning area, 0.54 sq.km (4%) of land is non-developable and around 12.53 sq.km of the land is developable land. Further, a total of 1.88 sq.km of the land is already developed land (Area under existing settlement and Roads); hence, around 81.60% (10.65 sq.km) of the total village is available for future development.

Table 27: Total Land Available for Development

Parameter	Area(sq.km)
Total Water Bodies	0.07
Water Body Buffer Area (10 mt.)	0.02
Pasture Land (Gauchar Land)	0.43
Total Non-Developable Area	0.52
Total Nandasan GP Area	13.05
Total Land Suitable for Developable	12.53
Existing Settlement	1.25
Existing Roads	0.63
Total Available Land for Development	10.65 (81.60%)

Map 14: Land Available for Development – as per the Land Suitability Analysis



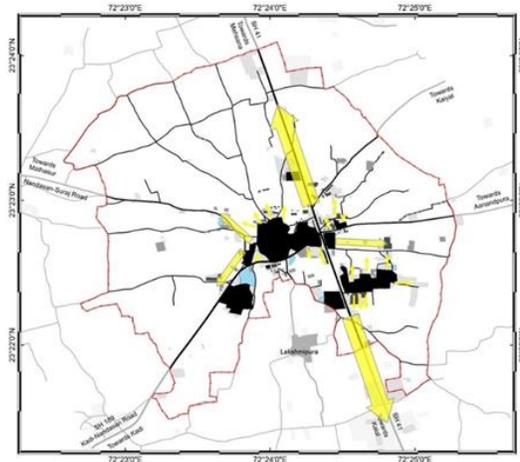
8.3.6 Spatial Growth Trend and Land Potential Analysis

In addition to land suitability analysis, the land potential analysis is required to determine the potential use of a suitable area within the region. In addition to the environmental constraints, landform and land cover also define the level of suitability for a pocket of land having the potential for development. Along with the land potential analysis, analyzing the spatial growth pattern in the region is equally important, as it highlights the pockets with the current demand for development; and by concentrative growth in the area with demand would help in channelizing the growth in a planned manner and avoid scattered and unplanned growth in the region. Also, avoid haphazard conversion of agricultural land to non-agricultural land.

8.3.6.1 Spatial Growth Trend

Village spatial growth pattern is one of the key criteria considered while developing the planning proposals. It is clear from the map that, over the period, Nandasani village has slowly and naturally grown all around the existing settlements and along the transport axis such as the SH 41, SH 189, and Other District Roads. The existing settlement of the village on the western side of the SH 41 has slowly grown in all directions and majorly in on the transport axis of SH 189 and the Nandasani-Suraj road. Additionally, the existing settlement of the village on the eastern side of the SH 41 has also grown naturally along with all directions but majorly towards the southern side along the SH 41.

Map 15: Spatial Growth Trend in Nandasani



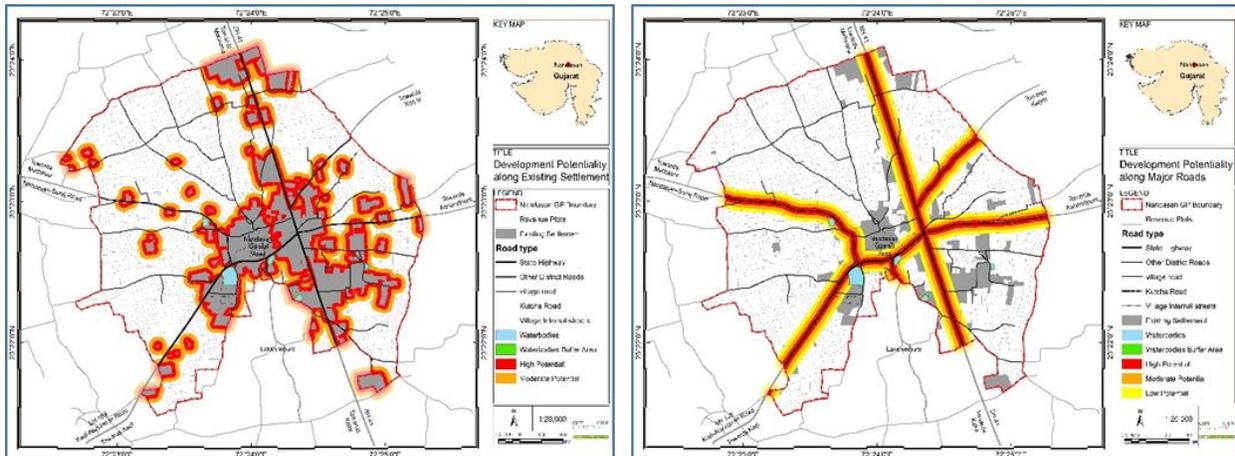
However, the village as a whole has experienced a prominent spatial growth along the State Highway 41 which connects Nandasani with the District center Mehsana towards the north and Chhatral, Kalol, Gandhinagar and Ahmedabad towards the South. (Refer to map-14).

8.3.6.2 Land Potential Analysis

For the land potential analysis, two criteria- existing settlement and transport axis (SH and District roads) are considered.

1. Existing Settlement: - The existing settlement is clustered on either side of the SH 41 with the more prominent settlement on the western side of the SH41. According to the existing land use survey and field survey, assumed high and moderate potential buffer around both of these existing settlement is 50 meters and 100 meters, respectively.
2. Transport Axis: - Although, two state Highways, SH 41 and SH 189 pass through the planning area, it is quite evident that SH 41 acts as the most prominent indicator for spatial growth due to its connectivity with major Growth centers. State Highway 189 also acts as an important axis connecting Nandasani with its Taluka (sub-district) headquarters of Kadi. For the analysis, state highways and district road going towards Suraj, Aanandpura and Kaiyal (based on the spatial growth pattern) were considered; where it is assumed that 50 meters on both sides of the roads have a high potential for development, while from 51 to 100 meters on both the sides have comparatively moderate development potential, and 150 meters and beyond that the development potential is low.

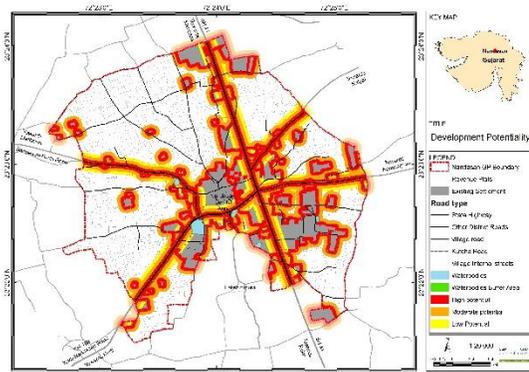
Map 16: Land Potential Analysis



8.3.6.3 Composite Spatial Growth Pattern and Land Potential Analysis

Based on the different parameter of land potentiality, a composite Land Potential Map was prepared to determine land with the most potential for development. This map was then overlaid with the spatial growth pattern map to identify the pockets with demand for development. It is clear, that the most suitable and potential area for development is along the transport axis- the district road that connects Nandasani with Suraji in the west and Kaiyal in the northeast. In recent years, significant growth is observed along this transport axis. Further, development in areas along the state highways is also observed; especially, commercial and economic development.

Map 17: Composite Spatial Growth Pattern and Land Potential Analysis



8.3.7 Provision of Socio-Physical Amenities

URDPFI guidelines will be the baseline for foreseeing the socio-physical amenities requirement for the horizon year 2041.

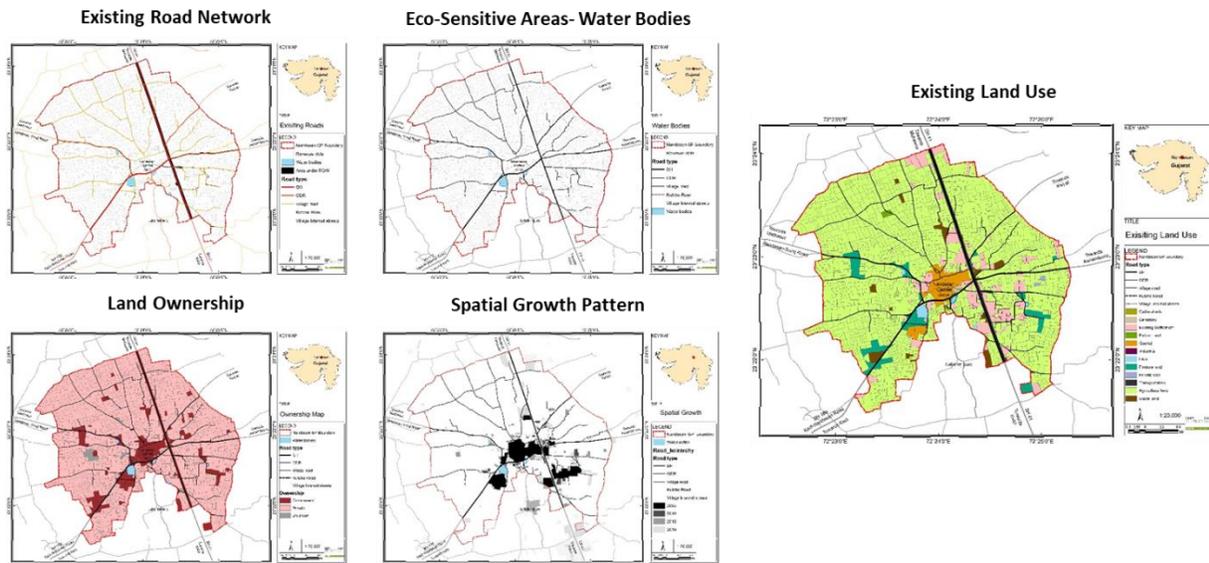
8.4. Concept Plan Development

8.4.1 Criteria for the Concept Development Plan

Purpose of the exercise was to examine the possibility for the development that can help in achieving sustainable development for the planning area. The concept is created based on the present spatial growth pattern. Focus on developing a logical and efficient road network that integrated with the environmental features and possible land uses has given high weightage while developing the concept. Existing Land Use, existing road network, existing settlement pattern, terrain topology, spatial growth pattern, locations of the eco-sensitive areas and existing land use have taken into consideration while developing proposed land-use zoning for the GP.

Nandasan is strategically located around the junction where State Highway 189 meets the major transport axis of State Highway 41. Through these highways, especially the SH 41, the village is very well connected with the rest of the district and the state. There has been visible growth observed along these highways. However, recently, new development is occurring along the major SH 41. Apart from the growth along SH 41, the village has observed natural growth around its existing settlement areas and the Other District Roads that connect the Village of Nandasan to nearby villages, however, this growth is minimal in nature. Hence, along with the spatial growth pattern & existing land use, the present road network is also taken into consideration while developing the proposed land use zoning for Nandasan. Also, as mentioned above, conserving water bodies was also a key consideration taken into account while developing the concept plan for Nandasan. Further, the location of government parcels was also taken into account to formulate proposals related to amenities and utilities.

Figure 19: Criteria taken into Consideration for the Concept Plan



8.4.2 Criteria for the Proposed Road Network

Road network should be designed to have a proper road circulation throughout the region, with road hierarchy to provide free movement. It is feasible to proposed road network based on the existing one, which will serve efficiently by reducing the discrepancies in the existing road network; hence, the existing road network has considered as the base while developing the proposed road network. Further, road hierarchy³ recommended by Ministry of Rural Development based on the right of way of roads is also considered while developing the road network.

- Emphasis is given to utilize existing road axis as far as possible with the purpose of strengthening the existing road axis and the overall existing road network as much as possible with new roads proposed only where it is necessary. An attempt is made to complete the missing links to enhance the overall circulation and connectivity.
- Since the major transport Axis i.e. the SH 41 is a thoroughfare with heavy traffic movement, safety in movement of pedestrians is proposed through pedestrian pathways/ feeder roads of 0.9mts width on either side.
- 6 mt wide ring road connecting the district road, SH 189 and other 9 mt wide roads travelling from the village center to outwards. The areas being proposed to absorb the future natural growth of

³ Framing Guidelines for Model Land Use, Development Control, & Service Level Benchmark with Appropriate Enforcement Mechanisms for Rural Clusters, prepared for Ministry of Rural Development by School of Planning and Architecture, Delhi

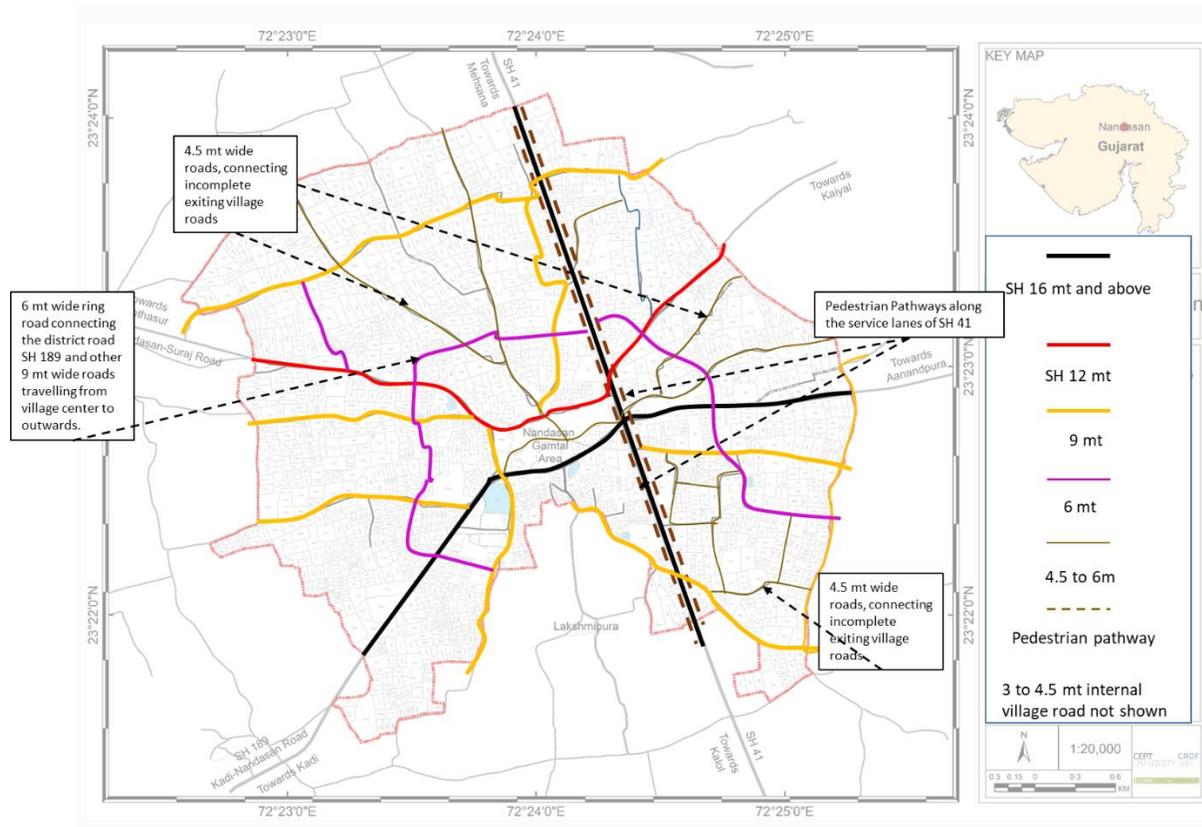
the village on either side of the SH 41 are proposed to have 6 mt wide ring road to provide access to areas with proposed Residential, commercial and other land uses.

- Road hierarchies were used as per standard right of way of road recommended under “Framing Guidelines for Model Land Use, Development Control, & Service Level Benchmark with appropriate Enforcement Mechanisms for Rural Clusters” prepared by Ministry of Rural Development.

