

An Appraisal of Various Social Infrastructure Facilities for North Zone, Surat City

Deepak Chavda¹, Axar Tarsariya², Suraj Salunkhe³, Anand Prajapati⁴, Mr. Rohan Kania⁵

^{1,2,3,4}UG, DEPARTMENT OF CIVIL ENGINEERING, MSCET, SURAT, GUJARAT, INDIA

⁵URBAN PLANNER, FACIL MAVEN PVT. LTD., SURAT, GUJARAT, INDIA.

Abstract – The modern town planning practices should be aimed at providing sufficient infrastructure to the people so as to achieve healthy life standards of people which may result in a number of comfort to the citizen by avoiding problems and also by providing sufficient facilities. As the social infrastructure provides number of routine and basic facilities it's deficiency results in a number of problems like traffic, low safety, improper education and health care, troubles in distribution of basic commodities and so much other. Thus in this paper we attempted to analyse the social infrastructure elements of North zone of Surat city for their sufficiency as per the norms according to population, and also it's distribution over entire area using ArcGIS By considering buffers of sufficient radius as per the requirements of the study area. Such study becomes essential for old cities whose zonal division is as per direction (Like north zone, South zone, south-east zone etc.) where social infrastructure facilities are to be provided in a particular zones whose land use contains almost all like (Residential, Commercial, Educational etc.) while not in case of per-developed cities there is particular zone like Residential zone, Commercial zone, Educational zone etc.

Key Words:- Social infrastructure, Government norms, Land use, GIS, SMC, Zone and Wards, Buffers

1. INTRODUCTION

Social Infrastructure shares a reference of the facilities and services provided in a community, through services and networks. It helps citizens to meet the social requirements, maximize their possibilities for development and enhance community well-being. Economic, physical and social infrastructures are inter-related for a sustainable community development. Adequate social infrastructure is the key to gain progressive society. Social infrastructure can be defined as a system that makes a society safe through the provision of health, education, public services, and recreation. Social Infrastructure is also take part in the economic development of a country.

a) Education facilities b) Healthcare facilities
c) Socio Cultural facilities d) Recreational facilities

e) Sports Facilities

f) Distribution Services

g) Police Safety

1.1 AIM OF STUDY

To analyze the social infrastructures in the north zone of Surat City, and gap analysis as per URDPFI guidelines and to make a proposal using GIS.:

1.2 OBJECTIVE

- To identify the existing social infrastructure in north zone.
- To identify the current needs for the infrastructure as per norms
- To analyse and identify the gap
- To locate existing facilities on GIS platform and to provide buffers as per reachable distance
- Determine the open spaces to provide new infrastructure using GIS.

2. STUDY AREA PROFILE

Surat is a city located on the western part of India in the state of Gujarat. It is one of the most dynamic city of India with one of the fastest growth rate due to immigration from various part of Gujarat and other states of India.

Table -1: Surat Details

Surat City	2nd largest city of Gujarat in terms of Area and Population
Area	326.515 sq.km.
Population	44,66,826 (Census 2011)
Density	13680 Persons/Sq.Km. (Census -
Location	Latitude: 21.112°N Longitude : 72.814°E
Municipality Established	1852 AD

2.1 NORTH ZONE

North zone of Surat contains a large residential area which is highly dense and a number of small and large industries, such as Dimond Industries, textile industries, and other local small industries.

Table 2-: North Zone Details

Sr no	Name of the area	Area (sq.km)	Total population
1	29 Rampura Lal Darwaja	0.4	10226
2	31 katargamgotalawadi	1.76	63237
3	38 Tunki	1.87	48038
4	39 Singanpur	2.62	32319
5	40 Dabholi	2.54	20160
6	41 Ved	2.84	6371
7	42 Katargam	7.0	328471
8	43 Fulpada	3.25	193253
9	70 ChhapraBhatha	2.962	46820
10	71 Kosad	9.532	88224
11	72 Amroli	0.413	28501
12	73 Utran (CT)	2.916	21459
	Total	38.103	887079

2.2 SCOPE OF WORK

For Our study purpose, as there are some limitations to us, we have considered the following components & their sub-components

- School
- College
- Hospitals
- Library
- Community hall
- Garden

3. GOVERNMENT NORMS

URBAN AND REGIONAL DEVELOPMENT PLANS FORMULATION AND IMPLEMENTATION (URDPFI) GUIDELINES

The URDPFI Guidelines, 2014 comprise two Volumes: Volume-I contains planning process, contents of the plans suggested in the planning system, resource mobilization for plan implementation including land and finance as the primary resources for sustainable

