

# **Exploring Historic Landscapes in a GIS Environment**

## **A Study of Lahore, Pakistan**

**Fatimah Khan**

**Geog-596B | FALL 2 | 11 December 2019**

**Pennsylvania State University**

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## **ABSTRACT**

This study explores the use of GIS methods to map and visualize a city's historic landscape. Using Lahore, Pakistan, as a pilot case, the study aims to understand the challenges involved in conceptualising a city's dynamic past in a digital environment. To this end, the thesis demonstrates how GIS is applied to record and in the process represent what used to be, what was lost and what came to be over time in the context of Lahore – a city associated with different rulers. In addition to historic maps, photographs, gazetteers, historical and literary accounts, memoirs etc., as well as contemporary mapping platforms constitute examples of key data sources. The documentation of place-names and the extent to which they can be linked to other data sources is central to the study. With the help of examples, the paper draws attention to the constraints and choices faced in defining the study area, in representing Lahore's historic landscape(s) in a geodatabase and in collecting and creating meaningful data. In the process, online data sources are examined to understand the extent to which they inform how historic footprints change over time. GIS provides an interactive platform to collect and to examine diverse sources of historical information and the case of Lahore presents an interesting opportunity to demonstrate its use within spatial humanities. Implicit in the present scope of work is an attempt to gain insight into how rationales are formed in deciding what and how to present data and implications of choosing one type of spatial representation over another.

## 1 INTRODUCTION

This paper draws attention to the complexities involved in exploring a city's historic footprint in a GIS (geographic information system). Using Lahore as a pilot case, the aim is to gain insight into the conceptual and practical challenges involved in using GIS to create narratives of historic spaces.<sup>1</sup> Broadly premised on the idea of a digital gazetteer, three overriding questions inform the study: (i) how to map and visualize change across time and space? (ii) how to rationalize what to present? and (iii) what are the implications of choosing one type of spatial representation over another? Additionally, online tools are examined as opportunities to create or derive narratives of historic spaces.

Section 2 outlines the methodology of the study. Section 3 provides a brief background to Lahore's spatial evolution since the 16<sup>th</sup> century and its association with Mughal, Sikh and British periods of rule. What the city experienced during the Partition riots of 1947 are briefly touched upon, arriving at what Lahore looks at present. Section 4 illustrates manifestations of change in tangible and intangible terms. Throughout, two points of inquiry - spatial footprints and place names - are relied upon to demonstrate how contested narratives inherent in historic landscapes may be mapped. Section 5 turns the focus of attention to visualizing change in historic spaces and the challenges involved in attempting to capture its dynamic nature in a GIS. Section 6 discusses existing platforms as potential ways to create historical narratives of Lahore. The current selection is by no means exhaustive, but a discussion helps to highlight relative strengths and limitations. Section 7 concludes with possible next steps.

## 2 METHODOLOGY

The study involves three stages. Firstly, various kinds of representative material are identified that provide insight into Lahore's history. This includes academic texts, travelogues, memoirs, colonial period gazetteers or directories, historic photographs etc. Secondly, Google Earth and Google Maps are relied upon to compile and locate a list of landmark sites and place names. Thirdly, historic maps of Lahore from the British colonial period found online are digitized in ArcMap to identify areas of interest that may no longer exist or have changed locations or names (or both).

Data sources such as J. L. Kipling and T. H. Thornton's *Lahore As It Was, A Travelogue*<sup>2</sup> allows one to visualise Lahore in the 1860s, roughly a decade after the arrival of the East India Company in Punjab. Much later, the Lahore Directory of 1914 provides a snapshot of the city's expanded territories including the Civil Lines and the Cantonment areas. The city boundary is further described in terms of the limits of the municipality. On the other hand, Pran Neville's *Lahore: A Sentimental Journey*<sup>3</sup> evokes a personal experience of the city in the early decades of the 20<sup>th</sup> century. References to hotels and cinemas are made, most of which no longer seem to exist.

Both Google Earth and Google Maps have been useful in verifying locations of points of interests through street configurations that have remained relatively constant over time or through place

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<sup>1</sup> For more on spatial humanities, see Southall, Humphrey, A. V. Lunen and P. Aucott. *On the Organisation of Geographical Knowledge: Data models for Gazetteers and Historical GIS*. 2009.

<sup>2</sup> Kipling, J. L. and T. H. Thornton. *Lahore As It Was, A Travelogue*. Historical Reprint by National College of Arts Publications, 2001.

<sup>3</sup> Neville, P. *Lahore: A Sentimental Journey*. Penguin Books, 1993.

names still in use. A similar attempt was made to identify locations on Open Street Map as an additional data source. However, the Google platform proved to be more resourceful.

In order to capture the dynamics of historical change in Lahore the basic workflow thus consists of compiling spatial data and place names from the above-mentioned sample data sources in ArcMap. However, limitations in the current approach warrant some attention. To begin with, any attempt at delineating historical boundaries has been difficult. Polygon features have been excluded to demarcate boundaries of any type and, instead, point and line features are used to remind oneself that boundaries of cities or localities are not set in stone even though a thick line on print may reflect otherwise.

The geodatabase includes a set of point and line feature layers where place names are shown as points, and roads as lines. For each point of interest, the two initial fields pertain to the name of a site and the period to which it belongs. At the risk of oversimplification but necessary for a rudimentary categorization, *period* broadly refers to the following eras – Mughal (1524-1752), Sikh (1799-1849), British (1849-1947) and Pakistani (1947 onwards). It is, however, important to note that these initial categories may be divided further with respect to the rules of different Mughal emperors such as Akbar, Jahangir, Shahjahan and Aurangzeb. While most Sikh-period additions to Lahore may be attributed to the time of maharaja Ranjit Singh (1799-1839), temporal classifications in the case of the British era need to consider the East India Company (1849-1858)<sup>4</sup> and the British Raj (1858-1947).

Additional fields relate to emerging scenarios or where new types of data are identified (Fig. 1). These include *year*, *type* (of site), *present use*, *previous use*, *present name*, *previous name*, and *also known as*. At the very least, these basic attributes aim to capture the notion of change in intangible terms. For instance, *year* may refer to the year of construction and *type of site* may relate to the initial function of an entity (such as tomb). As evident in several cases, buildings or sites have over time been subject to uses other than what they were initially intended for. A case in hand is the Mughal period Anarkali's Tomb (constructed in 1600) which by the 1860s served as the Station Church.<sup>5</sup> In 1923 the structure was converted into the Punjab Archives,<sup>6</sup> which remains in use to this day.

The various instances of name-change are also relevant to major roads and streets. In some cases, roads or intersections have been renamed officially but people still refer to older names. For example, Davis Road, despite a change in name to Sir Aga Khan Road, remains a popular reference even today. A field labelled "Also Known as" is meant to reflect this (Fig. 2).

The next section briefly describes the different eras broadly associated with Lahore since the 16<sup>th</sup> century – Mughal, Sikh, British, and Lahore at present. Parts of Lahore underwent major transformations in 1947 during the Partition of the Indian sub-continent. This period is mentioned since it has had long-term ramifications for the Walled City's historic urban landscape.

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<sup>4</sup> Although the East India Company was present in the Indian subcontinent since the 1600s, the date included here refers to the Company's annexation of Punjab in 1849. By 1858, the British government imposed direct rule of the subcontinent following the Indian Mutiny of 1857-59.

<sup>5</sup> Kipling, J. L. and T. H. Thornton. *Lahore As It Was, A Travelogue, 1860*. Historical Reprint by National College of Arts Publications, 2001. pg. 97.