Table 28: Recommended Road Hierarchy

S. No.	Road Description	Road Widths	Functions and Remarks
1.	Internal Village Road	3 m – 4.5 m	Village lanes meant for internal movement within a village.
2.	Village Road	Above 4.5 m –up to 6.0 m	These roads facilitate inter-village connections.
3.	Collector Street	Above 6.0 m up to 9.0m	Roads meant to take major traffic to the village. Village roads with a drain on both sides to facilitate drainage system in a village
4	Other Village Road/ District Roads	Above 9.0 m up to 12.0 m	Roads meant for connecting a village to nearby areas, connecting villages of villages with each other to the nearest road of a higher category. They also connect to major village activity nodes such as market place, lake, social amenities, etc.
5	Other District Roads	12.0 m above	Roads serving rural areas and providing them with outlets to market centers, taluka headquarters, block headquarters or major district roads, and serves to connect villages with a population of 1,000 and above or a cluster of villages.
Source: Framing Guidelines for Model Land Uses, Development Controls, and Service Level Benchmarks with Appropriate Enforcement Mechanisms for Rurban Clusters, prepared for MoRD by SPA Delhi			

Figure 20: Criteria taken into Consideration for Developing Proposed Road Network



8.4.3 Criteria for the Proposed Land Use Zoning

Based on the existing land use pattern, and existing situation following criteria were considered while developing land-use proposals for the GP:

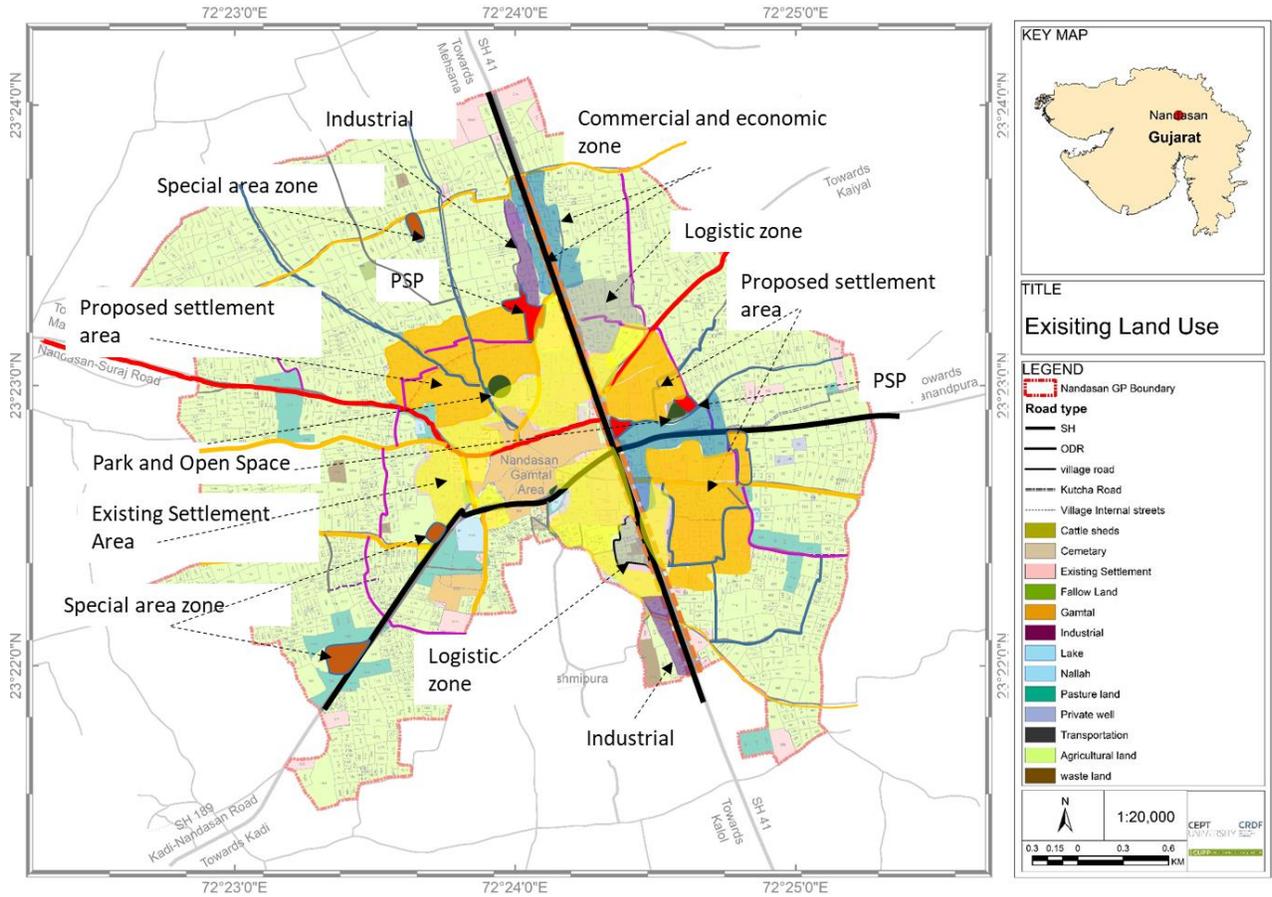
- Existing Land Use and Settlement Pattern were considered while preparing the development plan. It is clear from the spatial growth pattern that recent residential development is occurring naturally around the current existing settlement areas. Therefore, pockets near the existing settlements on both sides of SH 41 has been considered for natural expansion of the village.
- No-development buffer (Green Buffer) of 10 meters has kept surrounding the water bodies to conserve and protect the sensitivity of such features.
- The proposed Land Use Zoning Plan aims to conserve agriculture and grazing/ pasture lands as far as possible.
- Pocket is identified for the future industrial development close to the existing industrial area towards the southern side of the GP boundary adjacent to SH 41. This area is considered for future industrial development as the required infrastructure is already developed in the area which can

be utilized in future for similar activities as well. Additionally, another pocket for Industrial activity is considered towards the northern side of the GP boundary adjacent to SH 41 due to the same factors of ease in access and existing demand along the major State Highway 41.

- The area along the state highway 41 falls under high potential development possibility. There is a high potential for commercial and mixed-use activities where any kind of economic activities (formal and informal) can be established; hence, a pocket of commercial and economic activities is considered towards the north of the GP boundary and adjacent to the SH 41. Additionally, another pocket for the commercial and economic zone has been proposed along the District road that connects SH 41 with Aanandpura village as there is an increase in such kind of activity in the area. Purpose of identifying development pockets along these transport corridors for economic activities is to enhance commercial development in the GP and to increase employment opportunities in the tertiary sector.
- From the existing situation analysis, it is understood that the city requires a transport and logistics area where activities such as a Dedicated Bus Stop could be developed for Nandasan and nearby villages. Therefore, conceptually a Logistics zone is proposed to be developed adjacent to the primary axis of SH 41. Moreover, this logistic area would help in formalizing the activities like loading and unloading of goods which are currently taking place on the road.
- Government plots and/or waste land parcels have been identified to provide a village level Park and Open Space to improve the quality of life and promote social interaction and recreational activities in the village.
- Pockets of government land and/or waste land are identified as a special area which can be reserved to develop large scale public infrastructure, such as wastewater treatment plant, solid waste compost treatment plant, etc. Also, special area zone has been identified close to the key water body to treat the waste water getting into it.
- Also, for development of social amenities, government land identified under Public semi-public zone.

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Map 18: Concept Map



CHAPTER 9: PROPOSAL FOR GRAM PANCHAYAT SPATIAL DEVELOPMENT PLAN

This section of the report presents the development proposals for Nandasan GP, which are formulated based on the key consideration mentioned in section 8.3 and concept development criteria (section 8.4).

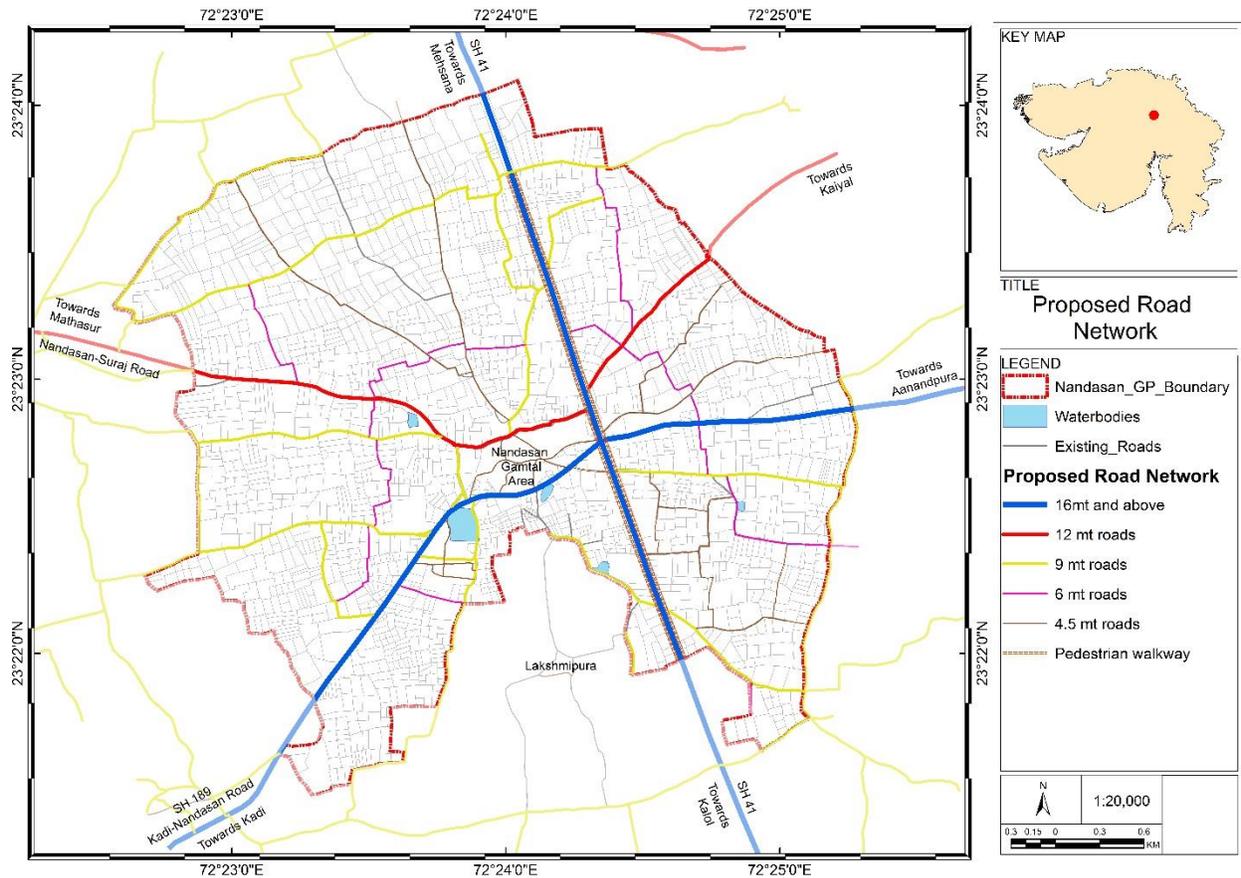
9.1. Proposed Road Network

Proposed road network for the GP is developed based on the criteria mentioned in section 8.4.2. The proposed road network is designed to have a proper road circulation through the planning area. Road hierarchy is proposed to provide free movement within the GP. Roads are earmarked as Transport Zone in the Proposed Land Use Zoning Map.

Proposed Hierarchy of Road

- Road 16 meter and above: - state highways passing through the gram panchayat fall under this hierarchy of roads. These roads carry through and through traffic, connecting the region with district and other parts of the state.
- 12-meter-wide roads: - Other district roads passing through the gram panchayat fall under this hierarchy of roads. These roads connect Nandasan with district headquarters and other surrounding towns and villages. These roads shall be designed with open or close stormwater channels to carry rain runoff water.
- 9-meter-wide roads: - These roads are meant to take major traffic to the village. The width of this road is 9 mt. This road connects the village with the highways and district roads and works as an access road to the village as well. These roads are designed to have a drain on both sides to facilitate the drainage system in the village.
- 6-meter-wide roads: -These roads are village road connecting 12-meter-wide and 9-meter-wide roads. These roads are designed to have a drain on both sides to facilitate the drainage system in the village. They also connect to major village activity nodes such as market place, lake, social amenities, etc.
- 4.5-meter-wide roads: - These roads facilitate inter-village connections. They are 4.5 meters wide. It is noticed that many roads in the existing road network are incomplete and ends abruptly; therefore, the proposed road network complete such roads by proposing the missing links, which are also 4.5 meters wide.
- 3-meter-wide roads: - These roads are meant to be for the internal movement within the village. Width of these roads is 3 meter; mainly existing internal village roads. This is the lowest hierarchy in the proposed road network.

Map 19: Proposed Road Network



9.2. Proposed Land Use Zoning Distribution

The table below presents the proposed land use zoning distribution in Nandasani GP. The proposed land use zoning map allocates around 7.97% land for Proposed Settlement zone, around 0.7% land for commercial & economic zone, and the existing settlement zone 14.41% of the total land. Also, the proposed land use map assigns 54% of the land for agricultural development, 1.39% for industrial activities, 0.38% for public and Semi-Public, and 1.61% land as logistic activities.

Table 29: Area Statement of Proposed Land Use Zoning

Sr. No	Proposed Land Use Zoning Categories	Area (sq.km)	Area (%)
1	Abadi Area (Gamtal Area)	0.34	2.61%
2	Existing Settlement Zone	1.88	14.41%
3	Proposed Settlement Zone	1.04	7.97%
4	Commercial and Economic Zone	0.7	5.36%
5	Industrial	0.18	1.39%
6	Logistic	0.21	1.61%
7	Public Semi-Public	0.05	0.38%
8	Park and Open Area	0.02	0.15%
9	Transport Zone	1.05	8.05%
10	Agriculture	7.02	53.79%
11	Pasture Land (Gauchar Land)	0.43	3.29%
12	Water Body	0.07	0.54%
13	Eco-Sensitive Area	0.02	0.15%
14	Special Area Zone	0.04	0.31%
Total		13.05	100%

Refer the Proposed Land Use Zoning Map below for earmarked area for each zone. Note- Here presented proposed land use zoning map is prepared plot wise.

