

# Developmental Issues and Dynamics of Mumbai Cityscapes: Geoinformatic Inventory of F & G South Ward

Dr. Prasad Gogate<sup>1</sup>, Dr. Dipti Mukherji<sup>2</sup>

**ABSTRACT** - Conceptually, the Geo-environmental landuse mapping is the spatial representation of the human activities which is mainly dependent on socio-economic condition on the nature's own built system exemplifying the suitability of different terrain units in relation to the existing utilization or selective alternate uses, i.e. sustainable landuse planning. The holistic approach, using Geographical Information System (GIS) allow managers to observe, study and monitor, for instance, the effects and consequences of a particular decision on land use within a large geographical area concurrently and over appropriate periods of time. The paper presents the authors' contributions to ways of understanding the mapping and interpretation to understand the powerful players who make decisions for a socio-economic vulnerable space. The area selected for the study is the part of Mumbai City. F & G South ward which has experienced a drastic landscape transformation over a period of time. The area is targeted for valorization of space. Vertical and horizontal spatial extension is distinct. Traditionally known as mill area it is associated with cotton mills, their workforce establishment and infrastructure. This area lost its significance after the closer of these mills in early 90s. There is a clear cut contrast in the form of basic amenities, infrastructure and facilities in the old residential area and newly developed skyscrapers. An attempt has also been made to create a spatial data base for the study area and develop a model in GIS environment to evaluate present and future problems the area is facing and the solution for the same, if any.

**Keywords:** Contested environment, space crises, development or disaster

## 1.0 Introduction:

The diffusion of GIS in planning has occurred at a remarkable rate. Growing awareness, institutional acceptance, and product diversity have led to a plethora of planning applications, varying in maturity and sophistication. GIS applications in planning are characterized by geographical scale and the dominant influences shaping GIS utilization in planning are examined at the national, regional, trans-regional, metropolitan and neighbourhood scales. Transformations brought about by the interplay of GIS and planning causes a symbiotic relation. Planning, and the technology which supports it, reflects the culture of the society it serves. The symbiotic relationship reflects the vernacular approach to urban and regional planning, and an emphasis on high-technology solutions to economic development. GIS technology has long been valued for improving communication and collaboration in decision making, for effectively managing resources and assets, for enhancing the efficiency of workflows, for improving the accessibility of information, and generally offering tangible cost savings to organizations both large and small. In an effort to deliver geospatial information and functionality throughout an

enterprise, organizations are choosing to leverage the geographic information that they create with their desktop GIS implementations and deliver it with servers for use in the enterprise and across the Web. In addition, focused sets of GIS logic can be embedded and deployed in custom applications. The influence of GIS is growing. It provides a powerful medium for managing, visualizing, and communicating about our world. In this paper, the research objective is to study the potential of GIS applications in support of the public participation and urban management and planning of, through GIS. Urban processing of geo-database, develops the capacity and the empowerment of local administration of the management tools and to interface the complex problems of urbanization, unplanned and negative impacts on the facilities and services and the environment and to locate vulnerable areas.

Central Mumbai is acquiring a new landscape, which seeks to obliterate any trace of its vibrant industrial past. Socio-spatial transformation is a on-going process in this locale. The departure of industries and commercial activities from the downtown has caused abandonment and derelict of erstwhile bustling physical spaces and structures. These structures are specifically adapted for industrial use and cannot be readily reused for more contemporary purposes. Parel was one of the original seven islands that formed Mumbai. It belonged to the 13th century kingdom of Raja Bhimdev. The Portuguese

Department of Geography, University of Mumbai, Vidyanagari, Mumbai 400098, India <sup>1</sup>[prasadgogate@gmail.com](mailto:prasadgogate@gmail.com), <sup>2</sup>[diptimukherji@gmail.com](mailto:diptimukherji@gmail.com)  
Corresponding Author: <sup>1</sup>[prasadgogate@gmail.com](mailto:prasadgogate@gmail.com)

