# DRAFT

# COMPREHENSIVE DEVELOPMENT PLAN 2031 (SECOND REVISED)

# PART I: EXISTING CONDITIONS, STUDIES & ANALYSIS





# **RAJKOT URBAN DEVELOPMENT AUTHORITY**

# DRAFT

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# (SECOND REVISED)

# PART I: EXISTING CONDITIONS, STUDIES AND ANALYSIS



SUBMITTED TO THE STATE GOVERNMENT UNDER SECTION 16 OF THE GUJARAT TOWN PLANNING AND URBAN DEVELOPMENT ACT, 1976



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# **SECTION I: INTRODUCTION**

#### 1.1 BACKGRO UND

Gujarat is one of the most developed states of India. The state is endowed with vast reserves of mineral and characterized by high industrialization. It features high rate of GDP growth and contributes almost 20% to India's overall industrial output. Power, construction and trade contribute a major share to the prosperity of the state. A Gujarat stand 5th is the contribution towards the total GDP of the nation.

Gujarat, with its mission to make itself a vibrant place to live and work, has been implementing several structural reforms in the recent past. With its growing industrialization, presently, the state is all set to achieve an exponential growth curve. To facilitate such economic growth, increasing needs of the people for better quality of life and to cater the burgeoning trade through the hinterland, the state has also drawn an infrastructure road map and intends to develop a world class infrastructure to sustain the rapid pace of economic growth. Gujarat has experienced a rapid rate of urbanization in last four decades.

There are 8 municipal corporations and 9 urban Development Authorities within the state of Gujarat. Rajkot is the one of the largest city in Gujarat in terms of population as well as in area. Rajkot is also the **Rajkot is the 28th urban agglomeration in India and is ranked as 22nd in "World's fastest growing cities & urban areas" for the period 2006 to 2020.**<sup>1</sup>Looking at its growth rate and rapid expansion, there is a pressing need to reconsider and redirect the development and growth patterns in the next decade.

Rajkot, since its foundation has been major urban centre, it is the centre for social, cultural, commercial, educational, political and industrial activities for the whole of Saurashtra

<sup>&</sup>lt;sup>1</sup> FTANT Database & FHWA Highway Statistics 2005, Asian Cities Database by ITPD, WRI/EMBARQ & CAI-Asia 2005, JnNURM CDPs, ITPS Public Transport for Sustainable Mobility in Asian Cities, DTRS: Australian Trends to 2020

region. In 1646 AD a permanent settlement had begun further the city was ruled by various Hindu and Muslim kings. In 1822 AD East India Company established a khothi for the first time, first railway line in Kathiawar was establish during 1872-73 AD in Rajkot. The Golden period of Rajkot started from the time of Sir Lakhajiraj (i.e. 1905 AD) which shows institutions, residential areas and markets being developed, special school and libraries for girls were established.

Rajkot became the capital of Saurashtra region with the end of the British rule and the most prosperous period of Rajkot began. The decade since 1947 A.D. saw a phenomenal increase in the population and size of Rajkot and its all round development in education, industry, commerce, culture, etc. Today, it is a major small scale industrial & trade hub in the whole Saurashtra region.

## 1.2 REGIONAL CONTEXT

Rajkot is strategically located in the centre of Suarashtra Region in the Aji basin. Rajkot is spread on both banks of Aji River which cuts through the city. The city is well connected not only to major towns within the state but also to neighboring states through strong transportation linkages all by rail, and road.

The notified Rajkot Urban Development Area is carved out of the one district and 5 talukas - **Rajkot, Padadhari, lodika, kotdasangani and Tankara** from Rajkot District. RUDA is surrounded by the other small villages form other talukas.

Within a periphery Form the boundary of RUDA there are 3 urban centers (Municipalities) namely Jamnagar in the north westerns part, Bhavagar to the southeast and Junagadh in the east.



FIGURE 1 REGIONAL CONTEXT OF RUDA AREA

#### **Growth of Rajkot**

In 1646 AD a permanent settlement had begun further the city was ruled by various Hindu and Muslim kings. In 1822 AD East India Company established a khothi for the first time, first railway line in Kathiawar was establish during 1872-73 AD in Rajkot.

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saw a phenomenal increase in the population and size of Rajkot and its all round development in education, industry, commerce, culture, etc.

#### 1947-1961

Decision of establishing small scale industrial estate at **A** (Bhakti Nagar Industrial area) is responsible for the development of area **B** (Bhakti Nagar Station Plot), for residential and commercial purpose. Change in the land use pattern had an impact on the surrounding areas.

Commuting routs C and D (which connects Surendranagar and Bhavnagar made it possible for development of surrounding area for the residential and industrial use. E Roads joining Rajkot and Jamnagar helped in the development of the areas for residential purpose, but the development was slow. Shifting of the railway line from the middle of the city and construction of Dhebar road altered the infrastructure of the city to a considerable extent.

#### 1961-1990

A being main lines of communication by road and rail respectively to Rajkot and other industrial cities, the area developed as residential area for the workers.



from Jamnagar

to Jamnagar

**B** road connects to Bhavnagar and B' developed as Aji industrial estate, the portion limits itself to residential and industrial land use as the area is bounded.



from Wankaner

**C** Physical growth took place towards Gondal road and Bhaktinagar due to the development of roads, national highways and industrial estate and new infrastructure.

**E** Saurashtra University developed on the western side of the city and the area is now slowly developing with institutional and residential land use, there by accelerating the growth on Kalawad road.

## 1.3 RAJKOT URBAN DEVELOPMENT AUTHORITY (RUDA)

As stated above the Rajkot Urban Development Authority came into existence on the 1<sup>st</sup> day of February, 1978. The following are the powers and functions of Rajkot Urban Development Authority under the provisions of section-23(I) of GTP & UD Act, 1976. The area under jurisdiction of RUDA was



686.31sq.km. The first expansion was done in the year 2002 that include 18 villages on the all over side covering an area of 203.31sq.km.

## 1.3.1 FUNCTION OF RUDA

Under Section 23(1) of Gujarat Town Planning and Urban Development Act 1976. The power and functions of an Urban Development Authority shall be,

- (i) To undertake the preparation of the Development Plan for the Urban Development Area.
- (ii) To undertake the preparation of Town Planning Scheme.
- (iii) To guide, direct and assist the local authorities' f authority and other statutory authorities functioning in Urban Development.
- (iv) To guide, direct and assist the local authorities of authority and other statutory authorities function in Urban Development Area in the matter pertains to planning, development area in the matter pertaining to planning, development and use of Urban land.

- To control the development activities in accordance with the development plan in the Urban Development Area.
- (vi) To execute works in connection with water supply, disposal of sewerage and provision of other services and amenities.
- (vii) To acquire, hold manage and dispose of property movable or immovable as it may deem necessary.
- (viii) To enter into contract, agreement or arrangement with any local Authority/Person or organization as the urban development authority may consider necessary for performing its functions.
- (ix) To carry out any development work in the urban Development Area as may be assigned to tit by the State Government from time to time.
- (x) To exercise such other powers and performs such other function as are supplemental, incidental or consequential to any of the foregoing powers and functions or as may be directed by the State Government.

## 1.4 PLANNING AREA AND ADMINISTRATIVE FRAMEWORK

Based on the Administrative entities the RUDA area can be categorized in two distinct areas:

- 1) Rajkot Municipal Corporation
- 2) Rest of RUDA



FIGURE 2 ADMINISTRATIVE BOUNDARY OF RUDA

# 1.4.1 RAJKOT MUNICIPAL CORPORATION (RMC)

The local body of Rajkot city received the status of Municipal Corporation in 1973. It is governed under provisions of the Bombay Provincial Municipal Corporation Act of 1949. Rajkot Municipal Corporation (RMC) is responsible for the provision and maintenance of the city's civic infrastructure and its administration.

The RMC area was divided into 18 wards and 1 zone namely Central covering an area 69 sq.km before year 1998.Spatial distribution of the population within the city over the decades shows that up to 2001 most of the new population added to the city was concentrated within the RMC limits itself, especially in the western part.

In year 1998, around 35.85 sq.km area gad been added on the western side of the city, which made the total area of the city to 104.85sq.km.Expansion of the peripheral areas began in the 2011 and has continued since then.



#### FIGURE 3 RAJKOT MUNICIPAL BOUNDARY

TABLE 1 ADMINISTRATIVE ZONES OF RUDA

No	Administrative zones	Area(sq.km)
1	Central Zone	22.25
2	West Zone	47.92
3	East Zone	34.68
	Total Area	104.85

(Source:GIS databse RMC)

## **Rest of RUDA**

Rest of RUDA included villages surrounding Rajkot Municipal Corporation area other than Growth centers within the RUDA Administrative Boundary. It includes 54 villages combining with 686.31sq.km of land.

## 1.5 PAST PLANNING EFFORTS

The planning process for the city of Rajkot is governed by the Gujarat Town Planning and Urban Development Act, 1976 under the provisions of which the Rajkot Urban Development Authority prepares the development plan for the entire area of RUDA including the area under the Rajkot Municipal Corporation. With this RMC is left with the preparation of Town Planning Schemes for the area under its jurisdiction based on the development plan prepared by RUDA.

The sanctioned Development plan required to be revised at least once in ten years and accordingly RUDA has undertaken the work of first Development plan was prepared in the year 1984.

The state of Gujarat as it exists today was then formed on 1<sup>st</sup> May 1960. It was realized that the preparation of DP for areas confined within the Municipal boundary would not meet the challenges of urban development since the urban growth knows no boundaries. It was felt that if planning activities are undertaken in a more rational and scientific basis with reference to development of areas which are not necessarily restricted to the areas within the jurisdiction of local authorities, it will be possible to create better conditions. It was, therefore, considered necessary to replace the aforesaid Act by a more comprehensive planning legislation was enacted titled as " The Gujarat Town Planning and Urban Development Act,1976" which came into force from 1<sup>st</sup> February,1978in the State of Gujarat.

Under the effect of this act RUDA got its first Sanctioned Development Plan in the year 1984 and same was revised for the first time in the year 2002. RUDA has prepared 12 Town Planning Schemes and RMC has prepared 36 TP Schemes under this act.



FIGURE 4 PAST PLANNING EFFORTS

The salient features of the previous two development plans are explained below:

#### 1984 Development Plan

- Land under green was reserved
- Reservations for public purpose by RMC

#### 2002 Development Plan

- Provision of restricted residential zone
- De-reservation policy adopted and public utility plots made available through TPS
- Planning in accordance with Transportation to Segregate Regional and Domestic traffic by proposing Ring Road.

# SECTION 2: METHODOLOGY & APPROACH

## 2.1 INTRODUCTION

The methodology and approach followed in the process of preparation of a development plan plays a significant role to produce an efficient and high quality plan. Moreover the methodology and approach undertaken support the achievement of the aims and objectives of the plan.

This chapter talks about the Development Plan & its purposes and gives the complete methodology adopted for preparation of development plan. It details out the four phases in the process of preparation of development plan and presents the objectives formulated for development plan.

## 2.2 DEVELOPMENT PLAN AND ITS PURPOSE

Development plan is a medium term comprehensive plan of spatio-economic development of the urban centre.

Revised Development plan for Rajkot shall indicate the manner in which the use of land in the area covered by it shall be regulated and the manner in which the development therein shall be carried out.

The Draft Revised Development Plan is to be prepared considering various demands of projected population for the next 10 years of the entire urban development area. The existing land use, circulation pattern, development potentiality of the land etc., are to be considered while deciding future proposals. Proper distribution of the residential, industrial, commercial zone, as well as open and recreational spaces is to be suggested to evolve overall urban form for entire RUDA area for the year 2031.

## 2.3 DEVELOPMENT PLAN PROCESS

Below diagram highlights the basic steps undertaken for the preparation of the draft development plan. The detailed process is explained in the following sub-section.

The first step in the methodological framework includes collecting data from different sources, primary surveys if required and then analyzing it to extract inferences from the same.



The Sanctioned Development Plan-2011 was the first revision of the Principal Development Plan. A review of the sanctioned development plan not only provides the analysis of the level of development achieved in the decade as against proposed but also the requirement of revising the proposals and policies for the better implementation of the Development Plan.

The next important aspect of the Development Plan is public participation to represent views and concerns of a wide cross-section of the society, based on which the goals, aims and objectives are formulated for the Development Plan 2031.

The final stage in preparation of the Draft Development Plan is the formation of the policies and proposals; this is done by accessing the gaps and deriving the demands for future.

This involves the proposals for land use zoning, urban services both physical and social and policies in terms of the General Development Regulations for controlling the developmental activities within the Authority area. With the completion of the preparation of the Development Plan the next step is the publication of the Development Plan in the official gazette of the Government of Gujarat and inviting of objections and suggestions.

The actual process of preparing the development plan involves many overlaps between the key steps and activities mentioned above.

# 2.4 DEVELOPMENT PLAN PREPARATION METHODOLOGY

The methodology of preparing the development plan involves numerous activities, many of which overlap and are carried out simultaneously. The methodology of Development Plan can be divided into four phases as per the type of activities having almost similar characteristics carried out in that particular phase.

**The First phase** of the development plan includes data collection, review of the Sanctioned Development Plan 2011, Initiation of the Public consultations and preparation of the Base Map.

These activities get initiated in the initial phase of the Development Plan and form the base for the preparation of the Development Plan. The data collection includes data from the primary sources such as surveys through questionnaires or pre designed formats and also through secondary sources, this also includes collection of material for literature review such as volumes of development Plan including General Development Regulations from different Authorities. Also data from different Govt. and Semi Govt. agencies is collected.

As for the Base Map preparation the initiation began with the transformation of the Sanctioned Development Plan in GIS format. The phase also included the initiation of the Public consultations and finalization of the working groups for detailed discussion.

**The Second phase** includes the analysis of the data collected mentioned in the phase I. With the progress of the review of the past development Plan, existing land use, infrastructural services and the General Development Regulations (GDCR) is done. Collection of the revenue maps from District Inspector of Land Records (DILR) and collection of the city survey maps from Superintendent of City Survey. The public consultations are a continuous process and progresses with the development plan as per the stage of the development plan, but for the consultations that are already conducted are analyzed and inferences are drawn from the same. **The Third phase** involves the assessment of the present gap calculation of the future demand for physical and social infrastructure and also the land requirement for the projected population of year 2021 and 2031. Another simultaneous activity in the third phase is the formation vision and based on public consultations. As for the Base Map preparation the integration of the maps and removal of the error is undertaken and the base map is ready for final checking and validation.

The Fourth phase covers the identification of projects based on the sectoral mission



statements derived from the vision Statement formed through Stake holding consultations for implementation for the targeted years of 2021 and 2031.

Zoning proposal for the years of 2021 and 2031 based on the requirement of the land derived from the projected population and based on the zoning proposals the formation of General Development efficient implementation of the Development Plan.

With the completion of the activities of the Development Plan the same is published in the official gazette of the State Government and suggestions and objections are requested. Having considered the suggestions and objections the improved Revised Draft Development Plan is then submitted to the State Government for final sanction.

The following flowchart explains the process of preparation of the draft development plan, highlighting the overlap between the different activities.

# 2.5 APPROACH

The Approach to the preparation of the Development Plan finalized considering different aspects that would be the cause to the improved quality of the Development Plan. For the development under revision there are three approaches that are considered

**1. Public consultations:** The revised Development Plan is a document for the people and cannot be prepared behind closed doors the involvement of the people is very necessary i.e a democratic approach is required and thus the first approach towards the 2nd Draft Revised Development Plan is the through Public consultations.

Extensive public consultations are carried out at different stages of the Development Plan. A wide cross-section of the society is represented through numerous interviews and workshops. The inputs from the consultations are studied and reviewed in detail, vision and objectives to fulfill the vision are formulated based on the inferences from the stake holdings. Nine working groups, formed by experts from individual fields focusing on key areas are formed. Stage wise consultation with the Working Groups has led to the formulation of final policy and proposals

**2. GIS based approach**: The Development Plan prepared for the area of Rajkot Urban Development Authority is a huge document in terms of the data collected, analyzed and the proposals formed. There is a need for a robust system that is capable of handling such data at the same time carry out timely analysis to obtain desired results. The systems used are open ended and allow future improvement as well as addition and deduction of data from the data base at any point of time.

Thus an approach to prepare the Development Plan in a GIS environment is an approach considered for revising the 2<sup>™</sup> Draft Development Plan for the year 2031.

**3. Land use transport integration:** Regulating use and development of land is an important component of the Development Plan. But this must not be done without considering the transportation and infrastructure network.

Coordination between land use and transportation is crucial to improve the mobility and quality of life within the city. The Mobility Plan for Rajkot was prepared to assess the existing transportation scenario and to identify the option for future improvements and expansion of transportation network. The appropriate recommendations of the mobility plan are integrated with the second revised Development Plan in form of various projects and proposals.

# SECTION3: BASE MAP PREPARTION

## 3.1 INTRODUCTION

In preparation of Development Plan a Base Map plays an important role in defining the jurisdiction of different administrative boundaries within the defined area. It also helps in the realization of the land use plans, and also in the communication about what information is to be communicated through the geographical space or land parcels. The base map also forms the foundation on which the new proposals are based for the development of the city. The base map also facilitates the display of different information that is collected and analyzed as a part of the Development Plan preparation.

This chapter talks about the newly adopted process for preparing a robust, detailed GIS Based map for the entire RUDA region.

# 3.2 PREVIOUS BASE MAP

In the past DP, the final output of the DP was carried out on hand-made maps which were later converted into CAD format. This restricted the maps to be effectively reproduced at various scales. Certain analyses such as land suitability, environmental analysis, etc. were carried out in a limited GIS environment and the results were considered while preparing the DP.

After the Sanction of the Development plan in 2002, it was continuously revised for road variations, zone variations etc. The areas zoned as **'urbaniseable'** were consistently developed under Town Planning Schemes and various urban services such as road, water, sewerage; storm water drainage, street lights etc. were planned and implemented in those areas. Simultaneously, the total area under the jurisdiction of RUDA increased from 483.0sq. km to 686.85 sq. km and for RMC it increased from 69sq. km to 104.85sq. km. Some of the limitations faced as a result of all these issues are as listed below:

- Hand-made maps cannot be reproduced quickly and effectively
- The data built in CAD format is highly static and building multiple layers of dataset is cumbersome.
- Quick analysis and representation at various spatial scales other than the scale at which the data was built is impossible
- Data monitoring, rectification and updating requires more time and manpower.

The need arose for a system where in it would be easy to model this dynamics of an ever changing urban scenario. It was thus envisaged for this DP that the system to be built should be

- Robust and can handle huge datasets able to overlap most of the data which comes from several departments in several formats.
- Able to carry out complex analysis which stems from the vision of this project.
- Able to easily incorporate any future updates and modifications in the database.
- Able to meet the data visualization requirements of various stakeholders and produce very high quality maps.

# 3.3 MAPPING THROUGH NUIS GUIDELINES

The mapping done by RUDA for the preparation of the Development Plan is based on the guidelines provided by **the Nation Urban Information System (NUIS).** 

The major objectives of NUIS Standards are to design, organize and demonstrate an information system to support urban planning in the country. The objectives of these are as follows:

- To identify the volume of data and parameters required for urban planning, frequency of updating, level of redundancy, level of compilation and nature of processing at different hierarchical levels of urban planning.
- To standardize the classification system for various the matic layers required for different levels of urban planning.
- To design a comprehensive urban information system, useful to meet the needs of various hierarchical levels of urban planning viz. perspective, development and zonal (TP Schemes) plan exercises.
- To design a comprehensive spatial database as a link for urban planning and management.

# 3.4 PROCESS FOLLOWED FOR CREATION OF NEW BASE MAP

Thus keeping all these requirements, RUDA decision of introducing the use of **Geographical Information System (GIS)** for preparation of the Development Plan. The GIS System can be defined as:

Package specifically designed for use with geographic data that performs a comprehensive range of data handling tasks. These tasks include data input, storage, retrieval and output, in addition to a wide variety of descriptive and analytical processes<sup>2</sup>

The first stage in the entire process was to gather all the village and ward maps that would come together in the end to form one single base map. The next step was to convert all the maps to one single digital format which was then geo-referenced. The next steps included putting together all the parts into one complete whole, error identification and rectification, and to start attaching layers of different types of information.