- Play ground
- Fire station
- Sub fire station
- Police station

4. METHODOLOGY

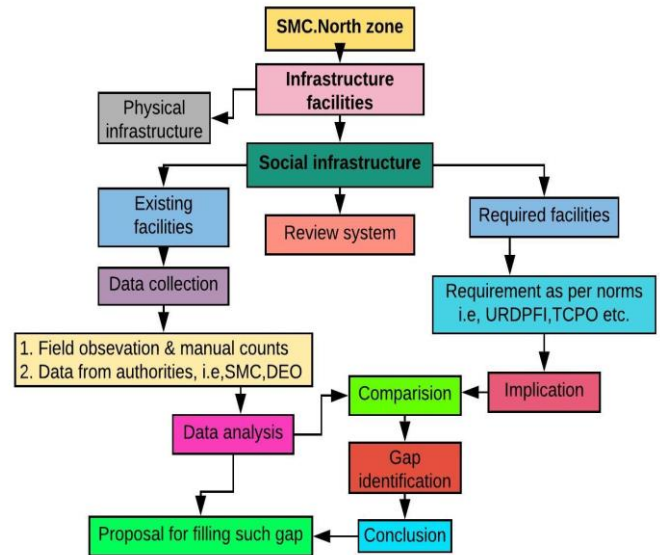


Figure 1-: PROPOSED METHODOLOGY

5. DATA COLLECTION:

The data collected of available Social Infrastructure in North zone of Surat city. All the data was collected from Surat municipal corporation office, north zone. & Also, by field survey and personal enquiry. Location of data is taken from Google maps. Social infrastructure includes following facilities as per Urban and Regional Development Plans Formulation and Implementation (URDPFI) guidelines and our scope of work

development, institutional reforms particularly at State level, and approaches and strategies for regional and urban planning. For addressing sustainability, various

Sources of Data:

- **SMC North zone,**
 1. **Housing Department**
 2. **Health-care department**
 3. **Property list**

➤ DEO, Surat (District Education Office)

➤ Field Survey

Table 3-: Data Collection

Sr. no	Facility	Existing Unit	Under Construction	Total
1	Schools	185	24	209
2	Collage	12	---	12
3	Hospitals	19	6	25
4	Library	16	5	21
5	Community hall	5	3	8
5	Garden	8	---	8
6	Playground	2	---	2
7	Fire Station	2	---	2
8	Sub Fire Station	0	0	0
9	Police Station	10	3	13

5	Community hall	59	8		Uniform
5	Garden	12	8	4	Uniform
6	Playground	12	2	10	---
7	Fire Station	5	2	3	---
8	Sub Fire Station		0		
9	Police Station	10	13	7	---

6. GAP IDENTIFICATION

Here, based on the previous Census data available for the ward level population, considering the population to compute the required infrastructure unit for identification of the gaps in the category of social infrastructure. Then second step is the study of the URDPFI, 2014 guidelines and obtain identical requirement of facility as per guiding norms. Set parameters were as for the social infrastructure, like, 1 primary school for 5,000 population and 1 senior secondary school for 7,500 population and so on, Then the gap identification by comparing existing provision with norms based recommended requirements were obtained. For the development of any area, check on availability of social infrastructure is sufficient so that by doing gap analysis we can find scarcity of social infrastructure of North zone of Surat. Here, below images represents the gap analysis through different wards of the North zone.