<sup>6</sup> *Archives*. Services and General Administration Department, Government of the Punjab. Accessed on 3 December 2019 from: [https://sgad.punjab.gov.pk/archives\\_wing](https://sgad.punjab.gov.pk/archives_wing)

OBJECTID*	SHAPE*	Name	Period	Year	Type	Present_Use	Present_Name	Previous_Use1	Previous_Use2	Also_Known_As
11	Point	Kurti Bagh	Pre-British		Open space					
14	Point	Charing Cross	British		Intersection		Faisal Chowk			
15	Point	Mayo Hospital	British		Construction		Mayo Hospital			
16	Point	Raja Jawahar Singh Tomb	Pre-British							
17	Point	Government House	British		Government			Tomb	Residence	Qasim Khan's tomb
18	Point	Lawrence Hall	British	1861		Library	Quaid-e-Azam Library	Club		Gymkhana Club
19	Point	Lawrence Garden	British							
20	Point	Punjab Chief's College	British							
21	Point	Punjab Club	British							
22	Point	Cathedral	British							
23	Point	Chief Court	British							
24	Point	The Central Museum	British	1864	Construction		Museum			Lahore Museum
25	Point	Bank of Bengal	British							
26	Point	Punjab Library	British							
27	Point	Telegraph Office	British							
28	Point	Protestant Cemetery	British							
29	Point	District Court House	British							
30	Point	Govt. Training College	British							
31	Point	Shah Mahal	Pre-British							
32	Point	Begumpura	Pre-British		Settlement					
33	Point	Dina Nath Garden	Pre-British							
34	Point	Nawazish Ali Khan Garden	Pre-British							
35	Point	Baghbanpura	Pre-British		Settlement					
36	Point	Shalimar Garden	Pre-British							
37	Point	Basti Ram Garden	Pre-British							
38	Point	Kot Knoja Sayad	Pre-British		Settlement					
39	Point	Hindu Cremation Ground	British							
40	Point	Minto Park	British							Greater Iqbal Park
41	Point	Gurdwara of Arjan Dev	Pre-British		Religious					Gurdwara of Arjan Dev
42	Point	Hazuri Bagh	Pre-British							
43	Point	Ranjit Singh Samadhi	Pre-British							
44	Point	Badshahi Mosque	Pre-British	1674	Religious	Religious	Badshahi Mosque			
46	Point	Pani Wala Talaab	British		Infrastructure		Water reservoir			
47	Point	Hira Mandi	British		Mohalla					
48	Point	Leather Store	British							

Table 1: This table includes a preliminary list of attributes with respect to pre-colonial and colonial era sites. Feature type: point.

OBJECTID*	SHAPE*	SHAPE_Length	Name	Period	Also_Known_As
4	Polyline M	365.211973	Victoria Road	British	
24	Polyline M	3620.905124	Upper Mall Road	British	
3	Polyline M	1230.447593	Shalimar Road	British	
20	Polyline M	1548.276021	Railway Road	British	
11	Polyline M	940.74385	Race Course Road	British	
25	Polyline M	3253.963121	No name	British	
26	Polyline M	2205.085877	No name	British	
27	Polyline M	837.162626	No name	British	
28	Polyline M	702.537962	No name	British	
29	Polyline M	1594.622579	No name	British	
30	Polyline M	938.089273	No name	British	
31	Polyline M	364.343038	No name	British	
32	Polyline M	1174.590787	No name	British	
33	Polyline M	895.742925	No name	British	
34	Polyline M	1071.428942	No name	British	
21	Polyline M	736.160127	Nisbot Road	British	
5	Polyline M	838.469627	Nicholson Road	British	
15	Polyline M	1029.811445	Mullan Road	British	
10	Polyline M	1135.792092	Montgomery Road	British	
19	Polyline M	2348.434038	McLeod Road	British	
23	Polyline M	1885.326572	Mazang Road	British	
6	Polyline M	2267.442092	Mayo Road	British	
22	Polyline M	697.846684	Madagan Road	British	
119	Polyline M	637.159903	Maichhi Hatta Bazaar	Pre-British	
17	Polyline M	1683.939358	Lytton Road	British	
36	Polyline M	1267.026446	Lower Mall Road	British	
14	Polyline M	1923.480946	Lawrence Road	British	
37	Polyline M	769.999751	Landa Bazaar	British	
16	Polyline M	999.525844	Lake Road	British	
12	Polyline M	1575.500006	Ferozepur Road	British	
7	Polyline M	2154.574135	Empress Road	British	
9	Polyline M	1050.734136	Egerton Road	British	
2	Polyline M	863.946718	Durand Road	British	
1	Polyline M	1299.715381	Davis Road	British	
35	Polyline M	8433.354108	Circular Road	British	
18	Polyline M	556.021657	Church Road	British	

Table 2: This data table shows attributes for roads in Lahore. Feature type: line.

### 3 LAHORE - A BIRD'S EYE VIEW

#### 3.1 Mughal Lahore

Lahore is said to be a thousand years old.<sup>7</sup> The city's relevance in the regional context of Punjab goes back to the Mughal period when its historic urban footprint in the form of the Walled City was etched under various emperors over the course of the 16<sup>th</sup> and 17<sup>th</sup> centuries. Situated on the left bank of the Ravi river, the previously fortified settlement is easily distinguished from its surroundings. Lahore's expansion is associated with emperor Akbar when it served as the capital of the Mughal empire between 1584 and 1598. During this time, the historic core was fortified and gated.<sup>8</sup> It also developed the identity of a Mughal garden city<sup>9</sup> with its fort and palaces. 16<sup>th</sup> century accounts of Lahore highlight that it was "both great and famous, in competition for the title of the metropolis with Agra".<sup>10</sup> Under emperor Shahjahan, Lahore "reached its acme of prosperity and material splendour". Inside the confines of the 12 gates (Fig. 1), the Walled City was characterised by densely packed buildings and a labyrinth of bazaars and narrow passageways. The wider surroundings outside the city walls comprised of "urban villages ... and formal gardens containing pleasure pavilions and the monumental tombs of the Mughal elite".<sup>11</sup>

The various emperors also left their mark on Lahore's historic landscape through architecture. Notable examples include Shahi Qila (imperial palace/citadel; and what later came to be known as the Lahore Fort), Wazir Khan Mosque and Badshahi Mosque. The citadel is in the north western quadrant of the Walled City. It spans some 20 hectares and towers over the historic core along its southern perimeter. It expanded in successive stages following the fortification of the Walled City in Akbar's time (late 16<sup>th</sup> century). Thereafter, Jahangir, Shahjahan and Aurangzeb each made significant adjustments to the citadel's structure such that specific spaces are attributed to the respective rulers in the form of the Akbari Gate (which connects the eastern part of the citadel to the Walled City), Jahangir's Quadrangle, Shahjahan's Quadrangle, and Alamgiri Gate (which connects the citadel to the Badshahi (imperial) Mosque on the far west). During Shahjahan's time, monumental structures such as the Wazir Khan Mosque (1634-35) was erected in the heart of the Walled City. Together with the Wazir Khan Hammam located further east of the Walled City and adjacent to Delhi Gate, this mosque, "sat astride the historic route that the Mughal nobility would traverse as they entered the city and made way to the royal residence."<sup>12</sup> The Badshahi Mosque,

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<sup>7</sup> Although the city's origins are not necessarily confirmed, its relevance in pre-Mughal eras is apparent. Lahore is mentioned in the works of the Chinese traveller, Hwan Thsang (630 AD) when the city was presumably inhabited by Brahmans.

<sup>8</sup> The Walled City had 12 gates and a thirteenth passageway (Mori Gate) to dispose the city's refuse. Only one gate remains in its original Mughal period form – Roshnai Gate – while others were reconstructed during the British era and some no longer exist. Starting in the north and moving clockwise the gates are Masti, Kashmiri, Sheranwala, Yakki, Delhi, Akbari, Mochi, Shah Alami, Lohari, Mori, Bhatti, Taxali and Roshnai.

<sup>9</sup> Gardens in Lahore existed prior to the arrival of the Mughals. For instance, there are six references to green spaces that existed between the 11<sup>th</sup> and 16<sup>th</sup> centuries. Some examples include that of Bagh-i-Malik Ayaz, Bagh Shah Ismail, Bagh-i-Shah Kaku Chishti although they appear to have disappeared by the time the Mughal rulers redefined Lahore's urban and suburban spaces. As the city's urban functions concentrated into what came to be known as the Walled City of Lahore, gardens during the Mughal period were established in the suburban fringes along major routes, such as Shalimar Bagh in east, Bagh-i-Dilkusha etc (the term *bagh* means garden in Urdu). *Lahore and its Garden Suburbs*. Smithsonian Productions, Accessed on 4 December from: [http://www.mughalgardens.org/html/lahore\\_suburbs.html](http://www.mughalgardens.org/html/lahore_suburbs.html).