conquered Bombay, they gave the authority of this area to the Jesuit priests, The British confiscated the church building in the battle in 1689 and spelt the area as Parel. In the 1770s, the governor shifted his official residence to Parel. This area then became one of the elite areas of the city. In 1867, tanners and dealers in dry fish were relocated in this area. By the 1870s, several cotton mills had been established in the reclaimed lands in Parel. Gradually, Parel became much polluted. After the plague epidemics i.e. 1890s, mills proliferated in this area. In 1915, the Parel Bridge was built with linked the Western and Central Railway stations. It became an industrial area and in addition provided space for mill workers. There were around 120 mills in the Mumbai city area during the period. This attracted many workers from Konkan region of Maharashtra, Uttar Pradesh and Bihar to work as mill workers. Initially the workers community somehow managed to live in the area. With the construction of chawls within the vicinity of the mill areas, the lone workers also brought their families from the rural villages and settled here permanently. This proximity of residential area to work place was an additional advantage for the mill owners. These also lead to establishment of associated functions like markets, theaters, cinema houses and ply grounds. This era also witnessed many social and cultural events which were deeply rooted in these migrated families.

### 1.1 The Cotton Mill Era and its Decline

The mills of Girangaon were once integral to Mumbai's economy, particularly during the British colonial period, when Mumbai (then known as Bombay) was often referred to as the "Manchester of the East". However, with the development of newer industries in and around Mumbai, these mills ceased to be profitable, and fell into a state of disrepair.

In the first half of the nineteenth century, India exported cotton to Britain, and then reimported the textile. In 1820, the total textile import was valued at Rs. 350,000. However, the cost had escalated significantly by 1860, when textile imports stood at Rs. 19.3 million. The impetus towards the founding of a cotton industry came from Indian entrepreneurs. The first Indian cotton mill, "The Bombay Spinning Mill", was opened in 1854 in Bombay by Cowasji Nanabhai Davar. Opposition from the Lancashire mill owners was eventually offset by the support of the British manufacturers of textile machinery.

The cotton mills of Bombay, and the rest of India, were owned and managed mainly by Indians. The initial investments came from families of the mill-owners, mainly obtained from trading. Later, when shares became available to the public, much of the ownership still remained Indian - of the 53 mills in the city in 1925, only 14 were British-owned. The management and directorships of these mills were also mainly Indian; of the 386 directorships recorded in 1925, only 44 were English. By 1870, there were 13 mills in Bombay. Cotton exports grew during the American Civil War, when supplies from the USA's cotton plantations were interrupted. At the end of 1895, there were 70 mills; growing to 83 in 1915. A period of stagnation set in during the recession of the 1920s. In 1925, there were 81 mills in the city. After World War II,

under strong competition from Japan, the mills declined. In 1953, there remained only 53 active mills in the city.

The textile mills, which played an important role in the industrialisation of Mumbai and evolved around the culture of the city's working class, are now giving way to development of upscale neighbourhoods. Mill floors that resounded with the clang of machinery have been converted into shopping arcades, and residential towers have replaced their chimneys in the new skyline (Frontline,2005). Mumbai has 437.71 sq.kms of land . Total land available or occupied is 68.71 sq.kms in the city, 210.34 sq.kms, in suburbs and 158066 sq.kms for extended suburbs. With density of population just above 45000 per sq.kms, the mega city has vast area of and to reduce the density. At present more than 12 crore sq.ft of projects going in full swing in Mumbai and its suburbs.

Mill lands would cater space and would be required to construct yet another 12 million sq.ft. There were 52 cotton mills in Mumbai. Of these 26 were deemed sick and were taken over by the government of India. Out of these, 25 were managed by National Textile Corporation (NTC) and by Maharashtra State Textile Corporation (MSTC). Remaining 32 mills continue to be in the private sector. Even after taken over, these mills continue to be sick. Textile mills hold 400 to 500 acres of land just in the heart of Greater Mumbai. Lower Parel played an important role in forging Bombay's industrial modernity. The area's reclaimed flats were chosen during the 1850s as the location for some of India's first spinning and weaving mills. These were established predominately by Bombay's wealthy multi-ethnic merchants who looked to exploit the cheap supply of raw cotton and labour from the city's Marathi-speaking hinterland, with the British leasing land and machinery, and providing managerial staff (Leadbeater, 1993). Lower Parel was part of what the historian Rajnarayan Chandavarkar (1998, p. 103) argues was 'an active political terrain'. The area was the crucible for the creation of a self-conscious Indian working-class and retained a strident trade union movement during the 1970s and 1980s. This was demonstrated by a prolonged and fractious textile strike during 1982 and 1983 (Van Wersch, 1992).