In all, all the TP area, non TP area and the newly added area maps were digitized, georeferenced and put together to form the final base map. A complete list of data layers attached to the base map is provided at the end of this subsection.

## 3.5 Advantages of the updated base map

The city is a dynamic system where interventions from natural and man-made entities such as government and private are continuously happening. The challenge is to integrate the various environmental parameters; stakeholders' aspirations etc. and come to an optimum decision so that it creates a win-win solution for everyone without harming the environment in the long run. Taking this process into consideration RUDA has built a spatial decision support system.

The information relating to the preparation of the Base Map was collected from various sources. The dataset was then prepared in Geographical Information System (GIS). GIS greatly facilitates the use of the generated datasets for conducting basic and complex analyses. Undertaking these analyses in earlier digital formats (CAD) would have required much more time and effort.

Key features of the GIS format base map:

• Single comprehensive database containing all kinds of datasets within

<sup>&</sup>lt;sup>2</sup> Calkins and Tomlinson, 1977

- Data from various departments and organizations can be attached easily to the base map. As a result coordination with other departments becomes efficient and less time consuming
- Any spatial as well as statistical data analysis is more accurately done in GIS
  - Basic analyses can be done very quickly
  - Complex analyses are possible between the different datasets
- Multiple layers of information can be built over time on the base map and these can be analyzed and updated regularly.
- High resolution maps, informative charts and graphs can be prepared quickly and easily for representation of data.
- The new updated base map can be made publicly accessible for viewing purposes through the internet. The current format will make this process more users friendly for the common man to use.

# SECTION 4: REVIEW OF SANCTIONED DEVELOPMENT PLAN OF 2011

# 4.1 INTRODUCTION

Before framing the policies and proposals of the Second Revised Draft Development Plan of RUDA, it would be essential to review the goals, policies and proposals of the sanctioned Development Plan of RUDA 2011 so that achievements made and the shortfalls observed could be considered while framing the proposals of the Revised Development Plan of RUDA 2031. This chapter discusses in detail the Objectives and Policies of Sanctioned Development plan 2011. It also analyzes in detail the projects and implementation of the projects and proposals of sanctioned Development Plan in the past decade.

# 4.2 REVIEW OF AIMS AND OBJECTIVES OF THE SANCTIONED DEVELOPMENT PLAN

The past development plan identified 14 aims and objectives that focused on various aspects such as creating good environment, providing effective infrastructure, compact development, augmentation of financial resources, coordination of various developmental activities etc. In the past decade significant work has been done towards achieving these aims and objectives. Below is an assessment of the work and the projects that have taken place since 2002.

# 1. To create a good environment and to minimize the environmental pollution with green spaces, open spaces and places of public activities and recreation.

Various efforts have been taken in past decade to minimize the environmental pollution, to provide adequate green spaces and open spaces and to provide facilities for recreation. Various projects and proposals that may be or may not be included in Sanctioned DP 2011 were implemented for this purpose. Below is the assessment of these projects.

Administrative areas	Gardens and Open Spaces developed in the past decade	
	Numbers	Area lakhs sqmt.
RMC	88	5.40

#### TABLE 2 GARDENS AND OPEN SPACE

RMC maintains 88 gardens spread over 5.40lakhs sq mt having around 2, 10,000 trees which accounts for about 2% green cover in the city. Rajkot is main source of recreation in the city as well as its surrounding area. There is a large open space in the heart of the city known as RACE COURSE which is the main recreation centre in the town. Apart from providing open

space it has other recreation center like Aji dam, Lalpari Lake and Randarda Lake these are an integral part of city open spaces. At the same time it provides at time larger open space to the city. It also maintains eco-system. It provides immense potential to tourism in the city.

In addition to the above the historic Aji river development project and II Civic Center in west side are also under pre planning stage.

In Addition to the Development Plan several projects and proposals have also been implemented in Rajkot to improve the environment of the city, such as Sports complexes at Race cours, Civic Centers in all four zones, Praduman park development, Iswariya Lake Development, etc.

# 2. To organize the growth and Distribution of population in urban and rural area for 2001 AD

RMC was the primarily urbanized area within RUDA limit. It covered an area of 104.85 sq km and included 88.7% of total population in RUDA in 2001. Population was projected for the year 2001 in the sanctioned Development Plan, in the areas of RMC and RUDA the population distribution that was anticipated has changed from 8 lacs to 9 lacs for RMC, 2 lacs to 1 lacs for or the total RUDA, there has been a change in the distribution of the population in urban and rural which is clearly evident from the below table.

Sr.no	Administrative area	% of total population in 2001 (Actual)	%of total population in 2001(Projected)
1	RMC	9,67,476	8,45,000
2	RUDA(Exl.RMC)	1,26,839	2,50,000
	Total RUDA	10,94,315	10,95,000

TABLE 3 POPULATION DISTRIBUTIONS IN DIFFERENT ADMINISTRATIVE AREAS

(Source:Census 2001)

The population projected by RUDA for the Urban Complex was quite appropriate, as these projected populations for the year 2001, matched with the actual population of same year.

3. To provide for the comprehensive developed area for residential, industrial, commercial and recreational uses required for the city with public support and active involvement.

The Development Plan is implemented through the mechanism of Town Planning Schemes, as per the sanctioned Development Plan 2011 the total zoned area i.e. 226.33 Sq.km. was covered under the Rajkot Urban Complex, this zoned area comprised of different land uses

such as Residential, Commercial, Industrial and recreational uses. Town Planning schemes were initiated for all these zones, as a procedure the town planning scheme is prepared in a democratic manner and the inputs in terms of objections and suggestions from the owners and the affected people are taken multiple times.

Zone	Rajkot Urban Complex (Including RMC)			
	Area zoned for development (in sq.km)	Area covered under TP Schemes		
		Area in sq.km	%	
Residential	125.16	73.93	59%	
Commercial	8.2	3.49	42.14%	
Industrial	51.98	25.37	48.81%	
Public purpose and Recreation	16.39	10.82	61.25%	
Total	201.73	113.61	56.31%	

Under past development plan total 36 TP schemes were prepared for the area under RMC and a total of 12 TP schemes were prepared for area under RUDA.



FIGURE 5 TPS IMPLEMENTED UNDER 2011 SANCTIONED DEVELOPMENT PLAN

## 4. To provide effective road linkages in the entire area

With a view to have efficient transportation system as well as to avoid the conflict at important road junctions various new roads, bridges, flyovers, underpasses in RUDA were proposed in sanctioned development plan.

Presently, the road length within RMC jurisdiction is about 1,797km.with respect to road condition 63% of the roads are surfaced and 38% are roads with earthen surfaces. Out of total surfaced roads, 61% are bituminous and 1.32% is water bound macadam (WBM) roads. The 38% earthen roads are in the newly merged areas of RMC limits.

The roads in RMC are classified into major roads, minor roads, and lanes according to the right of way (RoW). Roads with RoW of more than 15m are termed as major roads, roads with RoW between 3 to 15m are termed as minor roads and lanes have RoW less than 3m.

Rajkot has a road network with an average road density of 22.98km of roads per square kilometer area of the city. Majority of roads having width of four lanes or above are along Rajkot Road, Jamnagar Road, 80'Road, Kalawad Road and Ring Road. Along the major part of the road network (99.5%) in the central area and 98.7% in the rest RMC, there is no provision of service lane, thereby forcing the vehicles to use the principal network even for local movement.

RUDA is also developing a ring road around Rajkot city for the through movement of bypass traffic. Under this project a 20km long and 45m wide road is to be developed by RUDA in two phases. The first phase will involve the construction of 9 km of the road starting from Jamnagar Road near Ghanteswar village till the multiplex cinema on Kalavad Road. The second phase will be the construction of 11 km of the road starting from the multiplex cinema o Kalavad Road up to Gondal Road National Highway near the TB hospital. A part of Phase I of 6.5km length is being considered to be developed on PPP with the design, build, finance, operate, and transfer structure and is at the tendering stage.

## 5. To provide Physical Infrastructure and Social Infrastructure facilities at city level.

## Water supply Storage, Distribution Network & Service Connections

Administratively, RMC has been divided into three zones, West zone, East zone and Central zone. There are 35 storage reservoirs in the city of which 19 are ground reservoirs and 16 elevated. Total storage capacity of the ground reservoirs is 180.15 ML and storage capacity of the elevated reservoirs is 34.37 ML. of these reservoirs, 4 ESRs of total 10.38 ML capacity, and 9 GSRs of total 63.3 ML capacity are implemented under JNNURM assisted projects. Total storage capacity available with RMC is 94% of the daily supply which is adequate.

The water supply distribution network starts form storage reservoirs and ends at the property level individual connections. The entire water distribution system of RMC has been

divided into 11 zones. The length of the transmission main is 464km and that of the tertiary distribution network is 1624 km.

RMC has two types of consumer water supply connections, domestic and non-domestic. As Rajkot has been in the water scarce region, RMC does not encourage water supply connections to large industrial units. In RMC, all institutional connections have been treated as non-domestic connections and monthly water tariff is charged based on the size of connection. Currently there are 2.22 lakh domestic and 6,304 non domestic connections in RMC.

Mode of supply: intermittent 20minute daily by zoning

## Rate of Supply: 110 LPCD to 125 LPCD proposed to have 150 LPCD

#### Present total city water supply: 150 MLD

Water supply in areas under the Rajkot Urban Development Authority is provided by the gram panchayats of the respective villages through bore wells and in some of the areas through the Gujarat Water Supply and Sewerage Board (GWSSB) with help from water and Sanitation Management Organization (WASMO).

#### Sewerage System and sewage treatment Plant

Prior to 1984, sewage was collected through surface drains and it was disposed in the reservoir constructed downstream of Aji River. In 1984-1990, an underground sewerage project spread over 30 sq.km area was implemented in the old city of Rajkot with financial assistance from the World Bank. Subsequent to this, a project covering 10 sq.km was taken up by RMC. In 1998, the city limits of Rajkot were increased from 69 sqkm to 104.86 sqkm creating a demand for an additional sewerage network in this newly added 35.86sqkm area which comprised the village Raiya, Nana Madavdi and Moti Mavadi.

Year of Implementation	City limit (sq.km)	Phase	Part	Covered Area(Sq.km)	Status	Assistance From
Prior to 1998	69	I		40.00	Commissioned	World Bank
		II	I .	20.00	Commissioned	JNNURM
		II	II	9.00	Under	JNNURM
					Progress	
Since 1998	<b>e 1998</b> 104.86	111	I	15.00	Under Progress	JNNURM
		111	II	20.86	Under Progress	SJMMSVY

The entire sewerage system of Rajkot has been prepared in two phases.

Present water supply to the city is about 226 MLD. Since part of the water supply distribution system is old, substantial we lost 20-25% due leakages, thus only 200MLD net

supply reaching to the consumers. Also the coverage of the sewerage network is 58%. The quantity of sewage being generated would thus be in the range of 95-100 MLD.

The total length of the sewerage network in the city is approximately 1,500km. Currently there are total of 3, 22,407 properties in Rajkot of which 1, 85,852 properties are covered with direct connections to the sewer network implying 58% network coverage of household. The collected sewage is then pumped to the sewage treatment plant through 7 pumping stations. Currently there are two sewerage network projects which are approved under JNNURM, are being implemented by RMC.

Currently two activated sludge process based sewage treatment plants (STP) are operational. One STP of 44.5 MLD capacity is located at Madhapar and the other STP of 51 MLD capacity is located at Raiya. Both the STPs are currently running at 100% efficiency.

Sewage treatment plants in RMC						
Sr.	Location of STP	Design Capacity	Utilization (MLD)	%Utilization		
no						
1	Madhapar	44.50	48.6	100		
2	Raiya	51	47.3	93		

## Storm water drainage

Presently city does not have a designed storm water drainage network. During monsoons, the rain water flows into the voklas or natural drains and meets with the Aji Rriver. The annual average rainfall received by the city nearly 500mm. moreover, the rains area irregular and at time lesser than average. In such conditions the natural drains suffice the need for storm water drains.

## Sanitation

According to the information available from RMC, there are 150 public toilets in Rajkot. Most of these public toilets are running on pay and use basis. The total number of seats in these public toilets is 528.

## Social Infrastructure

Currently there are 87 municipal schools in Rajkot city. Of these, 81 are primary schools and six are high schools.

As per the registration information, 1216 medical facilities are present in Rajkot. Of these 1216 medical units, 48% are in central zone, 15% are in the East zone and remaining 13% are outside RMC. Further, 46% of medical units are allopathic, 21% are Ayurvedic, and 18% homeopathic and the remaining 14% other.

#### 6. Optimum use of land for compact urban development of the city.

In the past Development plan it was proposed to have a compact urban development of Rajkot, so as to have the maximum utilization of the infrastructure and amenities and to reduce the travel distance within the city by reducing the sprawl of the city. In 2001 Rajkot, Surat and Vadodara had 1.28, 4.4 and 1.66 million populations. When compared to these cities of approximately same scale, the sprawl of Rajkot over time is much less than other three cities. It can be seen from the image above that Rajkot shows comparatively compact development.



FIGURE 6 RUDA DEVELOPMENT PLAN 2011



FIGURE 8 AUDA DEVELOPMENT PLAN FIGURE 7 VUDA DEVELOPMENT 2031 PLAN 2031

# 7. To encourage and control the developmental activities in accordance and in harmony with the development plan proposals which may promote healthy city development.

Development in the city should take place as per the zoning regulations in the development plan. This can be implemented through the GDCR. It involves three steps namely commencement certificate, progress certificate and building use certificate. This three step process is enforced to control the developmental activities in accordance and in harmony with the development plan proposals which may promote healthy city development.

8. Mobilizing the land resource by virtue of the various planning proposals under the provisions of the Act which can generate the required finance for the implementation of the development plan including the T.P. Schemes.

# 9. To augment the financial resources as may be created by the proposals of the Development Plan.

These aims and objectives were basically fulfilled through the betterment charges and the sale for residential, commercial and industrial component levied in the town planning schemes.

# 10. To implement the various proposals by the various T.P. Schemes at appropriate time for appropriate areas as the T.P.Scheme has proved to be a sound and effective model for Urban Development at Micro Level Planning.

As mentioned above, in the Sanctioned DP-2011, it was expected that various infrastructure and recreational facilities would be developed through TP Schemes. Following is the table showing various facilities provided through TP schemes.

#### TABLE 4THE UTILIZATION OF TPS FOR URBAN DEVELOPMENT AT MICRO LEVEL PLANNING

No	Special Area Town Planning Schemes	Town Planning Scheme	Land Area/length
1	2 <sup>nd</sup> Ring road	36/3,42,20+21,19,18,10,16,23,rmc- 28,proposed-44,45,46,33,34	19.9km

11. To tap the potential of private entrepreneurship with its positive involvement in an appropriate manner which may boost up the city development process in addition to the efforts of Government and Semi-government Organization in their respective field.

Efforts of Govt. and Semi Govt. Organization to boost city development

#### Solid waste management

- Landfill site at Nakaravadi has been developed through Public Private Partnership model Rajkot Municipal contract with M/s Hanjer Biotech Energies Pvt Ltd,
- 95% of door to door collection is carried out in collaboration with Resident welfare association & NGOs.

#### Bus transit service:

A bus transit service has been provided by RMC in city area and the income for its operation and maintenance is generated through leasing the advertisement rights to private agencies.

12. To have a realistic approach in the context of statutory provisions and the financial, administrative and managerial capabilities of RUDA.
The budget of RUDA for implementation of Sanctioned Development Plan was made possible due to the realistic Approach. Implementation of several projects by RUDA in the past decade is done through the mechanism of TP Schemes. The implementation of the 1<sup>ST</sup> Ring Road is a unique example.

Some infrastructural projects implemented by RUDA were funded under the JnNURM project, the funding mechanism included considerable share through JNNURM rest to be borne by State Government and Local Authority. The share of RUDA was managed from the funding through different sources as income from Better and Amenity charges, FSI on Payment, Development Charges and Sale of Residential and Commercial plot the statutory provisions under which RUDA performs were very well observed wisely utilizing its financial, administrative and managerial capabilities to follow a realistic approach to implement its projects

# 4.3 COMMERCIAL PROJECTS AND THEIR IMPLEMENTATION

Along the 1<sup>st</sup> ring road and in the city there are few areas has been designated for commercial zone in development plan 2011. Map below shows the existing situation at those pockets.



# 4.4 OBSERVATION

# 1. Population Projections in Urban and Rural Areas

• **Observation:** The population projections anticipated in the sanctioned DP of 2011 for urban areas met the actual population growth in that decade.

### 2. Land available for Development

• **Observation:** There is still 4700 hc of serviced land available through Town Planning Schemes for development within all zones in the sanctioned development plan of 2011. This can be helpful to accommodate the future growth of the city.

### 3. Provision of Road Network

• **Observation:** 2.06 % of the estimated road network was implemented, proposed under the sanctioned development plan of 2011.

### 4. Provision of parks and open spaces:

• **Observation:** 1.47% of the estimated road network was implemented, proposed under the sanctioned development plan of 2011.

### 5. Provision of Physical and Social Infrastructure

• **Observation:** Based on the current scenario of actual work implemented for water supply, sewage system, storm water lines and solid waste management system under the sanctioned development plan of 2011, 90 % of coverage for water supply is achieved and 58% of coverage for sewage is achieved.

• **Observation:** Presently the Social infrastructure in the city is provided through a mechanism of Town Planning Schemes.

# SECTION5: PHYSIOGRAPHIC AND LAND

# 5.1 INTRODUCTION

Identification of land suitable for development is critical for preparing the development plan for Rajkot region. There are many different natural and man-made factors that impact the development suitability of land.

This chapter deals with the study of several aspects of physiographic such as soil type, ground water prospect, cropping patter etc., a detailed analysis to delineate land available for development is carried out and finally the methodology for land suitability analysis.

# 5.2 LAND USE-LAND COVER ANALYSIS

# 5.2.1 LAND COVER

Information on land use - land cover pattern, especially the extent and spatial distribution of the same is important for the preparation of the prospective Development Plan. The land use - land cover information helps in formulation of policies for urban development.

Using the classification system and employing both visual and digital analysis techniques and with limited field checks, the urban land use/land cover maps were prepared for the entire RUDA region. Later these maps were digitized and integrated with the spatial framework of RUDA area.

**Agriculture:** Agriculture is the predominant land use outside the RMC area as well as some agriculture land also within RMC area. The area under agricultural land is 416.79sq. Km and accounts for 60.73% percent of the total study area.

The agricultural land comprises of Crop Land, Fallow Land and Plantations. It is observed from the satellite data that a large part of the eastern area is under rabi crops indicating the availability of irrigation water. On the contrary, the agriculture land in the Western area from is fallow land which is an indication of the lack of irrigational facilities. Another major problem associated with this area is Salinity. Thus this region is dependent on rain fed crops only. The agricultural land has been further categorized into crop land, fallow and plantations. **Built-up land**: The area under built-up includes the urban agglomeration of Rajkot; the physical extent of total built up land is 126.95 Sq. Km. The following table shows details of built up in Administrative areas.

TABLE 5	Administrative	AREAS
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No.	Administrative area	Area(sq.km)
1	RMC +36 villages	70.02
2	RUDA (excluding 36 villages +RMC)	56.99
	TOTAL	126.95

**Water bodies**: The total area under water bodies is 32.95Sq.Km. this is 6.26 percent of the total study area. The prime surface water body in the area is the river Aji, which is flowing from south to north and dividing the city into two parts viz. east and west. The water is found in the river only during monsoon season and rest of the seasons it remains dry. The Nyari River and their tributaries of flowing in the western part of the study area. A number of lakes/ponds are observed in the entire study area. The peculiarity of the study area is that each and every village has a tank/lake. All these water bodies are mapped.

**Waste Lands**: The area under the wastelands is about 17.79 Sq. Km which is 25.92% percent of the total study area. It has been observed that most of the wasteland in the study area is located on the all the villages in scattered manner. These wastelands are mainly gullied lands with scrubs. These are mostly areas where the vegetative cover is less.