6.1 GRAPHICAL REPRESENTATION OF GAP IDENTIFICATIED

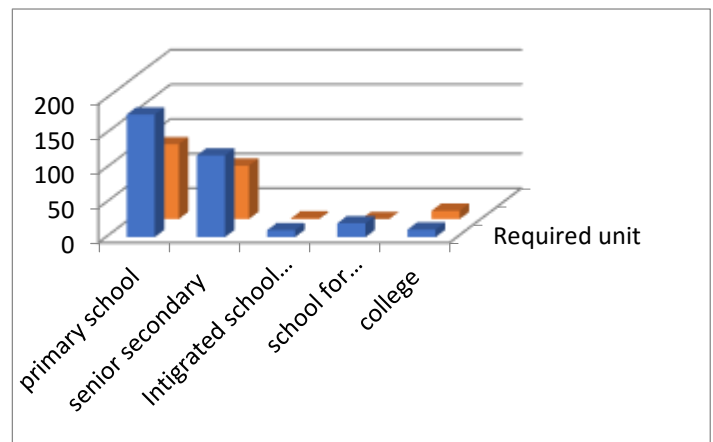


Figure 2-: GRAPHICAL REPRESENTATION OF GAP IDENTIFIED FOR EDUCATIONAL FACILITIES

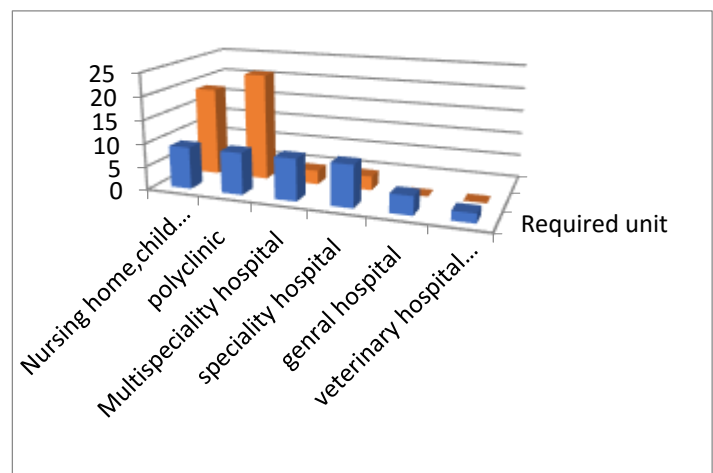


Figure 3-: GRAPHICAL REPRESENTATION OF GAP IDENTIFIED FOR HEALTHCARE FACILITIES

Table 4-: Gap Identified

Sr. no	Facility	Require d unit	Existin g Unit	Ga p	Short Analysis
1	Schools	295	209	86	Uniform but overlapped
2	Collage	7	12	---	Concentrated
3	Hospitals	39	25	18	Concentrated
4	Library	59	21	38	Uniform(Idea l)