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Map 20: Proposed Land Use Zoning Map

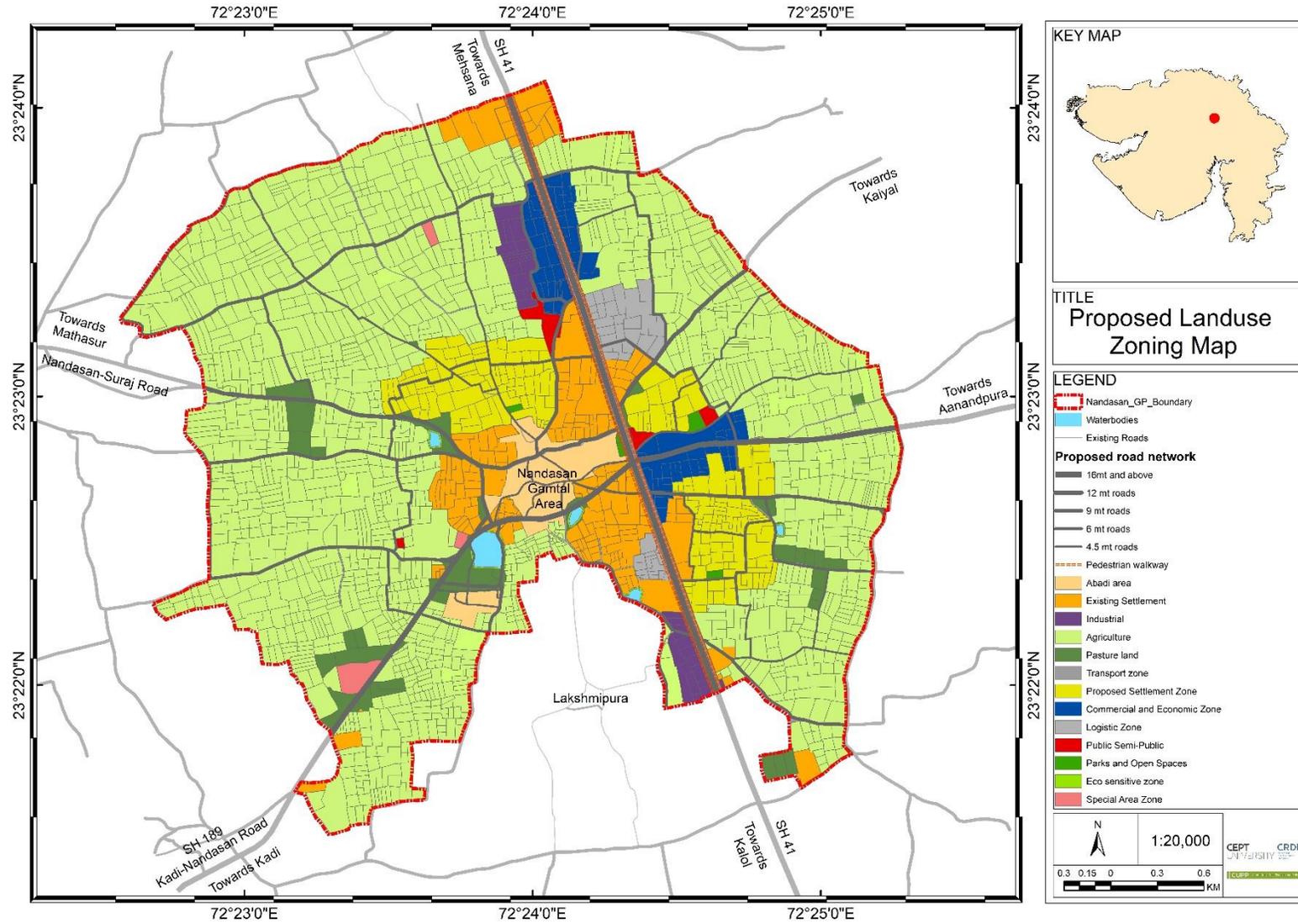


Table 30: Proposed land Use Zoning and Recommended Allowed Uses

No	Proposed Land Use Zoning	Description	Allowed Uses
1	Abadi Area (Gamtal Area)	The existing village area is known as Abadi or Gamtal area	<ul style="list-style-type: none"> All existing uses, as per current development regulations
2	Existing Settlement Zone	Existing settlement area, outside Abadi area	<ul style="list-style-type: none"> All existing uses, as per current development regulations Convenient shopping
3	Proposed Settlement Zone	Proposed expansion area to accommodate future housing demand	<ul style="list-style-type: none"> Residential activities Incidental commercial activities for day-to-day needs of shopping use A comprehensive range of community facilities, including schools, medical facilities, neighbourhood retail, and open space are permitted
4	Commercial and Economic Zone	The proposed area to accommodate additional economic activities	<ul style="list-style-type: none"> All existing uses Informal commercial activities- daily market, informal shopping, weekly market, Formal commercial activities- Retail shopping, market complex, godowns, storage units, grain and vegetable mandi, slaughters house, etc. Hotels, restaurants, provision store, carpentry workshop, private health and educational facilities workshops or working space related to economic activities, etc. A comprehensive range of community facilities, including schools, medical facilities, neighbourhood retail, and recreational space is permitted
5	Industrial	Area to accommodate household industries	<ul style="list-style-type: none"> Existing industries Household industries Warehouse, cold storage, etc.
6	Logistic	To accommodate transport-related activities	<ul style="list-style-type: none"> Bus stand, truck terminal, parking stand for para-transit vehicles (auto stand, van stand, private transport picking up and drop –off, public parking space, etc.
7	Public and Semi-Public Zone (PSP)	Government land for social and physical infrastructure	<ul style="list-style-type: none"> Educational centers- Anganwadis, schools Skill development training institute, skill development center,

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			<ul style="list-style-type: none"> • Health Facilities- sub-health center, dispensaries, primary health center, maternity center, community health center, hospital, private clinic, veterinary clinic and hospital • Community space- community hall, Dharamshala, social welfare center, religious buildings, neighborhood center, • bank and ATM, RO plant, cooperative and credit society, police post and station, cremation ground, burial ground, temple, mosque, church, and other religious institutions, • government and semi-government offices, common village land, and government land • Water bore well, ESR, Sump
8	Park and Open Space (OP)	Area with recreational activities, government land identified for the public recreational activities	<ul style="list-style-type: none"> • Public park, garden, public open space, playground, sports field
9	Transport	All roads, railway line, railway station	<ul style="list-style-type: none"> • Roads -NH, SH, District roads, and other roads, Existing rail line and railway station • Railway line, railway station
10	Agriculture Zone	Agricultural land, cultivable land	<ul style="list-style-type: none"> • All existing uses, tree plantation
11	Pasture Land (Gauchar Land)	Existing pasture land	<ul style="list-style-type: none"> • Grazing land and tree plantation
12	Water Body	Existing all water bodies- Lakes, canal, stream	<ul style="list-style-type: none"> • No development allowed, except
13	Eco-Sensitive	Green Buffer is created to protect the water bodies by providing a no-development buffer around them. The 10-meter wide buffer around the Full Tank Level of the water bodies is proposed as a Green Buffer	<ul style="list-style-type: none"> • No development/ no construction activities are permitted • Tree plantation is allowed
14	Special Area Zone	Government land is reserved for the development of public level large scale infrastructure	<ul style="list-style-type: none"> • Public level large scale infrastructure, such as water treatment plant, landfill (SWM site), ESR, Sump, etc.
<p>Note:</p> <ul style="list-style-type: none"> • Here recommended allowed uses in each zone are indicative and can be modified/applied as per the suitability and decisions are taken by a local implementing authority. • Note here that all the existing nonconforming uses are allowed in all the proposed zones until the redevelopment of such land parcels. However, whenever the parcel is subject to alteration, improvement, reconstruction, and redevelopment, the nonconforming uses will be terminated and the parcel will be subject to the respective proposed zoning requirements. Nonconforming uses mean the existing uses of a parcel which is not allowed as per the proposed land-use zoning for that specific parcel. 			

9.2.1 Proposed Land Use Zoning Proposals

This section of the report presents the proposed land-use zoning for Nandasan GP. Note here that all the existing nonconforming uses are allowed in all the proposed zones until the redevelopment of such land parcels.

9.2.1.1 Abadi Area (Gamtal Area)

Existing Abadi area is earmarked as Abadi Area. Total 0.34 sq.km of the area is covered under this zone. Allowed uses in this zone is as per the current development structure.

9.2.1.2 Existing Settlement Zone

The existing settlement as per the ELU map is earmarked as Existing Settlement Zone in the proposed land-use zoning map. As per the current structure, all the existing activities are permitted in the zone. The zone comprises a total of 1.88 sq.km of area.

9.2.1.3 Proposed Settlement Zone (PS)

This zone is primarily proposed is to accommodate future residential activity. This zone is a predominantly residential area, where major commercial and industrial activities are not allowed; however, it permits incidental commercial activities for the day-to-day needs of shopping uses. In addition, a comprehensive range of community facilities, including schools, medical facilities, neighborhood retail, and open space is permitted. Total 1.04 sq.km of the area is earmarked for Proposed Settlement Zone in the proposed land use plan.

9.2.1.4 Commercial and Economic Zone (C&E)

Total 0.7 sq.km of the area is earmarked as Commercial and Economic Zone. Purpose of this zone is to accommodate economic activities in the designated area rather than let them established haphazardly. Recently, supermarket and private hospital are established along with the SH 41 and scattered commercial and economic related activities are also observed along with the SH 189 (during the field visit). Hence, the proposed area for this zone is demarcated along with the SH 41 and SH 189. Economic activity supporting infrastructure is already established in this area and utilizing the same is feasible rather than developing in new areas; hence, this location is proposed for the C&E zone. Informal commercial activities (daily market, informal shopping, weekly market), formal commercial activities such as retail shopping, market complex, godowns, storage units, grain and vegetable mandi, slaughters house, etc., hotels, restaurants, provision store, carpentry workshop, private health and educational facilities workshops or working space

related to economic activities, etc., and a comprehensive range of community facilities, including schools, medical facilities, neighborhood retail, and recreational space are permitted in this zone.

9.2.1.5 Industrial

Total 0.18 sq.km of the area is earmarked as Industrial Zone to accommodate industrial activities. The proposed area for this zone is demarcated along with the SH 41. Existing industrial activities, household industries, godowns, storage units, warehouses and cold storage units shall be permitted in this zone; hazardous, large and medium scales industries shall not be permitted in this zone.

9.2.1.6 Logistic

Total 0.21 sq.km of the area is earmarked as Logistic Zone. Purpose of this zone is to accommodate transport-related activities such as bus stand, area for pick-up and drop-off passengers, designated parking area for autos and private van (private shared transport service), etc. The proposed land use zoning map earmarks the Logistic Zone along with the SH 41 (on both sides of the highway, before the flyover starts). This logistic area would also help in formalizing the activities like loading and unloading of goods which are currently taking place on the road.

9.2.1.7 Public and Semi-Public (PSP)

Total 0.05 sq.km of the area is earmarked as a Public and Semi-Public Zone in the proposed land use zoning map. Health, educational, cultural (community space), government buildings, recreational amenities and other small scale public amenity facilities are permitted in this zone. Government land and waste land are demarcated as this zone (except the road, and special area zone) in the PLU map. Note that government land located in Abadi Area and Existing Settlement Zone are not demarcated as PSP zone; only government land and waste land that are situated outside Abadi Area and Existing Settlement area is considered for this zone.

9.2.1.8 Park and Open Space Zone (OP)

Proposed land-use zoning plan proposes public open spaces as Park & Open Space Zone. Total 0.02 sq.km area is earmarked for this zone. This zone allows various types of recreational activities, parks, children playgrounds, public gardens, sports field, and exhibition grounds.

9.2.1.9 Agriculture Zone

Total 7.02 sq.km of the area is demarcated as Agriculture Zone. The zone allows activities that are related to agricultural activities and no other activities are permitted in this zone.

9.2.1.10 Pasture Land

Proposed Land Use Zoning has retained the pasture land, as far as possible. Total 0.43 sq.km of existing Gauchar land is earmarked as Pasture Land in the proposed Land Use Zoning Map, where grazing and related activities are allowed.

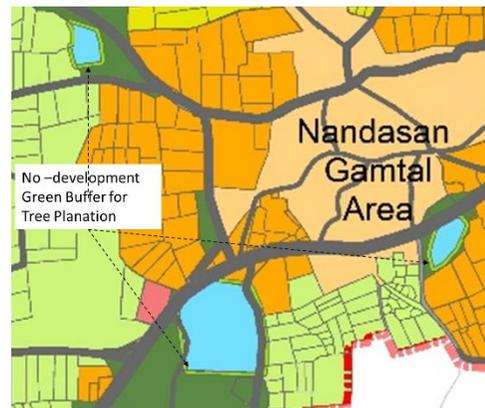
9.2.1.11 Water Body

Water Bodies Zone indicates all notified water bodies, i.e. lakes, streams, and canals, as indicated in the Revenue Department. Notified lakes data are procured from the DILR maps and NRSC; which have been considered in the PLU map. The boundary of the water bodies relates to the full tank level as indicated in relevant maps, 0.07 sq.km of land is covered with water bodies in the Village. No development – Green buffer is given surrounding the water bodies. No development activity is allowed in this zone and government rules and regulation to be followed in this zone.

9.2.1.12 Eco-Sensitive Zone

Green Buffer is created to protect the water bodies by providing a no-development buffer around them. Buffer width of 10 meters around the Full Tank Level of the water bodies is proposed as a Green Buffer; which is earmarked as Eco-Sensitive Zone in the proposed land-use zoning map. Total 0.02 sq.km of Green Buffer is earmarked in the proposed land-use zoning map. This area shall be used only for tree plantation activities and no development/ construction activities are permitted in this zone.

Figure 21: Eco-Sensitive Zone for Tree Plantation



9.2.1.13 Special Area Zone

The proposed land-use zoning map reserves land for the provision for larger-scale public infrastructure. Area for the same is earmarked as Special Area Zone in the proposed land-use zoning map. Government owned land or waste land are identified and reserved for the development of large scale amenities. For the quality of life if villagers and hygiene purpose, this zone is demarcated at distance from the settlement areas. Total of 0.04 sq.km of land is reserved for this zone.

9.2.1.14 Transport Zone

Total 1.05 sq.km of the area is demarcated as Transport Zone. Road area is earmarked as the Transport Zone in the proposed land-use zoning map.

9.2.1.15 Nonconforming Uses

A nonconforming use is an existing use of any parcel; which is no longer allowed or permitted under the current zoning regulations. Such existing uses (building/land) will continue as nonconforming use until such building/land apply for redevelopment. Whenever the parcel is subject to alteration, improvement, reconstruction, and redevelopment, the nonconforming use of the parcel will be terminated and the parcel will be subject to the respective proposed zoning requirements. Nonconforming uses mean the existing uses of a parcel which is not allowed as per the proposed land use zoning for that specific parcel.

9.3. Housing

Housing is one of the necessities of human sustenance deserves special attention in any kind of planning and policy level intervention. This section foresees the housing demand for the planning area. For this exercise, the following assumptions are adopted with the reference to the Census 2011 Housing profile for Nandasan GP:

- Dilapidated houses account for 6.2% of total housing stock for the project area
- Household size 5.2

Table 31: Household Size

	1991	2001	2011	Ave. HH Size
Household Size	5.08	5.43	5.16	5.2
Source: Census of India				

In addition, for 2041 projection 5.2 household size is considered, based on the historical data. The projected housing stokes for 2041 is 4,893 for the planning area. As per the census data, presently total housing stoke in the GP is 2,767; which means additional residential area required to accommodate additional 2,126 houses by the horizon year.

Table 32: Housing Demand

	2011	2021	2031	2041
Population	13,440	16,800	20,995	23,956
Avg, Household Size	5.16	5.2	5.2	5.2
No. Houses Required	2,605	3,231	4,038	4,607
6.5% Dilapidated Houses	162	200	250	286
Total No. of Houses Required	2,767	3,431	4,288	4,893
Source: Census of India				

Residential Area Requirement based on Housing Demand

As per the housing projection, the GP will be required 2,126 (4,893-2,767=2,126) additional houses by 2041. Based on the ground situation, 84 sq.mt of area per unit is considered. Total estimated residential requirement is 22 ha by 2041, to accommodate additional 2,396 houses; out of which 16 ha area will be required by 2031 to accommodate the demand of additional houses.

Table 33: Residential Area Requirement based on the Housing Demand

Parameters	2031	2041
Additional No. of Houses Required	1,521	2,126
Area Per Housing Unit (sq.mt)*	84	84*
Total Residential Area required (on sq.mt)	127,792	178,594
Assumed Additional 10 % Open Area Required**	12,779	17,859
Assumed Additional 15% circulation area (Roads)**	19,169	26,789
Net Area Requirement	159,740	223,243
Required Residential Area (sq.km)	0.16	0.22
Required Residential Area (ha)	16 ha (0.16 sq.km)	22 ha (0.22 sq.km)

Proposals and Recommendations:

Following proposals and recommendations are based on the housing situation analysis (Refer section 7.5), which should be fulfilled under various government schemes:

- At present, there are 6.2% of households are in a dilapidated condition, which should be upgraded under the PMYA scheme.
- At present, 29% of households do not have latrine facility, this gap should be covered. The gap can be covered under Swachh Bharat Mission and MNREGA schemes.
- Around 25% of households in the GP do not have bathing facilities within their premises. This gap should be covered under schemes like SBM and MENREGA

9.4. Inter Village Road and Connectivity

The gram panchayat is located along with the State Highway 41 (SH 41), which is also known as Palanpur-Ahmedabad Highway. The village is easily accessible from the SH 41; in fact, the village is divided into two parts by the highway. Nandasan is accessible from the service road of the SH 41. It is also accessible from the Kadi-Nandasan road (SH 189). The approach road connecting the village with the Kadi Nandasan Road is also asphalt road with 2 lanes.