<sup>10</sup> Shorto, S. "A Tomb of One's Own: The Governor's House, Lahore." *Colonial Modernities, Building, Dwelling and Architecture in British India and Ceylon*. Edited by Peter Scriver and Vikramaditya Prakash. Routledge, 2007, pp. 154.

<sup>11</sup> Ibid.,

<sup>12</sup> Khan, M. *Conservation of the Wazir Khan Mosque Lahore, Preliminary Report on Condition and Risk Assessment*. Aga Khan Cultural Service-Pakistan, 2012.





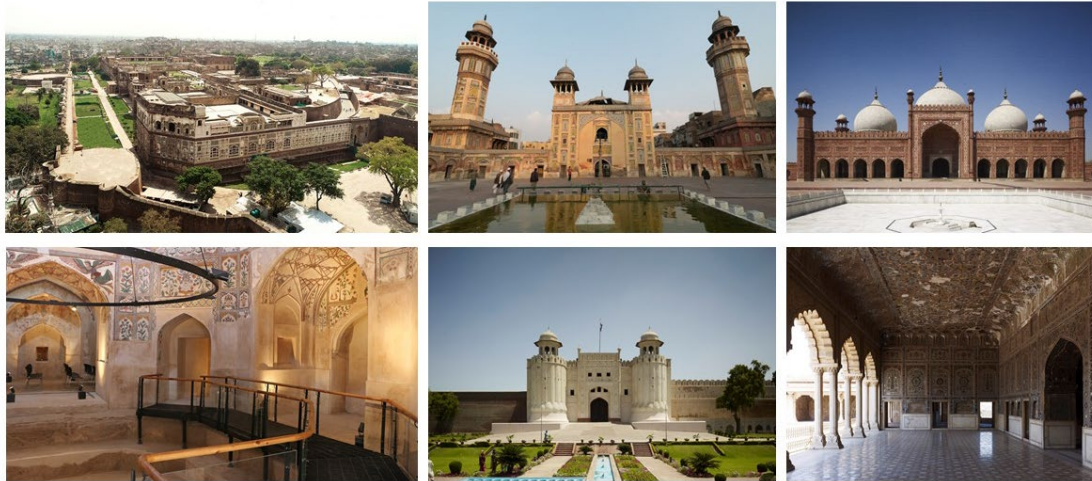


Figure 2: View of the Shahi Qila/Lahore Fort (top left), Wazir Khan Mosque (top centre), Badshahi Mosque (top right), interior of the Shahi Hammam (bottom left), Alamgiri Gate (bottom centre), Sheesh Mahal (bottom right). Source: Archnet.org.

### 3.2 Sikh Lahore

During the 18<sup>th</sup> century, Mughal influence in the region waned and “Lahore was subject to periodical invasion, pillage and depopulation, and was thus reduced from a mighty city to little more than a walled township in a circle of ruinous waste”.<sup>13</sup> Between 1799 and 1839, the city was provided some respite when the Sikh emperor Ranjit Singh consolidated Punjab<sup>14</sup> under his rule and made Lahore his kingdom’s capital. Ranjit Singh repaired and maintained the city walls, constructed a 14-meter wide moat all around and added an outer wall to improve the city’s defence.<sup>15</sup> Ranjit Singh also made Lahore Fort his residence and conducted his courtly affairs from the citadel. As a ruler, he also carved out spaces for himself within the fort precinct. The Athdara, a pavilion containing eight arched openings, was erected in the courtyard adjacent to the Sheesh Mahal (palace of mirrors). Another pavilion was established in Hazuri Bagh (garden) between the Badshahi Mosque and Alamgiri Gate (the citadel’s western entrance). During Ranjit Singh’s time, the once imperial Badshahi Mosque was converted into a stable and magazine while he held court at Hazuri Bagh.<sup>16</sup> By the time Ranjit Singh died<sup>17</sup> in 1839, a series of battles between different warring factions began to demolish the city.

<sup>13</sup> Walker, G. C. *Gazetteer of the Lahore District, 1893-94*. Sang-e-Meel Publications, 2006. p. 282.

<sup>14</sup> Punjab means the land (*ab*) of five (*punj*) rivers – Jhelum, Chenab, Ravi, Beas and Sutlej (tributaries of the Indus). Located in the northwest of the Indian subcontinent, the plains of Punjab remained relevant to various rulers dating back to the 6<sup>th</sup> century BCE when Darius the Great annexed the area as part of his Persian Empire. “Punjab Province, Pakistan”. Britannica. Accessed on 4 December 2019 from: <https://www.britannica.com/place/Punjab-province-Pakistan>.

<sup>15</sup> Khan et al. *The Walled City of Lahore*. Pakistan Environmental Planning and Architectural Consultants. Lahore Development Authority, 1993.

<sup>16</sup> In the context of Lahore, this is perhaps one of the earliest examples of a monumental site which was converted into something other than what it was designed for. The use of the mosque as a place of worship was restored in 1856 during the British era. Ranjit Singh is also credited with vandalising the tombs of Asif Khan and Jahangir (Kipling, J. L. and T. H. Thornton. *Lahore As it Was, 1860*, pp. 65-66).

<sup>17</sup> Ranjit Singh’s mausoleum/funerary complex is located to the west of Lahore Fort and north of Hazuri Bagh.

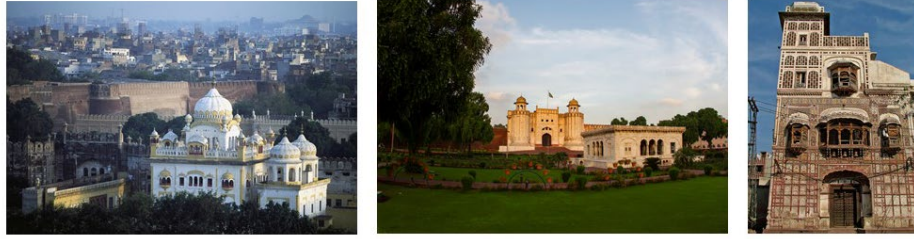


Figure 3: Sikh-period additions - Ranjit Singh's mausoleum (left), marble pavilion (with Alamgiri Gate in the background) at Hazuri Bagh (centre), Naunihal Singh's mansion (right) located in the Walled City.

### 3.3 British Colonial Lahore

Following the two Anglo-Sikh wars in 1845-46 and 1848-49, the British East India Company established its control over the territories previously consolidated by Ranjit Singh. The new rulers found Lahore in a state of decay where “the environs of the city in 1849 were a dreary expanse of crumbling ruins”.<sup>18</sup> Lahore was also referred to as “a deserted suburban fringe of formal gardens”.<sup>19</sup> Lahore's modernization took root as it transformed into a colonial (and provincial capital) city in the latter half of the 19<sup>th</sup> century. As the British colonial presence entrenched itself in Lahore's historic landscape over the course of a century, the city remained of strategic importance to its new rulers. Colonial governance asserted itself in the form of a modern military and through various kinds of institutions that stood in stark contrast to those of previous eras. Whereas Mughal Lahore resonated with a city of tombs, shrines and gardens – monumental in terms of architecture and scale – new forms institutions, Indo-Gothic architecture and a whole new city layout transpired after 1849 along with the introduction of the canal for large-scale irrigation, and the railway for mass transportation of goods.

The Walled City remained distinct as the native or indigenous quarters. The British established their initial cantonment (military station) in Lahore Fort, located north west of the Walled City. The cantonment later moved some 2.5 kms to Anarkali, a locality in what was referred to as the Civil Lines/Station, further south west of the historic core.<sup>20</sup> Eventually the military established its presence in Mian Mir further south east and about eight kms from Anarkali.<sup>21</sup> The cantonment was eight times the size of the Walled City, though housing a fraction of the population.<sup>22</sup> Colonial engagement in what was referred to as “the native quarters” was restricted to sanitary discourses and waste management.<sup>23</sup> In the 1860s, the Sikh-period moat around the Walled City was filled in

<sup>18</sup> Walker, G. C. *Gazetteer of the Lahore District, 1893-94*. Sang-e-Meel Publications, 2006. p. 284.

<sup>19</sup> Scriver, P and V. Prakash (eds). “Between Materiality and Representation: Framing An Architectural Critique of Colonial South Asia”. *Colonial Modernities, Building, Dwelling and Architecture in British India and Ceylon*. Routledge, 2007, p. 21.