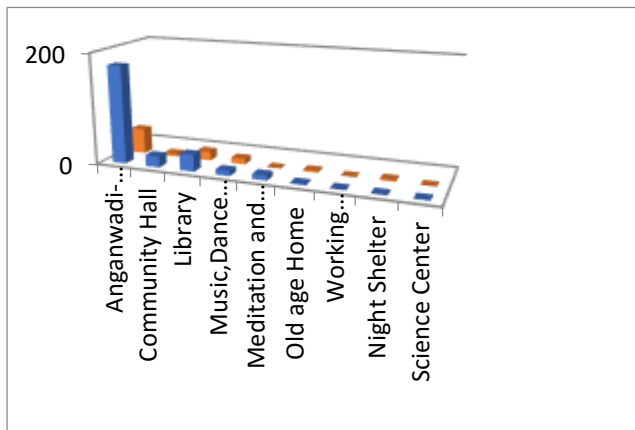


Figure 4:- GRAPHICAL REPRESENTATION OF GAP IDENTIFIED FOR SOCIO-CULTURAL FACILITIES

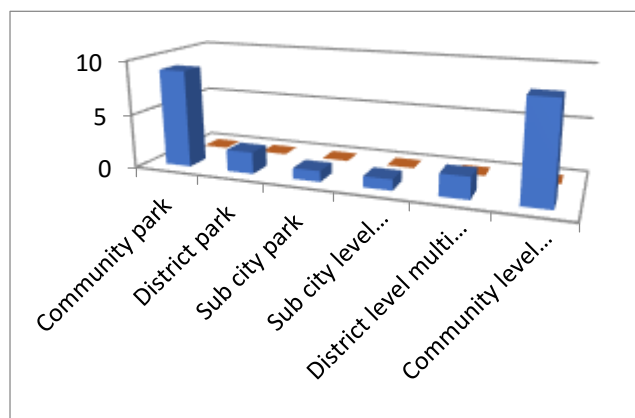


Figure 5:- GRAPHICAL REPRESENTATION OF GAP IDENTIFIED FOR OPEN SPACES

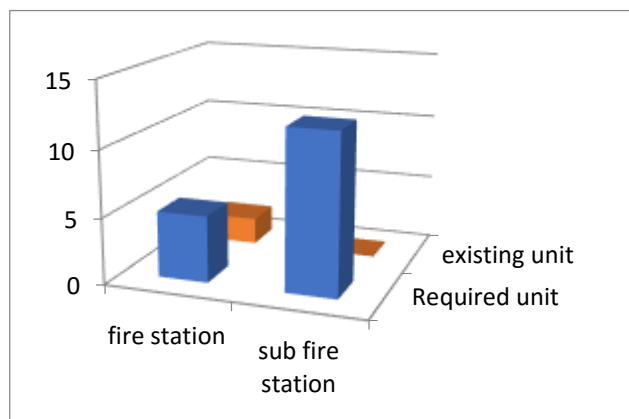


Figure 6:- GRAPHICAL REPRESENTATION OF GAP IDENTIFIED FOR FIRE SAFETY SERVICES

7. GIS BASED LOCATING & PROVISION OF BUFFERS

As on our study we have to consider the existing social infrastructure facilities in the north zone it becomes essential to locate them on GIS platform so that we can

have an idea of it's exact location at which it is located and also the spatial data of surroundings can be available directly which lead us to a brief knowledge about facility's distribution over a particular are ie. Weather it is uniformly distributed or concentrated about a limited area.

Buffers are the reachable distance of a particular Infrastructure facility for a surrounding. It's a circle giving idea for a individual facility regarding the area or radius of the land it can serve by a nominal travelling distance.

Radius of buffers can be decided based on population density and population served by a single unit of infrastructure facility and also by assessing government norms. The buffers decided for our study are based on based on population density and population served by a single unit of infrastructure facility and are as shown in table below:

Table -5: GIS based buffers Details

Sr. No.	Facility	Population Served per unit	Buffers
1	Schools	5000	500m
2	Collage	1.25 lakh	2600m
3	Hospitals	1 lakh	2300m
4	Library	15,000	900m
5	Community hall	15,000	900m
8	Garden	1 lakh	2300m
9	Playground	1 lakh	2300m
10	Fire Station	2 lakh	3300m
11	Police Station	90,000	2200m