### 5.2.2 GROUND WATER

Rapid urbanization and industrialization have increased the demand of water for domestic as well as industrial requirements. Groundwater accounts for a major portion of domestic and irrigation water in the state. The main source of water supply for the Rajkot Municipal Corporation area is the the ground water from the bore wells drilled in the Wakaner region, 80 kms away from the city. As there are no permanent surface water sources nearby the city, the only permanent source is to avail the water from Sardar Sarovar Project. For this a Maliya Branch Canal Project is planned, which is under progress. In this project the Narmada Water from Sardar Soravar will reach through Saurashtra main canal upto Maliya and from Maliya to Hadala through canal and from Hadala to Rajkot by pipeline.The next major source of water supply is from ground water through tube wells scattered all over the city.

### 5.2.3 SOIL CONDITION

Soil plays an important role in urban land use suitability analysis. Major Soil types of the entire RUDA area nearly 84 % of the geographical are is comprised of shallow to medium

deep black cotton and sandy loam soils having depth up to 0.6-1.00mt top soil. The soil is slightly reddish to very red and black in surface colour. By large soils are well drained with moderate water holding capacity.

# 5.2.4 TOPOGRAPHY

Information on slope and aspect of terrain in the study area are vital in determining the land suitable for different types of land uses. This information is also useful for drainage schemes. The slope map derived from elevation which is obtained from SOI Topo sheet and used as an input in TIN (Triangulated Irregular Network) analysis in GIS. It is found that most of areas are under category of very gentle slope. The natural ground slope is from South East



to North West direction. With level FIGURE 9 TOPOGRAPHY MAP OF RUDA difference of around 100mt from south

east to North West. Existing natural drains also follow the same slopes.

# 5.2.5 CLIMATE

The climate in the city is hot and dry. The average maximum and minimum temperatures recorded over the last 40 years are 43.50C and 24.20C respectively.

The average annual rainfall is 500 mm. However, over the last 60 years, it has been below normal during 20 years. In these years, the city along with the Rajkot Urban Development Area (RUDA) faced acute water shortage.

#### 5.3 LAND CLASSIFICATION & DELINEATION OF DEVELOPABLE AREA

A land suitability assessment is a planning tool for the design of a land use pattern that prevents environmental conflicts through the Segregation of competing land uses (Eastman et al., 1993). It is a decision problem under multiple criteria and multiple objectives that, when adapted into GIS, produces a land use pattern that minimizes conflict and maximizes consensus among the stakeholders (Malczewski et al., 1997). Considering the constraints, the land available for development is very limited, to identify the land having developable potential, the land under constraints is first identified and segregated and residual land available is the land having development potential. The constraints that restrict the development of land are listed below.

## **Constraints to Development**

- Legislative (areas governed by Court Interventions, Ecologically Sensitive, Acts)
- Non Negotiable (Physical Features, Manmade or Natural)
- Non Desirable (Hazard Prone, Prime Agricultural Land)

# 5.3.1 LEGISLATIVE CONSTRAINTS

**Airport:** Airport and Cantonment areas are restricted areas as 300m buffer around the periphery control the development subject to NOC from the concerned Authority, with height restriction.

**River and water bodies**: Areas under Rivers, Canals and water bodies, 9 to 15 m buffer around to preserve the natural character, development is totally restricted.

# 5.3.2 NON NEGOTIABLE CONSTRAINTS

**Road Network Map:** Areas under existing road network including Expressway, National Highway, Ring Road, State Highway, and Major District Road with their Building Control Lines cannot be utilized for development as considered non urbanized area.

**Rail Network**: Areas under existing Railway tracks with buffer area and railway station areas are not considered for the development work other than that of Railway's requirements.

**Village Gamtal Expansion:** within 200 m around the existing Gamtal there is provision or area for Development as per in Agricultural zone to keep the rural (village) character and allow expanding the village naturally.<sup>3</sup>

# 5.3.3 NON DESIRABLE GUIDELINES

**Double cropped Area**: Areas having better irrigation facilities and good soil character, yield maximum i.e. twice in a year are known as Double Crop Areas. These areas are the pioneer to agriculture product and should be preserved for agricultural use by restricting development proposals.

**Flood hazard area**: Low lying and marshy areas near water bodies having the possibility of being flooded and unsafe for human lives are considered as 'Flood Hazard zones' which are restricted for development for human habitation and not considered for urbanization.

# 5.4 LAND AVAILABLE FOR DEVELOPMENT

After considering and calculating land falling under the Legislative, Non negotiable and Non desirable categories,

3

#### TABLE 6 LAND POTENTIAL IN RUDA AREA

No		Description	Area(sq.km)	Area (%)
1		RUDA area	686.30	100
2		Area under water bodies	35.1	5.1
3		Existing developed area	128.7	18.7
4		Area available for Urban Development	522.4	76.1
	Α	High Sensitive Land	134	19.5
	В	Moderate Sensitive Land	299.7	43.7
	С	Low Sensitive(Barren and Open Land)	88.6	12.9

# 5.5 OBSERVATIONS AND ISSUES

#### **Soil Characteristics**

• **Observation:** Most of the RUDA land is characterized by Medium & shallow Black Croton soil which is favorable for construction purpose.

# Topography:

• **Observation**: Very gentle or flat topography of Rajkot city is favorable for the development.

# SECTION 6: DEMOGRAPHIC ANALYSIS

# 6.1 INTRODUCTION

Study of population and demographic trends is crucial to understand the character of a city and its needs and demands for housing, amenities, infrastructure etc. It helps to explain the current urban conditions and to derive the future directions for planning and managing the city's growth and development.

This chapter reviews the population trends over past decades and demographic patterns that influence the urban conditions in Rajkot region. The demographic assessment provides a snapshot of working population, literacy rates, sex ratios, household size, population growth rates, migration rates etc.

# 6.2 POPULATION

# 6.2.1 EXISTING POPULATION

Rajkot Urban Development Authority (RUDA) consists of one district – Rajkot. Rajkot district has the highest population with 5 talukas in the state. The total area of RUDA, which is 886.85 sq km, consists of Rajkot Municipal Corporation (RMC) and Rajkot Urban Development Authority (RUDA). The population for RMC, RUDA has been tabulated as follows.

No	Administrative zone	Population(Lakhas)	%of Total Population
1	RMC	12,86,995	84%
2	RUDA	2,48,117	16%
	TOTAL	15,35,109	100%

#### TABLE 7ADMINISTRATIVE ZONE WISE POPULATION

(Source: Census 2011)

In 2001 India's population was 121 Crore of which 6.04 Crore resided in Gujarat state. The population in RUDA area in 2011 was 52.37 lakh people, about 3% of the total state population.

There is a high concentration of population within RMC. Almost 84% of the total population of RUDA resides within these urbanized areas. RUDA rural areas have less population. TABLE 6 shows decadal change in population between 1991 and 2011 by administrative units (wards and villages). As can be seen from the table, the change in population in RMC is

#### TABLE 8 POPULATION CHANGE

No	Name of Village	Population					
•		1981	1991	2001	2011		
1	Amargadh	504	1,117	1,140	1,355		
2	Anandpar	3,060	4,924	7,273	14,800		
	(Navagam)						
3	Baghi	445		694	833		
4	Bedi	2,187	2,861	3,313	5,890		
5	Devgam	936		1,321	1,585		
6	Dhamalpar	624	780	858	1,055		
7	Dholara	1,326		1,854	2,225		
8	Gavaridad	2,396	2,905	3,372	4,046		
9	Ghanteshwar	532	358	4,087	5,868		
10	Gunda	939		695	834		
11	Hadmatia	661	910	938	1,000		
12	Haripar	975		1,466	2,100		
13	Jasavantpur	344	308	326	450		
14	Kalipat	1,081	1,421	2,240	2,690		
15	Kangasiyali	1,286	1,256	1,382	1,658		
16	Kankot	1,123		1,113	1,336		
17	Khandheri	735	869	845	1,014		
18	Kherdi	3,321	3,557	2,936	3,523		
19	Khirsara & Metoda	1,708		4,213	5,056		
20	Khokhaddad	1,379	1,653	1,898	2,278		
21	Kotharia	3,440	6,322	9,848	68,456		
22	Kuvadva	4,770		6,959	8,210		
23	Lampasari	652	760	1,054	1,265		
24	Madhapar	2,004	6,234	3,746	21,000		
25	Mahika	1,348	1,587	1,722	2,610		
26	Maliasan	1,613	2,130	2,735	3,510		
27	Manharpur & Ronki	1,065	1,136	2,796	3,746		
28	Metoda	1,063	See	No. 19 (Khirasara &	Metoda)		
29	Mota Mava	1,383	1,954	3,053	7,500		
30	Munjka	840	1,498	2,191	11,000		
31	Nakarawadi	744	907	1,346	1,750		
32	Naranka	792		1,195	1,434		
33	Nyara	1,250	1,539	1,891	2,000		
34	Pal	1,610	1,702	1,953	2,344		
35	Parapipaliya	782	895	1,624	1,949		
36	Pardi	1,106	1,443	2,359	2,831		
37	Rajgadh	316	393	437	875		
38	Rataiya	545		876	1,051		
39	Ratanpar	987		1,366	1,639		

40	Ronki	70	139	See No. 27 (Manharpur & Ronki)		
41	Shapur	1,827		7,148	8,578	
42	Sokhada	622	887	1,257	1,695	
43	Targhadia	1,512	1,527	1,428	1,755	
44	Targhari	1,691		3,272	3,926	
45	Thebachada	957	1,242	1,637	1,920	
46	Thorala		Gaa	mtal not exist		
47	Vadali	1,599	1,121	1,897	2,065	
48	Vajdi Gadh	504	527	681	700	
49	Vajdi Vad	672		1,300	1,560	
50	Vajdi Virda	362		1,367	1,640	
51	Vavdi	1,116	1,382	2,158	3,000	
52	Veraval	1,536		13,932	16,718	
53	Vejagam	992	1,025	1,194	1,250	
54	Vijaynagar	317		453	544	
Tota Popu	l 54 Village Ilation	65,649	59,269	126,839	248,117	
RM	C Population	4,45,076	5,56,137	9,67,476	12,86,995	
RUD	A Population	5,10,725	6,15,406	10,94,315	15,35,112	

(Source: Census: 1981, 1991, 2001 and 2011)

much higher than the rest of RUDA. Some areas within RMC show a significant increase in population when compared to the rest of the city.

This trend may be attributed to urbanization of the city's fringes due to population and economic growth. Majority of RUDA rural area has seen comparatively slower growth in population during 1991 to 2011.

# 6.2.4 SEX RATIO

Gender ratio is important for understanding the distribution of males and females within the region. This ratio is calculated as total number of females per 1,000 males. The sex ratio in Rajkot City, according to the 2011 Census has been 905 females per 1000 males, which is higher compared to the sex ratio at the state level of 886 and lower than the national level sex ratio of 940.

#### TABLE 9GENDER RATIO OF RAJKOT 2001 AND 2011

Description	2001	2011
India	933	940
Gujarat state	921	918
Rajkot city	915	908
Rajkot rural	947	946

(Source: ORGI\_Census of India 2011&2001)

The decrease in female population in the urban areas may be due to higher number of males migrating to the urban areas in RMC for employment, education, and other opportunities.

# 6.2.4 LITERACY

Literacy level of Rajkot has always been higher than the states literacy levels. with a total literacy rate of 79.72% in 2011, the city has a comparatively higher literacy rate than the state literacy rate of 79.31% as well as the national literacy rate of 74.04%

Table 10 Literacy rate of Rajkot 2001 and 2011

Literacy rate of Rajkot 2001 and 2011						
Description	2001	2011				
India	54.16%	74.04%				
Gujarat stare	69.96%	79.31%				
Rajkot	73.86%	79.72%				

(Source: Census of India (2001 and 2011)

### 6.2.5 WORKING POPULATION

Work is defined as the participation of a person in any economically productive activity with or without compensation, wages or profit. There are two types of working population, main and marginal working population; those who work more than six months of the year and those who work less than six months of the year respectively. The population that does not come under the above mentioned work-force types are considered as non-working or dependent population.

Analysis of occupation pattern indicates that it is primarily a manufacturing & services center. About 42 percent of the workers are engaged in service activities and about 34 percent are engaged in manufacturing activities.

In terms of work force, the participation ratio has increased from 30.07% in 1991 to 32.33% in 2001. As per census 2001 out of the total workers constitute of 0.83% as

cultivators, 0.58% as agricultural labors, 3.09 in household industries, and 95.51 % in the category of others.

TABLE 11 OCCUPATIONAL PATTERN

No.	Activity	% of Workers
1	Agricultural	3.75
2	House hold industries	3.00
3	Manufacturing	28.20
4	Construction	5.50
5	Trade and commerce	21.00
6	Transport	10.20
7	Services	28.35
	Total	100.00

(Source: City Development Plan, Rajkot)

As per fourth economic census (1998)-Gujarat state, there are 39,519 enterprise providing direct employment to 106,959 persons while they brings 46,845 as hired employment total being 153,804.

# 6.3 POPULATION GROWTH RATE

# 6.3.1 GROWTH RATE AND NATURAL GROWTH

Change in population has been derived from 2001 and 1991census data. It gives an idea of increase or decrease in population. Overall growth rate of RUDA population is 46% from 11, 28,849(2001) to 15, 35,112 (2011). RUDA's decadal population growth rate of 46% is higher than that of Gujarat state (22.7%) and of India (21.54%).

TABLE 12: ADMINISTRATIVE ZONE WISE DECADAL GROWTH RATE

No.	Administrative zone	Total Population(2001)	Total (2011)	Population	Growth rate
1	RMC	1002000	1286995		28%
2	RUDA (Excluding RMC)	126849	248117		95%
	Total RUDA	1128849	1535112		35%

	1971	1981	1991	2001	2011
Area (sq.km)	69	69	69	104.85	104.85
Population	300112	445076	559407	1002000	1286995
Growth Rate	54.58	48.30	25.69	79.12	28.31
Density	4349	6450	8107	9557	12275
Sex Ratio				906	905
Rajkot Urban Developme	ent Authorit	ÿ			
	1971	1981	1991	2001	2011
Area (sq.km)	-	483.00	483.00	483.00	686.31
Population		65649	86438	126839	248117
Growth Rate	-		23	54	34

#### Rajkot municipal corporation area

(Source: Census of India (2011)

Rajkot is the fourth largest population in the state of Gujarat after Rajkot, Baroda and Surat. The population of Rajkot has grown from 3 to 12.86 lakh during 1971-2011 periods recording 28.31 decadal growth rate. The growth in the city's population has been mainly caused by the expanding job opportunities created by mushrooming industries in and around the city better educational facilities. The conveniences promised by a city have also attracted a fair share of the rural population of Rajkot. During 1971 -1981 and 1981-1991 the percentage of increase in population of Rajkot city was 48% & 47.8% respectively. While in 2011 the population growth was 33%. Table no. 9shows the variation of population from 1971 to 2011.

#### TABLE 13 RAJKOT URBAN DEVELOPMENT AUTHORITY

Rajkot Urban Development Authority Population						
Year	<b>RUDA+RMC</b> Population	Decadal growth rate %	RMC	RUDA		
			Population	Population		
1981	510750	0.28	445076	65649		
1991	645845	0.20	559407	86438		
2001	1128839	0.25	1002000	126839		
2011	1535112	0.20	1286995	248117		

(Source: Census of India (2011)

The population of the Rajkot Urban Development Area has increased from 13.23 to 25.12 lakh during 1971 to 2011 with 25.86% average decadal growth rate. This reveals the rapid

rate of increase in the population as a result of industries which have been located in and around the city and also commercial and educational activities are flourishing.

Comparison with other urban agglomeration in the State					
Year 2011	Population	Growth Rate	Sex ratio		
Rajkot (U.A)	55,70,585	22.31	897		
Surat (U.A)	44,62,002	42.19	758		
Vadodara (U.A)	16,66,703		923		
Rajkot (U.A)	12,86,995	33.03	905		

(Source: Census of India (2011)

As per Table no. 13 Rajkot along with other urban agglomerations in the Gujarat state. It clearly suggest that Rajkot urban agglomerations has fourth largest decadal population growth rate.

#### **Birth and Death rates**

Both birth and death rates have remained stable in 2011 when compared to the 2001 census figures. While the birth rate has stabilized at 24 births per 1000 people, the death rate is around 9 deaths per 1000 people by 2011.



### **Infant Mortality Rate**

Ratio of number of infant deaths (death of children below one year) in a year to the number of live births in that year is called as Infant Mortality Rate (IMR). Number of deaths of women in the age group 15 to 49 while pregnant or within 42 days of termination of pregnancy and child birth per 1, 00,000 live births in a given year is called as Maternal Mortality Rate (MMR).

The factors which affect birth rate include the age structure of population, the average age for marriage, and the use of family planning tools. Increase in longevity of life due to improved health and hygiene facilities may also be a reason for reduction in the death rates in Rajkot.

# 6.3.2 MIGRATION

Rajkot is the largest city in Saurashtra and heavy in migration from the surrounding districts has been observed due to numerous opportunities the city offers for business and employment. In-migration has been observed not only from surrounding districts of Saurashtra but also from surrounding state, maximum in-migration has been observed from Bihar (32%) and Maharashtra (18%). In migration from outside the country is almost not seen.

# 6.4 POPULATION DENSITY

Population density is defined as hectare. Table of population density for all administrative units has been produced for year 2001 to understand the density pattern of the city. RUDA area 215 person/ Ha. India's density 325 person/ sq km and Gujarat state's density 258 person/ sq km.

No	Administrative Zone	Total Population (2001)	Total Population (2011)	Density (per/ha) (2001)	Density(per/ha )(2011)
1	RMC	1002000	1286995	95.56	122.74
2	RUDA	126849	248117	2.18	4.27

#### TABLE 15 POPULATION DENSITY

(Source: Census 2011)

Gross population density has grown from 2.18 persons/Hectare to 4.27 persons /Hectare for RUDA region since 2001 to 2011. While today the gross density in RMC areas is 144PPH and net density for residential and commercial areas is 250PPH. n RMC ward level population density vary from 62 persons per hectare (PPH) TO 321 persons per hectare. Below table shows the population densities of each ward.





(Source: GIS database RMC and Census of India 2011)

# 6.5 HOUSEHOLD

A 'household' is a group of persons who normally live together and take their meals from a common kitchen. (Source: Census 2001) Households are classified as size based and function based.

### 6.5.1 HOUSEHOLD DENSITY

Household density is calculated as number of households per hectare. Due to change in household size population density and household density may vary.

# 6.5.2 HOUSEHOLD SIZE

There are two basic types of household depending upon size such as single family and joint family. In the pace of urbanization large joint families are getting broken down into small single or nuclear families with smaller household size, which may result in high demand of housing units with smaller area requirement.

The average household size in the study area was 4.87 which vary from 4.85 in central area to 4.66 in rest of RMC and 5.26 in Rajkot OG respectively. Household size of Rajkot OG was higher compared to central area and rest of RMC indicating concentration of large size families on the periphery of the city and beyond.

No.	Census 2011	Population	Total HHs	Avg. Household size (2011)
1	Rajkot Urban	22,08,582	4,68,918	4.7
2	Rajkot UA	13,90,933	2,46,619	5.64*

\* Average household size of Rajkot city, 2001 has been considered to calculate Total households in Rajkot UA, in 2011.

# 6.6 OBSERVATIONS AND ISSUES

#### **Population and Growth Rate**

 Observation: Majority of RUDA population (84%) resides in RMC area. The gross population growth rate for whole RUDA is 34%. Within RUDA, the RMC New shows highest (28%) population growth.

#### **Population Densities**

 Observation: Higher population densities are observed in the RMC Central Zone and West Zone. The eastern areas of RMC have comparatively lower population densities.

#### Literacy

• **Observation:** The all 54 villages in RUDA show good literacy rate.

#### Sex Ratio

Observation: The rural areas of RUDA have better sex ratio (946 females per 1000 males) than the urbanized areas of RMC (908 females per 1000 males).

#### Household Size

• **Observation:** The household size has decreased in last decade and if the trend continues we will see further decrease.

**Issue:** With the decline in the household size the needfor individual housing units would increase to accommodate the population.

