

# Identification of Urban Void Spaces in an Area of Vadodara

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## Abstract

Increasing population and urbanization demand more resources in the urban area in terms of hard and soft infrastructure both. Many problems related to spatial resources in the urban area are addressed which disputes to development of the city. The process of building up spaces by every contributing individual and organizations somehow leaves certain unbuilt/un-utilized. These vacant, unused or underused spaces in an urban area are considered as urban void causing a rupture in the urban fabric. These spaces have a potential to get converted into functionalized space. The current study is addressing the identification of such spaces in a part of Vadodara City, located in the Gujarat State. The city has flourished over past decades with population growth and spatial development in the context of economic growth and potential. In Gujarat, the cities are developed under the aegis of the Gujarat Town Planning and Urban Development Act, 1976. The act imposes the development through means of a development plan, revealing proposed zoning and regulation at a macro level. The micro level land parcels are dealt by planning Town Planning Schemes and imposition of Building Control regulations. Void spaces are identified, their characteristics are understood and visualized by an observational study. Further, these spaces are addressed with the possible inclusion of improved functionality in terms of its use for the urban population. In the study area, ten void spaces were identified. However, the paper discusses five such pockets in detail with possible remedial measures leading to improvement of space utilization.

**Keyword- Town Planning, TPS, Urban Voids, Urbanization, Vadodara**

## I. BACKGROUND

A city experiences vacancy in spatial pockets with different urban processes like de-centralization, urban sprawl, de-industrialization, sub-urbanization and counter-urbanization and thus, spaces became vacant (Lee, Hwang, & Lee, 2015). By the time these spaces lose its identity and usability by becoming a lost place in an urban area. While in the existing planning process, the dynamics of changes in need of the citizens and space demand in the context of time is not considered. It also causes unused or underused spaces. These unused, underused, lost spaces in an urban area are considered as urban voids. Typologies for urban voids mainly includes for terms as planning void, functional void and geological void. Different researchers and author shave other different typologies based on characteristics of the study area (Trancik, 1986).

Void spaces in urban area rupture the fabric of the city and not let the city to communicate (within people object and facility) well. Urban void also decreases the surrounding land value, decrease economic productivity of the city. Also, a threat exists for the evolution of slums in such places. These urban voids have enormous potential to get converted in functionalized space and to serve the society without making the burden of land cost. There are different concepts in a developed country to developing urban voids as functionalized space like mini parks, community spaces, green spaces and planning programs (Kim, 2016).

In the Gujarat state, the Town Planning Schemes are prepared under the provision of the Gujarat Town Planning and Urban Development Act of 1976. With a change in trend to use space by people and the development of space with time causes urban development (Vadodara Urban Development Authority, 2013).

## II. AIM AND OBJECTIVES

The research is aiming to perform a pilot study for identification and exploration of spatial voids existing in an urban area and to propose for alternative suitable public-purpose use based on its area, ownership, current use, surrounding land use. Following objectives were identified for addressing the aim for the current study.

- To understand the study area in terms of growth of population and development over the years.
- To study and analyse the existing condition of urban spatial voids within the study area.
- To make an identification for alternative public purpose usage on the urban void spaces.

### III. LITERATURE REVIEW

Urban voids can be defined as unutilized, underutilized or abandoned land or areas and premises which exist in city areas owing to outdated or defunct uses (Trancik, 1986). Lack in planning, consideration of people's need, forecasting of demand, urban sprawl, haphazard development, change in trend with development is the primary cause of generation of void spaces in an urban area (Azhar & Gjerde, 2016). Void spaces are mainly classified into three categories planning void, geographical void and functional void wise (Trancik, 1986). Researchers and authors have different typologies according to the aim and relating to the study area. According to scale and ownership, four main types of voids are edge and buffer voids, infrastructural void, transportation void, large scale projects (Ansari, 2016).