<sup>20</sup> Terms such as cantonment and civil Lines/station have roots in British colonial military parlance. Colonial urban spaces in the Indian subcontinent essentially comprised of three distinct spatial units. Cantonment, which exemplified a permanent military station, civil lines/station associated with non-military bureaucratic and administrative affairs was also referred to as the European quarters; and the city, which was associated with indigenous communities the native quarters (King, A. The Language of Colonial Urbanization. *Sociology*. Vol. 8. No. 1. January 1974. Sage Publications. pp. 81-110).

<sup>21</sup> The military station was relocated from Anarkali in 1851-52 to Mian Mir. It was called Mian Cantonment until 1906, thereafter the Lahore Cantonment. *The Imperial Gazetteer of India* (1908), p. 115.

<sup>22</sup> Lahore's population excluding cantonment: 1881 (138,878), 1891 (159,597), 1901 (186,884). 1901: Muslims (113,253), Hindus (62,922), Sikhs (5,964) and Christians (4,199). “Lahore City”. *The Imperial Gazetteer of India*. Clarendon Press, 1908. p. 106.

<sup>23</sup> Glover, W. J. *Constructing and Imagining a Colonial City*. Oxford University Press, 1999.

and replaced with a large expanse of greenery - the Circular Gardens.<sup>24</sup> By 1884, the fortification of the Walled City was destroyed. The Circular Road formed the outer periphery of the gardens. In stark contrast to the more indigenous organic-like growth of the Walled City, urban spaces during the British period were configured along cartesian principles. The civilian administration grounded itself in the Civil Lines/Station (Donald Town).<sup>25</sup> It essentially acted as a buffer between the disorderly native quarters and the more rational ordering of the Cantonment.<sup>26</sup> Further south of the colonial city, suburban residential development such as that of Model Town<sup>27</sup> (established in the early 20<sup>th</sup> century) encapsulated Ebenezer Howard's Garden City concept in literal terms.

The establishment of the North Western Railway in the 1860s further left an indelible mark on Lahore's landscape, with the railway tracks cutting past Mughal monuments and pre-colonial localities along the way. While Punjab province remained a major source of agriculture and revenue for the colonial administration, the expansion of the North Western Railway<sup>28</sup> along with the establishment of its headquarter, railway colonies and workshops in Lahore impacted the city's emerging urban dynamics in the 19<sup>th</sup> century.<sup>29</sup> In response to the uprising of 1857-58, the expansion of the railway was reinforced through both internal security imperatives and broader geopolitical concerns of the military.<sup>30</sup> Together with the Civil Lines/Station and Cantonment, the railway lines, the station and the workshops served as "nodal points" around which the new city took form. A long-term impact of the railways was also a rise in Lahore's population.<sup>31</sup>

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<sup>24</sup> Walker, G. C. *Gazetteer of the Lahore District, 1893-94*. Sang-e-Meel Publications, 2006. p. 285. The names - Circular Gardens and Circular Road - are still in use.

<sup>25</sup> Donald Town was named after Donald McLeod, President of the Lahore Improvement Committee and Lieutenant-Governor of Punjab (1865-1870). As indicated in the *Gazetteer of the Lahore District, 1893-94*, Donald Town did not gain much popularity as a place name.

<sup>26</sup> In the Lahore Directory (1914), the boundary of the Municipality (established in 1867) is described in words with reference to its northern, southern, eastern and western limits.

<sup>27</sup> Maher, M. "Urban Interventions: Model Town or Mere Copy, the case of a Lahore neighbourhood". Express Tribune. 15 April 2013. Accessed on 30 November 2019 from: <https://tribune.com.pk/story/535687/urban-interventions-model-town-or-mere-copy-the-case-of-a-lahore-neighbourhood/>

<sup>28</sup> In addition to facilitating passenger and cargo services, the railway station was designed to provide defence against local uprisings as exemplified by the fortress-like structure. The railway workshops were established in the 1860s in Naulakha (east of the Walled City). By the beginning of the 20<sup>th</sup> century, railway workshops and factories mushroomed further east. Workshops were predominantly dedicated to repairing of locomotives and constructing/repairing of carriages and wagons. (Kerr, I. (n.d.). "Bombay and Lahore. Colonial Railways and Colonial Cities. Some Urban Consequences of the Development and Operation of Railways in India, 1850-1947").

<sup>29</sup> In 1914 the North Western Railway employed 30,814 persons (Lahore Directory of 1914. p.27).

<sup>30</sup> Simultaneously, commercial interests were facilitated through an extensive railway network across India's hinterlands.

<sup>31</sup> In the Lahore Directory of 1914, the total area of Lahore including the cantonment stood at 29 sq. miles (75 sq. km) with a population of 228,687. The cantonment occupied about 7 sq. miles (18 sq. km) with a population of 18,416 or population density of 1,023 per sq. km. On the other hand, the Walled City had a population of 120,436 over an area of 558 acres (2.3 sq. km) resulting in a population density of 52,363 per sq. km. The directory further highlights that Lahore's population was on the rise since 1881 (when the population was estimated to be 157,281). The railways also altered Lahore's social composition where Europeans occupied operational and managerial posts, Eurasians filled middle management positions and locals constituted the rank and file. As of 1914, some 30,000 persons were employed by the railway (Lahore Directory, 1914, pp. 26-27).



Figure 4: Lahore Railway Station (left), Lahore Museum (centre), Governor House (right) built around Qasim Khan's tomb.

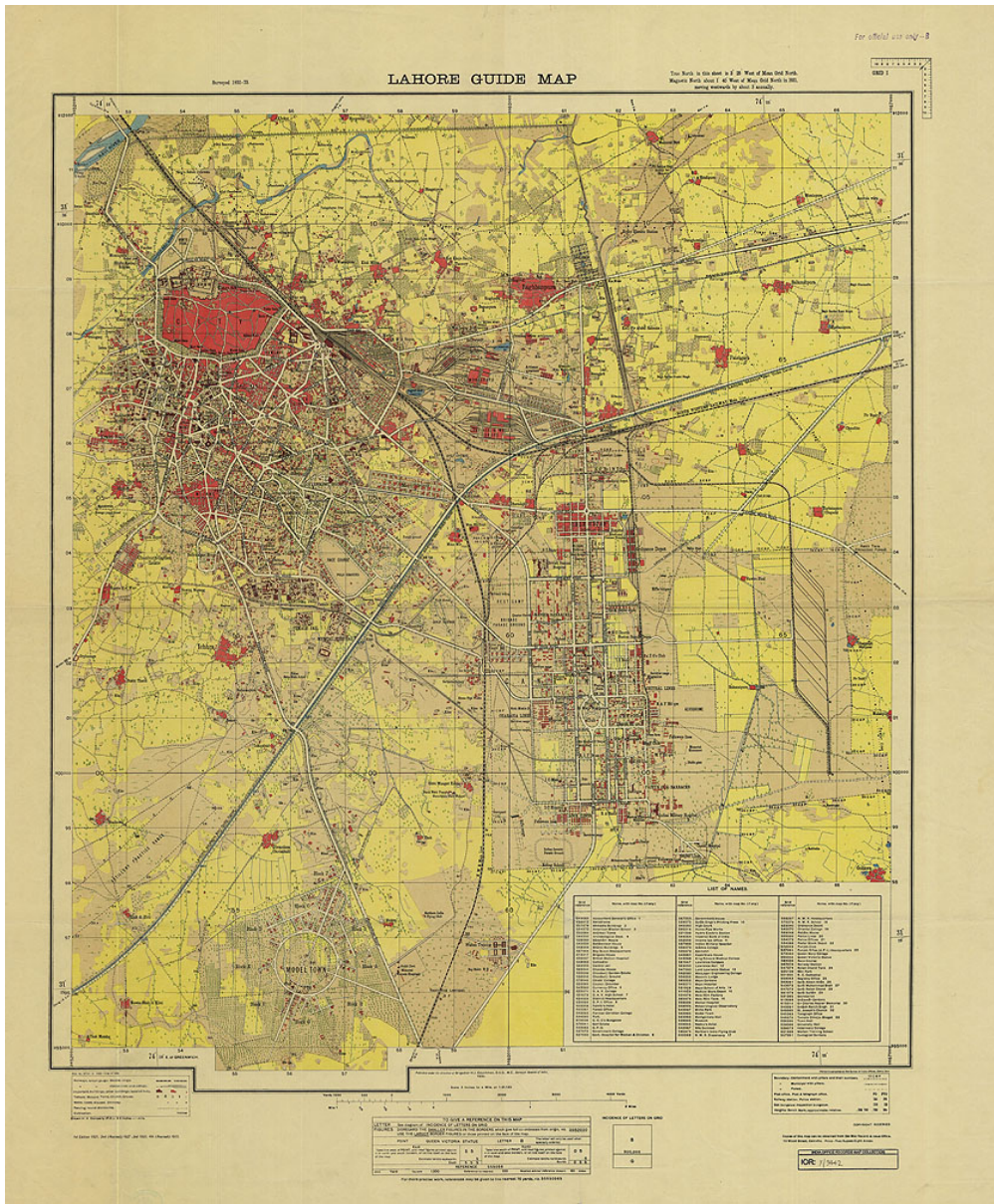


Figure 5: This guide map from 1935 shows the Walled City of Lahore and the expanding city (Civil Lines to the south of the Walled City and Cantonment to the south east) during the British era. The partially developed Model Town formed the southern limits. Source: The British Library, 2012. Lahore Guide Map.