### 1.2 History of Mill land and Impact on Regional Economy

1700 century was the beginning of cotton trade with China. In 1853, the first rail link was established to Thane and in 1863 the railway link was extended through the Bhor ghats to the Deccan. It was then possible to channelise raw cotton from its major growing areas especially Nagpur, to the foreign markets through Mumbai.

The Municipality undertook the task of filling up the lands between Mahalakshmi and northern parts of Parel that had originally been covered by swampy flats. A new thoroughfare was laid across the area where drainage seemed difficult; the land was raised to the height of the new roads. The project facilitated the construction of mills and chawls for workers on land lying between Tardeo and Lower Parel. These led to land speculation .

Regulation 58 of new DCR which into force in March 1991, provides for development of sick and / or closed cotton textile mills on condition that one third of land is given to BMC for public amenities and 27-37% (depending on the area of mill) is given to MHADA and PSU's for housing. The remaining lands could be developed by the owner for residential and commercial uses as may be permissible under the DC regulation in the force.

The DC regulation of march 1991 intended to regulate the development of cotton textile mills so as to generate open spaces and public houses for the city, in a manner, which could create coherent urban form. Such redevelopment that has occurred has been in a haphazard manner on a totally commercial basis without any portion of land becoming available either for low income housing or for public amenities. In June 2000 state government cleared the proposals to sales of surplus mill land of NTC as per DCR.

Now land is in the real estate market. The centralised site of these mills would have impact major sale of western suburbs. Proximity to South Mumbai and well connected to both the suburban lines, these mills land have approximately 200 acres to be constructed and sold. Land is now be accessible and available for private developers for big housing complexes. (Accommodation Time, 2012)

The ruling by the Mumbai High Court on the sale and redevelopment of mill lands has renewed attention on the future of the city. The court's order nullified the Rs 2,020 crore sale earlier this year of five National Textile Corporation (NTC) mills for having violated Supreme court guidelines and also rejected the government's 2001 interpretation of Development Control Regulation (DCR) 58 that only 10 percent of "open" mill land space need to be turned over for development of green spaces. The court's decision on DCR 58 will, in effect, release nearly 200 acres for developing green spaces and low-cost public housing for the city. The ruling has pitted two sides, with conflicting visions for the city's future development, against each other.

In the last decade, even as rapid construction of high-rises has wrought drastic changes in the city's skyline and in the elusively defined "quality of life", it is the court that have to direct the debate on Mumbai's development. The NTC mills and other privately owned mills occupy nearly 600 acres of prime state land in central Mumbai (traditionally called Girangaon). Most of the land is already in varying phases of redevelopment, assisted with investments made by several financial institutions and buyers. The area is under the process of gentrification. Gentrification has become a global phenomenon over the last fifteen years, and has been understood as an increasingly important strategy within neoliberal policy-making. The metamorphosis of the land is virtually complete. The mills of central Mumbai, once the engines of economic growth that employed lakhs of people, have long fallen silent. Smoke-stacks have been razed to make way for residential towers, malls, food courts, multiplexes and

even a five-star hotel. As the last of the 40,000-odd jobless mill workers stare into an uncertain future, their former employers are in a rush to tie up with real estate developers waiting to gentrify central Mumbai (TOI, 2003). Lower Parel have historically acted as 'metropolitan underside' to the growing wealth and modernity of their cities (Doreen Massey, 2000). Despite its decline in recent years, the textile industry remains the single most important in the country. It is the largest employer after agriculture, accounts for a Fifth of industrial production and employs 18 million directly. If one adds all those engaged in related industries, like textile machinery, dyes and chemicals, marketing, transport - not counting the millions of farmers growing cotton - the number dependent on it goes up substantially. Moreover, it contributes over 30 per cent of all export earnings. Within this industry, cotton textiles occupy the pride of place and Mumbai is the traditional base in the country, with the first mills being established midway through the 19th century. By 1931, it is estimated that as much as half the entire population of Mumbai was dependent on the textile industry. However, by the 1970s, the industry began to decline for a number of reasons. The 18-month-long strike in 1982-83, probably the most prolonged ever in the world for a workforce of this magnitude, saw the loss of a little over 100,000 jobs and was the proverbial nail in its coffin (Darryl D'Monte, 1998).