Various uses were suggested for rejuvenation of void spaces. Green infill for urban void can be the new solution for the redevelopment of many European cities like Lodz still struggle with economic decline, lack of investment, depopulation neighbourhood, a surplus of post-industrial vacant land (Wróblewski, 2015). Urban vacant land has high potential as an appreciated ecological reserve that provides ecosystem services that could take the arrangement of green space, public open space, and community garden in an urban area (Kim, 2016).

### IV. METHODOLOGY

A field survey was performed to achieve objectives for the research. It was focussed to analyse physical condition and aspects related to identified void spaces. A Questionnaire is prepared to overview void space in terms of location, usage, ownership, and surrounding. Methodology for the study is as shown in the following figure1 where development plan, town-planning scheme, census data are used as secondary data and data from field survey is taken as primary data.

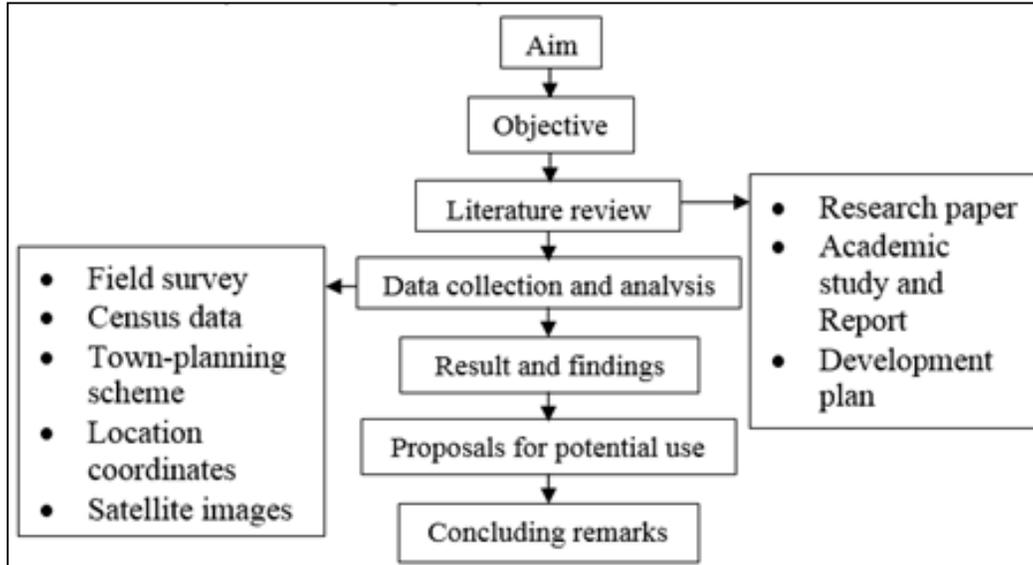


Fig. 1: Methodology

### V. HISTORY AND ADMINISTRATION IN VADODARA CITY

A small township, namely 'Ankottaka' sprang up during the second century BC on the bank of river Vishwamitri a tributary of Dhadhar. 'Vadpadraka' became the administrative headquarter of Alphas Khan, who was given charge of the region by Khilji. The Delhi Sultanate ruled the city till the end of the year 1403 from 1297 (Vadodara Urban Development Authority, 2013). It is a princely state ruled by sir Sayaji Rao Gaekwad (1875-1939) and having large premises of king's land and palace near to the core of the today's Vadodara city. Vadodara experienced development in terms of public amenity, MSU as a famous education centre for higher studies and hospital and more in time of Sir Sayaji Rao Gaekwad. After that chemical industries also settled in the north of the city and city having GIDC in Makarpura. The city also has premises of ONGC, Air force.

#### A. Governing Organizations

##### 1) Vadodara Urban Development Authority (VUDA)

- Vadodara Urban Development Authority (hereafter referred as VUDA), was constituted under section 22 of The Gujarat Town Planning & Urban Development Act, 1976 by the Govt. of Gujarat Notification in December 1983.
- The development area under the VUDA has a spread over 714.56 km<sup>2</sup>. It includes VMC and the part areas of Vadodara district with blocks of Padra, Vaghodia covering 104 villages.