### 3.4 Lahore during Partition (1947)

1947 marked the end of the British Raj in South Asia and Pakistan emerged as a new state on the 14<sup>th</sup> of August. In Lahore, the Partition riots of 1947 created ruptures at various levels with long-term ramifications for the multicultural city that Lahore was known to be in the first half of the 20<sup>th</sup> century. Prior to 1947, the Walled City constituted a dynamic social fabric interweaved by the presence of Muslims, Hindus and Sikhs who, despite proximity, lived in separate neighbourhoods. Muslim communities were in the majority and most often employed as artisans. Hindus and Sikhs, relatively more affluent, were entrepreneurial and controlled moneylending.<sup>32</sup>

Accounts of the riots that ensued in 1947 highlight the localised nature of violence which engulfed vast expanses of the Walled City. Both economically and politically motivated, Hindu and Sikh localities experienced by far the most damages from arson attacks where entire neighbourhoods were razed to the ground.<sup>33</sup> Elsewhere in Lahore, relatively richer neighbourhoods such as Model Town were by and large unaffected. Following the mass exodus of Hindus and Sikhs from Lahore, most sites associated with them have also disappeared.

### 3.5 Lahore at present

Present-day Lahore commands an area close to 700 square miles. A recently constructed Ring Road fences much of the metropolis. The Walled City remains distinct in character with an area of some 250 hectares. The fortification no longer remains but the British-period Circular Road which was constructed around it and the Circular Garden which replaced the moat maintain the boundary between the inner city and the outer world. With 150,000 residents, the Walled City is also one of the poorest and densely populated localities of Lahore.

Lahore Cantonment (established as Mian Mir Cantonment during the colonial era) dominates the city's landscape as prime real estate. Model Town remains an affluent neighbourhood while new gated communities such as Defence Housing Authority or Bahria Town offering an ideal quality of life continue to transpire. The conception of space as a rectilinear grid of street networks introduced during the colonial period remains the norm. In a nutshell, Lahore today, is a peculiar admixture of past conquests, imperial grandeur, forgotten spaces and new ones in the making.

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<sup>32</sup> Talbot, I. *Divided Cities. Partition and its Aftermath in Lahore and Amritsar 1947-57*. Oxford University Press, 2006. The latter owned two-thirds of the shops and four-fifth of the factories in the city and contributed towards 70% of urban taxes.

<sup>33</sup> Ibid., Close to 6,000 buildings are estimated to have been destroyed. Chuna Mandi which used to be a Sikh residential area as well as a limestone market sustained numerous arson attacks within a very short span of a few weeks. Similarly, Shah Alami – a Hindu locality, suffered large scale damages and was “the most important event in Lahore’s communal war of succession”.

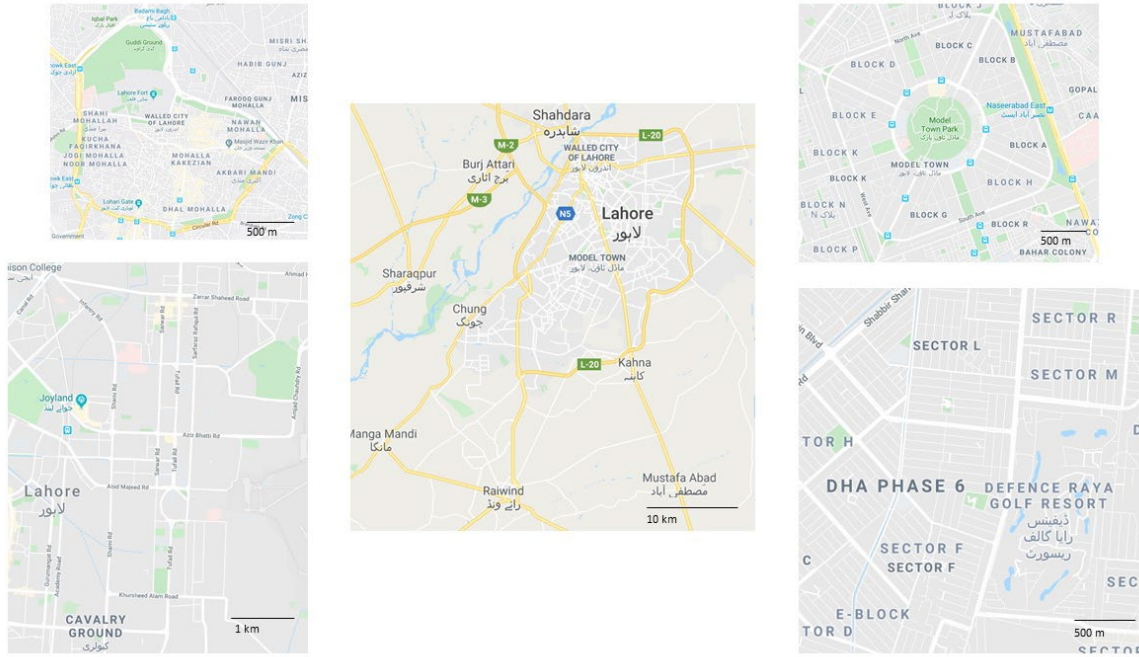


Figure 6: Lahore at present – Walled City of Lahore (top left), Lahore Cantonment (bottom left), metropolitan Lahore (centre), Model Town (top right) and Defence Housing Authority (bottom right). Source: Google Maps.

## 4 MAPPING CONTESTED NARRATIVES

### 4.1 Spatial Footprints

Thus far Lahore’s evolution with respect to different periods of rule is highlighted to explore spatial manifestations of change (social/political/cultural and economic) at a macro level. Instances of change are apparent at various scales - that of the city, neighbourhoods and individual sites. Whereas the limits of the Walled City (as the origins of Lahore) remain distinct, Lahore’s expansion over time has accommodated what remains of the Mughal, Sikh and British eras. Instances of change are just as obvious across neighbourhoods where major street networks have remained, but smaller streets within have changed course over time. Moreover, the existence or absence of various landmark sites raises some curiosity. Findings so far underscore the notion that historic landscapes constitute ‘contested’ narratives where the realm of the historic footprint drifts between seeming permanence and transience, whether in tangible terms or in popular imagination. Four examples are relied upon to demonstrate the prevalence of permanence and transience in the built environment.

The first example is that of Anarkali’s Tomb, a Mughal-period structure from the early 17<sup>th</sup> century which was erected on the orders of emperor Jahangir in the memory of a slave-girl by the name of Anarkali (pomegranate blossom). The tomb has served as a residence in the Sikh and British periods, as a parish church, an office, and eventually the Punjab Archives. The second example is that of Qasim Khan’s tomb, a cousin of emperor Akbar. In the Sikh era, it also served as a residence. It remained in use as a residence during the British era when a colonial exterior was built around it.<sup>34</sup>

<sup>34</sup> Shorto, Sylvia. “A Tomb of One’s Own: The Governor’s House, Lahore.” *Colonial Modernities, Building, Dwelling and Architecture in British India and Ceylon*. Edited by Peter Scriver and Vikramaditya Prakash. Routledge, 2007, pp. 151-168

As the Governor House,<sup>35</sup> the structure remains politically relevant today. Both tombs are etched onto popular imaginations to varying degrees - easily identifiable given the scale of their existence and their use over the centuries. In the process they exemplify permanent markers of Lahore's past.