7.1 DIGITIZED LAYOUT ON GIS

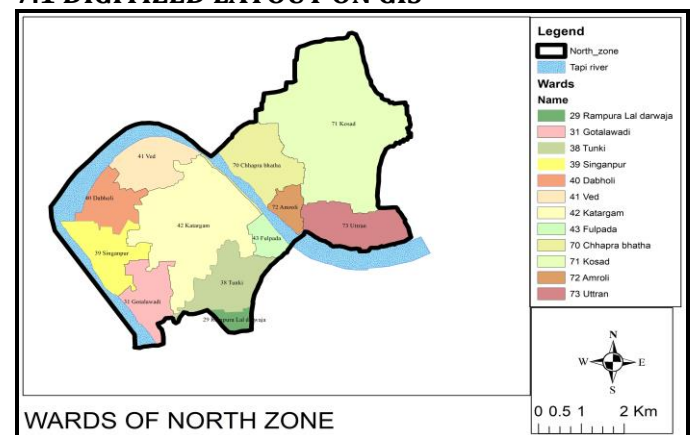


Figure 7

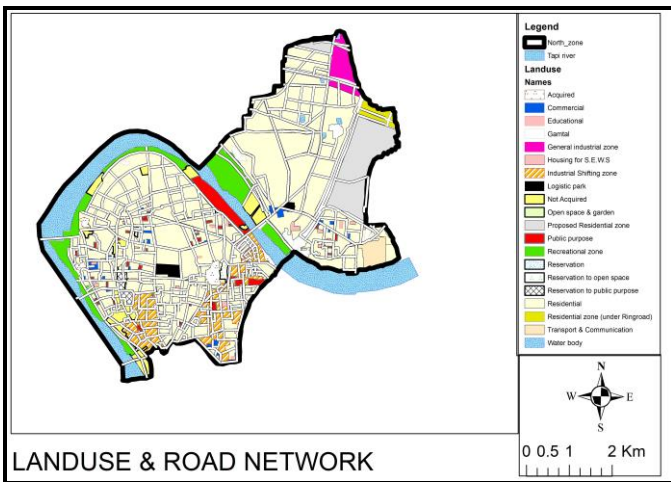


Figure 8

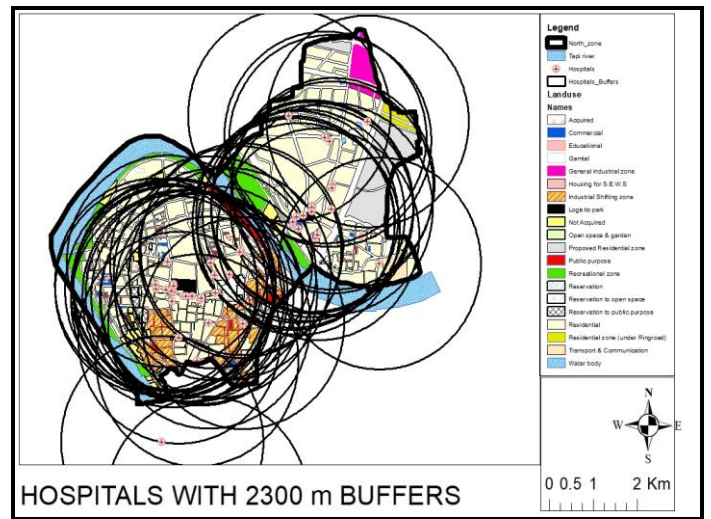


Figure 11

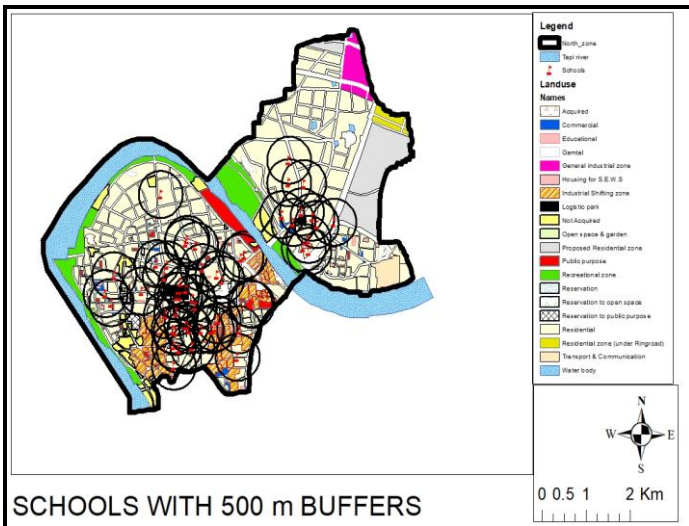


Figure 9

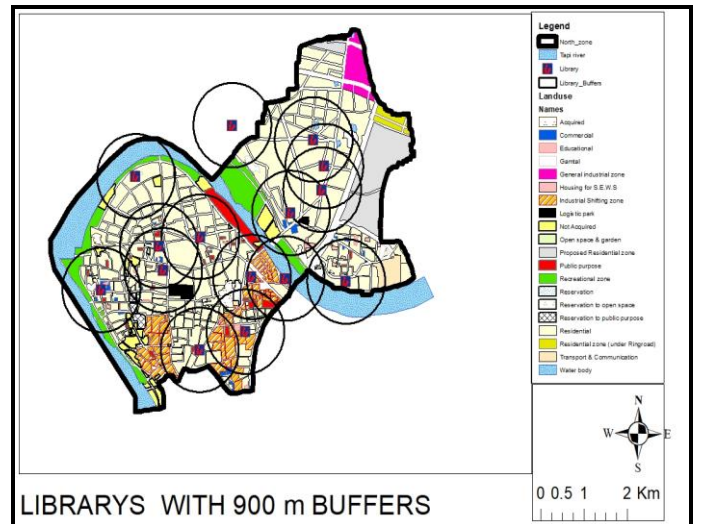


Figure 12

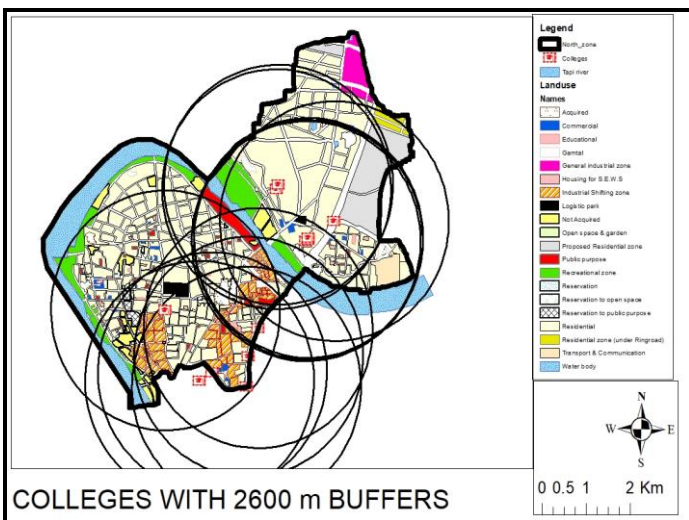


Figure 10

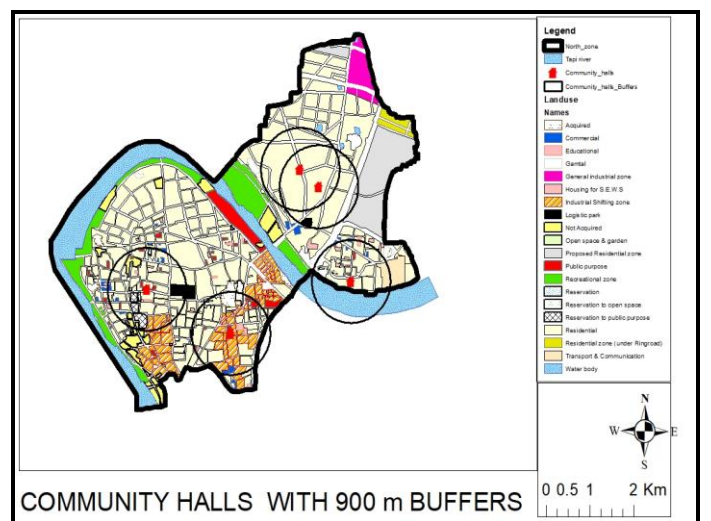


Figure 13

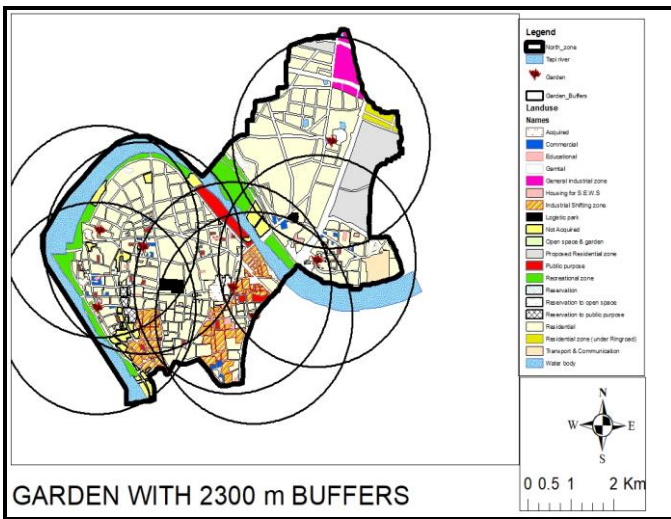


Figure 14

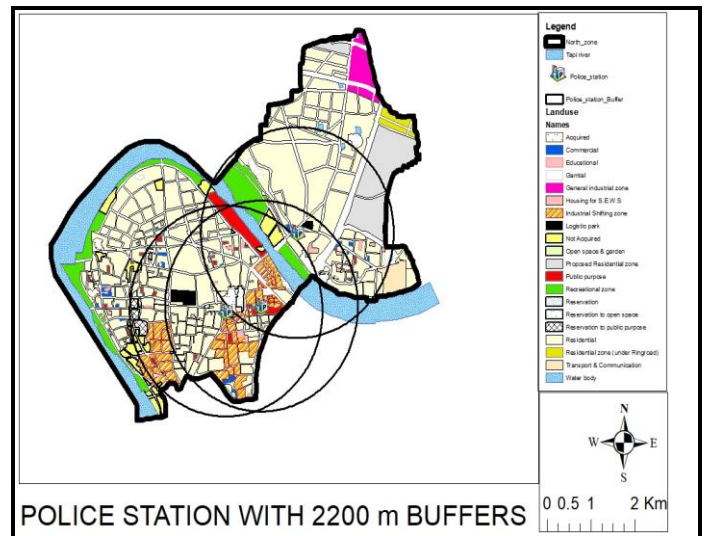


Figure 17

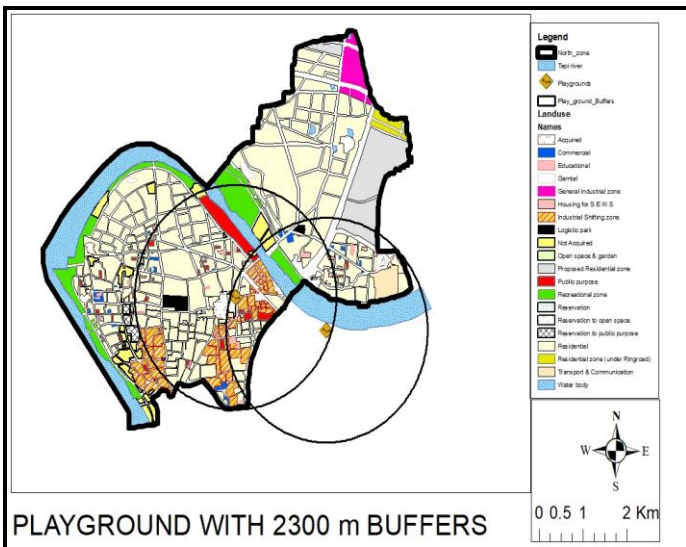


Figure 15

8. PROPOSAL

This study lead us to know that there is large deficiency in the Educational facilities, Healthcare facilities, Socio cultural facilities, Play