- While, since the authority is constituted, the municipal corporation limits have been extended twice, once in the year 2001 and second time in the year 2006 and accordingly the municipal area has exceeded from 101.01 km<sup>2</sup> to 156.05 km<sup>2</sup>.
- 2) *Vadodara Municipal Corporation (VMC)*
- The Municipality of Baroda began to work in the year 1830 within the city walls, and the municipal limits were extended beyond city walls in the year 1859 in response to the growth around the city.
  - While, since the authority is constituted, the municipal corporation limits were extended twice, once in the year 2001 and second time in the year 2006 and accordingly the municipal area has exceeded from 101.01 km<sup>2</sup> to 156.05 km<sup>2</sup>.

## VI. STUDY AREA PROFILE

Administrative wards of 4 and 12 of the south zone of Vadodara city is considered as a study area. Modification in boundary and area of the administrative ward was observed in the year 2006 by separating one ward from another or by extending the boundary of the same. Previously, the administrative wards 4 and 12 were as single administrative ward 4 only. Administrative wards 4 and 12 are having the highest population after the administrative wards 7, 9 and 10. These are connected with boundary and can be approximately defined as the area constrained between broad-gauge railways, narrow -gauge railway and NH-48 as shown in figure 2.

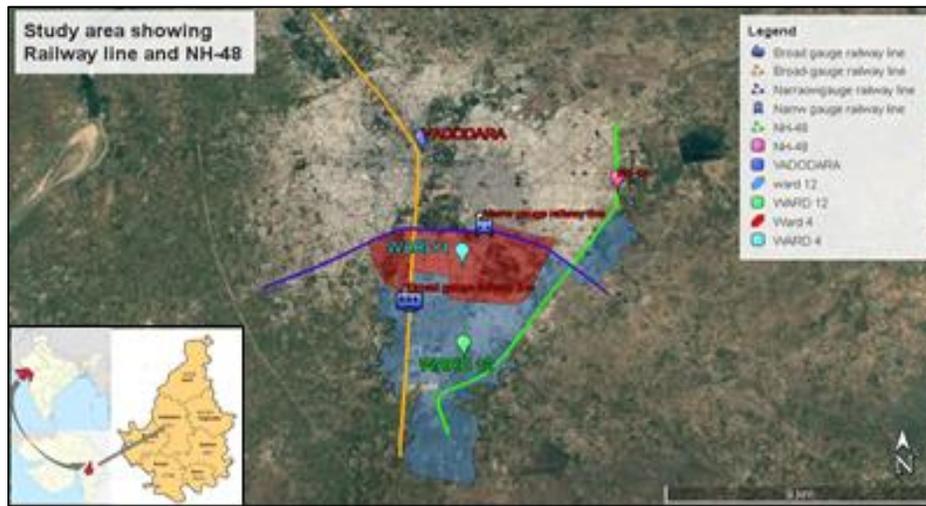


Fig. 2: Study area (Courtesy: Google Earth Pro)

## VII. DATA COLLECTION AND ANALYSIS

Vadodara is the third among the largest cities in the Gujarat state in terms of residing population. It is among the focal points of industrial growth in Western India. The city was declared as a metropolis in the year 1991, along with eleven other major cities across the country accommodating one million-population.

Year	VMC	
	Population (in Lakh)	Growth rate
1951	2.11	--
1961	2.98 (65.35%)*	41.23
1971	4.67 (70.12%)*	56.71
1981	7.34 (73.25%)*	57.17
1991	10.21 (75.18%)*	39.10
2001	13.06 (74.04%)*	27.42
2011	16.70 (80.05%)*	35.52