On the other hand, there are myriad instances of the complete erasure of structures, sites and entire neighbourhoods over time. The absence of certain points of interest hints at the transient nature of historic footprints and social memory for that matter.<sup>36</sup> Immediate examples that come to mind are Rattan Chand Temple and Jain Mandir. Both structures were places of worship prior to 1947. A search on Google Maps shows that a remnant of Rattan Chand Temple's original structure remains while a query for the latter returns Jain Mandir Bus Stop.

A lack of imagery on Google Maps essentially lays testament to the absence of important parts of history. For instance, two different British-era maps of Lahore indicate two sites where Hindu cremation grounds were located, west of the Walled City and south of Mian Mir Cantonment. A search on Google Maps for cremation grounds reveals that none presently exist.<sup>37</sup>



Figure 7: A sketch of Anarkali's Tomb<sup>38</sup> (top left) and a Google Maps search result for the site (bottom right). Rattan Chand Temple<sup>39</sup> (top right) and its present condition as indicated in Google Maps (bottom right).

<sup>35</sup> "Governor House – Lahore". Lahore City History. Accessed on 1 December 2019 from: <http://lahore.city-history.com/places/governor-house/>

<sup>36</sup> In presenting a comparative study of partition-related violence in Lahore and Amritsar, Ian Talbot (2006) highlights how shocking the scale of events during the massacres of August 1947 was to administrators and politicians at the time. The author further points out that historical amnesia prevailed due to "the newly independent states' ambiguous role concerning the violence".

<sup>37</sup> Bilal, Rana. "Lahore High Court accepts petition demanding cremation ground for Hindus in Lahore". Dawn, 11 September 2018. Accessed on 3 December 2019 from: <https://www.dawn.com/news/1432305>.

This article in a leading newspaper reveals the presence of an otherwise forgotten or unseen community.

<sup>38</sup> Anarkali Tomb. Accessed on 1 December 2019 from: <http://lahore.city-history.com/places/Story-of-Anarkali-And-Her-Tomb-at-Lahore/>

<sup>39</sup> A photo of Rattan Chand Temple (1880). Accessed on 1 December 2019 from: [https://commons.wikimedia.org/wiki/File:1880\\_photo\\_of\\_the\\_Rattan\\_Chand\\_temple,\\_Lahore\\_Pakistan.jpg](https://commons.wikimedia.org/wiki/File:1880_photo_of_the_Rattan_Chand_temple,_Lahore_Pakistan.jpg)

## 4.2 Place names

Place names compiled from historic maps reveal a stark contrast between pre-colonial names and those introduced during the British era. For instance, the former contains an abundance of terms such as *masjid*, *mazaar*, *maqbara* and *bagh* which translate into mosque, shrine, tomb and garden respectively. Colonial place names on the other hand exemplify a governance structure radically different from previous forms of social control. Place names that transpired after 1849 reveal an abundance of institutions – administrative, judicial, educational, transportation, health as well as penal. For example, the Civil Secretariat, Town Hall, District Court House, Government College, North Western Railway Station, Mayo Hospital, Victoria Hotel, Central Jail, Female Penitentiary, Lunatic Asylum and Mental Hospital to name a few. At the very least, these examples resonate with the categorization of colonial terminologies included in Anthony King's *The Language of Colonial Urbanization*.<sup>40</sup>

To explore the present, Google Maps is relied upon as a heuristic tool to gain insight into the prevalence or disappearance of place names and road names over time. Table 3 shows a list of pre-colonial place names that are still in use, localities that contain Hindu/Sikh names<sup>41</sup> as well as place names that transpired during the British colonial period and after the creation of Pakistan in 1947.<sup>42</sup> Google Maps further reveals the ambiguities involved in (re)naming and experiencing places. For instance, Charing Cross<sup>43</sup> which is a busy intersection in the Upper Mall Road, the design of which is attributed to Basil M. Sullivan. This imperial label conjures an important site in London, the metropolitan capital and, by 1864, an important railway station. As part of the Charing Cross Scheme developed in Lahore in the early 1900s, a marble pavilion was erected off Mall Road (a principal thoroughfare constructed to connect the Mian Mir Cantonment and the Civil Lines/Station), and a statue of Queen Victoria was placed within. In the new state of Pakistan, the junction was renamed Faisal Chowk,<sup>44</sup> *chowk* the name for an intersection or roundabout, and the statue<sup>45</sup> was replaced with a Quran. A search on Google Maps for Charing Cross and Faisal Chowk clearly indicates the location of the former while the latter comes up as Faisal Chowk Bus Stand (Fig. 8). In another scenario, Davis Road remains in use despite an official change of name to Sir Aga Khan Road. Yet another example is that of Jail Road which remains a busy thoroughfare in central Lahore even though the jails have long shifted elsewhere.

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<sup>40</sup> Anthony King (1974) explores a list of linguistic terms from the British colonial period which provide insight into specific conceptions of urban spaces that by and large manifest the overriding principle of dualism: European/native, Home/India (colony), Anglo-Indian etc. Key terminologies included in the article, however, do not include penal terms such as jail/prison and mental/lunatic asylum. These terms are just as relevant to an understanding of the socio-spatial urban form that was imposed in India during the British Raj.

<sup>41</sup> The suburbs of Krishan Nagar and Sant Nagar were established in the 1930s following the 1922 Punjab Town Improvement Act. These localities were exclusively Hindu and Sikh. (Ian Talbot (2006)).

<sup>42</sup> The list draws attention to the co-existence of wholly different spatial forms that co-exist alongside one another rather uneasily. Consider for instance the expansion of gated communities which boast access to modern urban services concomitant with suburban lifestyles that target a certain socio-economic group. At the same time, unpaved roads and substandard infrastructure are characteristic of far older hamlets that are contained on all sides with concrete walls. Most often those who work as domestic staff in affluent neighbourhoods find cheap accommodation in these 'unplanned' neighbourhoods.

<sup>43</sup> Noor, Raza. "Marble Pavilion at Charing Cross". Accessed on 3 December from: [https://sites.ualberta.ca/~rnoor/marble\\_pavilion.html](https://sites.ualberta.ca/~rnoor/marble_pavilion.html)

<sup>44</sup> Faisal Chowk is most likely named after Saudi Arabia's King Faisal.

<sup>45</sup> The statue was removed in 1951 and is said to have been relocated to the Lahore Museum. Naz, N and Z. Ashraf. "Transformation of Urban Open Spaces of Lahore: From Charing Cross to Faisal Square". *Pakistan Journal of Engineering and Applied Sciences*. Vol. 2, January 2008. pp. 65-78. Accessed on 10 December 2019 from: <https://www.uet.edu.pk/export/sites/UETWebPortal/research/researchinfo/journal/volume2/9.pdf>



<b>Pre-British Localities</b>	<b>Hindu/Sikh names of localities</b>	<b>British era localities</b>	<b>Post 1947 Localities</b>
Lidher	Krishan Nagar	Birdwood Barracks	Gulberg
Dera Chahal	Sant Nagar	Mayo Garden	New Muslim Town
Kirianwala	Prem Nagar	Gazetted Officers' Residence	Defence Housing Authority
Harpalke	Arya Nagar	Upper Mall	Johar Town
Leel	Swami Nagar	Lower Mall	Green Town
Deo Kalan	Ram Gali	Cantonment	Township
Dullu Kalan	Qila Gujjar Singh	Charing Cross	Tech Society
Kahna	Rajgarh	Model Town	Architects Engineers Housing Society

Table 3: Examples of place names from Google Maps.