Located on the highway and having access to the public and private transportation, the village is well connected with the rest of the district, the state and with the surrounding towns and villages, and nearest railway station. As Nandasan located conveniently along the SH 41, and due to its good connectivity with the rest of the district and state via public and private transport services, villagers from the surrounding 10-15 villages come to Nandasan for the transport services as well.

Being one of the most crucial highways (SH41), lot of heavy vehicular traffic noticed on the SH 41; hence, recently, the flyover was constructed on the highway and access to the village is provided through the exit lanes; this has reduced the chance of accidents on the road. Nevertheless, in the process of constructing the flyover, state transport bus stop/s along the highway were removed and never gotten installed again. As a result, the availability of bus frequency is reduced as compared to the same before the construction of the flyover. Earlier, villagers were able to catch a bus going towards Mehsana or Ahmedabad at every 5 minutes; with the removal of the bus stop, many buses do not stop at the entrance to the village and by-pass using the flyover. Apart from the bus service, auto, shared van and other private transport facilities are easily available along the highway. Further, in absence of official bus stop along the SH 41, pick-up and drop-off of passengers by the public and private transport vehicles occur haphazardly and create a chaotic situation. In addition, absence of the official parking spot for autos, vans (Eco, Jeep, etc.) and tractors make the situation worst.

Moreover, various activities along the highway take place throughout the day (such as loading and unloading of materials, drop-off and pick-up of the passenger by private and public transport vehicles, a crossing of the highway (as the village is divided into 2 parts by the HWY), selling of fruits and vegetables, etc.), which involves pedestrian activity along the HWY, in absence of pedestrian pathway, chances of accidents are higher.

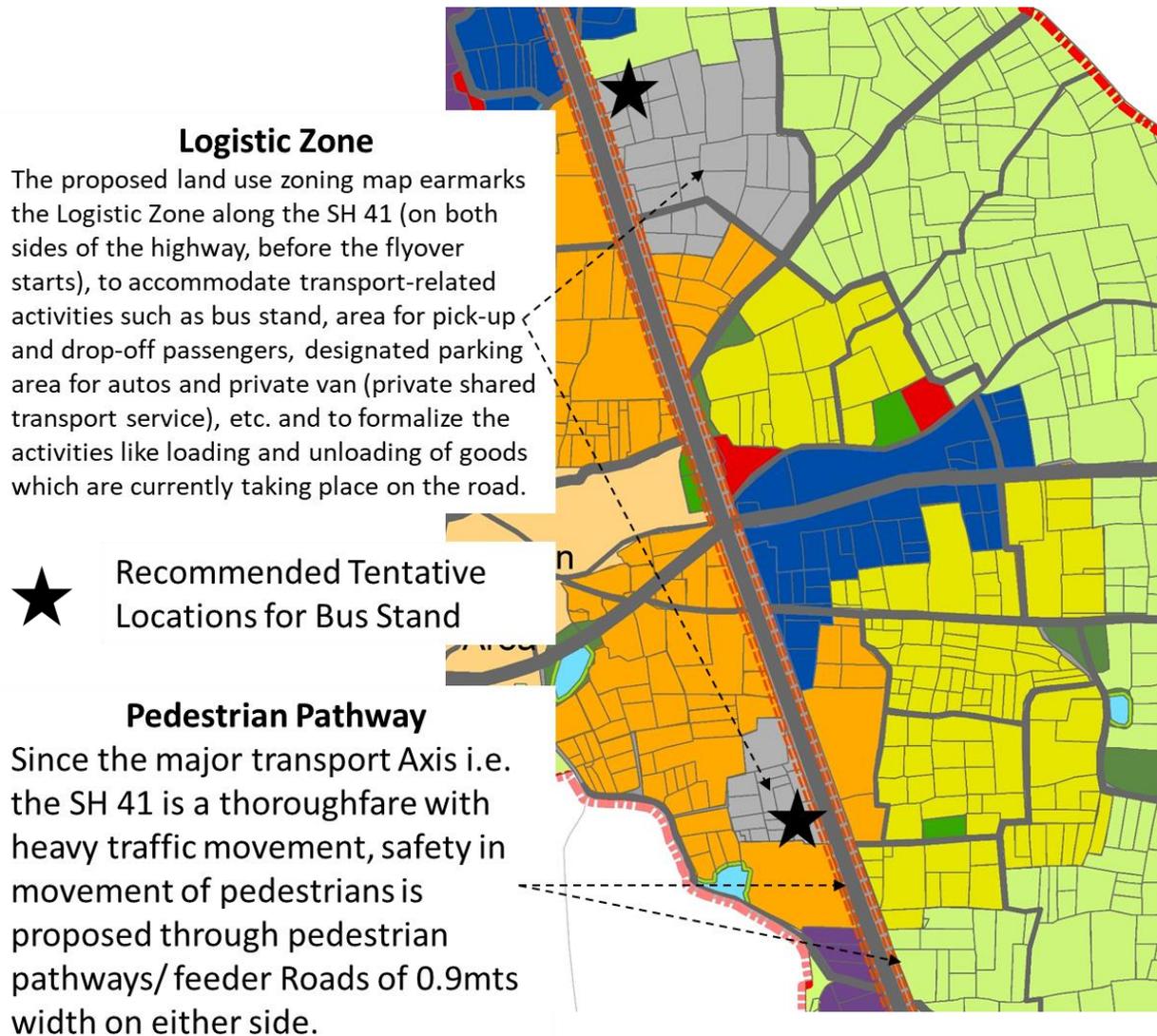
The road condition of the internal village road is good. Almost 70% of the internal village roads are paved and pucca roads and still, 30% of roads are either semi-pucca or kaccha. The panchayat is aiming to upgrade the kaccha roads into pucca using the fund available under various schemes. As per the panchayat, 90% of the internal roads have streetlights.

Proposals and Recommendation

- GPSDP proposes Logistic Zone along with the SH 41. The proposed land use zoning map earmarks the Logistic Zone along with the SH 41 (on both sides of the highway, before the flyover starts). Purpose of this zone is to facilitate transport-related activities- such as bus stops for drop-off and pick up of passengers by both the private and public transport service providers. Refer figure 22 for the suggested location for bus stops. Also, designated organized parking area for para-transit vehicles- autos, share van, and jeeps and formalized area for loading and unloading of good shall

also be established in this zone. The proposed land use zoning map earmarks the Logistic Zone along the SH 41 (on both sides of the highway, before the flyover starts).

Figure 22: Proposed Logistic Zone, Recommended Location for Bus Stands and Proposed Pedestrian Pathway along the Service Lanes of the SH 41



- Various activities along the highway take place throughout the day (such as loading and unloading of materials, drop-off and pick-up of the passenger by private and public transport vehicles, a crossing of the highway (as the village is divided into 2 parts by the HWY), selling of fruits and vegetables, etc., which involves pedestrian activity along the HWY, in absence of pedestrian pathway, chances of accidents are higher. Hence, the GPSDP proposes pedestrian pathway along

the service lanes of the highway for the safety of the pedestrian. Refer figure 22 for the suggested location of pathways.

- Upgrading the 1.06 km of kaccha roads to paved roads
- At present, 10% of inter-village streets do not have streetlights. It is recommended that all the village roads should have a street light. It is also recommended that all major cross roads/ junctions in the villages should be illuminated with LED towers.
- The plan also recommends that the feasibility of installing solar system on roofs of the government building shall be explored in consultation with UGVL.

9.5. Economic Activities

According to the Sarpanch and Talati, thought the village highly depends on agricultural activities, there is a lack of knowledge amongst farmers and cultivates regarding new technology in farming. Moreover, there is no KVK (Krishi Vigyan Kendra) center in the village to guide farmers and demonstrates technology generation, technology assessment and refinement and dissemination in the field of agriculture and allied sectors. Also, there are no skill development centers (Kaushlya Vardhan Kendra (KVK) or ITI) in the village for students and young work pool; such center is required in the village so the young work pool can be trained and absorbs in the surrounding industrial establishment/ various economic activities.

Proposals and Recommendations:

- Provision of Skill Development Center: - It is recommended the skill development centers like Kaushlya Vardhan Kendra (KVK), ITI should be established in the village. Courses such as sewing, tailoring, electrician, digital literacy, auto repairing, wireman, computer operator and programme assistant, welder, etc. shall be proposed at the centers to train younger work pool as well as the present work pool. Also, KVK (Krishi Vigyan Kendra) center in the village to guide farmers and demonstrates technology generation, technology assessment and refinement and dissemination in the field of agriculture and allied sectors. As per the standard, 1 such center per 5,000 of the population is required, which means to cater to the foreseen population around 5 skill development centers is required in the village. Such a center should be established along the road with a minimum of 6 meters wide. Training center can be established in the PSP and proposed Commercial and Economic Activity zones.
- At present, there is no cold storage facility available in the village. The plan recommend an establishment of one cold storage facility in the village; this can be developed in the proposed industrial zone.

9.6. Physical Infrastructure (Proposals)

9.6.1 Water Demand and Estimation for Wastewater Generation

This section foresees the water demand and recommendations to meet the gap in the facility for the planning area. Water demand and wastewater generation have been estimated for the GP. It is assumed that there will be continuous improvement in living standards of the population residing in the village after 2011 and so there will be an increase in water demand. For this exercise, the following assumptions are adopted with the reference to the CPHEEO guidelines:

- Per capita water supply level for the project area is 70 Lpcd
- Additional 15% of water demand for Unaccounted for Water (UFW) has been considered
- As water demand for the institutional and floating population is not available; addition 10% water demand has been considered.
- Firefighting water demand for the project area has been calculated in kiloliter per day based on the formula of population/100
- 80% of water supply is considered for wastewater generation

Estimated Water Demand

Based on the above-mentioned assumptions, the estimated water demand for the planning area is 2.05 MLD and 2.34 MLD by 2031 and 2041, respectively. Looking at the estimated water demand for the coming years there is a need to augment existing water supply sources. At present, the main source of water is 4 bore wells and the total water storage capacity is 0.18 MLD and addition 0.2 is proposed (for the estimation exercise 0.38 MLD total storage capacity is been considered). With these existing infrastructure, the panchayat supplies water for total of 4 hrs. (2 hrs. each morning and evening).

Table 34: Water Demand Estimation

GP Name	Population			Recommended Water Supply Level (CPHEEO)	Total Water Supply Req. (in MLD)	Existing Capacity MLD (1.75 lakh + 2 lakh proposed)	Additional Water Supply Req.	Total Wastewater Generation (in MLT)
	2011	2031	2041		2031/2041		2031/2041	2031/2041
Nandasan GP	13,440	20,995	23,956	70 lpcd	2.05/2.34	0.38	1.67/1.76	1.64/1.87

Source: CPHEEO Guidelines, and Primary Survey

Proposal and Recommendation

- Though the majority of households receive tap water (treated or un-treated sources), 5% HHs still do not have a tap connection. Also, at present, there are total 3,432 water connections in the village, which means to meet the future demand and cover the present gap addition 1,461 water connection will be required to be established. For which augmentation of the piped water network will be also required to be done. However, at present,
- Considering by 2041, the GP water demand will increase, to meet the future demand of 2.34 MLD by the horizon year, additional 1.76 MLD water supply capacity will be required to be augmented.

Estimated Wastewater Generation (Sewage System)

The total water requirement for the project area is 2.34 MLD (by the year 2041). As per CHPEEO Guideline, 80% of total water demand is considered as the sewerage flow; therefore, around 1.87 MLD water is expected to go in sewerage lines.

Currently, both open and close drainage system is available in the village, mostly close. Around 80 to 85% village is covered under the sewage network. Waste water from bathrooms and kitchen is directly connected with the close drainage network, and through the network, the untreated waste water from the households is discharged into the water bodies/ lake; as a result, the lake water is contaminated. In the area around the Meldi Mata Temple, underground sewage network is laid out but it is not connected with the main trunk line and so collected water from the HHs in the area is discharged on the road. Presently, toilets are connected with the septic tanks; almost all the households with toilets have septic tanks. However, they are not maintained well; they get clean on a required basis.

Proposal and Recommendation

- It is recommended that the priority shall be given to complete the incomplete work of sewage network, and HH sewage connection with the sewage network should be established.
- Provide remaining HHs with Individual Toilets. Currently, 29% HHs in the GP does not have individual toilets.
- At present, waste water from bathrooms and kitchen is through the closed drainage network discharged into the water bodies/ lake, without any treatment; as a result, the lake water is contaminated. Hence, a centralized conventional treatment plant, which consists of a combination of physical, chemical, and biological processes and operations to remove solids, organic matter and, sometimes, nutrients from wastewater. Sewerage Treatment Plant (STP) sites should be identified depending on considerations such as the quantum of environmentally suitable land, and availability of government land, capital and O&M cost of different options.

9.6.2 Solid Waste Management

Waste generation encompasses activities in which materials are identified as no longer being of value and are either thrown away or gathered together for disposal. The management of this waste refers to a systematic process that comprises of waste segregation and storage at the source, primary collection, secondary storage, transportation, secondary segregation, resource recovery, processing, treatment, and final disposal of solid waste.

Based on the CPHEEO standards, the following assumption were considered while estimating the volume of the solid waste and required area for the landfill site for the proposed urban population for the horizon year 2041:

- It is assumed, that solid waste will be collected by the panchayat on a regular basis
- Characteristic of the collected solid waste in the region will be the in consistent with the characteristics mentioned in the CPHEEO manual.
- Per Capita Solid Waste Generation-200 Grams per Capita per Day
- Composition of Collected Waste (Density in characteristics)- 0.55 tons per cubic meter
- Biodegradable Waste-75%, Inert Waste- 25%
- Active Period of the Landfill Site- 20 years
- Due to daily cover and components
- Increase in Volume of Liner- 10%, and in Cover- 12.5% (Due to daily cover and components)
- Decrease in Volume- 10% (Due to settlement & decomposition of waste)
- Landfill site is above the ground
 - Maximum Height of the Site- 25 meter
- Addition Landfill Area Required for Supporting Infrastructure- 15%
- Growth Rate of Waste Generation- 30% (Population Growth Rate of the GP)

Total estimated generated solid waste volume for the planning area is 1,748.79 tons per year, out of which only 437.20 cubic meters will be disposed to the landfill sites. Total required area to dispose of estimated volume is 0.01 sq.km by 2041.

Table 35: Estimation for Solid Waste Generation

	Units	
Projection for Solid Waste Generation		
Projected Population (2041)		23,956
Total Generated Waste per Day	Gram per Day	200
Total Generated Waste per Year	Tons per Year	1,748.79
Waste Disposal to the Landfill (25% of the total waste goes to the site)	cubic meters	437.20
Area Requirement for the Landfill Site		
Waste Generated in 20th Year	Tones per Year (TPY)	16,761.08
Total Waste	TPY	171,982.81
Total Volume in 20 Years	cubic meters	229,310.41
Volume of Daily Cover)	cubic meters	22,931.04
Volume for Components	cubic meters	57,327.60
Volume by Settlement	cubic meters	-22,931.04
1st estimate cu.mt	cubic meters	286,638.01
Total Required Landfill Area (sq.km)		0.01
Source: CPHEEO Guidelines		

Proposal and Recommendation

Currently, no door-to-door collection system is available in Nandasan GP. Community bins are installed in the village and its moral responsibilities of the villagers to dump their solid waste at the community bins. Every 2 to 3 days the waste from the community bins get collected for the disposal. However, there is no proper system of the disposal of the waste as well. The collected waste is being dumped on the dumping site without segregation. Once the site is full of the waste, the collected garbage is then disposed of by burning. GPSDP proposes the following proposals and recommendations for the management of solid waste in Nandasan.

