

# Pedestrian Accessibility at Dashashwamegh Ghat-Varanasi, India

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**Abstract**—Varanasi is known as cultural capital of India. It is famous because of holiest of the holy river Ganga and it's 80 Ghats full of spiritual ambience in a crescent formation with a total length of 6.5 km. As per the Hindu Mythology if any one who liberate his soul at Ganga Ghat may get Moksha (salvation). That's why Varanasi remains always over loaded with local visitors, National and International tourists at all Ghats especially during various religious festivals.

But the present scenario of these Ghats and its surrounding is full of traffic congestion and completely chaotic (Fig. 1). Pedestrian pilgrims and tourists are facing multiple problems of accessibility, especially around and within the Ghat areas. The overall condition of the roads leading to Ghats is very poor, lack of adequate traffic control, traffic signals, zebra crossing, pedestrian walkways, parking facility, sufficient turning radius of the roadset. Also the accessibility of paths leading to Ghats is full of hurdles due to narrow roads and due to their encroachment. Even at Ghat, varieties of activities are not planned as per their functional significance and feelings. This result in confusion there by looses its spiritual values.



Figure 1: Congestion at Gaudauliya Junction

This paper discusses the various issues of pedestrians' accessibility, especially at Dashashwamegh Ghat area of Varanasi with a non-motorized approach and proposed significant design intervention to create and maintain pedestrian friendly accessibility towards and also within Dashashwamegh Ghat.

**Keywords:** Non-motorized approach, Workability, Public space, Accessibility, Pedestrian friendly.

## Introduction

The present city has developed during the early 18th century. The Ganga river, considered the most sacred river for the Hindus, it is especially sacred in Varanasi where its course towards the Bay of Bengal suddenly turns from south to north. From its source in the Himalaya to its mouth in the Bay of Bengal, covering a course of about 2500 KM. It is only in Varanasi does the Ganga river flow in a crescent shape meandering from south to north (length 6.5km). The city also has one of the twelve Jyotirlingas- the Kashi Vishvanath temple, which is the most important place of worship of Lord Shiva. A 'Jyotirlinga' is a place where people worship Lord Shiva in the form of Ling as of light. It is due to this reason that the city is also known as the city of light (Rana.P.B Singh 2007) Banaras is as old as some of oldest cities in the world such as Athens, Jerusalem, Peking (Now in Beijing). The author of Banaras :City of light rightly remark if we could imagine the silent Acropolis and Agora of Athens still alive with the intellectual, cultural and ritual tradition of classical Greece, We might glimpse the remarkable tenacity of the life of Kashi (Eck, L, Diana-1983)

## Evolution of Varanasi:

As per the belief the Varanasi city is established over the Trishul of lord Shiva. The Gaᅅga, the patron deity Shiva, and the sacred territory of Kashi/ Varanasi — all together form the Cosmic Trinity the Gaᅅga, Shiva and Kashi in this city, (Kashi Khand -35.10). (fig. 2). From historical times name of the city is Kashi. The name Varanasi has evolved as the city is developed between two tributaries Varana and Asi meeting the crescent of Ganga at its North and South ends.



Figure 2: Varanasi on Trishul

**The City and its Ghats formation**

The city's topography consists of three mounds resembling lord shiva's Trishul. These are recognized as three sacred cores. Each core of Settlement develops on the basis of caste system.