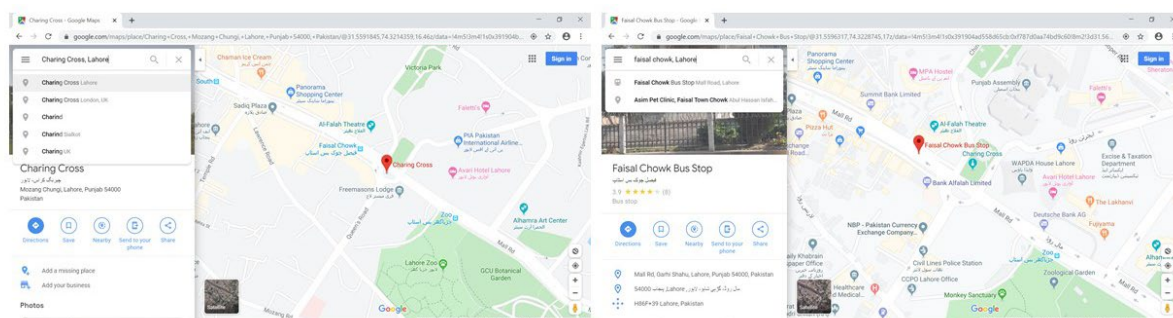


Figure 8: Charing Cross (left) and Faisal Chowk Bus Stand (right). Source: Google Maps.

## 5 VISUALISING CONTESTED NARRATIVES

The previous section explored ways in which to map spatial and intangible manifestations of change. In this respect, both historic maps and Google Maps provide relevant clues about what has survived from different eras of rule in Lahore. Notwithstanding the challenges involved in systematically extracting data from archival sources and online platforms, an attempt to visualize change across Lahore’s historic landscape presents its own set of conundrums. For instance, a key issue relates to differentiating between Mughal Lahore of the 16<sup>th</sup> and 17<sup>th</sup> centuries (as well as between different emperors from Akbar to Aurangzeb), Sikh Lahore of the first half of the 19<sup>th</sup> century and British Lahore from 1849 to 1947. To simplify the workflow different periods of rule are divided into two broad categories – pre-British and British.<sup>46</sup> Even then, delineating the spatial limits of the city at a point in time raises some questions. To what extent can a physical boundary for the historic city be established in an objective or unbiased manner? Should a polygon to reflect the city’s boundary overlay with that of the Walled City’s fortification or should nearby villages such as Ichhra or Mazung be included?<sup>47</sup> The *Gazetteer of the Lahore District 1893-94*, for instance, indicates that several hamlets constituted Lahore until such time that emperor Akbar consolidated the fortification of the city (late 16<sup>th</sup> century) such that “the city, par excellence, was that portion surrounded by the wall and covered the same area as the present city; but outside the walls were long bazaars and thickly

<sup>46</sup> This distinction is made to remain within the scope of the present study and to demonstrate the conceptual and practical challenges in creating a geodatabase of historic features. Pre-British is used to signify pre-colonial settlements that had common characteristics such as winding alleyways and closely packed dwellings. As indicated earlier in the paper, British presence radically transformed Lahore’s urban landscape in favour of cartesian conceptions of space.

<sup>47</sup> As elaborated in Anthony King’s *The Language of Colonial Urbanization*, colonial conceptions of space differentiated between the ‘native city’ and the colonial bureaucratic and military areas. The map of 1847 (fig. 1) includes only the Walled City as if other spaces did not exist.

populated suburbs which no longer exist; ...”<sup>48</sup> Since the late 16<sup>th</sup> century, the Walled City has maintained its distinct pre-colonial urban form with its principal thoroughfares remaining more or less the same.<sup>49</sup>

The arrival of the East India Company and later the establishment of the British Raj essentially resulted in the carving out of a new footprint on what was likely to be garden suburbs during the Mughal era. Moving on to the British era, establishing a boundary or boundaries to depict Lahore’s expansion between 1849 and 1947 remains just as subjective and perhaps misleading. As of 1849, Lahore and its surrounding areas are described as “a dreary expanse of crumbling ruins.” The initial military stations were located inside the citadel and later to the south of the Walled City. Over the next decades, increasing numbers of a foreign population resulted in the city expanding eastward and city expansion was synonymous with the laying metal roads that “pierced the debris of former days, and bungalows and gardens have succeeded to ruins and rough jungle”.<sup>50</sup> What is relevant to highlight at this stage is that “modern” Lahore as described in the *Gazetteer of the Lahore District, 1893-94* includes the Walled City, the citadel as well as other landmark structures from the Mughal and Sikh era.<sup>51</sup> The inclusion of the Walled City as both pre-colonial and modern, when describing the expanse of Lahore in the late 19<sup>th</sup> century, draws attention to the ambiguities one encounters in trying to establish spatial limits across social/historical/cultural/political experiences.

As an alternative to polygons, an attempt is made to illustrate city expansion over time via point and line features. This approach aims to capture those instances that come up at a point in time (such as Anarkali’s Tomb (1600), Wazir Khan Mosque (1634), Shalimar Bagh (1667), first European houses in Anarkali (1847-48), Mayo Hospital (1871) and so on. Additionally, line features reflect linear progressions such as the building of new roads that are concomitant with city expansion. Similarly, insertions such as the railway network and the canal - important features in modernizing Lahore’s landscape albeit driven by colonial imperatives - can be depicted linearly across space and time.

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<sup>48</sup> In quoting Nizam-ud-din Ahmad’s work from emperor Akbar’s time, the gazetteer highlights that the neighbourhood between Anarkali (Civil Lines/Station) and the village of Mazung – known as Langar Khan – was most populated in the late 16<sup>th</sup> century (p. 278).

<sup>49</sup> The rebuilding of the fortification, the moat around the outer perimeter of the Walled City and the erection of some new structures (such as the Hazuri Bagh pavilion between the western gate of the citadel and the Badshahi Mosque) are attributed to Ranjit Singh. However, there appears to be no traces of city expansion as such during the Sikh era.

<sup>50</sup> Lawrence Garden (the Kensington Gardens of Lahore as noted by Sir George Casson Walker in the *Gazetteer of the Lahore District*, p. 306) is one example.

<sup>51</sup> Walker, G. C. *Gazetteer of the Lahore District 1893-94*. Chapter VI – Towns, Municipalities and Cantonments. Section B – Modern Lahore. p. 284. The fact that the gazetteer includes a description of the Walled City as a part of ancient Lahore and modern Lahore cannot be ignored when exploring the ambiguities of the socio-spatial progression/variation of cities over time.



Figure 9: Major thoroughfares located within the Walled City (native quarters) are shown in brown; and road network that constituted the Civil Lines/Station (European quarters) is shown in purple.

Simultaneously, owing to a lack of pre-colonial cartographic depictions of Lahore,<sup>52</sup> place names are used to gauge city expansion over time. As illustrated in Fig. 10, areas east of the Walled City and along the Grand Trunk<sup>53</sup> (GT) Road had numerous green spaces – evident from the preponderance of the term *bagh* (garden).<sup>54</sup> Presently, Shalimar Bagh (laid out during the time of emperor Shahjahan), is the only garden that has survived from the Mughal era and it remains an important landmark in Lahore’s present expanse. On the other hand, Badami Bagh - located north of the Walled City (and now one of Lahore’s three major bus terminals) was named after Gul Badam (a Kashmiri girl who Ranjit Singh married in 1833) - is associated with the Sikh era.<sup>55</sup>

In the British era, Model Town appears to mark the southern limits of Lahore in the early 1930s (Fig. 5).<sup>56</sup> As mentioned earlier, place names from the colonial era resonate with new forms of governance and a wide variety of institutions. Most of the buildings that served major purposes are located along a principal road called the Mall Road. This road name is still in use and the road remains a key thoroughfare. In addition, the Lahore High Court or the General Post Office are still located in the same colonial period premises. As the city expanded, the district and female jails relocated further outside of Lahore. However, Jail Road<sup>57</sup> remains very much in use as a major road in central Lahore.

<sup>52</sup> The study relies on historic maps available online. An exploration of pre-colonial cartography is beyond scope of the present undertaking.

<sup>53</sup> GT Road is a pre-colonial highway that connects Bengal (east of India) to central Asia.

<sup>54</sup> For instance, Shalimar Bagh, Nawazish Ali Khan Bagh, Basti Ram Bagh, Dina Nath Bagh, Badami Bagh etc.

<sup>55</sup> Singh, P and J. M. Rai. *Empire of the Sikhs, The Life and Times of Maharaja Ranjit Singh*. Hay House, 2009. p. 208.

<sup>56</sup> The British Library. 2012. Lahore Guide Map.