- Door to Door collection and Transportation: - Gram panchayat shall be facilitating 100% door-to-door services. However, for achieving 100% door to door collection, the Gram Panchayats shall be provided with sufficient equipment which includes Small Commercial Vehicles (SCV), such as tractor, tricycle, etc. for the village. These vehicles will also transport the collected waste to the land fill site.
- Segregation of waste at source: - Segregation of organic waste and other waste must be done at the source. Here presented approach of waste segregation should be encouraged by the panchayat. However, since this transformation may take time and if the waste is not segregated at the source than it shall be segregated at transfer station by the panchayat.
- GPSDP recommends having a Treatment plant/ Compost plant to manage solid waste in the village effectively.

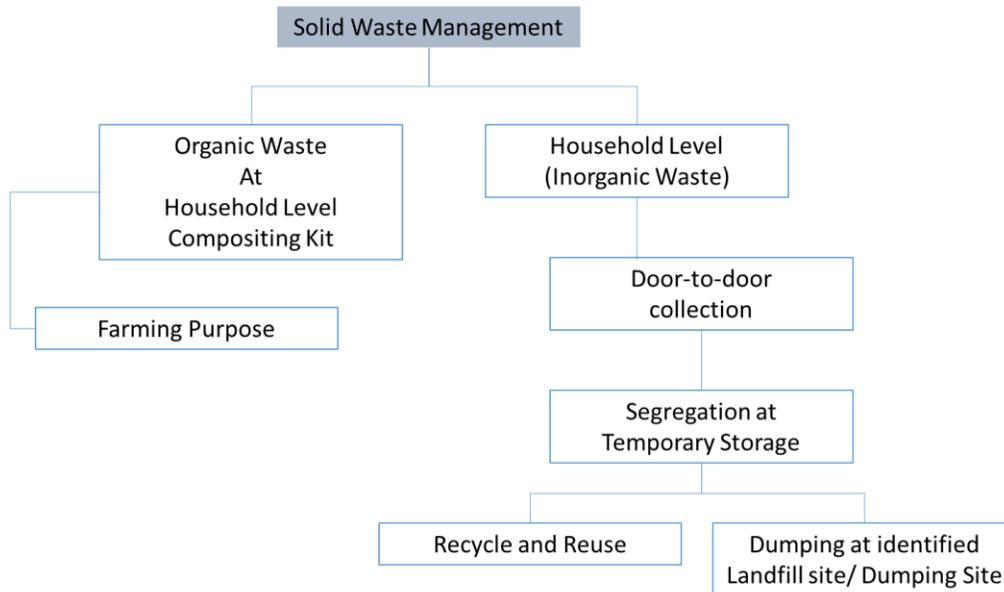
- Awareness regarding solid waste management and the importance of segregation at the source (at household) should be spread by the panchayat.

Treatment Plant or Compost Plant

The spatial development plan for Nandasan recommends having Compost treatment plant for managing solid waste in the village. The capacity of the proposed plant is 5 tons per day. This capacity will be able to cater to the projected population for 2041. Location for the garbage plant can be the site utilized for the dumping of solid waste. Different metallurgy material is segregated with separators and it is converted into manure or refuse-derived fuel or it can also be baled. This solid waste material can be used to produce manure, RDF and electricity by different methods of conveying, screening, and distorting. Thus in a way it can also serve the purpose of generating revenue to make it sustainable in long run. After segregating the waste, the waste is then transferred to the landfill site.

- **Provision of Composting Kits at Household Level:** - There will be different systems for organic waste and inorganic waste in solid waste management. For organic waste, there will be the provision of composting kit at the individual household level. Hence, organic waste will be used for farming purpose. Inorganic waste will be collected through door to door collection and segregated at temporary storage at the village level. Later segregation, recyclable waste will be reuse while non-recyclable waste will be dumped to the wasteland for fill up the ground (as per the present practice). Total projected houses for the village is 4,893; out of which current household stock is 2,787; hence, over 4,500 composting kits required by 2041; out of which currently, over 2,700 composite kits are required.
- **Guidelines for Locations of the Landfill Sites:** - Ideally, landfill site should be located in the area, which is at the distance from the residential development where people do not come directly in contact with the site. In addition, landfill sites should not be located close to the river, lake, parks, forest, wetlands, etc. The site should have with the area for both waste filling and supporting facilities. The waste filling area can proceed in phases with only a part of the area under active operation. The site should be facilities with access roads, equipment shelters, weighing scales, office space, location of waste inspection & transfer station, temporary waste storage and/or disposal sites for special wastes, areas to be used for waste processing, demarcation of the landfill areas, and demarcation of the areas for stockpiling cover material & liner material, drainage facilities, location of landfill gas management facilities, location of leachate treatment facilities, and location of monitoring wells. Biogas plants for bio-degradable waste can also be considered in association with the landfill site as future expansion. However, a detail project report is required to be prepared for the feasibility, design and the selection of the landfill site/s for the project area.

Figure 23: Recommended Solid Waste Management System



9.6.3 Storm Water System

Presently there is not stormwater drainage network in the village. During monsoons, rainwater following the natural contours and water flows towards the lake and eventually mixes with the lake water.

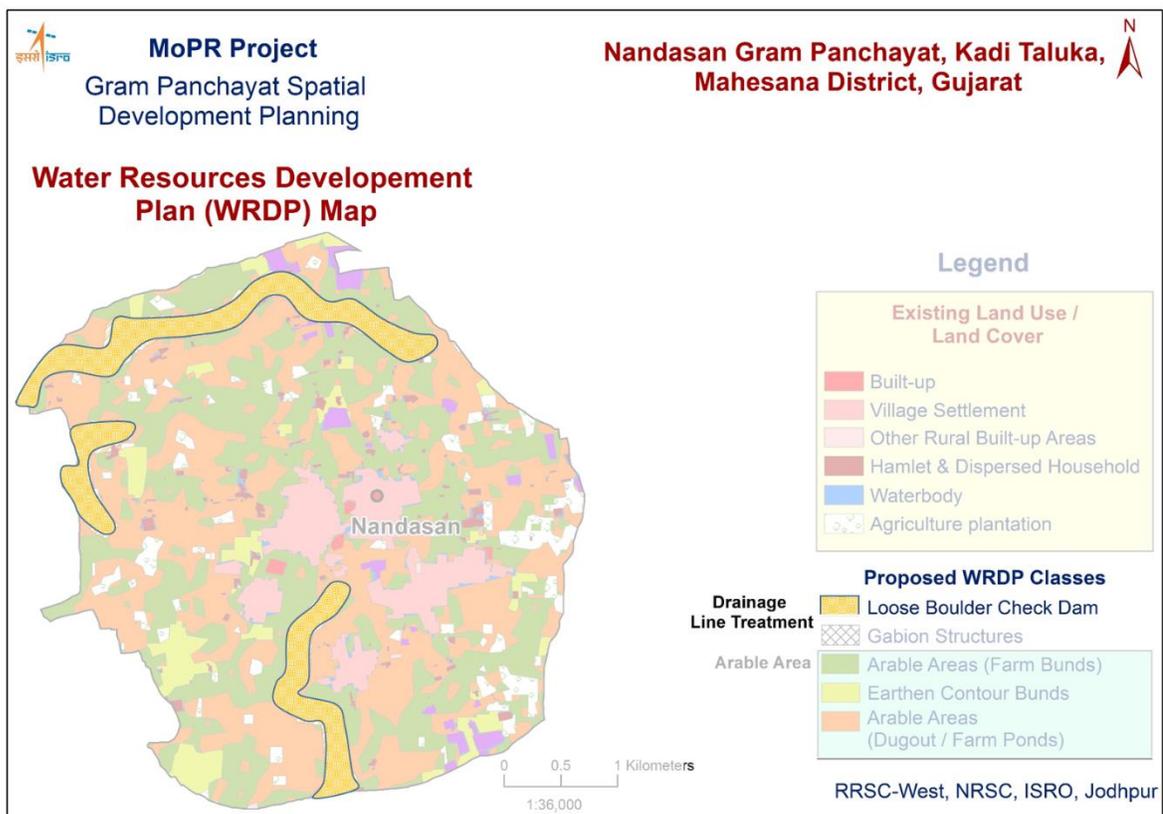
Proposal and Recommendation

Following are the recommendation for the strengthening the natural drainage system in the GP:

- GPSDP for Nandasan proposed the provision of Paver Block Streets with stormwater drains in the villages. Recommended width of the village street for this project is 3 meter to 4.5 meters. GPSDP also proposes upgrading the road with drains in the village.
- Provision of settling and screening technology based stormwater treatment plant in the catchment area of the lake.
- The spatial development plan also recommends that new roads should be planned in accordance with the slope, which will allow the natural drains to strengthen. Major stormwater drainage should be converged towards the river and should be parallel to the major transportation network. Roads should be proposed to be a carrier for the stormwater and can channelize the water towards the lake.
- Water bodies depicted are inventory of water storage structures and can be augmented with de-silting and other renovation. As per the water resources development plan by NRSC, drainage line although not very defined due to land-levelling but concentrated runoff will route through 2nd

order drainage derived from DEM for Nandasan gram panchayat. For the purpose of controlling the hydraulics in the channel flow the loose bolder check dams are suggested confining to 100 meter buffer of streams (refer figure 24 for the recommended locations for check dams). It is also recommended that, in farm ponds are with in farm and in black cotton and fine textured soils dugout pond or large diameter dug-well can be used for storing the run-off. Also, the GPSDP recommends that the earthen contour bunds should be explored as water harvesting technology for establishment of trees.

Figure 24: Recommended Locations for Check Dame



Source: Provided by NRSC

Table 36: Educational Facility Projection

Type of School	Population 2011	Existing No. Facility	Required	Surplus/ Deficit	Population 2041	Required	Additional
Pre-Primary School (Aanganwadi)	13,440	7	5	2	23,956	5	-2
Primary Schools (primary + middle) I-VIII		3	3	0		5	2
Secondary Schools (IX to X)		1	2	-1		3	2
Senior Secondary (XI-XII)		1	1	0		2	1
Colleges		0	0	0		0	0
Source: Census of India, Village Profile 2020, and URDPFI Guidelines							

- **Pre-Primary School:**

Generally, pre-primary schools refer to Anganwadi. As per URDPFI guidelines, one pre-primary school is required for every 2,500 of population. The total pre-primary schools available within the village are 7. As per Census 2011, the pre-primary school scenario in the planning area is in surplus. Further, by 2041, a total number of required pre-primary schools is 5, which means no additional new anganwadi will be required in Nandasan GP.

- **Primary School (Primary + Middle School):**

Generally, primary plus middle schools refer to the grade of education starts from standards 1st to 8th. As per URDPFI guidelines, one primary School is required for every 5,000 of population. The total primary schools available within the planning area are 3. Further, by 2041, the total number of required primary schools is 5, which means 2 additional new schools will be required in Nandasan GP.

- **Secondary School:**

Secondary schools refer to the grade of education from 9th to 10th. As per URDPFI guidelines, one secondary school is required for every 7,500 of population. There are a total of 1 secondary school located in the village. Further, by 2041, the total number of required secondary schools will be 3 which means 2 additional new schools will be required in Nandasan GP.

- **Senior Secondary School:**

11th and 12th grades of education referred to senior secondary schools. As per URDPFI guidelines, one senior secondary school is required for every 15,000 of population. The total senior secondary schools available within the planning area is 1. At present, there is having one school in the village is sufficient; however, by 2041, 2 senior secondary schools will be required in Nandasan GP; hence, additional one new schools will be required. If the additional school is a government school, then it can be established in the

proposed PSP zone/ on the government land or if it is a private school then it can be developed in the proposed new settlement zone area.

- **College:**

Generally, college refers to graduate-level education. As per URDPFI guidelines, one college served per unit for every 125,000; hence, there is no requirement of establishing a college in the village,

9.7.2 Health Facilities

Adequacy of the health facility is assessed for the village to understand the differential requirement for the projected population by the year 2041.

- **Sub-Health Center:**

As per the Indian Public Health Standards (by Ministry of Health and Family Welfare (MoHFW)), one sub-center is required for a population of 5,000 people. At present, there is only one sub-center in the village and 3 additional required. By 2041, additional 3 sub health center will be needed in the village to serve the foreseen population.

Table 37: HealthCare Facility Projection

Type of Facility	Population 2011	Existing No. Facility	Required	Surplus/ Deficit	Population 2041	Required	Additional
Sub-Center	13,440	2	3	0	23,956	5	3
Primary Health Center		0	0	0		1	1
Community Health Center		1	0	1		0	0
Maternity & Child Welfare Center		0	1	0		2	2
Source: Census of India and MoHFW Guidelines							

As per the Indian Public Health Standards (by Ministry of Health and Family Welfare (MoHFW)), one sub-center is required for a population 5,000 people, one Primary Health Center (PHC) for 30,000 of population, one Community Health Center (CHC/Rural Hospital) for a population of one lakh, and one Maternity & Child Welfare Center is required per 15,000 of population.

- **Maternity and Child Welfare Center:**

As per the standards, one such center is required for a population of 15,000 people, which means, which means, with the foreseen population of 30,685 total 2 such centers are required in the village. Currently, there is no center in the village; hence, and 2 additional will be required by 2041.

- **Primary Health Center:**

As per the Indian Public Health Standards (by Ministry of Health and Family Welfare (MoHFW)), one sub-center is required for a population 30,000 people, which means, with the foreseen population of 23,956 total 1 PHC is required in the village. Currently, there is no PHC located in the village; hence, and one additional will be required by 2041.

- **Community Sub-Center:**

As per the Indian Public Health Standards (by Ministry of Health and Family Welfare (MoHFW)), one Community Center (CHC) is required for a population 1 lakh people, which means, with the foreseen population of 23,956, and presence of the CHC within the panchayat jurisdiction is not required. Currently there is 1 CHC located in the village.

Proposal and Recommendation

Overall, the village has enough health care facilities to serve the present population. Nandasan has one CHC, which is not required by the standard. Considering the fact that the village does not required any CHC by the standards and yet there is one CHC is in Nandasan, it is assumed that instead of adding 3 sub health center, having established one new sub center will be sufficient to server the projected population. Hence, it is proposed to develop one new sub health center, 1 primary health center and two new maternity and child welfare center in the village, which can be developed by the government in the proposed PSP zone or the proposed commercial and economic activity zone, if it is by a private developer.

9.7.3 Social and Cultural Facilities

As per URDPFI guidelines, one recreational center or a neighborhood park is required for every 15,000 of population, and for other socio-cultural facilities; facility center is required per every 100,000 of population. As per the Village Profile and the Sarpanch, the GP has one Public Park, community hall and open-air theater, which is sufficient facilities to serve the present population. However, one additional recreational center (such as a public park, community hall, playground, sports field etc.) will be by 2041 to serve the projected population. Hence, GPSDP proposes to develop one new public park/ public recreational facility or children playground; which can be developed in Park and Open Space or PSP zones.

Table 38: Social and Cultural Facility Projection

Type of Facility	Population 2011	Existing No. Facility	Required	Surplus/ Deficit	Population 2041	Required	Additional
Recreational Center	13,440	1	1	0	23,956	2	1
Socio Cultural Facilities other than Recreational Center		0	0	0		0	0

Source: Census of India, Village Profile 2020, and URDPFI Guidelines

9.7.4 Communication Facility

Post office and telecommunication are the various means of communication facilities available in the village. Adequacy of the communication facility is assessed of the planning area to understand the differential requirement for the projected population by the year 2041. Analysis of the communication facilities had been done using URDPFI guidelines and Census 2011 data. However, with the extensive use of mobile services, in the current scenario availability of telecommunication became insignificant; hence, this aspect of socio-physical infrastructure is not included here.

Post Office

As per the URDPFI Guidelines, one post office is required per 15,000 of population. As per the Census 2011, a total number of post offices recorded within the project area is 1. By the year 2041, a total of 2 post offices will be required in the project area; hence, additional 1 new post offices will be required to meet the demand.