Figure 3: Varanasi on trishul

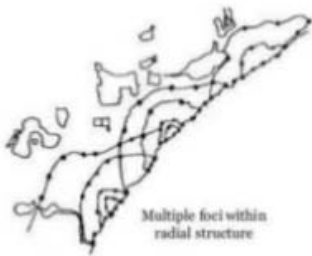


Figure 4: Hillock of Ghat

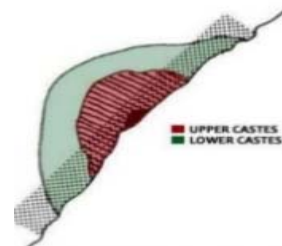


Figure 5: Settlement along Ghat

The average height of the city from mean sea level is 77 M. The crescent slop are varying 72M to 84M toward the Varuna river. This peculiar shape is the result of fluvial process through which the coarser sediments get deposited on its western bank between Raj Ghat in the north and Samne Ghat in the south. The portion between these two points a hillock-like geologic feature, called natural levée, consists of nearly 60m bed of clay with coarse grained sand, lime stone concretion (*kankar*) and gravel. (cf. Kumar, G. 1999). This unique geological formation has provided the base for the growth of the city in a crescent shape, symbolically described as crescent moon on the forehead of Lord Shiva. In terms of river ecology, this characteristic is also considered as the unique aspect of energy quantum and direction of the energy flow.



Figure 6: Bank of Ganga River      Figure 7: Radical planning of Varanasi Ghat

**The City and its Ghats Development**

The Varanasi city is also called the city of temples and streets. It is not regular because of the earlier streets (pathways) network was based on the radial pattern .During the British period they planed the ortho based street network along the bank of Ganga river. That is why the streets are irregular and interconnecting with various nods in Varanasi city.



Figure 8: Ortho Network of Varanasi

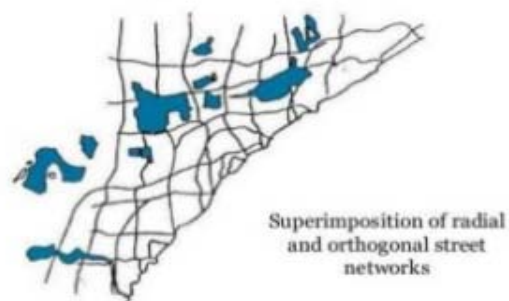


Figure 9: Combination of Radical and Ortho network

It was already an old city and was a flourishing centre of culture, trade and commerce. By 17th century the riverfront landscape (Ghats) became prominent in the overall arena of Varanasi. The 17th century Varadaraja's Girvana-padamanjari writings gives a full account of the Ghats, rituals and festivals associated with them. The palatial buildings along the Ghats were built under the patronage of the Marathas during 18th - 19th centuries. Even in 19th-20th century many Ghats were re-constructed, re-named and reshaped too.

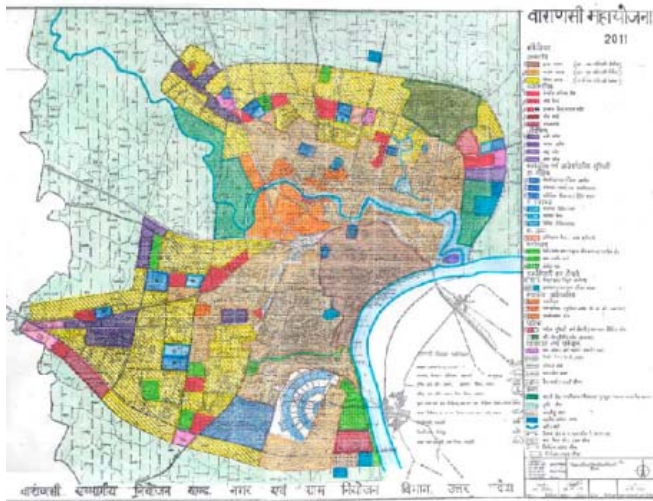
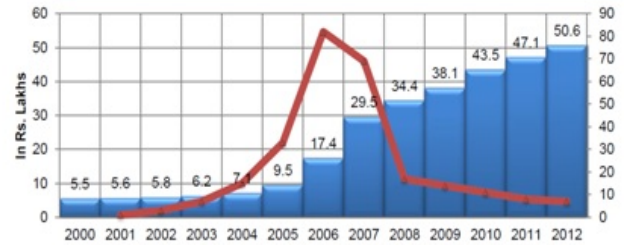