# SECTION7: LAND USE, ZONING AND BUILT FLOOR SPACE

# 7.1 INTRODUCTION

Development is one of the basic indicators of growth. Over the past decades the urban area of Rajkot has grown significantly and a large amount of land has come under development. Within RUDA area this development is regulated by zoning regulation provided in the sanctioned Development Plan.

This chapter provides an assessment of land area within various zones, existing land uses, and built floor space within various zones. The different analyses and the relevant inferences should help to identify availability of land and floor space for future development.

# 7.2 ZONING UNDER DEVELOPMENT PLAN 2011

# 7.2.1 EXISTING ZONING AND DEVELOPMENT WITHIN ZONED AREA

The Sanctioned Development Plan covered an area of 686.30 Sq.km. of which 418.17 Sq.km of area is covered under agriculture whereas 267.12 Sq.km. of area is covered under other zoning. The plan identifies multiple zones for this area shown in FIG.7. Out of all zones identified in the plan, three major zones are the most critical for regulating development within the planned area. These are: Residential Zone Commercial Zone and Industrial Zone. In addition to these, the Gamtal and Walled City zones are critical for regulating development within the old cores. Agricultural zone covers the largest land area (61%), this helps in preserving the precious cropped land under agriculture. Table 14 shows total area covered under each zone.

NO	Type of Zone	Area (HA)	% of total ruda area
1	Residential	12528	18.25
2	Commercial	827	1.205
3	Industrial	5205	7.584
4	Public purpose	591	0.861
5	Recreation	1053	1.534

 TABLE 16 AREA IN VARIOUS ZONES IN RUDA REGION AS PER SANCTIONED DEVELOPMENT PLAN 2011

6	Road Transport & communication	2453	3.574
7	Agriculture + Water body + Other	45973	66.99
	(Ag- 61.02% + water body-5.1%+ other -0.7%)		
	Urbanise area (total developed area)	22657	
	Non urbanise area (Agriculture + Water body+ Other )	45973	
	Total	68630	100

#### FIGURE 11 ZONING AS PER SANCTIONED DEVELOPMENT PLAN 2011



The Land Use analysis of the land uses proposed under the Sanctioned Development Plan 2011 is done considering the total RUDA area of 686.30 Sq.km.

As per the Sanctioned Development Plan 2011, the land under Agriculture is approximately 418.17 Sq.km., which is

61%, the area under Water Bodies is approximately 34.95 Sq.km. which is 5.1%. The zoned area for the purpose of development is approximately 267.12 Sq.km. which include the Residential zones occupy almost 125.06 Sq.km. respectively which is 18.25%, whereas commercial zones covers approx. 8.2 Sq.km. area which is 1.2% and Industrial zone covers approx. 51.39 Sq.km. which is 7.5% of the total land use. The residential zone includes other uses such as parks, open spaces, small scale commercial uses, shopping centers, malls, office uses, light industries; workshops etc.

# 7.2.2 DEVELOPMENT OUTSIDE ZONED AREA

While the sanctioned Development Plan (2011) regulated development within the zoned area, a significant amount of development also took place in areas outside the plan boundary. About 1% of area excluding Gamtal was already developed outside the original RUDA area towards west by 2010. This has been a cause of concern which has led to expansion of RUDA boundaries to incorporate the more 70 villages within RUDA.

# 7.2.3 UNDEVELOPED AREA IN RUDA REGION

While planning for future development it is important to understand the availability of land within existing zoned area and its development potentials. The table below shows available undeveloped land and the permissible floor space in Residential zones. Although it cannot be assumed that all of this land will be developed in future, this assessment helps to provide an understanding of remaining development potential within currently zoned area.

#### TABLE 17UNDEVELOPED LAND AND AVAILABLE FLOOR SPACE IN ZONED AREA

zone	Total Vacant land in zone(sq.km)	% of vacant land in zone	Total Zone Area (sq.km)
Residential	9.34	4.74	125.06

**Note**: Undeveloped land includes vacant and agricultural land within Residential zone.

# 7.3 EXISTING LAND USE

'Land use' is identification of use or activity on a land parcel. Land use classification system identifies activities taking place on land parcels in various categories such as residential, commercial, industrial, institutional, utilities, road, open spaces, vacant land etc. Traditionally almost all previous Development Plans have included land use maps and land use assessment. However, due to various limitations these maps remained coarse and highly generalized. Realizing the importance of detailed mapping for accurate assessment, RUDA has developed a new GIS based land use classification system. Analysis included in this section (and used throughout this Development Plan) uses this new, highly detailed GIS based map to assess:

- Actual land use patterns throughout the RUDA region
- Land use distribution in various zones
- Amount of developed and undeveloped land within various zones and in various administrative areas
- Permissible floor space and utilized floor space

# 7.3.1 PREPARATION OF LAND USE MAP

# Need for developing land use map:

Need for developing land use map: A land use map is a representation of various uses happening within the given area. Land use map helps to study and analyze trend of land use pattern of the city. Actual area under various uses and location information is the outcome of the land use map. It explains qualitative and quantitative aspects of the developed land. By studying existing level of development the projected scenario could be visualized and built.

**Methodology for preparing the land use map:** Developing existing land use survey which is carried out to the scale of survey numbers in the revenue areas and up to the scale of final / sub plots in the town planning scheme areas along with secondary data from various authorities and sources. The collected data need to be imposed on updated road and plot map along with natural features final land use map.



After the commencement of the development plan, one of the important tasks for the Authority was to undertake the land use survey for the total 686.30 sq km which was declared as Rajkot Urban Development Authority area. A strategy was worked out summarised below:

- 1. Preparation of formats for Land use survey based on UDPFI and NUIS Guidelines.
- 2. Formation of Teams for land use survey by RMC and RUDA for their respective areas.
- 3. Allocation of land parcels in terms of maps for filling up of the land use details both in Revenue areas and TP Scheme areas.
- 4. Collection of Data from various departments such as Indian Railways, National Highway Authority of India, State Road and Building Departments, Department of Industries and Mines, Dedicated Freight Corridor Corporation (DFCC), Industrial Extension Bureau (Ind. Ext. B), District Collector's Office, Gujarat Urban Development Corporation, Department of Irrigation, and Sardar Sarovar Nigam Limited etc.
- 5. Conversion of above mentioned data on maps into GIS (Geographic Information Systems), for data from various departments of Government and the land use survey results both into TP schemes and revenue areas.
- 6. Generation of final land use maps and preparation of Land use tables.

# 7.4 EXISTING LAND USE PATTERNS AND ANALYSIS

To analyze existing land use pattern of the city, maps of individual uses have been prepared. The Individual maps show concentration of the particular land use in different locations or different zones.

NO	Type of Zone	Area (HA)	% of total RMC area
1	Residential	5502	52.47
2	Commercial	279	2.66
3	Industrial	738	7.04
4	Public purpose	249	2.37
5	Recreation	523	4.99
6	Road Transport & communication	1650	15.74
7	Agriculture + Water body + Other	1544	14.73
	(Ag-7.63% + water boday-2.25% + OT- 4.85%)		

#### TABLE 18PROPOSED LAND USE FOR RMC AREA 2011

Urbanise area (total developed ar	ea)	8941	
Non urbanise area (Agriculture+ Other)	Water body+	1544	
Total		10485	100.00

#### TABLE 19PROPOSED LAND USE FOR RUDA 2011

NO	Type of Zone	Area (HA)	%	of	total	ruda
			are	ea		
1	Residential	12528			18.25	
2	Commercial	827			1.205	
3	Industrial	5205			7.584	
4	Public purpose	591			0.861	
5	Recreation	1053			1.534	
6	Road Transport & communication	2453			3.574	
7	Agriculture + Water body + Other	45973			66.99	
	(Ag- 61.02% + water body-5.1%+ other -0.7%)					
	Urbanise area (total developed area)	22657				
	Non urbanise area (Agriculture + Water body+ Other)	45973				
	Total	68630			100	

Type of Zone	Existing Develop ment area(HA ) RMC	Existing Develo pment area (HA)54	Total Devel oped area (HA)R	Existing Develo pment area (HA)18	%Prop osed land use in 18	Existing Develo pment area (HA)36	%Prop osed land use in 36	% Devel oped area	% Prop osed in 2011
Residential	4382	Villages	UDA 7395	Villages	villages	Villages	villages	10 78	18 25
Residential	4302	5015	/3/3	4.70	13.0	0.02	13.02	10.70	10.25
Commercial	189	163	352	0.21	1.81	0.30	0.95	0.51	1.21
Industrial	766	1770	2536	2.38	13.4	1.32	5.13	3.70	7.58
Public purpose & Recreation	579	428	1007	0.70	1.51	0.77	2.77	1.47	2.40
Road Transport & communicat ion	1283	133	1416	0.26	2.49	1.8	4.03	2.06	3.57
Agriculture +Water Body+ Other)	3007	52638	5564 5		66.89		67.49		66.99
TOTAL DEVEL	OPED AREA	A Contraction of the second seco		8.31	33.1	10.21	32.5	18.51	33.01
Agriculture area + Other +Undeveloped area out of proposed area			91.69		90.08		81.49		
Total %								100	100
Total area					203.32		482. 99		686.30

#### TABLE 20PROPOSED LAND USE 2011 V/S EXISTING LANDUSE 2012



#### TABLE 22 PROPOSED LAND USE 2011

#### TABLE 21 EXISTING LAND USE 2012

#### **Residential Land Use**

There is considerable variation in residential typologies in city depending upon the area consumption, density, design of the building, height of the building, age of the structure, etc. Majority of residential development on the west side is includes high rises, low rise low density bungalows and low rise multifamily tenements. While as walled city, dense chawls and compact slums, whereas located in central part of the city.

**Distribution by Administrative Areas**: More than half of total developed area is in under residential use. Almost 52% of the total residential area falls within RMC. While RUDA accommodate 12% of residential land. It also includes the Gamtals.

**Distribution by subcategories:** Residential uses are further sub categorised than Low rise is the most dominating residential type that includes low rise apartments, bungalows, and other housing, covering almost 75% of all residential land. High rise residential occupies a small segment, whereas slums and other informal housing types cover almost 11% of the residential area.





### Commercial Land Use:

City of Rajkot shows a variety of commercial typologies. These uses can be broadly categorised in three categories (1) Small Scale Commercial, such as shops or small stores, (2) Medium Scale Commercial, such as shopping centers or commercial strips ,and (3) Large Scale Commercial, such as malls with retails stores, theatres, entertainment centers etc.

A majority of commercial uses in Rajkot fall under Mixed Commercial (63%) and Retail shopping (37%), which includes the Small Scale Commercial uses and Medium Scale shopping centers. The small scale commercial uses are generally located along almost all

major and minor arterials. Commercial uses in Walled City are also characterized by rows of mixed small scale shops along main streets.

Medium scale commercial, generally identifiable as shopping centers, are found along major arterial streets such as yagnik road. Large scale commercial includes malls, complexes with cinema theatres, office complexes and business parks. Though Malls and Cinema theatres occupy about 0.3% of total area under commercial, they are significant landmarks of the city generally located along major arterial roads and at important nodes along kalavad road, 150 ft Ring Road. Large office complexes along the 150ft Ring road, while Dhebar road area the major employment generating commercial typology.

Wholesale markets take up almost 20% of total commercial land use. These are generally located in old city such us Bedipara.



FIGURE 13EXITING COMMERCIAL LAND USE

#### **Industrial Land Use**

As an industrial town since 19<sup>th</sup> century there was a significant land allocated for industrial development on the peripheral areas of the city. These areas subsequently merged into the city and became part of the industrial zones as the city expanded. A significant number of manufacturing industries are located on the south and western side along the state highway such as kalavad road, Gondal road and Ahmedabad road. At present more than 35% of total industrial land within

RMC is located in the eastern part and South part of the city. Some of this includes machinery and manufacturing industries. On the western side the industries have followed GIDC along kalavad road and On South side the industries have followed corridors along in south towards vavdi, kothariya, shaper and veraval.while on Eastern side some industries have followed corridors along Ahmedabad road towards anadpar, kuvadava. At last but not the least on North-west side some industries have followed corridors along Jamnagar road towards targhadiya.

FIGURE 14 EXISTING INDUSTRIAL LAND USE



#### Gardens, Parks and Open Spaces and Public Amenities and Utilities:

Parks and open spaces can be categorised as city level and neighborhood level. Race Course, Aji dam, Nyari dam, Parduman Park, Lalpari lake, Iswariya park are the examples of the city level open spaces whereas small parks and gardens, urban greens developed by RMC as are the neighborhood level open spaces. The parks are located within the walk able distance in Wards no. 2, Ward no.18, Ward no.11 etc.

There is 249 Ha of land under public use in RMC which is being used for various purposes such as health care, police station, post office, water tanks, solid waste and sewerage disposal/ treatment sites, community halls, libraries, crematorium, religious monuments and stations, fire fighting stations, government offices, etc. Development plan designates the land for various public purposes and local authority implements the task.

In RMC area the consumption of public land is 2.37% which is very less as compared with UDPFI standards. The educational institutions in city can be classified as public and private institutions as well as schools and colleges. The institutes like Marvadi, R.K University, ATMIYA, V.V.P, etc are the reputed institutions not only in Rajkot but also in Saurashtra region as well as in Gujarat also. Education is one of the important reasons for migration in Rajkot.

FIGURE 15EXISTING GARDENS, PARKS AND OPEN SPACES AND PUBLIC AMENITIES AND UTILITIES LAND USE



# 7.5 OBSERVATIONS AND ISSUES

## Available undeveloped Land in Zoned Areas

• **Observation:** Approximately 102.61 sq km of land is undeveloped

## Development outside the zoned areas

 Observation: In the past decade, significant development has occurred in the newly added areas within the RUDA area. These peripheral areas did not have a proper regulatory authority before they were added to RUDA and have had haphazard development.

# Spatial Building/Land use Typologies

- Observation: Presently, there exists a difference in residential typologies on eastern and western side of the city. The Eastern side is characterized by low rise and informal housing where as the western side has high rise, mid rise; bungalow and farm house typologies.
- Almost 70% of industries are located on the south-eastern side. On the other hand a high percentage of educational institutes are located on western side.

# SECTION:8 ROADS AND TRANSPORTATION

# 8.1 INTRODUCTION

Rajkot is well connected to rest of the country by Road, and Rail. The transportation system of the city is predominantly dependent on roadway system. The vehicular growth has been rapid and there is a strong need to control the increasing traffic congestion.

This chapter provides an overview of the existing transportation system in terms of road network, public transport, pedestrian and non motorized transport facilities, parking, signage & way finding, vehicular growth and assessing the existing scenario of land use transportation integration in the city.

Planning the traffic and transportation systems in Rajkot city involves interacting with several agencies including the Municipal Corporation, National Highway Authority of India (NHAI), Public Works Department (PWD), State Highways, Indian Railways, interstate bus operators, and private bus operators. RMC is vested with the development and maintenance of the road network, traffic management, public transportation, management of truck operations, etc.

# 8.2 ROAD NETWORK AND CONDITION

Presently, the road length within RMC jurisdiction is about 1,797km.with respect to road condition 63% of the roads are surfaced and 38% are roads with earthen surfaces. Out of total surfaced roads, 61% are bituminous and 1.32% is water bound macadam (WBM) roads. The 38% earthen roads are in the newly merged areas of RMC limits.

The roads in RMC are classified into major roads, minor roads, and lanes according to the right of way (RoW). Roads with RoW of more than 15m are termed as major roads, roads with RoW between 3 to 15m are termed as minor roads and lanes have RoW less than 3m.

Rajkot has a road network with an average road density of 22.98km of roads per square kilometer area of the city. Majority of roads having width of four lanes or above are along Rajkot Road, Jamnagar Road, 80'Road, Kalawad Road and Ring Road. Along the major part of the road network (99.5%) in the central area and 98.7% in the res RMC, there is no provision of service lane, thereby forcing the vehicles to use the principal network even for local movement.

RUDA is also developing a ring road around Rajkot city for the through movement of bypass traffic. Under this project a 20km long and 45m wide road is to be developed by RUDA in two phases. The first phase will involve the construction of 9 km of the road starting from Jamnagar Road near Ghanteswar village till the multiplex cinema on Kalavad Road. The second phase will be the construction of 11 km of the road starting from the multiplex

cinema o Kalavad Road up to Gondal Road National Highway near the TB hospital. A part of Phase I of 6.5km length is being considered to be developed on PPP with the design, build, finance, operate, and transfer structure and is at the tendering stage.



FIGURE 166 ROAD NETWORK AT REGIONAL LEVEL





# 8.3 TRAFFIC AND TRAVEL CHARACTERISTICS

Rajkot is the centre for many social, cultural, commercial, political, industrial and educational activities for the whole of Saurashtra Region and has experienced many material changes in its physical structure. These activities are mainly concentrated in the central part of the city as well as on Gondal Road, Bhavnagar Road, Kuvadava Road, University Road, Kalavad Road, Raiya Road and Ring road. The major industrial development is on Gondal Road and Bhavanagar Road. The major commercial activities are in the central part of the city and on Kuvadava Road and near Lakhajiraj Station area. The major educational institutions are located Yagnik Road and Kalawad Road. This has resulted in most unsatisfactory relationship between places of working and living areas. A large number of people have to commute from one living areas. A large number of people have to commute from one living areas. A large number of people have to commute from one living areas. A large number of people have to commute from one living areas. A large number of people have to commute from one living areas. A large number of people have to commute from one living areas. A large number of people have to commute from one living areas. A large number of people have to commute from one end of the town to another end to reach their working places. This causes undue delays, traffic jams, accidents, parking problems and unavoidable heavy pressure on public transport during peak hours.

### 8.3.1 TRAFFIC CHARACTERISTICS

The traffic movement on the north-south direction is 4, 82,296 vehicles (3, 56,535 PUCs) and 3, 43,483 vehicles (2, 39,734 PCUs) in east-west direction.

Sr no.	Type of Vehicles	%
А	Private Vehicles	
1	Scooters motor cycles & Auto Rickshaw	35%
2	Motor, Cars, Jeep etc.	16%
В	Public vehicles	
1	Bus	5%
2	Chakadas	14%
3	Trucks	17%
4	LCV	7%
5	Tractors	2%
6	Passenger buses	5%
7	Cycle	3%
8	Auto	1%
9	ADV/HDV	0.3%

(Source: Comprehensive Mobility Plan, RMC)

This traffic is contributed largely by passengers from nearby villages and towns visiting Rajkot for their daily domestic and commercial needs. These passengers do not contribute much to the internal city traffic as they come for specific needs and leave.

# 8.4 INTERCITY TRANSPORTATION FACILITIES

# **Gujarat State Regional Transportation Corporation and Private Buses**

Public transportation is a need of Rajkot. Since December 2011, the city bus service has been privatized and is managed by ViTCOS Transportation Pvt. Ltd. Prior to this; Gujarat State Road Transportation Corporation (GSRTC) was providing urban transport service on select routes.

Bus based public transportation is Rajkot city has been recently implemented through PPP. As per the agreement with a private operator, 56 routes have been identified within Rajkot city as well as nearby villages located in 10km distance. Out of these routes, 14 are currently operational and 31 buses are plying on these routes on daily basis.



Approximately 6500 passengers use the current bus service on daily basis.



#### FIGURE 18 THE MAJOR CORRIDORS AND GSRTC ROUTE MAP

#### LEGEND



0.058 - 0.059

# Rail

The rail network for the city is spread in all the four directions connecting Rajkot with different states of India. Rajkot is a major hub for Western Railway in Suarastra Region . The railway network is broadly divided into the broad gauge and railway lines. The major railway stations are Bhaktinagar, and Junction. Both of these Stations are Passenger oriented stations. Both railway stations are reasonably well connected to different parts of the city through bus services.

FIGURE 19 RAIL NETWORK AND RAILWAY STATIONS IN RAJKOT



### Air

Rajkot Airport is the busiest airport in Saurastra region and third busiest in Gujarat behind Ahmedabad Airport and Vadodara Airport

**Domestic traffic**: Daily flights are operated by Jet Airways and Air India. Rajkot Airport has parking apron for one Boeing and one ATR 72, with the terminal having capacity for 125 people.

The airport now suffers from considerable capacity restraints, due to the expansion of the city and because of the residential and commercial buildings which have been built around it. because of that authority plans for an entirely new airport have been submitted, and
suggested that a new bigger airport be developed on 500 acres (2.0 km<sup>2</sup>) of land near the Rajkot- Gondal -Jamnagar highway, around 10 km away from the city and nearer Khirasara village. This proposal is still under consideration.