Table 39: Projections for Communication Facilities

Type of Facility	Population 2011	Existing No. Facility	Required	Surplus/ Deficit	Population 2031	Required	Additional
Post Office	13,440	1	1	0	23,956	2	1

Source: Census of India, Village Profile 2020, and URDPFI Guidelines

9.7.5 Financial Services

Generally, banking facility refers to Co-operative Commercial, Agricultural Credit Societies, and other Credit Societies. Financial services have further divided into four categories such as Co-operative Commercial, Agricultural Credit Societies, and other credit societies included in the Banking Facility for the planning area. As per URDPFI guidelines, one bank is required per 15,000 of the population; which

means, only 1 bank is required in the village. By the year 2041, total 2 banking facility will be required in the Nandasan; however, at present the total 3 facilities available in the village, no additional bank establishment required to meet the demand.

Table 40: Projections for Financial Facilities

Type of Facility	Population 2011	Existing No. Facility	Required	Surplus/ Deficit	Population 2031	Required	Additional
Banks	13,440	3	1	2	23,956	2	0

Source: Census of India, Village Profile 2020 and URDPFI Guidelines

9.7.6 Cooking Fuel- LPG Facility

As per the panchayat report, 90% HHs in the village have LPG facilities. Though the LPG gas cylinder agency is not located in the GP, but twice a week LPG gas cylinder distributors visit the village for cylinder supply, villagers need to register for the cylinder with the distributors one day in advance. Recently around 10% HH has installed PNG pipeline service for more convenience (as per the Sarpanch and Talati). Remaining household still uses kerosene and wood as cooking fuel; the majority of such households fall under BPL category.

- Social awareness regarding the benefits of LPG as a cooking fuel is required to spread.
- Establish LPG connection to the remaining 10% of households

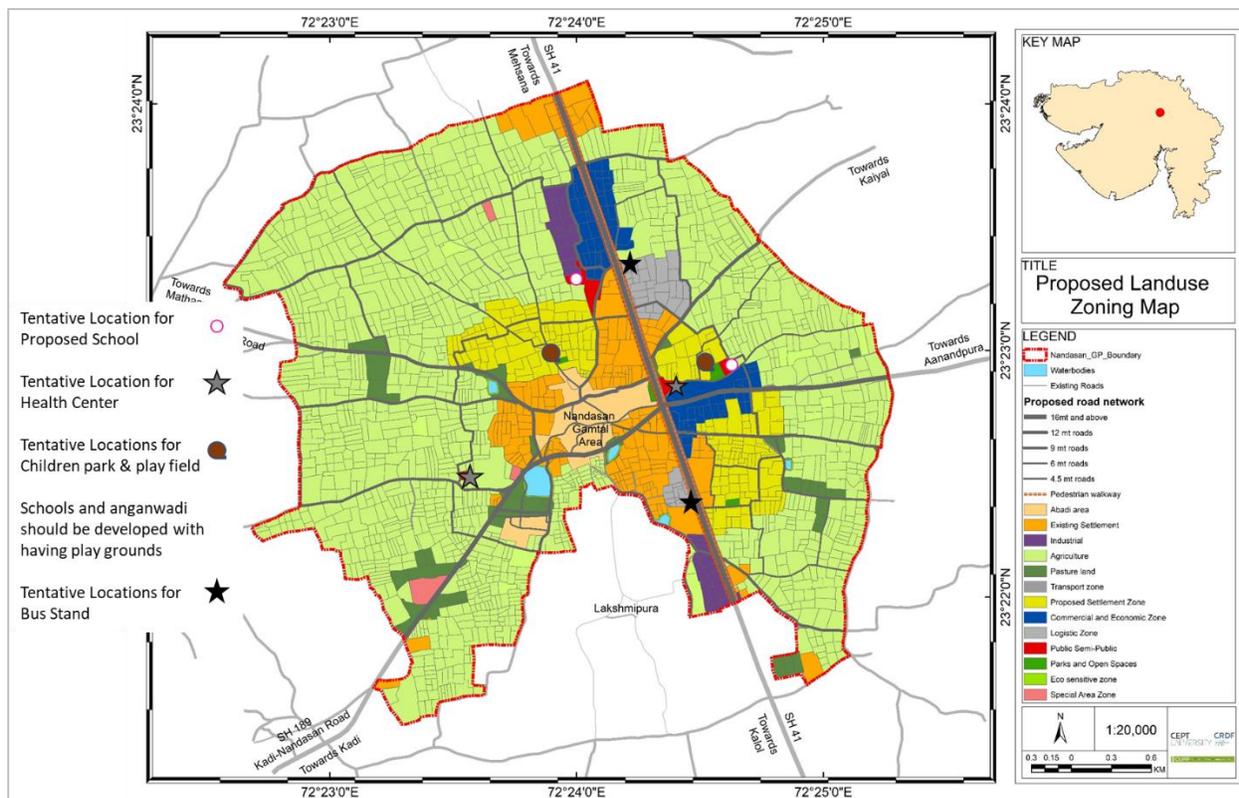
Proposals and Recommendations for Social Infrastructure

- Two additional primary to secondary schools (from 1st grade to 10th grade) and one new senior school (11th and 12th grade) are required to meet future demand. If the additional schools are government schools, then they can be developed in the proposed PSP zone, if they are private schools by private developers then it can be developed in the proposed new settlement and commercial and economic zones as well. In any cases, new schools' locations should be in proximity to the settlement areas. Further, minimum road width required for a new school establishment is 6 meter. It is recommended that all aganwadies and school should have children playground as part of the school.
- Overall, the village has surplus health care facilities to serve the present population. Nandasan has one CHC, as per the URDPFI guideline one CHC is required for a population 1 lakh people; which means the village does not require to have CHC in the GP area. Because the village does not require any CHC by the standards and yet there is one CHC is in Nandasan; hence, it is assumed that instead of adding 3 sub health center, having established one new sub center will be sufficient to server the projected population. Hence, it is proposed to develop one new sub health center, 1 primary health center and two new maternity and child welfare center in the village. Any new

government health center can be developed in the proposed PSP zone; while private hospitals, dispensaries, maternity health center developed in the proposed new settlement and commercial and economic zones. In any case, location for any new health centers should be in proximity to the settlement areas. Further, minimum road width required for a sub-health establishment is 6 meter and for a hospital, development is 9 meters.

- One recreational center, such as a public park, children playground and park, community hall, etc. will be required to develop by 2041 to serve the projected population. Public park, children playground and garden can be developed in the proposed park and open space zone; while small community hall can be developed in the proposed new settlement and commercial and economic zones as well.
- Additional 1 new post offices will be required to meet the demand.
- Establish LPG connection to the remaining 10% of households

Figure 26: Recommended Tentative Locations for Social Amenities



9.8. Recommendation for Implementation Strategy

Identified proposals by the GPSDP Nandasan shall be implemented through various central and state-level schemes. The table below identifies schemes under which the proposals can be implemented.

Table 41: Recommendation for Implementation Strategy- Through Central and State Schemes

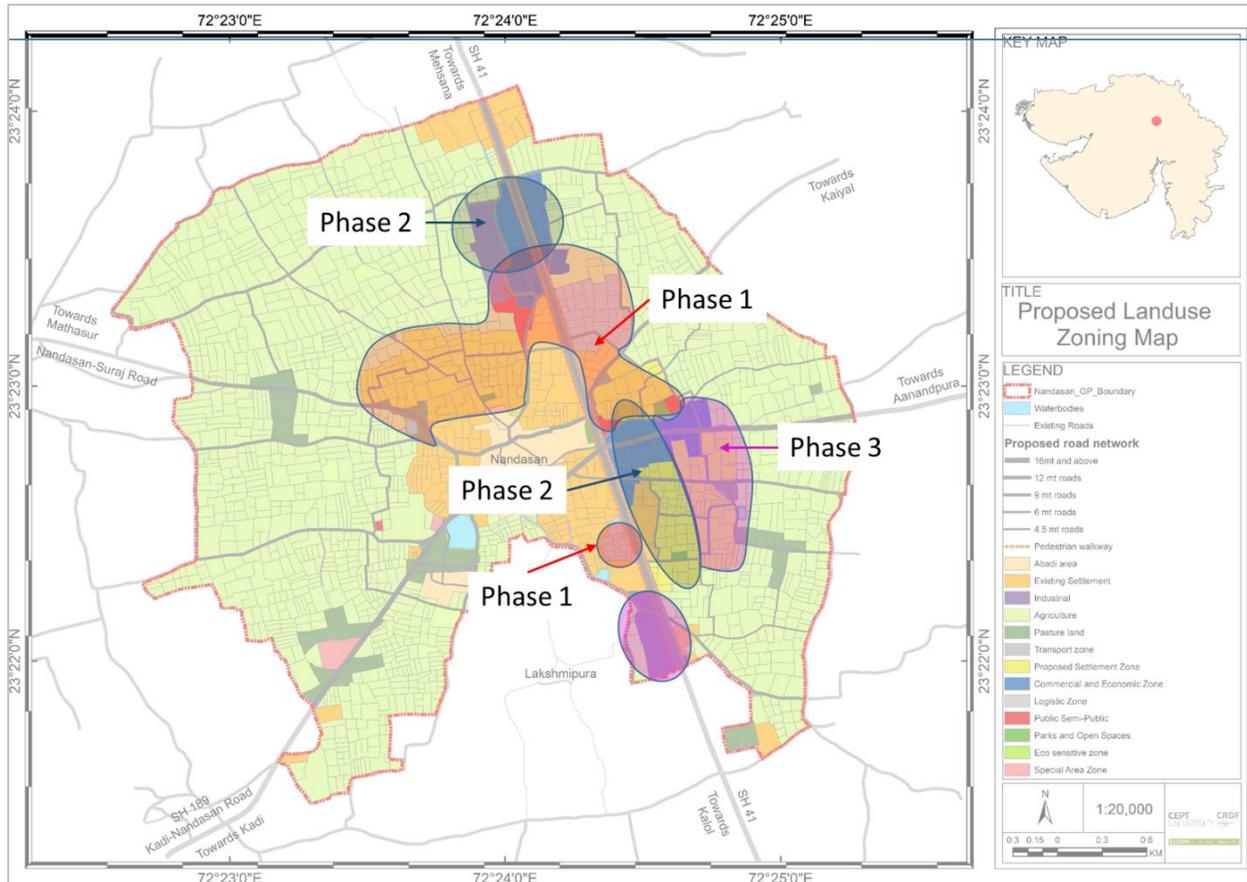
Category	Project	Scheme Name
Housing	At present, there are 6.2% of households are in dilapidated condition. Upgradation of Kaccha Houses	PMYA
Village Road and related infrastructure	Provision of upgrading unpaved roads to paved roads	Pradhan Mantri Gram Sadak Yojana
	Provision of solar system on roofs of the government buildings	UGVL
	Provision of Streetlight, and LED towers at junctions	Jyoti Gram Yojana
	Provision of new CC roads in the villages	District Fund, MLA Fund, Pradhan Mantri Gram Sadak Yojana,
	Provision of Bus Stand	
Training linked to economic activities	Provision of pedestrian pathway along the service lanes of SH 41- in proximity to the village	District Fund, MLA Fund, Pradhan Mantri Gram Sadak Yojana
	Skill Development Center	DDU-GKY, National Backward Classes Finance & Development Corporation, GCSRA, Mason Training- PMYA
Water Supply	Provision of cold storage	MLA Fund, District fund, Community social responsibility fund (CSR)
	Expansion of distribution network and provision of the water connection to all household through the water supply system.	National Rural Drinking Water Programme (NRDWP), Quality Monitoring and Surveillance (WQMS), GWSSB, WASMO, MGNREGA
Provision for additional Water Storage Capacity to meet future demand		
Sewage Network/ Sanitation	Provide remaining HHs with Individual Toilets (Laterin facility at HH level)	Swachh Bharat Mission/ MNREGA/ GWSSB
	Complete the incomplete work of sewage network	
	Establishing HH sewage line connection with the sewage network, to the main sewage network trunk.	
	A centralized conventional sewage treatment plant	

Category	Project	Scheme Name
Solid Waste Management	Provision of Composting kit at Projected HH for 2041 (4,893 HH)	Swachha Gram Swastha Gram
	Provision of Landfill site	MLA Fund, District fund, Community social responsibility fund (CSR)
	Provision of Treatment Plant/ Compost Plan	SBM Gramin
	Provision of Transportation Infrastructure for achieving 100% door-to-door collection and to transport the collected waste to the land fill site.	SBM Gramin
Storm Water Drainage	Provision of Paver Block Streets with stormwater drains in the villages. Recommended width of the village street for this project is 3 meter to 4.5 meter.	GWSSB (Gujarat Water Supply & Sewerage Board)
	Upgrading road with drains in the village	
	Provision of settling and screening technology based stormwater treatment plant in the catchment area of the lake.	
Education	Two additional primary to secondary schools (from 1st grade to 10th grade) and one new senior school (11th and 12th grade) are required by 2041	Sarva Siksha Abhiyan
Health	One new Sub-Health Center	National Rural Health Mission (NRHM)
	One Maternity and Child Welfare center	National Rural Health Mission (NRHM)
Communication Facility	Additional Post Office required	
Recreational Facility	Provision for a public park with children playground	
LPG Connection	Provision of LPG Connections to the remaining 10% HHs	Pradhan Mantri Ujjwala Yojana

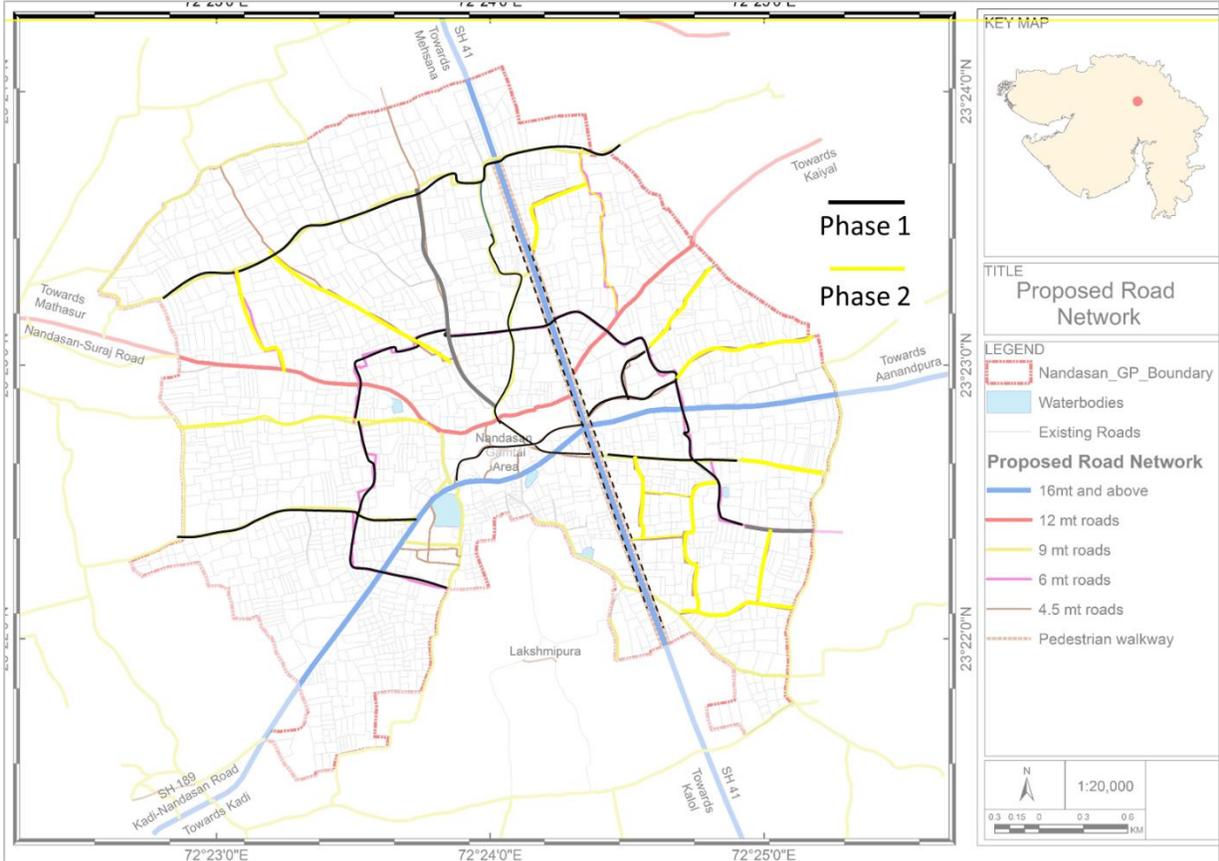
9.9. Implementation Phasing

The spatial development plan for Nandasani GP recommends development in phasing. The plan recommends opening areas for development and upgrading road network in phasing as shown in the maps below.