\* Population share of VMC in Vadodara District in per cent

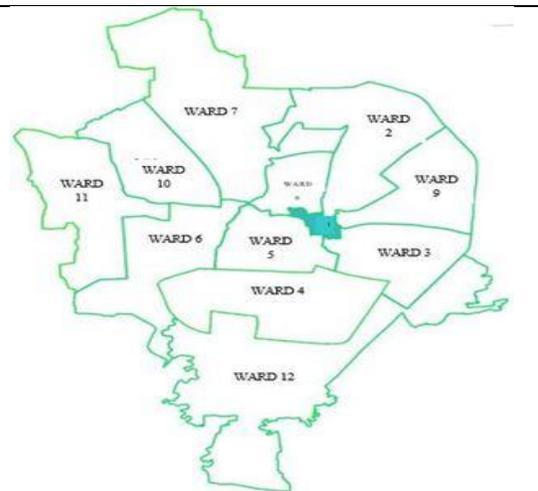


Fig. 3: Administrative ward boundaries in Vadodara city

The city has witnessed the highest growth (57%) during the decade of the year 1981 to 1991. However, it was observed a downfall in the momentum of growth; slowing down to 27% in the decade of the year 1991 to 2001. The population registered

in the Census 2001 was 13.01 Lakh as against 10.21 Lakh 1991. In the Census 2011, the population recorded as 16.07 Lakh as shown in Table 1 with a little increase in the growth rate. The development in the city is managed by the Town Planning Schemes. The status of the schemes is shown in Table 2.

Year	Final Schemes	Preliminary Schemes	Draft schemes	Proposed schemes yet to be prepared.	Total
2006	8	7	9	41	65
2015	21	06	11	27	65

Table 2: Town Planning Scheme status by 2006 and 2015

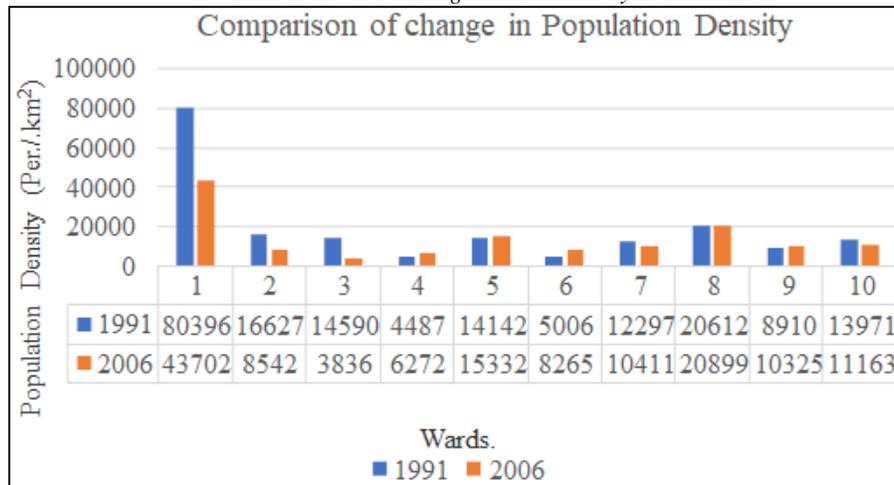


Chart 1: Comparison of change in population density

It can be seen from Chart 1 that ward 4 has experienced a considerable increase in the population density which is next to the highest in the ward 6 although it has a tremendous decrease in growth rate from 2001 to 2011 which can be seen in Table 3 but which is due to the reason that ward 12 is separated from 4 after the year 2006.

Ward No.	Name of the Ward	Total Area (km <sup>2</sup> )	Census Population								
			1971	1981	G.R.*	1991	G.R.*	2001	G.R.*	2011	G.R.*
1	City	0.664	58,950	64,831	9.98	53,383	-17.66	47,636	-10.77	43,555	-0.85
2	Fatehpura	7.054	62,206	1,19,465	92.05	1,17,289	-1.82	1,14,720	-2.19	1,22,741	0.71
3	Wadi	5.974	79,078	1,12,735	42.56	87,158	-22.69	94,588	8.52	1,41,314	4.49
4	GIDC	29.854	24,420	77,457	217.19	133,943	72.93	2,17,592	62.45	1,60,969	-2.60
5	Babajipura	4.954	64,850	74,476	14.84	70,057	-5.93	78,192	11.61	88,349	1.29
6	Sayajiganj (S)	25.24	33,006	61,957	87.71	1,26,343	103.92	1,90,095	50.46	1,30,715	-3.12
7	Sayajiganj (N)	9.14	77,404	1,28,559	66.09	1,12,399	-12.57	1,32,115	17.54	1,82,567	3.81
8	Raopura	5.47	78,508	94,993	21	1,12,750	18.69	1,14,525	1.57	98,723	-1.38
9	Kishanwadi	12.02	0	0	0	1,07,104	0.00	1,62,931	52.12	2,36,097	4.49
10	Gorwa	7.94	0	0	0	1,10,926	0.00	1,54,043	38.87	1,77,287	1.51
11	-	-	-	-	-	-	-	-	-	1,22,645	-
12	-	-	-	-	-	-	-	-	-	1,39,349	-
13	-	-	-	-	-	-	-	-	-	26,495	-
	Total	108.31	4,78,422	73,443		10,31,352		13,06,436	26.67	16,70,806	4.54