### 1.3 GIS and Socio-spatial Information

Conceptually, the Geo-environmental landuse mapping is the spatial representation of the human activities which is mainly dependent on socio-economic condition on the nature's own built system exemplifying the suitability of different terrain units in relation to the existing utilization or selective alternate uses, i.e. sustainable landuse planning. The holistic approach, using Geographical Information System (GIS) allow managers to observe, study and monitor, for instance, the effects and consequences of a particular decision on land use within a large geographical area concurrently and over appropriate periods of time. Spatial information fully and reasonably, provide information services for urban planning management and decision-making for urban planning administration. This promote the modernization for urban management. Application of GIS is appropriate and essential for scientific management and the decision making for socio-economic vulnerable space.

### 2.0 Study Area:

The area selected for the study is the part of Mumbai City. F South ward which has experienced a drastic landscape transformation over a period of time. The area is targeted for valorization of space. Vertical and horizontal spatial extension is distinct. Traditionally known as mill area it is associated with cotton mills, their workforce establishment and infrastructure. This area lost its significance after the closer of these mills in early 90s. There is a clear cut contrast in the form of basic amenities, infrastructure and facilities in the old residential area and newly developed skyscrapers. The Study Area (refer to the file for maps and photos)

### 2.1 Geoinformatic Inventory Analysis of F and G South Ward

To effectively manage all of the geospatial and non-geospatial information associated with urban infrastructure, cities today need a 3D City Geospatial Information System (Fredericque Benoit, Lapierre, Alain, Byrn Peter ,2010). Efficient urban information system is a vital pre-requisite for planned development. The increasing demands in urban planning and management sectors call for co-ordinate application of Remote sensing and Geographic Information System(GIS) for sustainable development of Urban areas. There is an urgent need to adopt Remote Sensing and Geographic Information System approach in urban development. and monitoring process for implementing pragmatic plan of Urban development. The plan must incorporate an integrated approach of spatial modeling using Remote Sensing Data, GIS database. This helps in evolving efficient and economical models for development and location of industries, education, housing, water supply, service facility

and disposal system etc. Geospatial Virtual Environments of the study area provides an effective way of presenting large amounts of complex information to a wide audience. 3D visual through geospatial analysis representation is fundamental to understanding and analysing variations in geospace . The endeavour for the study is as follows:

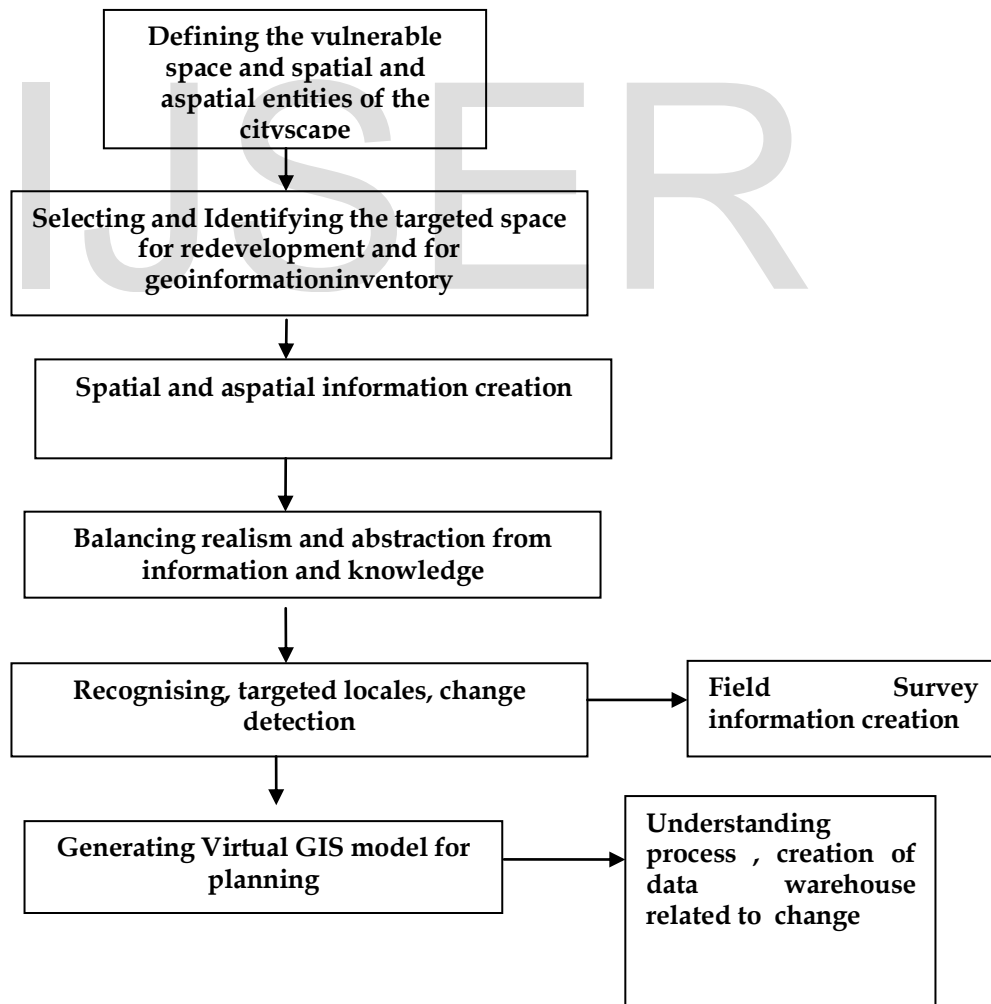
Visualisation of the susceptible space of the mill land area and creation of database.