Map 21: Recommended Implementation Phasing for Developable Land



Map 22: Recommended Implementation Phasing for Proposed Road Network



9.10. Recommendations for the Development Control Regulation⁴

Development control regulations give shape and form to the built environment. So far no such provisions exist specifically for rural areas. This section of the report presents recommendations for the development control regulations in Nandasan GP. Here presented recommendations are adopted from the Framing Guidelines for Model Land Uses, Development Controls, and Service Level Benchmarks with Appropriate Enforcement Mechanisms for Rurban Clusters developed by School of Planning and Architecture Delhi (SPA Delhi) for Ministry of Rural Development.

Key Definitions for a Spatial Development Plan

Following are the suggested key definitions for the Gram Panchayat Spatial Development Plan:

- **Development:** With all its variations and cognate expressions, development means the carrying out of any building, engineering, mining, or other operations in, on, over and under land or the making of any material changes in any building or land or the case of use of any building or land and includes layout and sub-division of any land.
- **Agriculture:** Agriculture includes horticulture, farming, growing crops, fruits, etc., breeding and keeping of livestock, use of land for any purpose, which is ancillary to cultivation or any other agriculture purposes.
- **Amenity:** It includes roads, streets, open spaces, parks, playgrounds, recreational grounds, water and electric supply, street lighting, sewerage, drainage, public works and other agriculture purposes.
- **District:** A district constituted from time to time under the Land Revenue Code or any other relevant state act in force in a state.
- **District Development Officer:** Such an officer as a state government may appoint to be the district development officer for this act or officer of a similar rank.
- **District Panchayat:** A district panchayat (zilla panchayat) as per the relevant state panchayati raj act.
- **Land:** This includes benefits to arise out of the land, and things attached to the earth or permanently fastened to anything attached to the earth.
- **Village Panchayat/ Gram Panchayat:** A village panchayat, taluka or block panchayat, or district panchayat as constituted under a state panchayati raj act.

⁴ Here presented recommendations are adopted from the Framing Guidelines for Model Land Uses, Development Controls, and Service Level Benchmarks with Appropriate Enforcement Mechanisms for Rurban Clusters developed by School of Planning and Architecture Delhi (SPA Delhi) for Ministry of Rural Development.

- Regulations: Regulations made by a block Samiti would include development regulations and any other regulations made as a part of a cluster development plan.
- Revenue Village: Revenue village is a small administrative unit with defined borders. One revenue village may contain many hamlets.
- Sarpanch: An elected head of a village panchayat may be called a Sarpanch.
- Taluka: Taluka means a taluka as constituted from time to time under a relevant state act.
- Taluka Panchayat: Taluka panchayat means a panchayat constituted from time to time under a Panchayati Raj Act.
- Tax: Tax, or rate imposed under an act of a state government, which does not include a fee.

Recommendation for Guidelines for Reserving Land for Public Purposes

Here, recommended guidelines for reserving land for public purposes are derived from the national level guidelines such as URDPFI, and CPHEEO. These guidelines suggest to reserve available public land or government land for development of public amenities. However, these guidelines are based on population and are suggestive in nature, and hence open to modifications.

Table 42: Space Requirements for Reservation of Land for Amenities at Village Level

S.No	Amenities at Village Level	Population Range	Area Requirement	Minimum Road Width Requirement
1	Skill Development Center	1,000 - 5,000	300 - 500 sq.mt	Minimum 6 m
2	Agriculture Services and Processing Center	1,000 - 5,000	300 - 500 sq.mt	Minimum 6 m
3	Warehouses for Cold and Dry Storage	1,000 – 5,000	300 - 500 sq.mt	Minimum 6 m
4	Primary School	One for 2,500	800 sq.mt	Minimum 6 m
5	Secondary School	One for 5,000	4000 sq.mt	Minimum 6 m
	Senior Secondary	One per 15,000	Area per school is 1.80 ha; Maximum ground coverage 50 per cent	Minimum 9 m
6	Health Sub – Center	3,000-5,000	800 – 1,200 sq.mt	Minimum 6 m
	Primary Health Center	One per 30,000	0.20 - 0.30 ha	Minimum 9 m
7	LPG Distribution Center	2,500	100 sq.mt	Minimum 6 m
8	Common Service Center	1,000	100 sq.mt	Minimum 6 m

Note: The space norms provided are indicative and can be applied as per the suitability and decisions are taken by a local plan preparing agency.

Source: Framing Guidelines for Model Land Uses, Development Controls, and Service Level Benchmarks with Appropriate Enforcement Mechanisms for Rurban Clusters developed by School of Planning and Architecture Delhi (SPA Delhi) for Ministry of Rural Development.

Recommendation for Building Development Guidelines

Building development guidelines provide guidelines related to buildings in a rural settlement area and settlement extension area or buffer area. These guidelines are based on road widths to avoid congestion and to ensure sufficient spaces for provision of infrastructure.

Table 43: Recommendation for Building Development Guidelines

Road Width in meter	Minimum Plot Size (sq. m)	Uses Permissible	Front Setback in m	Side Setback in m	Rear Setback in m	Maximum Permissible Building Height and Maximum Ground
Less than 9 m	<100	Residential, Commercial, others	A = 1.5	A = 1.0	A = 1.0	MPBH = 7 m GC = 60 %
			AE = 1.5	AE = 1.0	AE = 1.0	Others = 75 %
09 to 12	100	Residential, Commercial, others	A = 1.5	A = 1.0	A = 1.5	MPBH = 10 GC = 60 %
			AE = 3	AE = 1.0	AE = 1.5	Others = 75 %
12 to 18	100	Residential, Commercial, others	A = 1.5	A = 1.0 AE = 2.25	A = 1.5	MPBH = 15 GC = 50 %
			AE = 3		AE = 3.0	Others = 60 %
18 to 24	100	Residential, Commercial, others	A = 3	A = 1.5 AE = 2.25	A = 2.25	MPBH = 15 GC = 50 %
			AE = 3		AE = 3.0	Others = 60 %

Note:

- A= Abadi & Existing Settlement Area
- AE= Abadi Extension areas, such as Proposed Settlement Zone, Commercial & Economic Zone, Industrial Zone, and Logistic Zone
- Animal crossing in the form of an underpass to be provided if village animals will have to cross a road with a right of way of 18 meters or more.
- MPBH = Maximum permissible building height; GC = Ground Coverage for Commercial Use; GI = Ground Coverage for Industrial Use; O = Ground Coverage for Other Uses

Source: Framing Guidelines for Model Land Uses, Development Controls, and Service Level Benchmarks with Appropriate Enforcement Mechanisms for Rurban Clusters developed by School of Planning and Architecture Delhi (SPA Delhi) for Ministry of Rural Development.

Recommendation for Parking Norms

Parking of vehicles is likely to become a critical issue in a village well as more people and households would own more private vehicles per person with rising economic development. Thus another important aspect of planning for as well.

Table 44: Recommendation for Parking Norms

Land Use Category	Parking Norms
Residential	1 ECS for 100 sq mt of built space
Commercial	2 ECS for 100 sq mt of built space
Public Semi-Public	2 ECS for 100 sq mt of built space
Mandi and Godowns	2 ECS for 100 sq mt of the plot area
Industry	2 ECS for 100 sq mt of built space
Note: ECS= Equivalent Car Space	
Source: Framing Guidelines for Model Land Uses, Development Controls, and Service Level Benchmarks with Appropriate Enforcement Mechanisms for Rurban Clusters developed by School of Planning and Architecture Delhi (SPA Delhi) for Ministry of Rural Development.	

CHAPTER 10: WAY FORWARD

Preparation of Nandasan GPSDP is a part of an initiative started by MoPR as a pilot project for integrated spatial and economic development in the rural areas of India. For this pilot project, total 32 gram panchayats and 16 institutes were identified for preparation of the Gram Panchayat Spatial Development Plan. CEPT University is being one of these institutes involved in preparing the GPSDP for two gram panchayats, namely, Nandasan Gram Panchayat, District Mehsana and Tarapur Gram Panchayat, District Anand. Prepared GPSDP for Nandasan GP is a document with a set of proposals for land uses in the gram panchayat to have a systematic development in the village, to provide quality of life to the villagers through planned growth and to spur overall economic growth of the area. The plan also covers proposals and recommendations for social & civic amenities and infrastructure development.

A development plan is usually a broad vision for the project area that includes a broad brush policy, projects, and recommendations for the various topic, such as land use zoning, housing, social and civic amenities, utilities, infrastructure, etc.; which are further needed to be detailed out and should be implemented systematically. Currently, the ministry is in process of formulating an implementation strategies for the systematic implementation of the plan. This section of the GPSDP for Nandasan GP recommends the following consideration that should be taken up into account while formulating an implementing mechanism of the GPSDP:

- Public Participation and Transparency:

Normally public participation has a positive impact on the quality of governance, where transparency is considered as the first step of the public participation process as it means that all the stakeholder/ public have access to all the necessary information to contribute to decision making. Therefore, it is recommended that the prepared Gram Panchayat Spatial Development Plan should be kept in a public domain so villagers can review the plan; however, a period should be specified by the implementation authority for such review. In addition, public participation can be done through gram sabhas. Further, a methodology or mechanism for collecting and reviewing comments and suggestions from the villager should be recognized.

Statutory provisions, similar to GTPUD Act, for enabling the action of keeping the plan open in the public domain for public inspection is required for keeping the plan in the public domain for receiving objection and suggestions. In case of GTPUDA the local authority is responsible to prepare, publish and receiving objections and suggestions on the development plans. Similar statutory, institutional and implementation mechanism is required to be formulated for the systematic implementation of the spatial development plan for the rural area.

- Self-Revenue Generating Model:

Empowerment of panchayats lies in the ability of a self-revenue generating institution to finance their expenditure. Therefore, a self-revenue generating model through panchayat for the implementation of the GPSDP should be explored so that the panchayat does not only need to depend on state government devolutions and fund for the development in the village. This would lead to the timely development of the required infrastructure and amenities. Through the panchayat's internal generation of resources, such as water supply charges, housing tax, developing commercial spaces on government land and leasing out for the various economic activities, development through a public-private partnership, etc. can help the panchayat become self-sufficiency and independent with the reduced dependency on the availability of funds via central and state government. Moreover, along with the development of infrastructure and amenities, the self-revenue generating model should also include the aspect of maintenance of the developed infrastructure and amenities in a long run.

- Implementation Mechanism through Land Pooling Model (Town Planning Scheme):

Town Planning Scheme is an implantation tool developed based on the land pooling mechanism for the development of public facilities. The GPSDP recommends that the similar to the section 40 of the GTPUD Act (Gujarat Town Planning and Urban Development Act), a statutory mechanism enabling the implementation of the Gram Panchayat Spatial Development Plan through land pooling mechanism (Town Planning Scheme) should be explored. This would help in reducing dependency on the availability of government land for the required development of amenities and infrastructure and avoid land acquisition for the same. Moreover, the land pooling mechanism is public participation oriented implementation mechanism; hence, implementation of the GPSDP through Town Planning Scheme would also bring transparency in the implementation process.

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ANNEXURE

CHAPTER 11: ANNEXURE

Annexure 1: Household Survey Form- in Gujarati (Regional) Language

હાઉસહોલ્ડ સર્વે								No.							
પ્રતિસાદ આપનારનું નામ:								નિવાસનો સમયગાળો:				સ્થાન:			
ધર્મ:				જાતિ:				માલિકી: ભાડે:				બીપીએલ કાર્ડ: રેશન કાર્ડ:			
મૂળભૂત માહિતી															
સભ્ય	ઉંમર	સેક્સ	વૈવાહિક સ્થિતિ	લાયકાત	શિક્ષણ સુવિધાનું સ્થાન	વ્યવસાય	જોબનું સ્થાન	વાહન માલિકીનું					સ્થાન તર સ્થાન	ડિજિટલ સાક્ષરતા	
								2	3	4	5	કંઈ નહીં			
વ્યવસાયમાં પરિવર્તન જો કોઈ હોય તો: ક્યારે અને કારણ:															
મોબાઇલ વપરાશ / નેટવર્ક															
સભ્ય	કનેક્ટિવિટી		ઇન્ટરનેટનો ઉપયોગ		વાઇફાઇ / બ્રોબંધ		ઉપયોગનો હેતુ								
	સારું	ગરીબ	હા	ના	હા	ના	ફેમિલી કનેક્ટ	કામ	અભ્યાસ	ઓનલાઇન ખરીદી	ઇમરજન્સી ઉપયોગ				

અવધિ											
જો કૃષિ / બાગાયતી			જો કુશળ / અશિષ્ટ લેબર / મત્સ્યઉદ્યોગ / صنعت			જો વ્યવસાય					
સામેલ સભ્યોની સંખ્યા:											
વિસ્તાર		માટીનો પ્રકાર	પ્રકાર			પ્રકાર					
પાકનો પ્રકાર			સ્થાન			સ્થાન					
આવર્તન			મુસાફરીની રીત			મુસાફરીની રીત					
સિંચાઈનો સ્ત્રોત			યાત્રા અંતર			યાત્રા અંતર					
જો હા, યોજના / ખાનગી			સીમાંત / પૂર્ણ વર્ષ			સીમાંત / પૂર્ણ વર્ષ					
બીજ ઉપલબ્ધતા (ક્યાંથી)			વેતન			વાર્ષિક આવક					
શું પાકની પદ્ધતિમાં કોઈ ફેરફાર છે?			ગુણવત્તા અને સપોર્ટ સ્થિતિનું વર્ણન અને સમસ્યાઓ જો કોઈ હોય તો								
સ્ટોર સ્થાન			રોજગાર સુવિધા			આર્થિક સુરક્ષા / ભવિષ્ય નિધિ, પેન્શન વગેરે.					
તમે ક્યાં વેચો છો			સ્વચ્છતા સુવિધા			કામ શિફ્ટ ટાઇમિંગ					
પે પે			હીથકેર સપોર્ટ			કોઈપણ અન્ય ટિપ્પણી					

જો સેવા જોબ				
વધુ અભ્યાસ અથવા કૌશલ્ય વિકાસ માટે અવકાશ		યાત્રા અંતરની ટિપ્પણી અથવા ફેરફાર માટે ટિપ્પણીઓ		
અવકાશ અને સુવિધા અપગ્રેડ કરવાની		સમય અને મુશ્કેલીઓ પર ટિપ્પણી શિફ્ટ કરો જો કોઈ હોય તો		
શું તમે કોઈપણ સર્પોર્ટ સુવિધાને પ્રાધાન્ય આપો છો?		કોઈપણ અન્ય ટિપ્પણી		
જમીન હોલ્ડિંગ				
ઠાસરા નં.	વિસ્તાર:		જમીન હોલ્ડિંગનો સમયગાળો:	
ખેતીભાયક:	ગળી જવું/ fallow land:			
વધારાની જમીન ધારક/ Additional land holding:		વિસ્તાર:	હેતુ:	
હાઉસિંગ (બિલ્ટ અપ ડિટેલ)				
સ્ટ્રક્ચરનો પ્રકાર	કચ્છ	પાકું	સેમી પાકું	
સામગ્રી (છત)	ઘાસ / ખાંચો / વાંસ	કાદવ	અનબ્રંટ ઇંટો	મોટાર સાથે સ્ટોન
સામગ્રી (વોલ)	ઘાસ / ખાંચો / વાંસ	કાદવ	અનબ્રંટ ઇંટો	મોટાર સાથે સ્ટોન
બિલ્ડિંગ ંયાઇ	જી	જી + 1	જી + 2	જી + 3
યોજના ((Yes/ No))				
રચનાની ઉંમર	10 વર્ષથી ઓછા	10-20 વર્ષ	20-50 વર્ષ	50 થી વધુ વર્ષો
શરત	સારું	જીવંત	જર્જરિત	