Table 3: Population and growth rate in the ward by decade  
(Kumar & Dash, 2013)

A field survey was conducted to identify urban voids in the study area. Sites were visited, preliminary information from the T. P. Scheme and Revenue records were obtained for identified void plots. The field survey 10 spatial voids explored for its current function and activities in the vicinity within the study area. The location of the identified urban voids is shown in Figure 4. Summary of the voids is discussed in Table 4 that includes for five cases.

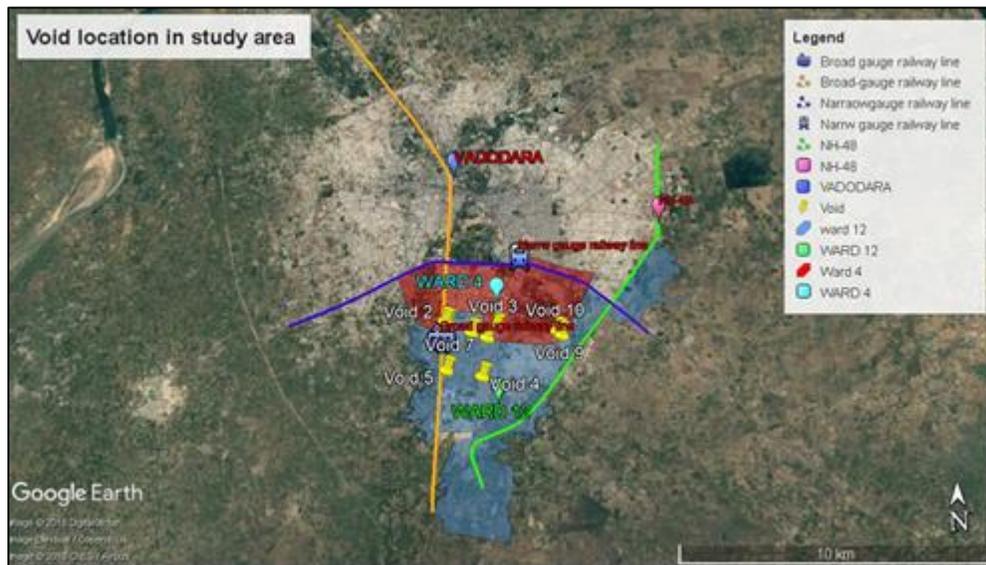


Fig. 4: Location of voids in the study area (Courtesy: Google Earth Pro)

Void number	1	
Location	Under Vadasar over-bridge (West side)	
Ownership	Government	
Corresponding ward	4	
Current use	Un-authorized domestic use by industry workers	
Surrounding environment	Noisy, Slums	
Coordinates	22.2604 N 73.17831E	
Void number	2	
Location	Under Vadasar over-bridge (East side)	
Ownership	Government	
Corresponding ward	4	
Current use	Auto stand, Anganwadi	
Surrounding environment	Noisy	
Coordinates	22.26053N 73.17659E	
Void number	3	
Location	Jupiter Char Rasta	
Ownership	Government	
Corresponding ward	4	
Current use	Slum formation	
Surrounding environment	Busy with vehicular movement and traffic jams	
Coordinates	22.25848N 73.194E	
Void number	4	