Figure 10: Planning after Independence

Since 1950 the state Government of Uttar Pradesh has been deeply involved in making the Ghats stone stairs (pucca) and their repairing. During the period between late 18th and 20th century, along the riverfront many monasteries (Ashramas), Sanskrit schools, temples, and pilgrims rest house were built by principalities, of different parts of India, like Peshvas of Pune (Maharashtra), Holkar of Indore, and Scindhias of Gwalior (Madhya Pradesh), Bhonshalas of Nagpur (Maharashtra), Sursand, Bhabhua, and Darbhanga estates of Bihar, Rani Bhavani of Bengal, kings of Nepal, etc

**Religious and socio cultural Tourism at Varanasi:**

Tourism can be local, domestic or international, and international tourism has both incoming and outgoing implications on a country's balance of payments. Today, tourism is a major source of income for many countries, and affects the economy of both the source and host countries, in some cases being of vital importance. It means as on average 13700/-tourists are coming Varanasi Ghat per day. While this numbers may exceed 10-15 time up during the fest season.



Source – UP Tourism Department, Varanasi and Ministry of Tourism, Government of India

Figure 11: Tourist Inflow Number and Growth

**Traffic Characteristics:**

The total population of Varanasi city is 12 lacs. The city of Varanasi can be reached through airways, roadways and waterways modes. On an average 34, 000-35, 000 passengers come through per day to the city by the multi mode transportation system. The total number of registered vehicles are 7.8 lacs at RTO of Varanasi. which has sub division of 2-wheelers (34%), Autos (20%), cycles (16%), walk (14%), 4-wheelers and cycle rickshaws (6% each) and others (4%). [3]

**Traffic volume**

The traffic composition in the city varies with area. Traffic in the city comprises mostly of motorized (comprising mainly of two wheelers and autos) as well as non-motorized (comprising of cycle rickshaws and bicycles) vehicles. The main reason for congestion in the city is due to the unregulated movement of cycle rickshaws followed by two wheelers and autos. Traffic volume at major intersections is as shown below (table 1).

Table 1: Traffic Volume at Major Junction

Areas	Truc k	Bus	Tract or	Bullock Carts	Jeep	Car	Auto Rickshaw	Ricksha w	2- Wheeler	Cycle	Total
Sigra	69	221	60	26	1594	3942	7302	12824	22732	24039	72809
Dharamshala	1226	886	225	214	2154	2303	12017	10073	13253	11293	53644
Rathiyatra	12	203	10	8	1508	3044	8248	12354	2519	20417	70994
Gurubagh	25	75	18	12	918	2893	4801	9089	12017	13262	43110
Kamachha	30	117	15	14	1240	2318	5086	5118	15413	14995	44346
Lahnurabir	147	142	47	33	931	2316	10269	20069	30871	32445	97270
Benabagh	67	86	39	34	392	854	3340	22847	13551	18930	60140
Ranapura	30	48	19	26	1198	727	2549	27001	23759	31042	86399
Gadaula	28	23	6	6	793	1192	445	23703	17459	19361	63016
Maidagin	71	134	40	212	909	1297	7175	19529	16512	18356	63936
Nadesar	58	86	28	1	1019	620	3675	1992	12502	11517	31498
Andura Pul	1175	1612	272	108	4300	4650	10966	9390	20642	20332	72766
Englishrya	49	21	38	46	662	998	4717	5194	10510	13044	39043