<sup>57</sup> Although beyond the scope of the present study, a search on Google Maps for the term “Jail Road” comes up in other cities in the Indian sub-continent – Multan, Amritsar, Delhi, Lucknow, Dhaka.

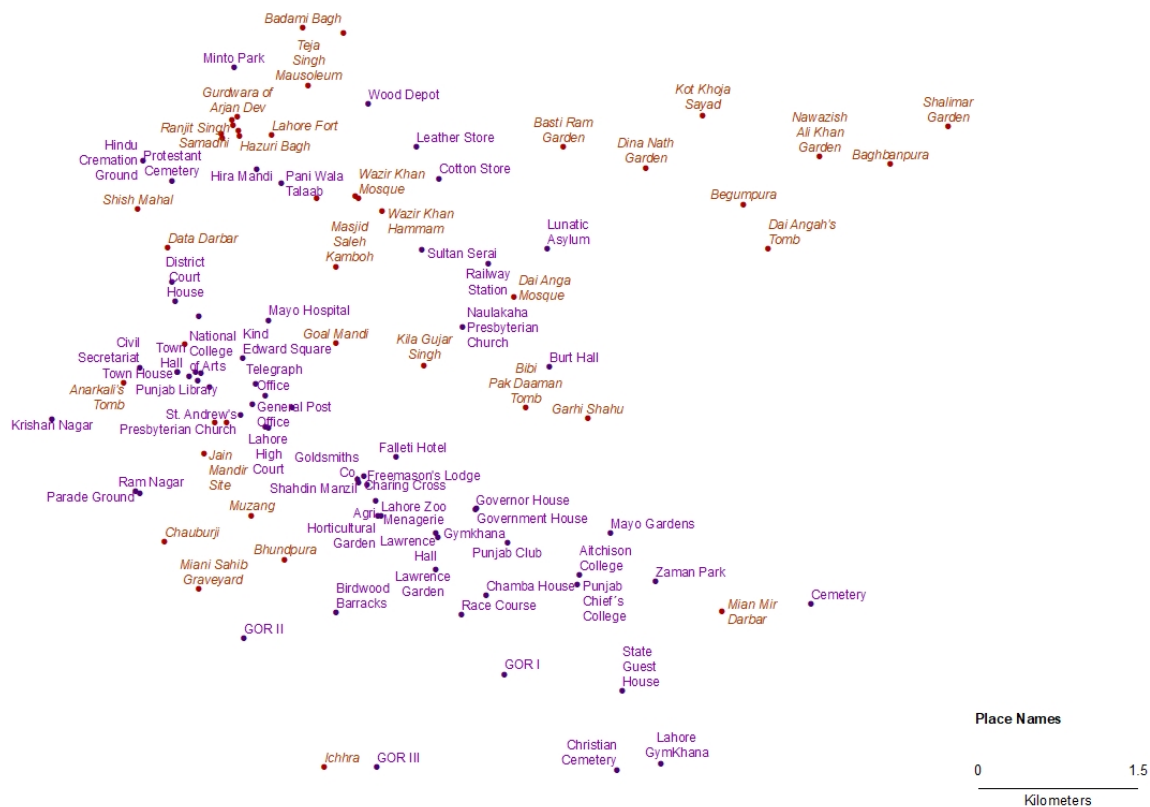


Figure 10: Pre-colonial (shown in brown) and colonial place names (shown in purple).

## 6 ONLINE PLATFORMS

Online platforms provide opportunities to collect, share and visualise historic data. In this respect, several online tools are available such as Open Street Map (OSM), Google Maps, ArcGIS Story Maps, and WorldMap. This section provides a brief comparative overview of how data may be created for and communicated to a digital audience. In the case of OSM, the most obvious advantage pertains to a free platform that facilitates crowdsourced volunteered geographic information. Other advantages include the downloading of source data that can be used to derive additional cartographic outputs, the creation of a rich database based on users' disciplines as well as a quick adaptation to incorporate new features/information.<sup>58</sup> However, the lack of a systematic framework to verify the quality of data limits OSM's use with respect to historical data. Especially in those instances where historical points of interest no longer exist, data accuracy may be constrained significantly. Moreover, the nature of historical change discussed in this paper may not be effectively visualised in OSM.

Google Maps is another example of a collaborative platform that provides a relatively straightforward way to compile an inventory of historic areas of interest. Like OSM, Google Maps

<sup>58</sup> Quinn, Sterling. John A. Dutton e-Education Institute, College of Earth and Mineral Sciences, The Pennsylvania State University. Geog-585 Open Web Mapping: OpenStreetMap and its use as open data. Benefits and Weaknesses of OSM. <https://www.e-education.psu.edu/geog585/node/738>

contains an extensive database of place names and road names. The added functionality of corresponding images and the possibility to include new ones is also beneficial. Google Maps also exemplifies what exists at present – spatially as well as through place names. In terms of data sharing, KML/KMZ formats address issues of data interoperability. However, the current version of Google Maps appears to be limited in terms of visualising change through historical data.

Compared with OSM and Google Maps, ArcGIS is a proprietary software. Notwithstanding issues of cost and a relatively steep learning curve involved, ArcGIS Story Maps provides opportunities to create narratives using multiple data sources and media. In view of the kind of historical data required to highlight different eras of rule, desktop applications such as ArcMap provides a structured approach to create datasets in a systematic manner. It further allows vector data to be imported from other formats such as AutoCAD and KML, which can facilitate collaboration with diverse users who do not necessarily work with ArcGIS. An open source contender to ArcGIS is WorldMap, which allows for data sharing and collaboration. Aimed at scholars, the web mapping platform facilitates various GIS capabilities including uploading of layers, data creation and editing, publishing and exporting to different formats etc.<sup>59</sup>

Although beyond the scope of the current study, examples of historical databases include the China Historical GIS<sup>60</sup> and the Great Britain Historical GIS.<sup>61</sup> Both are exemplary in highlighting the complexities involved in developing historical toponymic databases and in addressing data creation and usage concerns. Each of these has taken a decade or longer to accumulate the necessary historical data, using a team of researchers. Efforts by a solo researcher to replicate these would be daunting. Whether teams of school children, university students or interested adults could be commissioned to do this for Lahore or other places in Pakistan is a matter for pilot studies, and likely only after considerable consultation with relevant state agencies. The discussion in this paper has sketched the broad contours of what the data fields might entail. Further exploration of each of these frameworks will no doubt enrich current efforts in conceptualising and creating digital narratives of historical change in a spatio-temporal context.

## 7 CONCLUSION

This paper draws attention to mapping and visualizing change across the historic landscape, rationalizing what to present and the implications of choosing one type of spatial representation over another. Spatial manifestations of change in the context of different periods of rule in Lahore are broadly highlighted with respect to pre-colonial and British eras. Throughout, the documentation of spatial footprints and place names has constituted a necessary focus of inquiry to capture the dynamic nature of change – over time and across space at a given point in time. Several challenges have been highlighted which are summarized below. This list is by no means exhaustive but provides an overview of the kind of issues that require further deliberation to arrive at a historical GIS.

- Documentation of vernacular place names in English that are also characterised by variations in spellings.

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<sup>59</sup> WorldMap. Centre for Geographic Analysis at Harvard University. Accessed on 6 December 2019 from: <https://worldmap.harvard.edu/>

<sup>60</sup> China Historical GIS. Accessed on 6 December 2019 from: <http://chgis.fas.harvard.edu/>

<sup>61</sup> Great Britain Historical Geographic Information System. Accessed on 6 December 2019 from: <http://www2.port.ac.uk/research/gbhgis/>

- Instances where footprints exist but place names and/or functions have changed.
- Instances where neither footprint nor place name exist except in photographs/literature/conversations.
- Instances where footprints disappear but names exist.
- Ambiguities involved in delineating city boundaries at a point in time.
- Incorporating source material from different languages – especially Urdu and Punjabi, which are local languages.
- Issues of proprietary data that limits user access as well as increases barriers to data sharing and collaboration.

Thus far, the study has attempted to focus on the conceptual aspects of designing a historical GIS in the context of Lahore. The underlying assumption has been that digital platforms provide both opportunities and challenges to create and communicate historical datasets. As next steps it is proposed that the existing dataset be elaborated upon further and a pilot web map be developed with an emphasis on the British colonial era, given the richness of digitally available historical cartography.

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