grounds, and Fire safety. But as per our systems using government vacant land it will priorities to provide government sector facilities like Community halls, Libraries, Play grounds, Gardens, Police Stations, Fire Stations, and some sort of government schools and hospitals. The proposal we suggest are based on four factors namely

- Gap Identified
- Distribution of Facility over area
- Importance of Facility
- Availability of vacant land (in lacking area)

The list of proposal we made are as listed below:

Table -6: Proposal Details

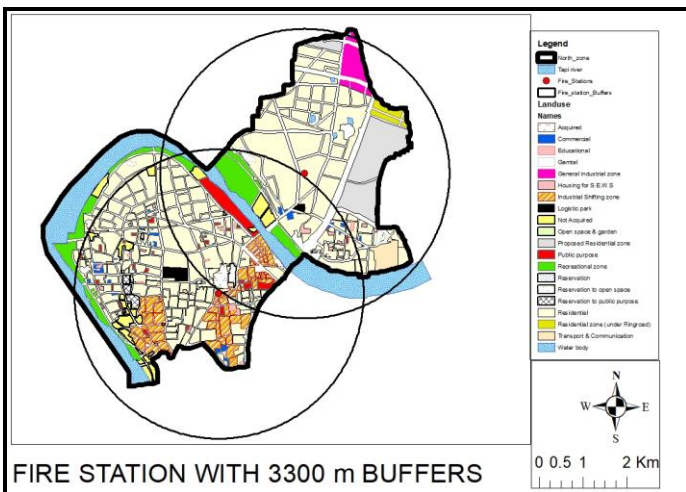


Figure 16

Sr. No	Facility	Sr. No	Facility
1	School	15	Garden
2	School	16	Garden
3	Technical College	17	District Sport Centre
4	Hospital	18	Play ground