Generating a landscape model with high degree of realism.

Represent space and to understand space management

The study emphasised through GIS the planning for utilities like water supply, sewerage and storm water, hospital, drainage channels, educational institutes and housing facilities. Creation of geodatabase would augment the capacities in relation to the projected population and economic activities in different urban vulnerable space . This gives rise to design challenge that can be adequately addressed by GIS functions like 3D modelling .

### 2.3 Workflow Diagram:



## 2.4 Map of Landuse / land cover 2012

The map depicts the dynamicity of the landuse in the area. It is observed that there is contrasting use of land here. Pockets of highrise apartments are embedded in the original landscape of the mill land with workers quarters and mills. The process of gentrification is visualised by the geoinformation analysis. The targeted locales can be recognised and the related socio-spatial issues could be identified. This had helped to build a knowledge base of the study area for infrastructure planning .

Recycling and generation of new landscapes are visualised . The analysis also highlighted FSI of the skyscrapers within the built environment. This clearly projects the intrusion of globalisation.

## 3.0 Changing Cityscape of Parel

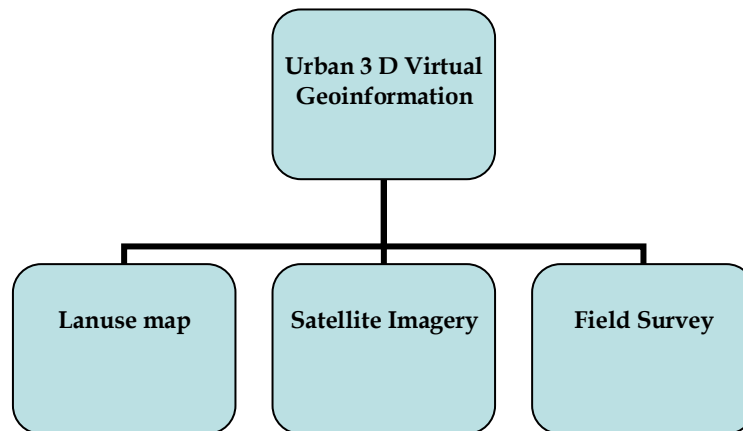
With the gradual decline of the mills in the late twentieth century, this space is being recycled. Recently Parel has seen an influx of huge enterprises in the compounds of the long gone cotton mills. Five star hotel *ITC Hotel The Grand Central, Mumbai - The Luxury Collection* is located in Parel. During the time cotton mills were operating in Parel are, many thousands of mill workers called Parel home. Now cotton mill jobs have long disappeared and large cotton mill real estate is being recycled into ultra-expensive gated communities. Parel has thus become an area where lower middle class and rich live side by side. Parel happens to one of the fastest developing neighborhoods in the world (outside of Guangdong / Shenzhen, China). Parel has seen huge property price appreciation in excess of 8X over the last 10 years. Cafe' Coffee day has finally opened up here. Lodha World One, the world's tallest residential tower, which is to be located on former mill land in Lower Parel. (Map 2).Urban planning and development is a continuous process and involves planners, administrators, developers, investors and of course, the residents. Capacity of GIS are found helpful to bring in transparency in planning desired by the above groups. It is therefore high time to consolidate on the reported gains of the GIS application in urban planning. In other words, the urban planning authorities and agencies in the country should adopt standard usage described in this paper at the earliest. On the other hand interfacing of urban planning models with GIS important. Incorporation of land-use transportation models, water distribution network analysis, simulation of urban activities to evaluate different urban development alternatives in the GIS framework needs to be explored for added advantage. Evaluation of urban policy by model-based GIS approach provides a useful insight to guide the development process and this is another area of application. The large