સેવાઓ										
સેવાઓ	પ્રાપ્યતા સિસ્ટમ અનુસરી	આવર્તન અને જથ્થો	યાત્રા અંતર	સુવિધાઓ	મોસમી વિક્ષેપો					
					ઉનાળો	વરસાદી				
પાણી પુરવઠા અને સંગ્રહ (જોડવાની તસવીર)				ફૂવો / હેન્ડ પંપ / બોરવેલ / ખાનગી ટેપ / સાર્વજનિક ટેપ						
સોલિડ વેસ્ટ સંગ્રહ (જોડવાની તસવીર)				ડમ્પિંગ / કમ્પોસ્ટ / કલેક્શન કાર્ટ ખોલો						
વીજળી				હાઉસ હોલ્ડ / સિંચાઈ						
પરિવહન				બસ / ટેમ્પો / ટ્રેક્ટર / બુલ્લોક કાર્ટ / 2 વ્હીલર / 4 વ્હીલર / સાયકલ						
ટેલિફોન										
રાંધણ ઇંધણ (જોડવાની તસવીર)				એલપીજી / કેરોસીન / ફાયર વુડ / બાયોગેસ / ડબર કેક						
શ્રેષ્ઠ પ્રયાસો (જોડવાની તસવીર)				વરસાદનાં પાણીની ખેતી / ખાતર / રસોડું ગાર્ડન / સૌર ઉપકરણો						
ટોઇલેટ્સ										
અવલેબિલિટી yes / No	જો હા, વપરાશ હેઠળ	જાહેર	ખાનગી	સમુદાય	ખુલ્લા માં શૌચ	યોજના હેઠળ / પોતાના બાંધકામ	જો યોજના હેઠળ; પ્રાપ્ત રકમ:	પાણી જોડાણની ઉપલબ્ધતા	છબી જોડવાની છે	

	(yes / No)								(yes / No)				
માસિક ખર્ચ													
માપદંડ	ખોરાક	આરોગ્ય	શિક્ષણ / તાલીમ	પરિવહન	ભાડુ	નવરાશ							
રેન્કિંગ													
એકમ રકમનો માસિક ખર્ચ:				જો વ્યાજ ચૂકવવું હોય તો કેટલું:				વ્યાજનો સમયાવાધિ:					
આરોગ્ય													
સભ્ય	આરોગ્ય કાર્ડ / વીમો	આદતો				પ્રાથમિક આરોગ્ય સંભાળનું સ્થાન	કિટિકલ કેરનું સ્થાન	મુસાફરીની રીત	યાત્રા અંતર	એક મહિનામાં હોસ્પિટલની મુલાકાતની સંખ્યા	1 વખતની મુલાકાત માટે ફી ચૂકવવામાં આવે છે	છેલ્લા 2 વર્ષથી આરોગ્યના પ્રશ્નો	મૃત્યુના કારણો જો કોઈ હોય તો
		અલ્કોહોલ	ધૂમ્ર પાન	તમાકુ	અન્ય								

રસીકરણ જો કોઈ હોય તો: હા નહીં														
વિવિધ સરકારી આરોગ્ય યોજનાઓ વિશે જાગૃતિ: હા / ના														
એસેટ્સ														
પશુધન	નંબર	સમસ્યા / રોગ	વાણિજ્યિક (Yes/ No)		અન્ય સંપત્તિ	હા નાં								
ગાય / 'ભેંસ					ટેલિવિઝન									
બળદ					સ્માર્ટફોન									
બકરીઓ					રેફ્રિજરેટર									
ચિકન					સૌર ઉપકરણો									
ઘોડાઓ					સ્ટોવનો પ્રકાર									
ગધેડા					કમ્પ્યુટર / લેપટોપ									
અન્ય														
વિલાજ ઈન્ફ્રાસ્ટ્રક્ચરના સુધારણા માટે સૂચનો														
સામાજિક સુવિધાઓ	શિક્ષણ સુવિધાઓ	હેલ્થકેર સુવિધાઓ	વ્યાપાર સુવિધાઓ	રોજગાર સુવિધાઓ										

											pi ng	

OCCUPATION												
IF AGRICULTURE/ Horticulture				IF SKILLED/UNSKILLED LABOUR/ FISHING/ INDUSTRY					IF BUSINESS			
No. of members involved:					1	2	3			1	2	
Area		Soil Type		Type			Type					
Crop Type				Location			Location					
Frequency				Mode of Travel			Mode of Travel					
Source of Irrigation				Travel Distance			Travel Distance					
if yes, scheme/private				Marginal/ Full Year			Marginal/Full Year					
Seeds Availability (From where)				Wages			Annual Income					
is there any change in cropping pattern				Quality and Support status description and problems if any								
Store Location				employment facility			economic security/ provident fund, pension etc.					
Where do you sell				hygiene facility			Shifts timing of work					

Produce p.a.		healthcare support		any other remarks	
IF SERVICE JOB					
scope for further study or skill development		Travel Distance remarks or comments for change			
scope and facility to upgrade		Shifts remarks on timing and difficulties if any			
would you prefer any support facility		any other remarks			

LAND HOLDING				
Khasra No.		Area:		Time Period of Land Holding:
Cultivable:		Fallow:		
Additi onal Land Holdin g:			Area:	Purpose:

HOUSING (Built up Detail)				
Type of Structure	Kachcha	Pucca	Semi Pucca	
Material (Roof)	Grass/thatch /bamboo	Mud	Unburnt Bricks	Stone with Mortar
Material (Wall)	Grass/thatch /bamboo	Mud	Unburnt Bricks	Stone with Mortar
Building Height	G	G+1	G+2	G+3
Scheme (Y/N)				

Age of structure	Less than 10 Years	10–20 Years	20–50 Years	More than 50 Years
Condition	Good	Livable	Dilapidated	

SERVICES						
Services	Availability system followed	Frequency and quantity	Travel Distance	Facilities	Seasonal Interruptions	
					Summer	Rainy
Water Supply & Storage (Image to be attached)				Well / Hand pump / Bore well / Private Tap / Public Tap		
Solid waste collection (Image to be attached)				Open Dumping / Compost / Collection Cart		
Electricity				House Hold / Irrigation		
Transportation				Bus / Tempo / Tractor / Bullock Cart / 2 wheeler / 4 wheeler/ Cycle		
Telephone						
Cooking Fuel (Image to be attached)				LPG/ Kerosene/Fire wood/Biogas/Dung Cake		
Best Practises (Image to be attached)				Rain water Harvesting/Composting/Kitchen Garden/ Solar Appliances		

TOILETS									
Availa- bility (Y/N)	If Yes, Unde- r Use (Y/N)	Pub- lic	Pri- vat- e	Comm- unity	Ope- n defe- cati- on	Un- der Sch- em- e/ Ow- n Co- nst- ruc- tio- n	If under scheme; Amount received:	Availa- bility of water Connecti- on (Y/N)	Image to be attached

MONTHLY EXPENDITURE						
Criteria	Food	Health	Education/ Training	Transportation	Rent	Leisure
Ranking						
Lump-sum Monthly Expenditure:			If paying Interest then how much:		Time period of Interest:	

HEALTH													
Memb- er	Healt- h Card / Insur- ance	Habits				Loca- tion of Pri- mary He- alth Car- e	Locat- ion of Critic- al Care	M- ode of trav- el	Trave- l Dista- nce	No. of visit to Hospita- l in a month	Fee s pai- d for 1 time visi- t	He- alt- h Iss- ue s for pa- st 2	Cause of Death If any
		Alc- hol	Sm- oki- ng	Tobac- co	Oth- ers								

Annexure 3: Sarpanch Questionnaire- in English

1. Background Information about Sarpanch

	Name		Age:
	Caste		
	Education		
	Contact No		

2. Cultural Information about village (Source: Sarpanch/Talati)

	Languages spoken	Gujarati	Hindi	English	Other
	Religion and (Population %)	Hindu	Muslim	Christian	Others
	Types of Caste				
	Types of Tribes				
	Pilgrimage Centers in Village				
	Tourist centers				
	Monuments and heritage				

3. Educational Profile of village (Source: Schools of villages)

	% of population with higher secondary education	
	% of population with secondary education	
	% of population with Primary education	
	Enrolment and Dropout rate M/F	

4. Skill Development (Source: Sarpanch/Talati)

	% of population with knowledge of digital gadgets (e-literacy)	Smart Phones		Computer	
	Campaigns for Digital literacy				
	No of beneficiaries % (M/F)	Total	Male Total No Percentage	Female Total No Percentage	
	Types of skills with villagers				
	Schemes undertaken for skill development				
	No of beneficiaries % (M/F)	Total	Male Total No Percentage	Female Total No Percentage	
	Identified needs for skill development				
	Agencies involved in skill development/training				

5. Demographic data (Talati/Sarpanch)

	% Population disabled				
	% Population of single woman				
	Age profile (age bracket with the largest % of population)				
	Age profile of the village	0-14	14-35	35-60	>60

6. Basic Infrastructure Information of the villag (Sarpanch/Talati/ Water supply dept.)

Water				
Water supply system	Piped		Public Tap	Public Hand Pumps
Water supply source	Lake	Ground Water	Canal	Tankers

Water supply agency	Panchayat		State Govt. Agency		Other		
Depth of water table	Winter		Summer		Monsoon		
Timing for water supply	Once in a day (Hours)			Twice in a day(hours)			
Water supply treatment plant	Type			capacity			
ESR and Ground storage capacity	No of ESR:			No of sump:			
	Total Storage Capacity:			Total Storage Capacity:			
Age of infrastructure							
Number of	Hand Pumps			Stand Posts			
HH Covered by each hand pump and stand post							
% of HH with individual WS connection							
Per capita availability of water							
Metering system	yes		no		Coverage(%HH)		
Quality of water							
Water supply systems of historical/religious significance							
Sanitation and Drainage							
Drainage system in the village	Open Drainage		Closed drainage		Piped drainage network		No drainage
Agency providing Drainage							
Toilet coverage in the village (%) Caste wise	Total (%)						
Condition of individual toilets							

Percentage open defecation					
Number of public toilets in the village					
Condition of public toilets	good		average		bad
Public toilets connected to	A) Open drain	B) Soak Pit	C) Septic tank	D) Sewerage	
If not connected to sewage, Alternative Grey water Disposal	A) Side Drain (Closed)	B) Side Drain (Open)	C) Discharge to open plots / roads	D) Discharge to Water bodies	
Sewerage system coverage (%)					
Sewerage treatment plant	Type		Condition		
Alternate system (if any)					
Recycling system (if any)					
Storm water drains					
% of streets covered with drains					
Type of drains (covered /uncovered)					
Storm water disposal facilities					

Solid waste				
Solid waste collection?	Door to door	Secondary	Dumping	No collection
Collection frequency				
Segregation methods used				
Agency for solid waste collection				
Service charge for Door to door collection (Rs.)				
Existing facilities for treatment				
Existing facilities for disposal				
Any non-conventional/nonconventional method for organic composting				
Waste disposal facilities for hazardous/industrial waste				
Do you reuse the solid waste elsewhere?	Yes	Where:		No
Electricity				
Electricity coverage of village				
Availability of three phase electricity	Yes		No	
No of connections	Residential connections	Agricultural connections	Industrial Connections	
Power cut Duration Issues (hours/day)				
Non-conventional source of electricity				

Potential of renewable energy usage	Wind	Solar	Mini Hydel							
Cooking fuel/ LPG availability (Sarpanch, LPG agencies)										
What is the cooking energy used?	A. LPG Gas cylinder	B. Pipe system	C. kero sene	D. Fire wood	E. othe rs					
No of HH with LPG connections										
No of LPG godowns										
Social Infrastructure (Sarpanch, Schools, Hospitals) {All School data to be written individually on left page for each school}										
No. of Educational institutions in village (If not available then distance of it from the village)	A. Primary School		B. Secondary School		C. Higher secondary school		D. Govt. College		E. ITI center	
	Govt	Pvt	Govt	Pvt	Govt	Pvt	Govt	Pvt	F. Aan gan wadi	
School specifications	No of standards	Total no of classes	No of teachers	No of male students	No of female students					
	Separate toilets	Drinking water	Bench availability	Play ground	Compute r Lab	Mid-day meal				
School for physically challenged person										
Healthcare facilities in village and no.	A. Primary health center		B. Samuhi k Arogya Kendra		C. Govt . Hos pital No. Of beds :		D. Mobile health unit		E. Vete rinar y hosp ital	
	F. Lady health visitor?		G. Pathol ogical service s		H. Doctor availability in village					

If not in village than Distance from village					
Infrastructure facilities at health care centers	No of beds:	Operation theatre	Maternity service	Ambulance	
	X-ray, Citi scan machines				
Diseases in last one year					
Road Network					
Coverage of village streets					
Length of roads in % (length in km)	Kutcha	Semi-Pucca	pucca		
Connectivity with major roads	MDR	State Highway	National Highway		
Width of village streets(motorable/n on-motorable)	motorable		Non-motorable		
Capacity of existing roads					
Pedestrian pathways available					
Transportation (ST depot, Sarpanch)					
Public transport at HH level	Chhakada	Rickshaw	Tempo	Others	
Public transport	Direct connectivity to taluka HQ		Direct connectivity to District HQ		
	Frequency per day		Frequency per day		
Destination with highest frequency of	Bus		Chhakada		
Public transport connectivity at Cluster level	Bus Terminals	Railway stations	Local Trains connectivity		

Improvement proposal				
Village street lights				
Street Light availability(per km)	Yes		No	
Type of street lights	LED		Sodium vapour	
Nonconventional methods for Street lighting				
No of street lights to be replaced				
Irrigation (Talati/Sarpanch)				
Source of Irrigation	Well/Tube well	Canal	Khet talavadi	Rain water
Area under irrigation (in hectares)				
Fuel used for irrigation	Electricity	Diesel	Kerosene	Non-conventional
Area under drip irrigation				
Environment Information (General public)				
Drinking water quality	Good		Satisfactory	Bad
Usage of renewable energy in village	Solar	Biogas	Wind	Other
Major Polluters	Vehicle	Industries	Sewage	Solid waste

4. Economic profile of the village (Talati/Sarpanch)

Presence of occupations in the village	Agriculture	Industrial	Home based industry	Others
Occupation that villagers are involved in				

Home based or traditional industries		
MSME cluster details	No:	Types:
Employment Generated by		
Average distance to work place		

7. Agricultural Services and Processing (Talati/Sarpanch)

Type of crops			
Crop Yield and area			
Any Existing agricultural service center			
Yes	No		
Issues and need for up gradation			
Agro processing Industries	Type	Size	Scale
Yes	No		
Presence of adequate storage & warehousing facilities			
Presence of cold storage facilities			
Presence of mandis/wholesale agri produce markets (No and distance between these mandis)			

Issues related to optimum yield					
Identified requirement of additional support infrastructure to improve agri-productivity.					

8. Digital Amenities (Talati/Sarpach)

ICT enabled front end Common Service Center	Issues :				
yes	no				
Connectivity under NOFN/Broad Band connectivity					
Coverage of the above 2 services					
Coverage under E-Kranti					
% of households with digital connectivity					
% of households with at-least one e literate person					

9. Institutional infrastructure (Talati/Sarpanch)

Banks			
Sahkari Mandali			
Post office			
ATM			
Cooperative dairy			
Panchayat Building			
Anganwadi			
Gram Hat			

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