5	Hospital	19	Play ground
6	Community Hall	20	Play ground
7	Community Hall	21	Fire Station
8	Community Hall	22	Sub Fire Station
9	Community Hall	23	Sub Fire Station
10	Community Hall	24	Sub Fire Station
11	Community Hall	25	Police Station
12	Library	26	Police Station
13	Garden	27	Police Station
14	Garden		

8.2 GIS Layout for proposal

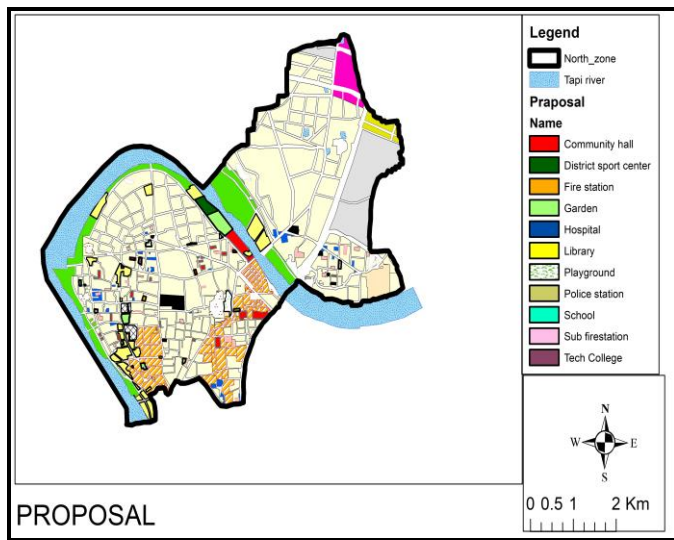


Figure 18

9. Result and Discussion

This study lead us to have exact Scenario of current availability of existing of Social infrastructure facilities and also about it's distribution in the entire north zone on GIS platform in digitized manner which has been compared with the requirements as per the population and area of the north zone.