variety and number of actors possibly involved in urban renewal, makes the design of urban gentrification plans a very specific and complex challenge. In this process design and communication tools play an important role. Visual information is believed to help to find out what the design problems are, to understand them and to choose sustainable solutions because this visual information is supposed to be a common language between the different actors in the process. In this paper we study in which ways visual information may support the design process or urban renewal and in how far 3D visualisation and GIS-technology may be useful to achieve this task. 3D models provide the largest flexibility in interacting, exploring, editing and analysing. But in contrast to photo images, 3D models always lack the real-world realism, which often is seen as the greatest problem in communicating ideas.

## References

- [1] "The Paradox of Mumbai: Slums, Stocks, Stars and the New India - SPIEGEL ONLINE - News - International". Spiegel.de.  
<http://www.spiegel.de/international/spiegel/0,1518,469031-2,00.html>. Retrieved 2011-10-26.
- [2] "The Cotton Mills: Mumbai/Bombay pages". Theory.tifr.res.in.  
<http://theory.tifr.res.in/bombay/history/cotton.html>. Retrieved 2011-10-26.
- [3] "Hard Rock Cafe MUMBAI". Hardrock.com. 2006-09-12.  
<http://www.hardrock.com/locations/cafes3/cafe.aspx?LocationID=455&MIBEnumID=3>. Retrieved 2011-10-26.
- [4] "Dosti Group". Dosti Group.  
<http://www.dostigroup.com/dostiflamingos/photos.htm>. Retrieved 2011-10-26.
- [5] "Projects". Peninsula.  
<http://www.peninsula.co.in/projects/residential/ashoktowers/ashoktowers.php>. Retrieved 2011-10-26.
- [6] "Indiabulls Sky". Indiabulls.com.  
<http://indiabulls.com/realestate/sky/index.html>. Retrieved 2011-10-26.
- [7] "The Hindu : National : Kohinoor Mills land sale: Shiv Sena changing stance?". Hinduonnet.com. 2005-09-07.  
<http://www.hinduonnet.com/2005/09/07/stories/2005090715891100.htm>. Retrieved 2011-10-26.
- [8] The Cotton Mills article by Tata Institute of Fundamental Research, Mumbai
- [9] Ravkar, Prasad :Sanganmatanchya katat Girnikamgar Ekta (in Marathi): Loksatta 22nd January 2013

**Database for Geoinformation:**



**Table 1**

Sr. No	Name of the former mill	Location	New Development	Nature of change
1	Bradbury Mills	Jacob Circle	No development	
2	China Mill compound	Sewri	Dosti Flamingos	Residential
3	Dawn Mills	Lower Parel	Peninsula/Piramal Project	Commercial
4	Digvijay Mills	Kalachowkie	No development	
5	Elphinstone Mills (South)	Elphinstone	Indiabulls Finance Centre and Indiabulls Sky Suites	Finance
6	Gokuldas Morarjee Mills no.1	Parel	Ashok Towers	High Class Residential
7	Gokuldas Morarjee Mills no.2	Lower Parel	Peninsula Corporate park	Commercial
8	Hindoostan Spinning & Weaving Mills No.1	Jacob Circle	Raheja Vivarea	High Class Residential
9	Hindoostan Spinning & Weaving Mills no.2	Jacob Circle	Kalpataru Heights	High Class Residential
10	Hindoostan Spinning & Weaving Mills no.3 (Crown Mills)	Prabhadevi	Orchid Crown	High Class Residential
11	India United Dye Works no.6 (North)	Prabhadevi	India International Trade Center	
12	India United Mills no.1 (North)	Parel/Currey Road	No development	
13	India United Mills no.2	Kalachowkie	MCGM	
14	India United Mills no.3	Kalachowkie	MCGM	
15	India United Mills no.4	Kalachowkie	MHADA	
16	India United Mills no.5	Byculla	No development	
17	Jam Mills	Lalbaug	MHADA	Low Class Residential
18	Jupiter Mills (South)	Lower Parel	Indiabulls Sky <sup>[6]</sup>	