# 8.4.1 INTERMEDIATE PUBLIC TRANSPORT

Intermediate Public Transport (IPT) is normally expected to fulfill a need that neither public transport nor are personal vehicles able to fulfill. They normally cater to a category of small trips, gap left with the public transport, or emergency trips that have to be undertaken immediately and it is not possible to wait for public transport. IPT services are usually provided by private operators, usually single-person enterprises that are often self regulating or controlled by illicit groups. Often vehicles are hired to drivers on a daily basis. IPT services in Rajkot include Auto rickshaws, chakdas and taxis.

Auto rickshaws: There were only 2053 auto rickshaws registered in RAJKOT RTO. The total number of registered auto rickshaws in Gujarat, 1% is registered in Rajkot. In Rajkot city, two types of Auto rickshaw are found plying on roads to provide public transportation to the residents:

- 1. Regular service This service is based on passengers' rickshaws.
- 2. Sharing Based Service This service carries multiple passengers at a time.

Generally in Auto rickshaw, the routes are decided by the passenger but at the same time some Auto rickshaw drivers operate only on popular routes where the demand is high.

The major origins points of shared rickshaws are ST.bus stand, Trikon bag, K.K.V HALL, Raiya chokvdi, Hospital chowk, Green land chowkdi and major activity centers FIGURE 21SCHOOL GOING AUTORIKSHAW

where demand is high. The major routes of shared



FIGURE 20CNG AUTORIKSHAWS



rickshaws are Trikon bag to K.K.V Hall, S.T Bus Stand to Trikon bag via Dharmendra road.

#### 8.5 PEDESTRIAN AND BICYCLE

The RUDA region has an area of 685.85 Sq km of which the city of Rajkot past development plans, the city is relatively compact with well developed, ring radial road network and mixed land use. The major concern though is that there is very less involvement of people on cycles, and pedestrians. Which suggests that there needs to be more focus on safety for these modes.

# **Bicycles and Pedestrian along BRTS**

Rajkot as of now has about 20 km of dedicated cycle and pedestrian track along the Bus Rapid Transit Route. Besides the BRTS network, Rajkot has very less existing pedestrian streets; however there are a number of street markets/ places that have potential to be developed as fully or partially pedestrian streets.

A significant numbers of pedestrians are observed in the old city in the market areas like Dharmendar market, Soni bazzar, Gundavadi Market etc Apart from the walled city, a major informal market that exists on the western side of the city. A significant amount of pedestrian movement in the morning is observed at Race Course.



SONI BAZZAR MARKET AREA

FIGURE 24RACE COURSE

PEDESTRAIN ALONG BRTS

# 8.5.1 BUS RAPID TRANSIT SYSTEM (BRTS)

RMC has developed a comprehensive plan for the development of a BRTS system in Rajkot city. The total length of the BRTS corridor is 63.5km, out of which the initial phase with a length of 10.7km is undertaken in JNNURM as Blue Corridor. At present the construction of phase 1 was started at 150' Ring Road.



# 8.6 LAND USE TRANSPORTATION INTEGRATION

Landuse transportation integration ideally constitutes of livable and walkable neighborhoods; where residents of diverse incomes, ages and backgrounds have an option to walk to nearby shopping areas, restaurants, parks and school; where streets are safe to walk along and offer convenient means of public transportation as well as private vehicles.

Broadly, it is desirable to have the abutting land use character based on capacity of the streets and vise versa.

In Rajkot mixed use type of development exists along the streets. However, these streets do not offer any safety to the pedestrians & cyclists, forming a missing link in the landuse transportation integration.

# 8.6.1 LAND USE AND TRANSPORTATION INTEGRATION ALONG MAJOR ROADS/STREETS.

# **Existing Scenario**

Presently it is seen that the road width affects the height and scale permissible for development within any given plot. The development along the major streets is regulated according to the width of the road on which it abuts.

Basically both residential and commercial land use are permitted along all the major roads in the city etc. that are wider than 15 m. Moreover, roads having widths lower than 15 m permit the development of small scale commercial and residential activities. As the width of the road decreases the scale and height of the building reduces. Analyzing the existing development along major streets, the following observations can be made:



FIGURE 25 DEVELOPMENT ALONG MAJOR ROAD

# 8.6.2 INTEGRATION OF TRANSPORTATION NETWORK WITH DEVELOPMENT PATTERN

A character based classification for streets is proposed that describes the inter-relationship of land use and transportation, identifies the drawbacks & areas for improvement. The following section describes the existing interaction between land use and transportation for the Major streets of Rajkot.

# 1. Predominantly Residential

These streets generally have a mix of all kinds of land uses such as small scale & large scale commercial, different residential typologies, etc. However, the major land use observed is residential.

# Predominantly Residential Low Rise:

- They have small scale commercial activities like grocery stores. These are mainly neighborhood streets.
- These streets carry less traffic volumes as compared to other major streets in the city and tend to be more pedestrian oriented than commercial streets.
- Typical examples are the stretch from Amin Marg Stretch.

# Predominantly Residential mid Rise:

- A typical example of a street with predominantly Midrise residential character can be found along Jamnagar Road. From Ghanteswar and Madhapar.
- Along these streets, a wide range of commercial activities are seen with the scale depending on the street widths.
- These streets connect or serve as traffic feeder to the major arterials.

# Predominantly Residential High Rise:

- A typical example for predominantly Residential Highrise in Rajkot is the stretch from 150'Ring road.
- These streets have a mix of large scale and small scale commercial activities and highrise residential buildings. They usually carry high traffic volumes throughout the day.

However, at locations where large scale



commercial activities are found, there are parking and traffic issues during peak hours of the day.





## Predominantly Residential High Rise with Commercial at Base:

- Streets like Kalavad Road Race Cource Ring Road, Amin Marg Main road, have mainly residential High rise buildings with commercial activity at their lower floors.
- These streets also carry significant number of vehicles throughout the day and have traffic congestion at peak hours.



 These streets have heavy pedestrian movement due to the commercial activity abutting the roadside. However for most of the streets of this kind, unregulated parking remains a major issue.

## 2. Predominantly Commercial

### **Retail with Shopping Centre and offices:**

- Yagnik road is the main example in the city for this category of street.
- These roads are generally wide with pedestrian movement at the edges along with informal vending activities and parking facilities for private vehicles and wide carriage way carrying high volumes of vehicular traffic.



### **Retail with Mall type Commercial**

Kalavad road and 150'ring road is a typical example of an urban street with Mall type of retail commercial all along the road.

150'ring road has a 4 lane carriage way with service road, on either side of the median. It

has service lanes on either side for entry to the commercial development.

These streets generally have medium traffic throughout the day with the increasing traffic density during peak hours.



# 3. Institutional

- The main institutional area for Rajkot lies on the Western side and North side . Kalavad road and Bhavnagar road are the main institutional road in the city.
- These roads have informal vending activities at certain locations of the street, and wide carriage way that



carries medium traffic throughout the day.

# 4. Commercial with Industrial Heavy Industries with Transit

- Gondal road (Kothriya-vavdi) is the major industrial area on the south side in Rajkot city.
- The land use abutting this road is mainly large and small cale industrial development.



FIGURE 26LARGE AND SMALL SCALE INDUSTRIES

• It carries heavy through traffic, with inadequate space for non-motorized transport.

# 8.6.3 Study indicators for Integrated Land use Transportation

Service level Benchmark for land use transport system integration as per GoI has been studied and analyzed.

According to the GoI Service level benchmark, the indicators to quantitatively assess the land use transport integration are as follows:

- Population density gross persons per ha
- Mixed land use on Major Transit corridors per network (i.e. percentage non residential area)
- Intensity of Development city wide (FSI index)
- Intensity of development along transit corridor
- Clear pattern and complete network
- Area under roads (%)
- Proportion of network having exclusive ROW for Transit

# 8.7 PARKING

Well designed, and appropriately located parking creates a welcoming atmosphere and leads to positive responses and satisfied patrons for all kinds of activities; commercial and residential, in addition to easing traffic flow and reducing congestion. Parking can be basically categorized into three types namely:

- On-street Parking
- Off-street Parking

## 8.7.1 ON-STREET PARKING

For motorized vehicles, there are three basic arrangements for on-street parking: parallel, perpendicular and angle parking. Rahjot city has a typical example for angular on-street parking. The on-street parking at Kalavad road in Rajkot addresses a lot of issues of vehicular movement, shopping, residential access and parking that are commonly found on majority of streets in the city.



The objective of parking design in Kalavad road was to resolve conflicts in street use in the most efficient manner possible, through careful detailing.

Provision of on-street parking in this pattern avoids the instances of ad hoc approach of parking. The photographs show the planned strip of on-street parking along the kalavad road

In the photograph shown above, the entire strip which has the planned on-street parking along with certain open spaces in terms of gardens FIGURE 27 ORGANIZED ON STREET PARKING and tree plantations. This strip provides parking for two wheelers as well as four wheelers.

Provision of parking in this lane has changed the character of this lane from residential to commercial.

Provision of on-street parking is also found on 150'ring road however this parking does not follow any FIGURE 28 UN ORGANIZE PARKING ALONG particular pattern.

As shown in the photographs, parking for two wheelers as well as four wheels is provided along the service lane of 150'ring road .On the whole; the newly developed roads in the city

have the availability of parking space while the already developed roads have a demand for provision of parking space.

# 8.7.2 OFF-STREET PARKING

Parking within the plots; not along the road is termed as off street parking. Off-street parking spaces for vehicles are to be provided in every new building constructed for the first use or when the use of the



FIGURE 29 OFF STREET PARKING

building is changed.

There are two types of off-street parking spaces, based on ownership - public and private. A public parking lot is a cleared area that is intended for parking vehicles. Parking lots are found in varying sizes. These can be small with parking spaces for just few vehicles, or very large with spaces for thousand vehicles.

Public parking lots near commercial and institutional buildings often help to avoid on street parking on the road, which otherwise would reduce the carriage way of the road and lead to traffic congestions. The number of public parking lots does not meet the parking demand especially on commercial streets in Rajkot, hence incentives to build better and efficient parking lots would help to change the issues faced due to haphazard on-street parking.

# 8.7.3 MAJOR OBSERVATIONS AND ISSUES

- Poor accessibility to basement parking.
- Unauthorized rickshaw parking on the road.
- Carriage way, service road and footpath were used for parking.
- Need of on-street parking provision to be addressed near public transit corridors and commercial centers.
- Generally, short term users prefer on-street parking and long term users prefer offstreet parking.

# 8.8 SIGNAGE AND WAY FINDING

Signage is any kind of visual graphics found in the public domain to display information. Signage can include traffic signs, road names, etc. and typically includes way finding information for the surrounding area. Presently, it is observed that the road network and the traffic system does not follow any particular pattern for signage and way finding, and in most cases it is non-existent. Hence there is a strong need for creating a city wide signage system and upgrading signage across the entire city.

# 8.9 OBSERVATIONS AND ISSUES

# 1. Absence of functional hierarchy and Street Typology

Presently the only way to classify the streets in the city is based on the ROW widths; which is also not standardized.

# 2. Intersection planning on major junctions

Presently many junctions/intersections within the city face massive traffic congestion during peak hours.

# 3. Integration between the modes of public transportation system

Currently, there is little planned integration between the modes of public transport within the city namely RMTS, BRTS and intermediate public transport (auto rickshaws).

# 4. Insufficient Green streets within the city

Presently, there are not enough green streets in the city so as to encourage the pedestrian activity and the use of non motorized transport on these streets.

# 5. Insufficient width of foot path on major pedestrian streets/roads

- In general, there is a lack of proper footpaths with minimum 2 m (6 ft.) clear width for walking.
- The on-street parking blocks the pedestrian activity; also informal activities encroach on the footpaths.
- The streets intersections do not have proper pedestrian crossings.
- At many places due to lack of maintenance, the footpaths are broken & dumped with garbage.

# 6. Cycle Tracks

- Lack of provision of cycle track for children in the areas surrounding schools is a major issue.
- Cycle track network is inadequate.

# 7. Inadequate parking facilities around major Public Transportation Station

The present GSRTC bus depot located in city centre which leads to congestion in the city centre due to lack of parking facilities for GSRTC buses.

# 8. Unorganized parking for private buses

The buses park, pick up and drop off the passengers from busy intersections.

The bus stop activities at various places congest the roads and critical intersections.

# 9. Absence of integration between Land use and transportation system

Presently, the city has poor integration of land use and the transport network in the city.

# 10. Inadequate on-street and off-street parking facilities

Presently, on-street and off-street public parking is a major issue in the city.

Even though Rajkot has a number of planned on street parking facilities, there exists an issue of haphazard on-street parking on major streets due to inadequate availability of off-street parking within the commercial and residential complexes.

The existing public parking spaces are quite inadequate in order to meet the parking demands.

# 11. Increase in vehicular volume/ congestion on road

There is a constant increase in the number of four wheelers and two wheelers ownership in the city. Growth of vehicles leads to traffic congestion and further increases the vehicle density on the road.

# SECTION9: HOUSING

# 9.1 INTRODUCTION

Housing is the basic human need next to food and clothing. The combination of basic services and affordable housing in urban areas promote good quality environment. This chapter does an overarching review of the housing sector which includes the Lower, Middle and Higher Income Group Housing in the market. It further assesses the present housing need based on the population and the existing housing supply in the market.

Further the chapter focuses on housing for urban poor and provision of economically weaker section housing. The chapter then reviews various housing policies that are likely to impact the housing stock in the city in future and provide basic housing to the entire population in the city.

# 9.2 Housing Demand for $12_{\text{TH}}$ Five year Plan Case 1

# CASE 1

As per the Census 2011 total population of Rajkot district (Urban) and Rajkot Urban Agglomeration (UA) is 22, 08,582 and 13, 90,933 respectively. Total Number of Households for district (urban) and urban agglomerations are as shown in the table below:

Census 2011	Population	Total HHs	Average HH Size
Rajkot Urban	22,08,582	4,68,918	4.7
Rajkot UA	13,90,933	2,46,619	5.64*

TABLE 23POPULATION AND HOUSEHOLDS OF RAJKOT DISTRICT (URBAN) AND RAJKOT UA, 2011

\* Average household size of Rajkot city, 2001 has been considered to calculate Total households in Rajkot UA, in 2011.

Given that Rajkot city-level Housing Census data for 2011 is not yet available, Housing shortage for Rajkot UA has been calculated first for Rajkot district (urban); and proportion of which are then applied at total households in Rajkot UA. The methodology applied for calculating the housing shortage is adapted from the report of the **Technical Group On Urban Housing Shortage** (TG-12) (2012-17) that considers the following factors: 1) *Excess of* households over housing stock 2) number of households residing in unacceptable dwelling units (obsolescent factor) 3) number of households residing in unacceptable physical and social conditions (congestion factor) and 4) the homeless households. For the purpose of estimating obsolescent housing stock; the obsolescent factor calculated from 12<sup>th</sup> Five Year Plan (Obsolescent Houses/ Total Households i.e: 2.27 Mn/ 81.35 Mn = .027904) is multiplied with the number of households in Rajkot UA for year 2011 is 20087 units.

No	Housing shortage	Rajkot UA 2011
1	Households	246619
2	Acceptable Housing stock	244896
	Pucca	233261
	Semi Pucca	11055
	Serviceable katcha	580
3	Excess of Households over housing stock	1723
4	Congestion in households	10903
5	Obsolescence factor**	6882
6	Up gradation of serviceable catcher houses	580
7	Total Housing shortage= (3+4+5+6)	20087

#### TABLE 24 2. ESTIMATION OF HOUSING SHORTAGE FOR RAJKOT UA FOR 2011

**\*\***Obsolescent Houses/ Total Households i.e: 2.27 Mn/ 81.35 Mn = .027904 (12th Five Year Plan) Calculation of Congestion factor for Rajkot District (Urban), 2011

Congestion factor is calculated based on the assumption that each married couple will require an exclusive room to themselves. The numbers in the table below are from Census 2011 for Rajkot district (Urban). The numbers in the bracket are the couples requiring separate room.

#### TABLE 25 CONGESTION IN HOUSEHOLD

Number of married	Number of Households having:						Total married		
couples	No exclusive room	One	Тwo	Three	Four	Five	couples requiring separate room		
1	(1) x4007						4007		
2	(2) x417	(1) x8170					9004		
3	(3) x75	(2) x775	(1) x4017				5792		
4	(4) x15	(3) x85	(2) x310	(1) x518			1453		
5+	(5) x6	(4) x17	(3) x24	(2) x60	(1) x105	(1) x79	474		
Total married	d couples rec	quiring separat	Total married couples requiring separate room20730						

## Congestion in Households (Rajkot District Urban- 2011)

### Case 2

# Housing Shortage Estimation as per Slum Survey

As per the Survey covered under the RAY, the total city population in the Municipal limits is 1286995 persons, of which 204000 persons are living in slums with 124 slum pockets. All the slum pockets are widely spread across the city covering 22 wards out of 23 in total. The total number of Household in all 124 slum pockets is 497411. Out of which, 72.8 % HH (36216) are living below the poverty line (BPL) followed by 27.2% (13525) are above the poverty line (APL)

#### TABLE 26HOUSE REQUIREMENT FOR EWS AND LIG

<b>City Population</b>	Slum Population	Slum HH		Total HH
		APL*	BPL**	
12,86,995	204000	13525	36216	49741

(Source- RAY Cell)

Note- As per Slum Survey \* Houses Required for LIG \*\* Houses required for EWS

# Criteria for deciding the Housing typology

As per the Guidelines given by the Government of India for the allotment of EWS and LIG houses are purely based on the Income status of the people, as given in the table below, EWS housing is majorly for those who has less than equal to 5000 income/ month, and as per the guideline given by the Planning commission for people living below the poverty line (BPL) is those whose annual income is more less than equal to 17000/ annum.

#### TABLE 27INCOME GROUPS

Category	Income Group
EWS	<= 5000
LIG	5001 – 10000
MIG & Above	10001+

By the above criteria it can be considered that EWS housing can be allotted for the BPL (36008), whereas LIG can be considered for the APL (13448).

	Housing Required for Working Population (2011)						
Sr.No	Activity	% of	2001	HH Required	2011	HH Required	
		workers					
1	Agricultural & Allied Activities	3.75	15603	2786	16650	2973	
2	Household industries	3	12483	2229	13320	2379	
3	Manufacturing (other than HH)	28.2	117336	20953	125212	22359	
4	Construction	5.5	22885	4087	24421	4361	
5	Trade & Commerce	21	87378	15603	93243	16650	
6	Transport	10.2	42441	7579	45289	8087	
7	Transport	28.35	117960	21064	125878	22478	
	TOTAL	100	416085	74301	444013	79288	

CASE-3 TABLE 28HOUSING REQUIRED FOR WORKING POPULATION (2011)

The table indicates that the working population of Rajkot can be further categorized under 7 categories. The total population in each of the categories for the years 2001 and 2011 is equated to determine the houses that are required to be constructed. The demand of dwelling units has increased from **74,301** to **79,288** from **2001-2011**. These working categories can be placed under the heads of EWS, LIG and MIG income groups, whereby, Agricultural & Allied Activities and Household industries, Manufacturing and Construction can be considered as EWS, Trade & Commerce and Transport as LIG and Services as MIG. Considering this there are nearly **32072 houses required in EWS, 24737 houses on LIG and 22478 houses in MIG categories**.

# Conclusion

The city Housing requirement is not predictable and accountable, it can only be assumed and calculated by using different statistical methods, and based on scenario we can calculate the Housing demand for the city.

To fulfill the requirement we have considered three cases to calculate housing demand, the first case is based on the obsolescent housing stock, and congestion in Household which shows the housing shortage of **20087** houses.

On the other hand, the RAY cell under RMC has conducted a socioeconomic survey for 124 slum pockets. It is found that around 204000 persons are living in slums with and average household size is 4.1, with that it is estimated that around **49741** households are there in the Slums pockets, along with that it was found that 72.8 % of the household are below the poverty line, and rest 27.2% were above the poverty line, which inference that people living below the poverty line are eligible for the EWS housing only, and the rest are eligible for the LIG housing.