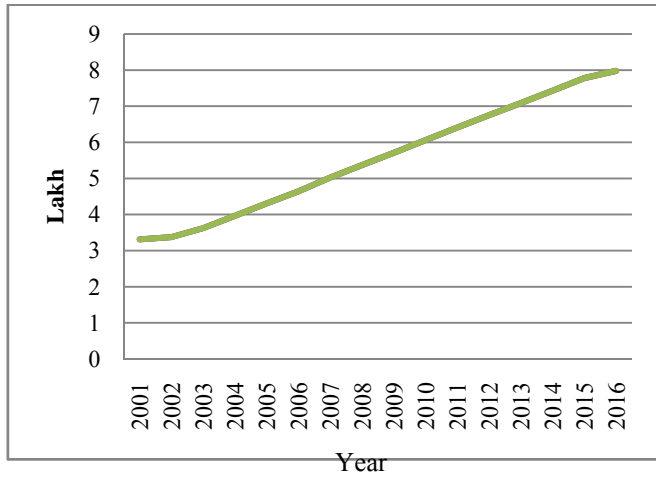
Source: Traffic Police Department, Varanasi, 2002

From the above table it can be seen that traffic volume is very high at all the nodes and intersections and the roads have already exhausted their capacity. Slow moving traffic in form of rickshaws contributes maximum to traffic volume of the city causing congestions at various places.

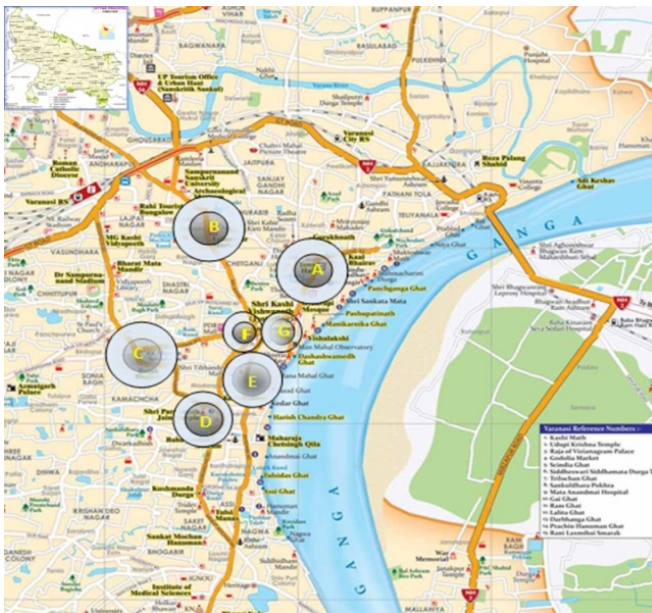
**Vehicular Growth Rate**

The total registered vehicles in Varanasi in the year 2001 were 3.3 lakh. Which has increased to 3.4 lakh in the year of 2004. Latest update about the vehicle growth is 7.8 lakh in 2016. It include every types of vehicles such as truck, lorries, light

motor vehicle, buses, taxies cars, jeeps, tractors etc. The reason for this may be non- availability of road space and congestion cause due to non- motorize traffic like cycle rickshaw.



Source: Traffic police Department, Varanasi, 2001-2016  
**Figure 12: Vehicular growth rate of Varanasi**



**Figure 13: Map of Varanasi junction**

**Status of Surveyed junctions at Varanasi**

**Table 2: Surveyed at Varanasi Junction**

Sr. No	Name of Junction	Traffic Signal Present	Traffic Signal Working	Zebra Crossing Available	Sufficient Turning Radius	Pedestrian Walkways	Remarks
A	Madaigin Crossing	N	N	N	Y	N	Parking and Encroachment Issues
B	Laurabir Crossing	N	N	Y	Y	N	Parking and Encroachment at junction
C	Rathyatra Crossing	Y	N	Y	Y	N	Services like transformer/electric poles at Junction
D	Kamaccha Crossing	N	N	N	Y	N	Encroachment (Temple at the Junction)
E	Bhelupur Crossing	N	N	N	Y	N	Parking of Vehicles at junction
F	Gadaulia Crossing	N	N	N	Y	N	Parking and Encroachment Issues
G	NaiSadak Crossing	N	N	N	N	N	Parking and Encroachment Issues with Mix Traffic and Narrow Road

Source: CRIS- 2015

**Proposed Road Junction widening/improvement:**

As per the city development plan 2014 the following junction need to be improved because of encroachment, congestion in traffic, and overcrowd etc.