The comparison has resulted the crucial findings include a considerable deficiency in the educational facilities, Healthcare facilities, Sociocultural facilities such as Community hall, libraries & open spaces, and Safety management services.

This study also leads us to know that there some concentration of facilities in particular area which can be seen on GIS platform that we prepared. Which should be uniformly distributed over the area so as to have easy and economical accessibilities to the facilities. For Example, there is Concentration of Educational and Healthcare facilities in Katargam ward which leads to Parking and Traffic Problems in that particular areas.

The approach taken up by this study can improve the accessibility of these facilities provided for public utilization more effectively as, the distribution of these facilities will be based on prevailing guiding norms.

Analysis for this area in a manner similar to the current exercise is never carried out in the city of Surat. IF the

records of different social infrastructure components-facilities-services are maintained by means of a uniform record, future proposal for defining land allocation for specific locality can be streamlined. Such an attempt, if practiced, can avoid irregular provisioning of infrastructure in urban areas and bring in the maximum utilization of these facilities

For filling up such gap in social infrastructure facilities, the land kept for reservation by the authority can be used, for such provision a proposal can be made by using GIS, but practically it become possible only for the Recreational Facilities (such as Open spaces, Organized Green etc.) & Fire safety services and other government services, because the other social infrastructure components can also be provided by private sectors by using own resources for commercial bases or own practices as a professionals such as Educational Facilities, Healthcare Facilities etc.

In this study we have tried make the Proposals which can lead to avoid the problems arising due to lack of this facility, we firmly believe that such implementation will provide healthy living standard to people of the north zone of Surat and thus by health life it can be away to growth of people and overall growth of the area, City, State and finally the Country.

9.1 ADVANTAGES OF STUDY AND IMPLEMENTATION

- Sufficient Provision of infrastructure facilities.
- Achieving healthy living standards of people.
- Avoiding traffic problems.
- Avoiding parking problems.
- Avoiding trouble to people for having services at nearby areas.
- Sustainable town planning practices.
- Effective utilization of government resources (Reservation land, Infrastructure Budget)
- Effective utilization of transportation facilities.
- Increase in Revenue of Government.
- Savings in expenditure incurred for unnecessary facilities.

10. CONCLUSION

It is prime fact that the social infrastructure has a significant influence on the people's living and healthy life standards, as the sufficiency of social infrastructure

components provides comfort to the people for basic facilities like education, healthcare, socio cultural, safety services etc. and lacking of such facilities causes major problems like Traffic, lowering quality of facility, parking problems etc. Thus, going through such study for a particular area provides the fact information and correction of such gap by providing lacking facilities a sustainable town planning can be achieved which will be essential in future for this increasing population.

ACKNOWLEDGEMENT

We wish to express our heartiest thanks and a sense of gratitude with respect to Mr. Rohan Kania (M.E Town and country planning). for their valuable guidance and constant inspiration in this study, without which would not have been able to complete the report. We also want to express our thanks to Mr. Abhishek Batliwala (B.E Planning) who made us able to prepare GIS layout on ArcGIS.

REFERENCES

- [1] Dupal F. Chaudhari, Bhasker Vijaykumar Bhatt, "An assessment of social infrastructure in west zone of surat city" JETIR (ISSN-2349-5162) April 2017, Volume 4, Issue 04

- [2] Himanshu Chandra, B.K. Patel, "appraisal of infrastructure facilities of a backward taluka on gis platform – case study of nizar taluka of tapi district, gujarat, india" 12th Esri India User Conference 2011

- [3] URDPFI (URBAN AND REGIONAL DEVELOPMENT PLANS FORMULATION AND IMPLEMENTATION) GUIDELINES, 2015

- [4] Surat Municipal Corporation (North Zone), Near Gajera School Katargam, Surat, Gujarat, INDIA