The third Case is based on the working activities, as the people engaged in primary, secondary and tertiary activities. Considering the above activities there are nearly **32072** houses required in EWS (Primary Activities), **24737** houses in LIG (Secondary Activities) and **22478** houses in MIG (tertiary activities) categories.

	No. of Household	EWS	LIG	MIG
Case 1*	20087	20087	0	0
Case 2**	49741	36216	13525	0
Case 3***	79288	32072	24737	22478

Note - \* Based on obsolescent housing stock, and congestion in the household

\*\* Based on the Socioeconomics Survey

\*\*\* Based on the Working Population

# 9.3 SLUMS IN RAJKOT

Slums have become the very integral part of the rapid industrialization and the urbanization in any city of India. The Census of 2001 has made an attempt to present the slum demography by the actual count of the individual households. For the purpose of Census of India, 2001, the slum areas broadly constitute of:-

 All specified areas in a town or city notified as 'Slum' by State/Local Government and UT Administration under any Act including a 'Slum Act'.

- All areas recognized as 'Slum' by State/Local Government and UT Administration, Housing and Slum Boards, which may have not been formally notified as slum under any act;
- A compact area of at least 300 populations or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities."

# 9.4 CHARACTER OF THE SLUM DEVELOPMENT

The substantial increase in the city's population after independence made the city stretch in every direction without a planned layout. The city started experiencing ribbon development along the transportation corridors with poor quality dwellings. Many of the public open spaces and river banks were occupied by migrants/squatters. A large number of huts were erected without any supporting infrastructural facilities. Establishment of industries in some areas fostered the growth of many more slums and squatter houses in their vicinity. In spite of many physical developmental schemes undertaken by the government, the slums became an unavoidable part of the city. Thus, the layout of Rajkot, which was well planned in the grid-iron pattern with some open spaces as lungs and a river bank water-front, started decaying with the emergence of slums. Presence of squatter settlements made the city areas over-crowded, polluted the environment and deteriorated the standards of living of the people. The slums in Rajkot are experiencing a faster growth rate than that of the city and many times that of the provision of facilities. There were 24 slums with 4927 households with population of 3,210 persons in Rajkot in 1972-73. At present, there are 118 slums with approximately 45,562 households as identified by all detailed Socio-Economic Survey.

The population has grown by leaps and bounds and the corresponding provision of housing facilities have not kept abreast. Shortage of housing facilities has contributed to the emergence of slums. Religion and caste play an important role in the social structure of the Rajkot slums. This is normal from the nomenclature itself. Certain slum pockets are known by the caste of its inhabitants. The majority (almost 90 per cent) of the slum dwellers are Hindus, the remaining being Muslims & Christians.

Ward No.	Total	Total slums covered/	Number of	Total slum	Total Area in
	Slums	found*	households	Population	Sq.mts
1	5	4	2771	11629	524868
2	4	3	653	2924	64934
3	10	9	1454	6947	149877
1					

Ward wise distribution of Slums and their area is listed as follows.

# SECOND REVISED DRAFT DEVELOPMNET PLAN OF RUDA: PART I 2031AD

4	2	2	1434	5730	176412
5	14	13	5371	22031	682507
6	10	10	3631	15402	446794
7	3	3	704	2807	42508
8	3	3	633	2474	63384
9	5	5	1145	4815	58494
10	3	3	762	3000	57213
11	2	2	213	835	150689
12	1	1	444	2049	48638
13	3	2	808	3367	111365
14	2	1	159	839	67541
15	1	2	719	2932	53749
16	20	20	7586	30796	636814
17	19	18	8210	34294	709219
18	1	1	2637	10908	285385
19	1	1	282	1333	31421
20	0	0	0	0	0
21	2	2	3482	13998	375325
22	3	3	869	3245	78123
23	4	3	1595	6110	178453
Total	118	111	45,562	1,88,465	49,93,713

\*Those slums where household survey was not permitted, majority part of the slum falling in other Slum, not found on site during mapping/survey have not been considered.

#### FIGURE **30LOCATION OF SLUMS**



#### RUDA DP-2031 – AS SUBMITTED UNDER SECTION 16

## 9.5 ECONOMICALLY WEAKER SECTION

So far as housing activities are concerned, the RMC has played a vital role to provide housing particularity to lower income logbook in year 1976 class of people viz. EWS &LIG. The corporation has implemented various housing schemes for socially and Economically Weaker sections of the Society. In this respect RMC has taken keen interest and has constructed three Basic Services to Urban Poor(BSUP) projects under JNNURM have been sanctioned, indicating 401% realization of the identified investment. Under two projects (BSUP-I and BSUP-II), total 6,040 dwelling units are under construction for the economically weaker section (EWS), on the reserved plot in different town planning schemes (TPS) in Rajkot. Under the remaining project (BSUP-III), 2,624 dwelling units considering in-situ development are under construction.

Also RMC has proposed an urban housing project for constructing 8664 dwelling units under JNNURM. The cost of this project is Rs. 191.38 crore.

For the economically backward class of people low cost housing schemes have been undertaken by RMC at an affordable cost and monthly repayment scheme. Several housing schemes have been completed so far with the financial help of HUDCO. World Bank &HUDCO assistance has encouraged RMC to develop human settlement projects that offer sustainable development for urban poor for providing practical &imaginative solution to current housing problem.

# 9.6 REVIEW OF HOUSING POLICIES

Despite India being the second fastest growing economy, the availability of infrastructure and housing shortage (demand and supply gap) has always been a key area of concern.

Growing cities are creators of employment opportunities, which in turn creates influx of people and this increases demands in the housing sector. For this very reason there are certain efforts taken on national level as well as state level to improvise the housing scenario of various cities across the country. National Housing Policy (2007) and the Slum Policy (2001) are two policies introduced at national level whereas the new township policy (2009) and the role of town planning schemes in provision of EWS housing have provided a leverage for accelerating the supply of housing stock.

In addition, the state government of Gujarat is also formulating a policy to address the issue of providing affordable houses for the city. Below is the review of these policies, which have a direct or indirect impact on the housing stock within the city.

# 9.6.1 NATIONAL HOUSING POLICY (2007)

This policy intends to promote sustainable development of habitat in the country with a view to ensuring equitable supply of land, shelter and services at affordable prices to all sections of society. To summarize in brief this policy aims to fulfill the following points:

# 1. Urban Planning

- Development of Master and Zoning Plans for housing and basic services for the urban poor by government bodies.
- Promoting balanced urban-rural planning by following the Regional Planning Approach.

# 2. Affordable Housing

Creating adequate housing stock both on rental and ownership basis with special emphasis on Economically Weaker Section

# 3. Increase flow of Funds

- Promoting larger flow of funds from governmental and private sources for fulfilling housing and infrastructure.
- Removing legal, financial and administrative barriers for facilitating access to tenure, land and finance.

# 4. Increase Supply of Land

 Facilitating accessibility to serviced land and housing with focus on Economically Weaker Section and Lower Income Group categories.

# 9.6.2 THE RAJIV AWAS YOJANA (RAY)

The regulation for rehabilitation and redevelopment of slums and (RAY) policies are formulated primarily for the betterment of the slum dwellers and the urban poor.

# The Regulation for Rehabilitation and Redevelopment of Slums:

Slums are an integral part of urban areas and contribute significantly to their economy both through their labor market contributions and informal production activities. This Policy, endorses upgrading and improvement approach in all slums. It does not advocate the concept of slum clearance except under strict guidelines set down for resettlement and rehabilitation in respect of certain slums located on untenable sites.

# Rajiv Awas Yojana (RAY):

 This policy envisages a 'Slum-free India' through encouraging States/UTs and aims to provide support for shelter and basic services for slum redevelopment and creation of affordable housing stock to assign property rights to slum dwellers.

- This scheme proposes to address the problem of slums in a holistic and definitive way adopting a multi pronged approach focusing on bringing existing slums within the formal system and enabling them to avail the same level of basic amenities as the rest of the town.
- It redresses the failures of the formal system that lies behind the creation of slums and tackles the shortages of urban land and housing that keeps shelter out of reach of the urban poor and forces them to resort to extra legal solutions in a bid to retain their sources of livelihood and employment.
- The overarching aim of RAY is thus to drive a fundamental change in policy and reform in the existing urban development systems to make cities inclusive and equitable.

# 9.7 OBSERVATIONS AND ISSUES

# Need of affordable housing

 Issue: There is significant lack of housing for the Lower Income Group and lower Middle Income Group in the city.

## Inadequate housing for Economically Weaker Section

 Issue: There is an inadequate provision of economically weaker section housing in the city.

# SECTION 10: PHYSICAL INFRASTRUCTURE

# 10.1 INTRODUCTION

Basic physical infrastructure facilities, services, and installations needed for the functioning of a community or society are water supply, sewerage, storm water lines and solid waste management. Hence, this chapter focuses on identifying the issues arising for these services in fulfilling the growing demand. Due to the increase in urbanization at a fast pace in Rajkot, there exists significant pressure on the urban infrastructure due to urban growth both spatially and demographically.

In this chapter, the current scenario for the basic physical infrastructure services namely water supply system, sewerage system; storm water network and solid waste management are discussed. It further assesses the demand and gap analysis for each of these services and identifies the gaps in various areas.

# Water Supply

# 10.2 WATER SUPPLY CURRENT SCENARIO

Water Supply is one the prime infrastructure services a city needs. The main sources of water supply for the entire RUDA region are surface water as well as ground water. Surface water sources are received from River Aji, River Nyari, River Bhadar and River Narmada. Through ground water sources it is received through French wells, bore wells and tube wells. The entire water supply process takes place through various steps namely water is received through the source in the treatment plant where it is treated. The treated water is stored in the storage reservoirs and then supplied to the administrative areas. The following sections describe how the water supply system has developed from past to present and the entire water supply system.

# 10.2.1 SOURCE OF WATER SUPPLY

In Rajkot town proper water supply was introduced in 1901 when Lalpari Lake towards east was put into commission for two purposes. i.e. water supply and irrigation. Subsequently the demand for water supply had gone high and a large spring well was constructed known as Zilla Garden near Aji River. At present when the population 12.86 and almost 90% of the households in the city covers the Water supply service.

The potable piped water supply in Rajkot city was made available with its first water scheme Aji-I developed by the then Saurashtra Government in 1955. This water supply scheme is still functional. With the city growth, the population increased and Aji-I reservoir became insufficient for supplying water to Rajkot. In 1977, Nyari-I scheme was developed by the Rajkot Municipal Corporation to serve the western part of the city. After this, in 1988, the Bhadar scheme was developed by RMC. In 1998, with the expansion of limits, RMC developed another water supply scheme based on the Nyari-II reservoir. Moreover, RMC also sources water from the Narmada canal from the Maliya-Jamanagar section and the twin lakes of Lalpari and Randarda.

Sr.No	Source	Type of Source	Distance from city (km)	Year of Commissioning	Raw bulk water supply (MLD)
1	Aji+Narmada at Aji	Dam +Canal	0	1955	110
2	Lalpari-Randarda	Lake	0	1955	6
3	Bhadar-I	Dam	65	1988	50
4	Nyari-I	Dam	18	1975	35
5	Nyari -II	Dam	24	1998	7.5
6	Narmada at Raiyadhar	Canal	6	-	35
Total					243.5

#### TABLE 29 SOURCE OF WATER

# 10.2.2 CURRENT SERVICE LEVELS - WATER SUPPLY

As per the information available with RMC, service levels for water supply according to the SLB handbook of MoUD -- the performance of RMC is fairly good only in terms of coverage of water supply connections which is 90%. Per capita water supplied in terms of lpcd is only 106 as against the benchmark of 135 lpcd. There are only 714 meters installed against 228721 total water connections; as against the benchmark of 100%.

At present with the available sources of water, RMC is able to supply only 20 minutes of water daily as against the benchmark of 24 hours.

According to the service level benchmark, recovery of the operation and maintenance cost shall be 100%. Cost recovery for the current year is 73%. During the assessment period, average collection efficiency (for the year 2006-07 to 2010-11) of the water charges in RMC is only 43%. The indicator wise benchmark, the current indicator value and the gap is presented in the chart below



#### FIGURE 31SERVICE LEVEL BENCHMARKS (WATER SUPPLY) - RMC

### 10.2.3 STORAGE, DISTRIBUTION NETWORK & SERVICE CONNECTIONS

Administratively, RMC has been divided into three zones, West zone, East zone and Central zone. There are 35 storage reservoirs in the city of which 19 are ground reservoirs and 16 elevated. Total storage capacity of the ground reservoirs is 180.15 ML and storage capacity of the elevated reservoirs is 34.37 ML. of these reservoirs, 4 ESRs of total 10.38 ML capacity, and 9 GSRs of total 63.3 ML capacity are implemented under JNNURM assisted projects. Total storage capacity available with RMC is 94% of the daily supply which is adequate.

Sr. No	Location of GSR-ESR	Zone	GSR Capacity(ML)	ESR Capacity (ML)
1	Raiyadhar	West	20	3
2	Nyari-I	West	18.60	2.3
3	Mavdi	West	8	2.50
4	150'Ring Road	West	2.50	1.25
5	Bajrangwadi	West	5	0.50
6	Sojitra Nagar	West	3	1.40
7	Nyari II (Ghanteshwar)	West	4	-
8	Chandresh Nagar	West	6.25	2.50
9	Aji	East	35.60	-
10	Doodhsagar	East	7	1
11	Marketing Yard	East	0.80	0.20
12	Kothariya	East	1.50	0.23
13	Greenland	East	10	3
14	Vinod Nagar	East	10	3
15	Ribda	Central	24.50	-
16	Gurukul	Central	5.40	4.74
17	Jubili	Central	6	5.40

#### TABLE 30 DETAIL OF ESR AND GSR IN RMC

18	Lalbahadur	Central	4	1.35
19	Popat Para	Central	8	2
Total			180.15	34.37

The water supply distribution network starts form storage reservoirs and ends at the property level individual connections. The entire water distribution system of RMC has been divided into 11 zones. The length of the transmission main is 464km and that of the tertiary distribution network is 1624 km.

RMC has two types of consumer water supply connections, domestic and non-domestic. As Rajkot has been in the water scarce region, RMC does not encourage water supply connections to large industrial units. In RMC, all institutional connections have been treated as non-domestic connections and monthly water tariff is charged based on the size of connection. Currently there are 2.22 lakh domestic and 6,304 non domestic connections in RMC.

FIGURE 32: WATER SUPPLY ZONE MAP



Mode of supply: intermittent 20minute daily by zoning

Rate of Supply: 110 LPCD to 125 LPCD proposed to have 150 LPCD

Present total city water supply: 150 MLD

The demand of water supply in the year 2031 according to RMC will be huge. Because of that The Corporation is vigilant on this issue and therefore, it has included this issue in the master plan for long term water supply and sewerage project of Rajkot city. It is hoped that this project when implemented will satisfy the future requirement of the city with respect to water supply and sewerage.

# Water supply in RUDA

Water supply in areas under the Rajkot Urban Development Authority is provided by the gram panchayats of the respective villages through bore wells and in some of the areas through the Gujarat Water Supply and Sewerage Board (GWSSB) with help from water and Sanitation Management Organization (WASMO).

# 10.2.4 WATER TREATMENT PLANT

Raw water received at the water treatment plant (WTP) is treated and pumped either to the storage reservoir of the WTP, or to the elevated service reservoir of the respective water supply zone. The length of raw water transmission mains from source to treatment plants is 117 km. There are five water treatment plants in RMC with a total installed treatment capacity of 248.5 MLD, out of which 226 MLD treated water is drawn daily. Of these five WTPs, the WTP at Raiyadhar (of 50 MLD capacity) has been developed as a component of the water supply project approved under JNNURM.

Νο	Treatment Plant	Distance from Source (km)**	Design Capacity (MLD)	Utilisation level (MLD)	Efficiency (%)
1	Aji	4	103.00	100	97%
2	Ribda	65	50.00	50	100%
3	Nyri-1	18	32.00	35	109%
4	Raiyadhar	30	50.00	35	70%
5	Ghanteshwar	0	13.00	6	44%
6	Total	117	248.5	226	-

#### TABLE 31 : WATER TREATMENT PLANTS IN RMC

# \*\* Distance of Raw water transmission mains coming from different sources to each WTP.

(Source: Water Works Department, RMC)

Water audit and other studies are are being conducted to access the extent of losses for both raw.

# 10.3 OBSERVATIONS AND ISSUES OF WATER SUPPLY

### **Exploitation of Ground Water Source**

**Observation:** The dependency on ground water continues to be high in the periphery. Apart from the Municipal bores, a large number of private bores supply water in various peripheral area of the city.

**Issue:** There is inadequate water supply network in the city as a result people depend on ground water.

## **Devastate Available Resources**

**Issue:** Presently sufficient measures are not available to conserve the surface runoff water from roof top buildings, road surfaces and parks to recharge the water resources.

## Contamination of water due to old service connections

**Observation:** The water supply network lines in the old city are quite old. These connections are often not replaced on time and leads to the problems of leakage, low pressure and contamination.

## Inadequate Coverage

**Observation:** Presently almost 90% of the RMC area is served by municipal water supply. Moreover, there is an under provision of water supply network in the newly added areas in RMC.

# Inadequate Treatment facility and Coverage

**Observation:** Presently there is a lack of treatment plants. There is an under provision of water supply network in the part of the areas of the developing growth centers.

# Sewage System

# 10.4 OVERVIEW OF RAJKOT SEWERAGE SYSTEM

Prior to 1984, sewage was collected through surface drains and it was disposed in the reservoir constructed downstream of Aji River. In 1984-1990, an underground sewerage project spread over 30 sq.km area was implemented in the old city of Rajkot with financial assistance from the World Bank. Subsequent to this, a project covering 10 sq.km was taken up by RMC. In 1998, the city limits of Rajkot were increased from 69 sqkm to 104.86 sqkm creating a demand for an additional sewerage network in this newly added 35.86sqkm area which comprised the village Raiya, Nana Madavdi and Moti Mavadi.

The entire sewerage system of Rajkot has been prepared in two phases.

Year of Implementation	City limit (sq.km)	Phase	Part	Covered Area(Sq.km)	Status	Assistance From
Prior to 1998	69	I		40.00	Commissioned	World Bank
		II	I	20.00	Commissioned	JNNURM
		II	II	9.00	Under Progress	JNNURM
Since 1998	104.86 II	III	I	15.00	Under Progress	JNNURM
		III	II	20.86	Under Progress	SJMMSVY

Present water supply to the city is about 226 MLD. Since part of the water supply distribution system is old, substantial we lost 20-25% due leakages, thus only 200MLD net supply reaching to the consumers. Also the coverage of the sewerage network is 58%. The quantity of sewage being generated would thus be in the range of 95-100 MLD.

# 10.4.1 COLLECTION SYSTEM, NETWORK COVERAGE

The total length of the sewerage network in the city is approximately 1,500km. Currently there are total of 3, 22,407 properties in Rajkot of which 1, 85,852 properties are covered with direct connections to the sewer network implying 58% network coverage of household. The collected sewage is then pumped to the sewage treatment plant through 7 pumping stations. Currently there are two sewerage network projects which are approved under JNNURM, are being implemented by RMC.

# 10.4.2 SEWAGE TREATMENT

Currently two activated sludge process based sewage treatment plants (STP) are operational. One STP of 44.5 MLD capacity is located at Madhapar and the other STP of 51 MLD capacity is located at Raiya. Both the STPs are currently running at 100% efficiency.

Sewage treatment plants in RMC							
Sr.	Location of STP Design Capacity Utilization (MLD) %Utilization						
no							
1	Madhapar	44.50	48.6	100			
2	Raiya	51	47.3	93			

# 10.4.3 STORM WATER DRAINAGE

Presently city does not have a designed storm water drainage network. During monsoons, the rain water flows into the voklas or natural drains and meets with the Aji Rriver. The annual average rainfall received by the city nearly 500mm. moreover, the rains area irregular and at time lesser than average. In such conditions the natural drains suffice the need for storm water drains.

# 10.4.4SANITATION

According to the information available from RMC, there are 150 public toilets in Rajkot. Most of these public toilets are running on pay and use nasis. The total number of seats in these public toilets is 528.