**Table 3: Road widening at major Junction**

S.L No	Crossing
A	Madaigin Crossing
B	Laurabir Crossing
C	Rathyatra Crossing
D	Kamaccha Crossing
E	Bhelupur Crossing
F	Gadaulia Crossing
G	NaiSadak Crossing

Source: CDP-2041

**Air Pollution**

As per CPCB report, air pollution levels in the city are high and significant concentrations can be witnessed at major traffic intersections during peak hours. The major contributor to air pollution in the city is vehicular emissions from petrol and diesel vehicles which contribute to high Carbon Monoxide, Sulphur dioxide and Nitrogen dioxide levels. Suspended Particulate Matter (SPM) levels in the residential areas of Varanasi are high. High SPM levels in the city can be attributed to vehicular emissions, unpaved roads, high dust content in the air due to lack of plantation and proximity to river.

**Table 4: Vehicular Emission load in Varanasi**

	Particulates (kg/day)	SOx (kg/day)	NOx (kg/day)	Hydrocarbon (kg/day)	CO (kg/day)
Light duty gasoline powered	12.04	3.24	62.01	87.29	2269.43
Light duty diesel powered	84.66	335.11	388.02	91.71	1534.47
Heavy duty diesel powered	485.44	970.88	13592.25	1359.22	8220.08
Motorcycles	216.48	21.65	75.20	10823.94	18400.71
<b>Total load/day</b>	<b>798.62</b>	<b>1330.88</b>	<b>14117.48</b>	<b>12362.16</b>	<b>30424.69</b>

Source: UPPCB

**Noise pollution**

The noise pollution levels are perceivably high at major traffic intersections namely, core area, Chauka Ghat, Andhra Pul and the Railway Station. The high number of diesel autos and cycle rickshaws leading to traffic congestion contribute to city's noise pollution.

**Design Intervention Proposals:**

"Always design a thing by considering it in its next larger context - a chair in a room, a room in a house, a house in an environment, an environment in a city plan."

—Eliel Saarinen

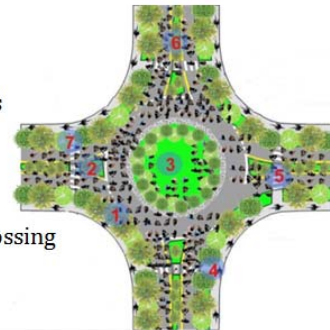


**Figure 13: Road Connectivity at Gaudauliya Crossing**

For smooth, user friendly accessibility to the Dashashwamegh Ghat, there is a need to change little bit road direction and broadening its width, especially the roads which are connecting at the junction of G nod (fig14). We need to divert the traffic (which are marked in yellow color) with the proper road signage and traffic signals, traffic police etc .We should keep G-nod (G Junction) vehicle free.

**Legend**

- 1-Pathways
- 2-Divider
- 3-Junction
- 4-Trees
- 5-Zebra Crossing
- 6-Hedges
- 7-Ramp



**Figure 15: Detail of G-Junction**

**Legend**

- A-Street Furniture
- B-Sunshed
- C-Lighting
- D-Streetscape
- E-Dustbin
- F-Signage
- G-BMS System
- H-Retails Shop
- I-Covered Drain
- J-walkway



**Figure 16: Typical cross section of Road**

To make the pedestrian friendly access to the Dashashwamegh Ghat, we should minimize the motor able vehicle circulation nearby the Ghat area. Even non motor able vehicles should be stopped well before the beginning of the pedestrians lanes approaching Ghats. Simultaneously we should think of the other mode of transportation like Mass Rapid Transportation system, through waterways by boating etc. For the better outcome, we should promote the Public participation approach etc. It is expected with above proposed design interventions, we may achieve, minimizing the traffic congestion, less air and sound pollution, and make the access pedestrian friendly towards and within Dashashwamegh Ghat area.

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