<i>Location</i>	<i>Ji Ji Mata Mandir</i>	
<i>Ownership</i>	<i>Government</i>	
<i>Corresponding ward</i>	<i>12</i>	
<i>Current use</i>	<i>Playing area by children</i>	
<i>Surrounding environment</i>	<i>Busy with traffic</i>	
<i>Coordinates</i>	<i>22.24356N 73.18973E</i>	
<i>Void number</i>	<i>9</i>	
<i>Location</i>	<i>Tarsali Pond</i>	
<i>Ownership</i>	<i>Government</i>	
<i>Corresponding ward</i>	<i>4</i>	
<i>Current use</i>	<i>Abandoned land</i>	
<i>Surrounding environment</i>	<i>Noisy, busy with traffic</i>	
<i>Coordinates</i>	<i>22.25544N 73.2166E</i>	

Table 4: Summary of void status

## VIII. RESULTS AND DISCUSSIONS

Spatial growth and changing population lead to different demand and create differences in provision according to planning and current needs of the community. While in planning, a wrong perception to the future demand also creates high or less demand to the provisions made.

It is observed that surroundings of spatial voids are mostly busy with public engagements, movements and vehicular traffic. The potential use of these spaces can be highly efficient as it can benefit in terms of improvements in social life, aesthetic, usability, and increased accessibility. These spatial voids can be used as parking, public open space for the local or daily market, public garden, green space, rainwater harvesting, ren-basera (night shelter), gathering space for neighbourhood and more. Following are a few proposed suggestive uses identify for ideal activities for development in the void spaces within the study area.

<i>Void No.</i>	<i>Existing use in the void space</i>	<i>Proposed alternative Public purpose use</i>
<i>1</i>	<i>Un-authorized domestic use by industry worker</i>	<i>Pay and park/ public amenities</i>
<i>2</i>	<i>Auto stand, Anganwadi</i>	<i>Vegetable market/ temporary stall/ local shops</i>
<i>3</i>	<i>Slum formation</i>	<i>Parking space/ local green space</i>
<i>4</i>	<i>Playing area by children</i>	<i>Development of waterbody and recreational area</i>
<i>9</i>	<i>Abandoned land</i>	<i>Recreational space/ public garden</i>

## IX. CONCLUDING REMARKS

Void spaces may not only just abandon the land, but it let people to under-utilize or make a loose or negative identity. These spaces have the potential to get turned into usable space which is efficient, planned, functional, and accessible. Governing authority should have legislative provisions through rules and regulations for derelict spaces, or while changing the usage of such space, it should be considered that it does not create spaces as a spatial void in future. The study conducted shows that urban voids are produced for no reason in the urban areas where the value of land is high and such land is precious and scarce in terms of developed status. Not only the legislation needs to be strengthened but also, the practice of urban planning and implementation shall be sensitized for keep track of developed land parcels, maybe, by means of introducing a land inventory management system based on GIS.

## REFERENCES

- [1] Ansari, A. (2016). Rethinking Urban Voids- Innovative ways to revitalize lost space-A case study of Ahmedabad.  
[2] Azhar, J., & Gjerde, M. (2016). Re-Thinking the role of Urban In-Between Spaces, (December), 11.

- [3] Kim, G. (2016). The Public Value of Urban Vacant Land: Social Responses and Ecological Value, 19.  
<https://doi.org/10.3390/su8050486>
- [4] Kumar, S. ;, & Dash, N. R. (2013). The Cultural Capital of Gujarat.
- [5] Lee, S. J., Hwang, S., & Lee, D. (2015). Urban Voids: As a Chance for Sustainable Urban Design, 007, 16.  
<https://doi.org/10.3390/ifou-D007>
- [6] Trancik, R. (1986). Finding Lost Space: Theories of Urban Design.
- [7] Vadodara Urban Development Authority. (2013). Second Revised Draft Development Plan 2031.
- [8] Wróblewski, W. (2015). Urban voids as communication gaps.