# 10.4.5 DRAINAGE IN RUDA

There is no underground drainage network in the area under RUDA. As such RUDA has implemented drainage works in the past worth Rs. 18.59 lakhs. The responsibility for provision of safe disposal of the sewage belongs to the respective gram panchayats of the villages. The drainage facility in RUDA is catered to by building level individual septic tanks.

# 10.5 OBSERVATIONS AND ISSUES OF SEWAGE SYSTEM

### **Insufficient Network Coverage**

 Observation: With coverage of 58 % area, the sewer system network needs to be developed.

## Life Span of Pumping and Discharge

 Observation: The pumping machinery has been in use for 20 years and will need replacement.

### Unavailability of treatment plant

Observation: lack of treatment facilities in all the five municipalities (Growth centres).

### Water logging

 Issue: Water logging is a major issue in some areas. etc. It leads to inadequacies associated with health and flooding.

### **Encroachments along Side Drains**

• **Issue:** The encroachments alongside drains in the city disturb the catchments runoff.

# Storm Water Adulteration

 Issue: Adulteration of storm water in drains takes place by the garbage and sewage, which is in turn discharged into the environmentally sensitive river/lake leading to water pollution.

# Solid Waste Management

# 10.6 INTRODUCTION TO SOLID WASTE MANAGEMENT

The total waste generated in the city is approximately 350 to 400 metric tons per day considering the population of 12.86 lakh in 2011. The Solid Waste Management Department of RMC is managing municipal solid waste from source to final disposal, under the supervision of an environment engineer.12 out of the 23 wards have been privatized so far for primary collection, transportation, and disposal of waste.

# 10.7 WASTE GENERATION

Municipal solid waste can be broadly divided into four major categories as per the source of generation:

#### Domestic waste

#### **Commercial waste**

#### Institutional waste

#### **Industrial waste**

At present 20-25% of municipal solid waste collected by RMC is recyclable. Currently, there

Sr. no	Source Category	Quantity (tons/day)	of	Waste	Generated
1	Domestic Waste	299.22			
2	Trade/Intuitional waste	12.55			
3	Construction Waste/Industrial Waste	21.80			
4	Market Waste	23.53			
5	Slaughter House Waste	0.90			
Total		358			

are 730 containers of 14 m3 capacity each and 75 containers of 8m3 capacity each for



#### watse collection per day (MT)

watse collection per day (MT)

storage of waste collected from the household as well as the commercial units. There are 42 ward offices (across 23 wards in the city) for monitoring and operating the collection and transportation of solid waste to the desired location

# 10.7.1 WASTE COLLECTION

# 10.7.1.1 PRIMARY STAGE

Domestic, trade, and institutional waste is largely collected through primary collection. The door-to door waste collection system has been introduced in 12 wards/80% households and establishments

One of the peculiar characteristics of the city is that it has a relatively higher number of the institutions and commercial establishments as compared to size of the city. This results in to a higher waste generation rate (including recyclables).

In the conventional style, waste is collected from the doorstep and the community bins. In certain commercial areas, the shops and/or trade centres have a dedicated dustbin for collecting the waste. Hence, primary collection of waste to a large extent relies on street sweeping by safai karamcharis. The collected waste is transported to a temporary storage location.

Waste collected through primary door-to-door collection and street sweeping is carried in hand-driven carts or wheel barrows, which usually carry six containers, by organized sakhi mandals (women's help groups). There are 94 registered sakhi mandals with RMC each having nine members and one leader. Approximately 2,10,000 households are covered by 85 mandals, and approximately 19,000 houses are covered under the do-it-yourself scheme through the safai grant. Currently, 3,669 wheel barrows are used for door-to-door waste collection by these sakhi mandals.

Littering bins of two different capacities have been provided across the city. There are 2,500 littering bins numbers of 33-L capacity and 2,000 littering bins of 55-L capacity.

Primary waste collection in certain wards (ward no. 1, 11, 12, 13, 21, 22/b and 23b) has been outsourced on contract basis to sanitary marts. Sanitary marts are registered cooperative organizations of the traditional sweeper community. Currently, they employ 375 full-time sweepers and 421 part-time sweepers as specified in their contract with RMC. These agreements existed prior to the local body becoming a municipal corporation from a nagarpalika.

# 10.7.1.2 Secondary stage

The waste carried in handcarts is transferred to the stationary Mild Steel (MS) containers placed at every available corner. These containers are of two different capacities: 4.5 and 8 m3. Currently, 1,218 containers are being used, with 1,143 of them with 4.5 m3 capacity

and the remaining 75 with 8m3 capacity.

# 10.7.2 TRANSPORTATION OF WASTE

The transportation of municipal solid waste can be divided into following activities:

- Lifting of Closed Containers
- Lifting of Dead Animals
- Lifting of Silt from Nallas

Waste collected through door-to-door collection is stored in the closed containers placed on roads of the city. The waste collected in these closed containers is then collected by the mechanical container lifting vehicles and transported to the transfer station. RMC owns various vehicles for the collection and transportation of waste.

# 10.7.3 PROCESSING AND DISPOSAL

# 10.7.3.1 PROCESSING OF WASTE<sup>4</sup>

RMC has entered an agreement with HEBPL to develop and operate a multi-integrated waste processing facility on BOO basis. Presently, approximately 300 tons of waste processed on daily basis. The plant produces 45 MT of organic manure, 80 MT of green coal, and 15,000 (approximately) of eco-bricks from the total solid waste received. As per the officials of HEBPL, the conversion rate of the waste to by-products is approximately 85–90%. Thus, approximately 85 tons per day of refuse goes to the landfill site after processing.



# 10.7.3.2 DISPOSAL OF WASTE

There is scientifically engineered municipal landfill facility at Nakarawadi, 15 km from the city and having a land area of 170 acres. Approximately 85 tons per day of refuse after

<sup>&</sup>lt;sup>4</sup> The integrated solid waste processing plant facility of RMC has been documented by the National Institute for Urban Affairs as a best practice case for the processing of municipal solid waste

processing goes to the Nakarawadi landfill site. RMC is augmenting landfill facility of Nakrawadi under JNNURM and the work is expected to be completed within few months.





# 10.8 OBSERVATIONS AND ISSUES

# No Segregation of waste at source:

**Issue:** Presently household segregation of dry and wet waste at source is not practiced in the city.

MSW scientific treatment plant is required.

Scientific approach in waste disposal is necessary in the growth centres. Waste collection vehicles and disposal need to enhance in the Growth Centres.

# SECTION 11: SOCIAL INFRASTRUCTURE

# 11.1 INTRODUCTION

High quality social infrastructure in cities provides good quality of life. The assessment of social infrastructure for Rajkot is largely based on secondary data and examines in particular, the issue of municipal service provision in each of these sectors.

This Chapter covers an assessment of social infrastructure facilities in Rajkot which include Educational facilities like pre-primary, primary, secondary, higher education, special institutes, Health facilities like public hospitals and health centres, Recreational facilities like swimming pools, community halls etc., and Fire and emergency services. Hence this chapter focuses on identifying the gaps in provision of social infrastructure services in the city so as to improve the scenario through various mechanisms.

# 11.2 EDUCATION

Rajkot Municipal Corporation is directly involved as a facilitator for the provision of primary education through pre-primary and primary schools. RMC provides land for schools through the TPS mechanism, develops and operates these schools. It also provides free textbooks to all students, and scholarships to students belonging to SC/ST/OBC.1 In the past decade private sector education has been growing and at present there are more private schools than schools run by RMC. RUDA also plays a role of a facilitator in the city's education as it provides land for schools and playgrounds at a subsidized rate through the TPS mechanism. The following are the levels of educational facilities found in Rajkot:

- Schools
  - Pre-primary schools
  - Primary schools
  - Secondary / Higher secondary schools
- Higher education and Special institutes

# 11.2.1 MUNICIPAL SCHOOLS IN RAJKOT

Currently there are 87 municipal schools in Rajkot city. Of these, 81 are primary schools and six are high schools. There are total 37258 students in the government schools with 35,775 students in primary schools and 1,483 in high schools. The 81 Primary Schools are run by Nagar Prathamik Shikshan Samity under the control of RMC General Board.

RMC has improved the enrolment of new students through extensive campaign and has also managed to bring down the school dropout ratio from 6.31% in 2009 to 1.96% in 2011. To ensure natural transition of a child in to mainstream schools, RMC affiliated Anganwadis to primary schools.

Year	No of Schools	
2011-12	81	
2010-11	86	
2009-10	92	
2008-09	92	
2007-08	92	
2006-07	92	
2005-06	92	
2004-05	92	
2003-04	92	
2002-03	92	
2001-02	92	

#### TABLE 32TABLE 49: PRIMARY SCHOOLS RUN BY RMC

(Source: Officer on Special Duty, RMC)

RMC also runs six high schools and secondary schools with the help of grants from the Government of Gujarat. The details of other government and private education institutions are as under.

TABLE **33GOVERNMENT EDUCATIONAL INSTITUTION IN RAJKOT** 

Category of institution	No.
Secondary	3
Higher Secondary	3
Colleges	26
Technical Training stations	3
Medical College	1
(Sources Education Deand DAAC)	

(Source: Education Board, RMC)

#### TABLE 34: PRIVATE EDUCATIONAL INSTITUTION IN RAJKOT

Category of institution	No.
Primary	296
Secondary	96
Higher Secondary	37
Colleges	48
Technical Training stations	3

(Source: Education Board, RMC)

# 11.2.2 SPECIAL INSTITUTES

Rajkot has several institutions that provide special education including schools for handicapped people, professional development etc.

# 11.2.3 Provision of Land for Education under $\mathsf{TPS}$

Rajkot Municipal Corporation and Development Authority act as facilitators in providing land for education under the TPS as a public utility.

# **11.3 HEALTH**

As per BPMC Act, 1942 under section 63, health is specified as an obligatory duty of the ULB. In Rajkot city, the Health Department is headed by the Medical officer who assists the Dy. Municipal Commissioner. Thereby he also assists the municipal commissioner for day operations and implementation of state as well as the central schemes related to health. The main functions of the Health Department are operating dispensaries, managing public health including various government programmers, implementing anti-malaria schemes, facilitating birth and death registration, food licensing, and factory licensing, and administration of crematoria etc.

# 11.3.1 HEALTH FACILITIES IN RAJKOT

According to the information available from the Health Department, all the medical facilities in the Rajkot city are registered with RMC under the Bombay Nursing Home Registration Act-(1949). As per the registration information, 1216 medical facilities are present in Rajkot. Of these 1216 medical units, 48% are in central zone, 15% are in the East zone and remaining 13% are outside RMC. Further, 46% of medical units are allopathic, 21% are Ayurvedic, and 18% homeopathic and the remaining 14% other.

Medical Facilities in Rajkot City						
No	Zone	Allopathic	Ayurvedic	Homeopathic	Other	Total
1	Central	368	68	68	75	579
2	East	28	61	57	41	187
3	West	95	86	62	53	296
Other	Other	74	39	36	5	154
Total		565	254	223	174	1216

#### TABLE 35MEDICAL FACILITIES IN RAJKOT CITY

(Source: Health Department, RMC)

# 11.4 FIRE AND EMERGENCY SERVICES

Fire and emergency services are a municipal function in Gujarat. Government of India has entrusted the additional responsibility to Fire Departments all over the country, of being the first responders to natural and anthropogenic disasters. The fire and emergency services
depend on response time, availability of necessary equipments and tools, trained manpower, organizational setup and financial requirements.

#### 11.4.1 FIRE STATIONS

There are 4 fire stations located at Bedipara, Kalavad Road, Kanak Road and Mavdi Road. within the limits of Rajkot Municipal Corporation. The Standing Fire Advisory Committee (SFAC), Government of India has laid down the norm of setting up at least one fire station (FS) for an area of 10 sq km radius in urban areas. Rajkot has 4 fire stations as of today, other Fire Stations are proposed in the outer periphery of the city, the newly merged area in RMC. According to the norms, there should be more Fire Stations in the city. There is a high concentration of fire stations within the central zone. In congested areas such as within the central zone, response time is greatly affected by traffic conditions due to which the service area may actually be smaller than other areas with better traffic conditions. However, there are large pockets of RMC that fall outside the recommended service area of fire-stations.

#### 11.4.2 EMERGENCY SERVICES

The fire department usually provides emergency services for natural and anthropogenic disasters. All medical emergencies are served by the private sectors and public agencies. An emergency service is provided by Emergency Management Research Institute.

This service has been initiated by the central government, coordinated by the state government, which aims to provide quick response to medical, police and fire emergencies. The pre hospitalization emergency care provided by EMRI is free and the patient is admitted to a hospital of his or her choice.

# **SECTION 12:** ECONOMIC ACTIVITIES

# 12.1 INTRODUCTION

Economic development plays a key role in growth and development of an urban area and the quality of life of its residents. Study of economic sectors and its distribution in Rajkot is critical to understand the existing urban character of the city and its various areas.

This chapter includes a review of the existing economic activities in and around Rajkotand discusses the factors and projects that are likely to guide the future growth and development patterns.

**Economic Sectors and Activities:** Economic growth of Rajkot is a key to the growth and development of the whole region and the state as well. In 1995, with 7 percent of the total population.

Rajkot is a automobiles hub in Saurashtra center. Rajkot was known for its large base of the automobiles and metal industries. There were about 400 foundries and forging units exist; in Rajkot. Since then Rajkot has transformed its economic base and established itself as a vibrant, versatile, thriving center for commerce, trade and manufacturing. The city serves as the industrial headquarters of many large and small business houses Jyoti CNC, Rotary etc.

Education based economy is based on following leading Institutes of Rajkot like VVP Engineering Collage, Indubhai Parekh School of Architecture, Darshan Collage, Marvadi Education institute. Atmiya Institute etc.

Rajkot, As per the registration information, 1216 medical facilities are present in Rajkot. Of these 1216 medical units, 48% are in the central zone, 24% are in the west zone, 15% are in the East zone and remaining 13% are outside RMC. Further, 46% of medical units are allopathic, 21% are ayurvedic, and 18% homeopathic and the remaining 14% other.

To promote tourism industry in Rajkot, various efforts have been taken like development of hotel industry and introduction of medical tourism.

#### 12.1.1 TYPES OF ECONOMIC SECTORS

Economy of the Rajkot region can be categorized into three economic sectors, primary sector, secondary sector and tertiary sector. These categories are derived based on their distance from the natural environment. For example primary sector includes economic activities that are directly dependent on natural resource (such as agriculture, mining etc.).

**The primary sector:** The primary sector of the economy extracts or harvests products from the natural sources like earth, sea, etc. Activities associated with the primary sector include agriculture, mining, farming, grazing and quarrying.

Primary sector is very small in RMC area and it employs only 1% of total workers. This is because majority of the area within RMC is urbanized and very little agricultural land is left within these developed areas. There was an increase in numbers of cultivators and agricultural laborers from 1971 to 1991. There are very few mining and quarrying activities in Rajkot as compared to other economic activities. There is reduction in mining workers in 2011 in comparison with the mining work in 1971 in Rajkot.

**Secondary economic sector:** Secondary economic sector involves the activities of manufacturing or processing of raw materials into finished products. All of manufacturing, processing, and construction lies within the secondary sector. Activities associated with the secondary sector include metal working and smelting, automobile production, textile production, chemical and engineering industries, aerospace manufacturing, energy utilities, engineering, breweries and bottlers, construction, and shipbuilding.

Rajkot district is an industrial base for chemicals, textiles, drugs & pharmaceuticals and agro & food processing industries. Textiles and chemicals have been the major industries of investment and employment in the district since 1980. Due to the fast urbanization process there is a high demand of building construction for various uses. Same trend could be observed in Rajkot also, there is increase in share of working population under construction work from 1.16% to 3.59% since 1991 to 2011.

**Tertiary economic sector:** Tertiary economic sector involves activities associated with the distribution of the finished product to the market. Activities associated with this sector include retail and wholesale sales, transportation and distribution, entertainment (movies, television, radio, music, theater, etc.), restaurants, clerical services, media, tourism, insurance, banking, healthcare, and law.

There is increase in trade and commerce all over India. Similarly, in Rajkot there is an improvement in tertiary economic activities. The workers population in this category has increased between 1991 to 2011

Efficient transportation and good communication are important for the growth of the activities like agriculture, industries, construction etc. This sector has shown an increase in working population between 1991 to 2011.

This sector includes all workers engaged under services like electricity, gas, water, public administration and defense services, sanitation services, education, BPOs, Mobile calling centers, scientific and research services, medical and health services, religious and welfare services, recreational, cultural and personal services. These are the indicators of quality of life; increase in share of these activities shows improvement in quality of life of Rajkot city.



Figure 0-1: Agriculture/Vacant Land

As shown in Map 66% of area is under agricultural use in RUDA out of which only 2% within RMC boundary. It proves that there is high concentration of agricultural workers in Rest of RUDA area.

# SECTION 13: HERITAGE AND TOURISM

## 13.1 INTRODUCTION

A society's identity and civic pride is rooted in its physical and cultural links to its past. Heritage is something that gives a sense of belongings and informs us about who we are and how our society has developed over time. Heritage can be something valued by a single person or it can be part of a wider group's sense of identity and character. It may be significant for scientific, aesthetic, architectural or historical reasons or for any other special cultural value. Heritage is something that is passed down through the generations. The heritage of a city can also have national and world-wide significance.

Heritage can be manifested throught sites, buildings, structures artefacts or objects with cultural and historic associations. The heritage values of such sites, buildings or structures may vary based on their scale of significance, ranging from, global and national to city or local level.

# 13.2 TANGIBLE HERITAGE OF RAJKOT-THE CITY AND ITS HERITAGE STRUCTURES.

Located on the banks of the river Aji, the erstwhile headquarters of the British political agency in Saurashtra, Rajkot is today the fourth largest city in Gujarat and the economic and political capital of Saurashtra region. The city was founded in 1608AD. It was here that Mahatma Gandhi spent early years of his life studying at Alfred High School. Today, Rajkot seems to be standing at cross roads of traditions and the phenomenon of becoming modern. With a population of approximately1.5 million and an area of 685.30sq.km the city still shares scales where no place is more than 20mintes apart and people invariable come across familiar faces every time they are out in the city.

This context has rapidly changes over the past few years. Marked differences are seen in the way people think of Rajkot. To many it is no more the small town it used to be and to others it appears as a **'fast –growing-small-city'**.

# 13.3 IMPORTANT HERITAGE STRUCTURE IN RAJKOT

#### Raiya Naka Gate and Tower

In 1892, the Chief Engineer of the British Agency, Sir Robert bell Booth, Renovated Raiya Nka Gate and built the present three storied clock tower.



#### Old Fortified Town of Rajkot

Masumkhan, Dy Faudar of Junagadh conquered Rajkot in 1720 AD. He got a fort built in 1722AD. It is said that the perimeter of the fort was 4 to 5km and its walls were 8 feet wide. There used to be a wide and deep moat all around the fort wall. The fort is non-existent today save some ruins and relics. The town within the gates and to the west of Aji River was the old fortified town of Rajkot.

#### Lang Library

In 1885AD. A library by the name of Gungrahak Mandli stared off as a one room affair in an English school during the British times. Later on in 186AD.it was shifted to its own independent building in kothi Compound area. From the grand building in Jubilee Garden. It is the oldest library in Saurashtra. The building housing the library is an important architectural monument.



#### Jubilee Garden

The Jubilee Garden forms the back drop to memorial institutes, buildings built during Colonial period in the memory of various people who served for the cause of Kathiawar during their times. They are Connaught Hall (erstwhile Senate House and now Arvindbhai Maniar Town Hall). Watson Museum and the 100 years old Lang Library.



#### **Hatkesh Temple**

In 1853, thakore Mehramanji IV, the ruler of Rajkot gifted Hatkesh temple to the Nagar community. The temple was renovated in 1935 AD.

#### Darbargadh

the seat of Jadeja rulers of Rajkot was built in 1791AD. It is built primarily out of locally available lime stone and black trap. The building itself sits on a high plateau overlooking the

river Aji to its east. The building is in dilapidated condition today. It housed two important temples of the old city Halkesh temple and Haveli temple.