19	Kamala Mills	Lower Parel	Kamala City	High Class Residential
20	Khatau Makanji Spinning & Weaving Mills	Jacob Circle	No development	
21	Mafatlal Mills no.3	Lower Parel	Marathon Futorex	
22	Matulya Mills	Lower Parel	Sun Palazzo	
23	Modern Mills	Jacob Circle	Mahindra Belvedere Court	
24	Mumbai Textile Mills (Sakseria Mills)	Lower Parel	DLF Place	
25	New City of Bombay Mfg Mills	Kalachowkie	No development	
26	New Hind Textile Mills	Byculla	MHADA	
27	New Islam Mills	Lower Parel	One Avighna Park	
28	Phoenix Mills	Lower Parel	High Street Phoenix	
29	Piramal Spinning & Weaving Mills	Lower Parel	Marathon Nextgen by Marathon Group	
30	Poddar Processors (Edward Mills)	Lower Parel	Indiabulls Bleu	Commercial / Finance
31	Raghuvanshi Mills	Lower Parel	K-lifestyle	
32	Shriniwas Mills	Lower Parel	World One	High Class Residential
33	Simplex Mills	Jacob Circle	Planet Godrej	High Class Residential
34	Sun Mills Compound	Lower Parel	Zenzi Mills Club / Lokhandwala Victoria	
35	Swan Mills	Sewri	Ashok Gardens	High Class Residential
36	Victoria Mills	Lower Parel	Victoria House & Car park	High Class Residential
37	Western India Spinning Mill	Kalachowkie	No development	







Fig. No.3 3 D modelling of Development on Mill land

Photos 1-4 Showing various stages of development in Parel Area

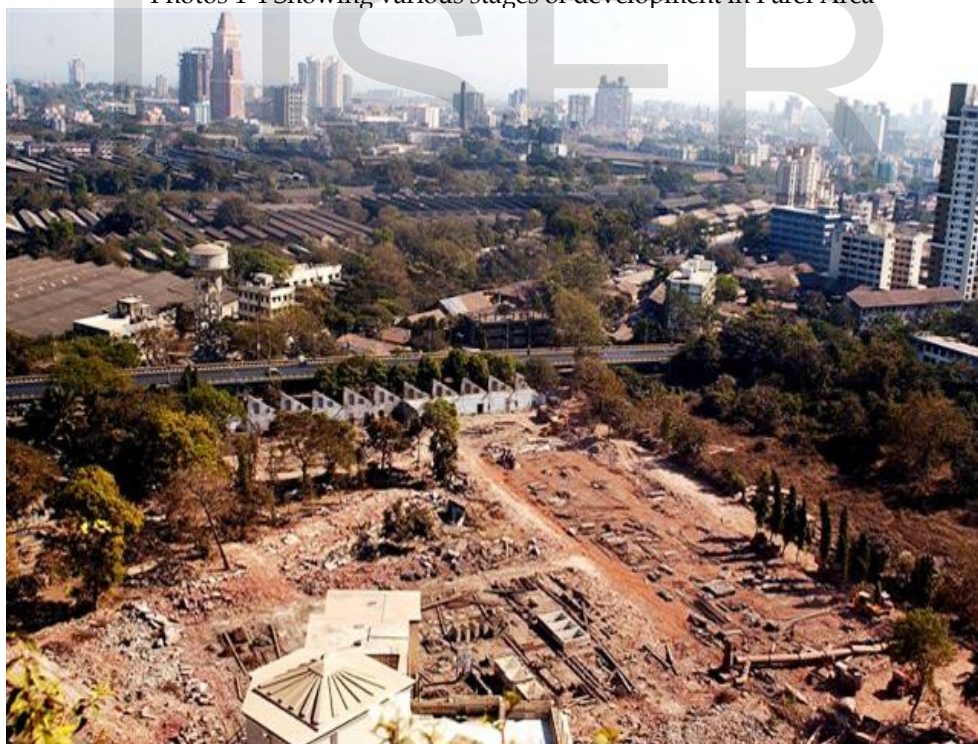


Photo 1



Photo 2



Photo 3



Photo 4



**Dr. Dipti Mukherjee**



**Dr. Prasad Gogate**