#### **Connaught Hall**

Connaught Hall was built to commemorate the visit of

Arthur. Duke of Connaught, third Prince of Empress Queen Victoria, to Kathiawar in 1887AD. This building later cam to be known as Senate Hall and presently it is known as Arvindbhai Maniar Town Hall.

#### Ba Dev Kunwarba Grain Market

The market was built on 2<sup>nd</sup> October 1825AD princely building this would have been the first attempt at forming a guild of grain merchants. The building is made of sandstone with fine wooden trusses. There are two rows of shapes with a central corridor. The height of the building allows for easy storage of sacks of grains.

#### Aji River

Aji is the most important independent river of Saurashtra. Originating from the hills in the Sardhar and Lodhika region, it travels through Rajkot, Padadhri and Morbi taluka of Rajkot district and meets the Arabian Sea near the village Ranjitpara of Jodiya taluka of Jamnagr district.

#### Watson Museum

In 1888 it was decided to build a museum in fond memory of Colonel John Watson, Political agent of Saurashtra from 1881 to 1889AD for the service he rendered to the cause of Saurashtr. The museum is set up in the Memorial Institute Buildings located in the Jubilee Garden. The Watson Museum of Rajkot is the second most important museum in Gujarat and is the oldest museum in Saurashtra.







There is some other heritage building also famous in Rajkot city like Traditional Dela Type Houses in Kadiwad, Thosa Gali and Sir Lakhaji Raj Vegetable Market etc.



#### 13.4 INTANGIBLE HERITAGE OF RAJKOT

Rajkot also had an extensive and well developed history of folk art and local traditions. These includes intangible heritage comprising movable arte-facts, handicrafts, folklore, myths, legends, spirituality, traditional knowledge, rites and rituals, festive events, visual and performing arts, music, literature, language, dialects, traditional medicine, culinary traditions, etc. which are intimately linked to the built heritage. These elements being intangible have sometimes been easily forgotten to be accounted for some of these traditions may be interlinked with each other and indirectly with specific types of buildings.

#### 13.5 HERITAGE WALKS

To promote heritage conservation and awareness regarding the importance of the heritage in Rajkot. Various walk and tours have been initiated in the city. Which is a part of the initiative called Rajkot Mari Najare. This initiative consists of the following.

Four Tours: Gandhian Tour, Rajkot Darshan, Senior Citizen Tour and Children Tour.

Four Walks: Heritage Walk, Colonial Walk, Religious Walk and Walk for the Youth.

- Heritage walk covers 21 spots in the city that were built at the time of Masumkhan, the Mughai Fauzdar of Rajkot and vassal of Emperor Aurangzeb.
- Colonial walks covers 17 buildings constructed by the British from 1820 to 1910, Rajkot was the seat of the representative of the crown.
- Religious walk covers major temples and religious structures constructed by the Jadeja Rajuts the princes of Rajkot and other structures.

#### 13.5.1 PROJECTS FOR HERITAGE CONSERVATION

In 2008-09 and 2009-10 the RMC initiated a study to prepare a comprehensive city conservation plan. It was first such effort for comprehensive study of heritage of Rajkot.Under this conservation plan study significant elements of the structure with respect to tangible as well as intangible heritage were observed and listed along with details of their physical condition. According to the study there are three types of buildings in Rajkot city with heritage significance government properties, trust owned properties and privately owned properties. The city conservation plan has identified structures with heritage significance and needs attention towards their conservation.

- Band stand
- Old city Railway station
- West Hospital (1873)
- Bedi naka Gate and Tower
- Shir Dharmendrasinhji Cloth Market
- Sir Lakhaji Rj Vegetable Market
- Ba Dev Kunwarba Grain Market
- Cabutra near the Grain Market
- Ghee Peeth
- Old Junagadh House
- Raiya Naka Gate and Tower
- Sardar Police Chowki
- Vada no Uttaro

# 13.6 OBSERVATIONS AND ISSUES

#### Poor maintenance

• **Observation:** The condition of heritage structures and their surroundings suffer due to poor maintenance and upkeep of the heritage sites identified as city monuments.

#### Process of Change of building use

 Observation: Currently the repair works and regular maintenance of heritage sites and structures have to be carried out by the owners at their own cost and no incentives are provided to them for the upkeep these valuable landmarks.

#### Building, reconstruction or extension permit

**Issue:** If a structure is identified as a heritage structure, it may become difficult for the owners of the building to obtain permit to repair, upgrade the building or reconstruct it. As a result of this, the maintenance of the structure becomes economically unviable and the structure is left to dilapidate.

# SECTION 14: INITIATIVES BY RMC & RUDA

# 14.1 INITIATIVES TAKEN UP BY RMC

The RMC has taken care for better growth of the town in spite of its financial hindrance. It has also undertaken some of the statutory works for its development such as preparation of the Development Plan & T.P. Schemes as well as shopping centers at various places to cater to the needs of the public at large. It has also undertaken residential housing schemes at various places for different classes of people viz. EWS, LIG, and MIG etc. with the financial and of HUDCO, New Delhi. It has also undertaken number of development works related to sports and recreational activities, as well as utilities and services for the citizens of Rajkot.

The Rajkot Municipal Corporation (RMC) has taken up progressive initiatives in the provision of better and efficient services to its citizens. These initiatives are being considered in various sectors such as, transportation, water supply, social infrastructure, and PPP, and also in developing various policies towards parking, street vending, and advertisement etc.

# 14.2 SERVICE RELATED INITIATIVES

# 14.2.1 WATER SUPPLY

Currently it is difficult to determine the supply of each ESR as the distribution network of the ESRs is overlapping each other. RMC has taken up a pilot project for the rezoning of supply zones of the ESR

Recently, with assistance from the performance assessment system (PAS) project of CEPT University, RMC has taken up a detailed water audit study for the water supply system of Rajkot city.

# 14.2.2 SEWERAGE

RMC is currently implementing a project for the construction of a 45MLD sewage treatment plant on Build Own Operate and Transfer (BOOT) basis. Approximate cost of the project is Rs. 11.20 lakhs.

# 14.2.3 SOLID WASTE MANAGEMENT

The solid Waste Management Department is facing cost recovery issues due to very high establishment costs. According to the financial analysis for the last five years, the establishment cost in SWM department is 80% of the total expenditure and as a part of this exercise; RMC is considering options for reducing the establishment expenditure and as a part of this exercise, RMC is purchasing mini-tippers which will reduce the dependency on man-power for door-to-door collection and improve the system efficiency. RMC is considering purchasing these mini tippers, initially for seven wards at Rs.6.75 lakh per unit and seven units per ward.

#### 14.2.4 TRAFFIC AND TRANSPORTATION

**Parking policy** -Rajkot city has been facing issues related to mobility and street parking. To cope with this issue, RMC has developed a parking policy with defines the parking and non-parking areas, institutional structure for parking management, parking pricing structure, parking restrictions, and operations structure etc.

**Elevated Bus System** – to reduce the public transports issues and ease the traffic movement in Rajkot city, RMC has considered the development of an elevated bus system in Rajkot city with assistance from Gujarat Infrastructure Development Board (GIDB). RMC has appointed Geodesic Techniques to prepare a detailed project report for the elevated bus system in Rajkot.

**Public cycle sharing system** –RMC prepared a project on developing a public sharing system with estimated capital expenditure of Rs. 928 lakhs with assistance from the institute of Transportation and Development policy (ITDP).

Along with core transportation proposals, RMC is also considering the development of green ways along the transportation corridors and a transport system for non-motorized vehicles in Rajkot, Apart from these, Rajkot is also initiated the process of preparing a low carbon mobility plan (LMCP) to reduce carbon emissions and improve urban mass transport with financial assistance from the United Nations Environment Programme (UNEP).

#### 14.2.5 URBAN POOR

So far as housing activities are concerned, the RMC has played a vital role to provide housing particularity to lower income logbook in year 1976 class of people viz. EWS &LIG. The corporation has implemented various housing schemes for socially and Economically Weaker sections of the Society. In this respect RMC has also taken interest and has constructed such class of people in the various plots designated for this purpose in the different T.P shemes.

For the economically backward class of people low cost housing schemes have been undertaken by RMC at an affordable cost and monthly repayment scheme. Several housing schemes have been completed so far with the financial help of HUDCO. World Bank &HUDCO assistance has encouraged RMC to develop human settlement projects that offer sustainable development for urban poor for providing practical &imaginative solution to current housing problem.

#### 14.2.6 PUBLIC WORKS & SOCIAL INFRASTRUCTURE

RMC is considering development of a world class aquarium and amusement parks at the Aji and Nyari dam sites. The expression of interest for selection of bidders has already been floated by the RMC. Apart from this, RMC has framed a policy for street vendors in 2011, delineating green vending zones, restricted vending zones, formulating town vending committees, and eligibility criteria for the street vendor and devising a licensing system for street vendors.

# 14.3 INITIATIVES TAKEN UP BY RUDA

After the establishment of RUDA in the year 1978, apart from preparing the Development Plan, it has undertaken various development projects as under:

RUDA undertook various Town Planning Schemes outside the RMC limits on the fringe area. Apart from RUDA has executed various Site & Services schemes in various areas. The EWS housing scheme was undertaken in 15- point programme, total land admeasuring 15,447 sq.mts of Survey no 237/P of village Kothariya. Total 552 units were built at a cost of Rs. 382.84 lakhs.

In 2012, RUDA has instituted a project implementation unit (PMU) cell and has appointed a team of 16 officers comprising assistant engineers, deputy engineers and a project manager who will take up planning and implementation of various infrastructure projects in the RUDA area. This initiative will bridge gap of technical capacity in planning and implementing projects in RUDA

Detail of Projects on hand by RUDA 2013-201	4
Name of the Projects	Cost of Projects Rs. In Lakh
Road Projects	175.09
Bridge works	326.00
Water supply	1100.00
Solid waste management	100.00
Drainage	1700.00
LED Street Light	400.00
Affordable Housing	2100.00
No of T.P Scheme implementation in future	13 new T.P Scheme
Total	5901.09

(Source: Rajkot Urban Development Authority)

The revision of the development plan prepared by RUDA in 2004 is due. To substantiate the revision of the development plan of RUDA, the exercise of mapping the existing land use is currently going on in RUDA. Out of 54villages, 20 villages are already mapped for existing land use.

The above different projects undertaken by RUDA and RMC show the intensity of developmental activities to cater to the needs of the public at large. Still more works are required to be done in the context of the increased rate of development activities in year to come by RMC & RUDA and they should be ready to meet this challenge.

# SECTION 15: STAKEHOLDERS CONSULTATION

# 15.1 INTRODUCTION

The participation process for Second Revised DP 2031 Rajkot has been conducted on three levels depending upon the breadth of the stakeholders involved and their level of participation.

**Round 1:** The first round of stakeholders' participation included experts' consultation, in which the stakeholders were involved through interviews and focus group discussions to review and assess the current levels of urban services and infrastructure needs.

**Round 2:** The second round of consultation was more participatory and collaborative. As series of working group meetings were held and stakeholders were involved in making more specific suggestions for improving the existing conditions.

**Round 3:** The third round of stakeholders' participation was carried out in order to seek the suggestions for various issues identified under each sector of development plan and discuss various feasible solutions for them.

# 15.2 STAKEHOLDERS CONSULTATION PROCESS

The aim of conducting consultations is to articulate stakeholder expectations so as to be able to formulate a vision for the revised development plan; prioritize city development issues; strategy / action consensus and choice of strategy options.

The methodology for consultation included following sequential tasks:

- 1. Identification of stakeholders;
- 2. Conducting consultations;
- 3. Documentation of consultations; and
- 4. Integrating consultation findings into project related decision-making.

Accordingly, consultations were carried out across a wide section of society. All stakeholder groups were identified and consultation process was conducted from August 2009 to August 2011.

#### **15.3** STAKEHOLDER GROUPS

Various stakeholder groups were identified during the consultation program to represent views of a wide cross-section of society. Two core groups of stakeholders were identified:

**Primary stakeholders**: Beneficiaries of a development intervention or those directly affected (positively or negatively) by it. The following stakeholder groups were included:

- Officers (of RMC & RUDA)
- Village Sarpanchs (of 54 villages)

• Institutes such as Chamber of Commerce, Gujarat institute of Architecture and Civil engineering etc.

- Non-Government Organizations
- Renowned Architects, Engineers and Town Planners
- Private Developers

**Secondary stakeholders:** Those who influence a development intervention or are indirectly affected by it.

The following stakeholder groups were included:

• Town Planner, Chief Executive Officer, Chairman, RMC Town Planner and other government employees

- Various government departmental officers
- MPs, MLAs

#### No Stakeholder Group

- 1. ALL Officers of RUDA
- 2. 54 villages Sarpunch and Talati Mantri
- 3. Institutes, Chamber of Commerce
- 4. Renowned Architects, Engineers and Town Planners
- 5. TPO RMC, other government employees
- 6. Private developers
- 7. Officers from Different government Dept
- 8. MP, MLA

The stakeholder's consultation process for Second Revised DP 2031, RUDA included a series of consultations in various focus areas of Development plan.

**Consultations with Village Sarpanch and Talati Mantri:** Series of meetings were held with the village sarpanchs and Talati Mantri, of 54 villages of RUDA.

**Consultations with Institutions:** Representatives of the following institutions were consulted to get their views on urban services and infrastructure situation, economic development, housing requirement, Transportation and other component of Development plan.

- Chamber of Commerce
- Indubhai School of Architecture
- Members from GIDC estate.

**Consultations with Governmental Departments:** Consultations were held with the local urban body, urban administrative departments and line agencies to seek inputs on urban development issues, related information, data etc.

The key urban administrative and line departments consulted included:

- Principal Secretary, UD & UHD
- Municipal Commissioner, Rajkot
- Chief Town Planner, Government of Gujarat
- Senior Town Planner, Saurashtra Region
- Officer on Special Duty, Government of Gujarat
- Department of Industry
- Irrigation Department
- City Engineer, Rajkot Municipal Corporation.
- Western Railway, Rajkot
- Airport Authority, Rajkot
- Disaster Management unit, Rajkot
- Other Stake holders: Architects, Town planners, Civil Engineers Association, Rajkot builder Association and Developers.

**Consultations with working groups**: Following working groups were formed that included experts from all fields, to focus on key areas. Consultation meetings with the working groups were held at regular intervals. Some of the working groups were consulted and series of meetings were held to find out the issues and probable solutions for the same. The groups focused on the following key areas:

TABLE **36W**ORKING GROUP CONSULTATIONS CARRIED OUT WITH DIFFERENT GROUPS OF STAKEHOLDERS:

# NO. Working Group 1 Regional structure and delineation of boundary 2 Traffic, Transportation and Mobility 3 Environmental Sustainability and Disasters 4 Housing, Informal sector and slums 5 General Development Control Regulations 6 Urban infrastructure

#### **7** Social Infrastructure

#### 8 Economic Development

**9** Demographic Projections, and Land Requirements

This was done to ensure that all segments of the society were represented and consulted adequately.

#### **15.4 STAKEHOLDERS SUGGESTIONS**

Stakeholders' consultations were held in various focus areas. The suggestions received during these stakeholders consultation meetings are summarized below.

#### **General Development Control Regulations**

- Fire systems in Building are not so effective. The access to fire vehicles should be improved.
- Parking lots to be identified and mass parking to be facilitated.
- In Layout if once provide a common plot than not to provide again common plot at the time of High-rise Building.
- In single unit plot provide a FSI of common plot like that to give Built-up of the same common plot.
- Avoid 100m buffer from the water body near shaper-veraval

#### Zoning

- Proposed industrial zones in some control centers have not developed. These should be changed to residential zones.
- New residential zones to be proposed for Villages and Control centers to cater to the population growth.
- Commercial developments to be permitted along highways.
- Provide knowledge zones on east side in RUDA region.
- Government departments demanding reservations should justify their reservations.

#### Demography and Land Requirement

Compact plan should be taken up.

 The migration data should also be considered while deriving future projections and making assumptions

#### **Environment sustainability**

• All control centers have potentials for lake development.

- Buffer zones for lakes, canals, water bodies and natural courses of water to be given.
- Along with the urban area, development of villages falling under RUDA should also be considered so that the population in villages should not migrate to city for better living condition and employment opportunities.
- Make road side forestry as must on all new roads being planned and make necessary provisions about this aspect while designing the width of the roads in new plan.
- Earmark appropriate green zones which would serve as lungs of the city.
- There can be a central planning and decision making mechanism that will keep check on the systems installed in the building.

#### **Road Network & Transportation**

- Roads to have a minimum width of 30 mts. for all major roads for smooth circulation of traffic.
- All the control centers to be provided with ring roads to bypass major traffic through city.
- All the villages to be well connected with city area.
- The ring roads to function for smooth mobility and the radial roads to function as commercial and recreational hubs.
- Connectivity to the Airport and Railway Station to be fast and the road network to be planned accordingly.
- The Control centers have demanded the extension of the BRTS and RMTS or public transportation to the Control centers.
- Construction of Flyovers at major junctions which create traffic problems during the peak hours in the city.

#### Social infrastructure

- Large city level open spaces to be proposed for RUDA region.
- City civic Center, pay and use Toilets, Sports Complexes, well distributed Gardens, Crematoriums, Primary Schools and Education, Bus stands, Higher Educational Facilities, Health facilities and EWS Housing to be proposed for villages.
- The schools should be provided within 3km radius of residential areas for easily accessibility for children.
- Knowledge zones should be identified and appropriate provision for infrastructure should be made.

#### **Physical Infrastructure**

- 54 Villages are in requirement of Water Supply Schemes which include replacement as well as installation of existing and new pipeline respectively, and provision of Underground Service Reservoirs and Elevated Service Reservoirs.
- Underground Sewerage system which includes replacement as well as installation of existing and new pipeline respectively, pumping stations and Sewage Treatment Plan for group of villages should be proposed.
- Most of the villages lack in basic amenities such as water supply and drainage.
- Street lighting also a major requirement of the villages. Due to high operating costs the villages are in a demand for Solar Street Lighting. This work already initiated by RUAD.
- Common effluent treatment plants to be proposed for all industrial estates.
- Water Logging and Flooding issues need to be resolved.
- Solid Waste Management: There is a need of proposing some more transfer stations in RMC as well as entire RUDA region to serve the rising population and demand. A potential solution to this is through the Land reservations under TPS.
- Infrastructure provision for high density development: The existing network of water supply and sewerage system fulfills the current needs but in future due to high density development the load on existing infrastructure would increase. Therefore infrastructure should be provided in the development plan considering future requirement. The capacities of sewage and water treatment plants should also be decided consideration population projection.

#### **Economic Development**

- Kothariya and vavdi have been experiencing development at a faster pace as compared to shaper, veraval and kuvadava. Therefore, the focus should be on development of the control centers.
- Balanced distribution of economic activities on both eastern and western side:
- In recent years majority of commercial and employment generating activities and businesses have been locating in the western parts of RUDA.
- There is a strong need of commercial activities and related activities should encourage in the eastern side as well.
- Development of large industries can bring in other supporting industries, businesses, other economic activities and residential development.
- Additional incentives need to be provided simultaneously to promote industrial development.
- In order to develop economic activities identification of transport nodes would be a key point to promote them.

- Land should be allocated for knowledge zone so as to promote education system in the city.
- The future working population should be identified sector wise. With the identified working population for future it would be possible to identify land requirements in each sector.

#### SWOT Analysis for city based on stakeholders' consultations

A SWOT analysis of the city based on city stakeholders' views has been presented below:

#### Strengths

- Strategic location on road and railway map of Saurashtra region.
- Aji Dam Development
- Plan for the integrated mobility
- Manufacturing and industry
- Regional level Educational hub

#### Weaknesses

- Huge area need to cater for infrastructure services
- Weak heritage conservation efforts
- Neglect of walled city and other heritage areas and Cultural industry (gems, handicrafts, textiles etc)
- Weak tourism interest in city.
- Lack of disaster management preparedness
- Lack of open spaces and green cover
- Insufficient supply of housing for low income group

#### Opportunities

- Fastest growing city in Gujarat
- Potential for Tourism development within Saurashtra Region
- Availability of Service Land
- Grooming Real Estate Market

#### Threats

- Requirement of huge funds for development
- Increasing rate of vehicles in the city
- Increasing land prices

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