Co-funded by the Erasmus+ Programme of the European Union

RESEARCH THESIS

related to SIX CROSS CUTTING THEMES UNDER

URGENT PROJECT

Approaches for Adaptive Reuse of Abandoned Industrial Sites:

A case of Teliya Mill Compound and Prasad Mill Compound

Student Name: *Sanjoli Kumawat*
Guide: *Ar. Foram Bhavsar*
Batch: *2018-2022*

B Arch Program

P 12

NIRMA UNIVERSITY

AHMEDABAD

GUJARAT

INDIA

In the final semester of a Bachelor of Architecture (B. Arch) program, students engage in academic research by selecting an area of interest within the field of architecture. This process typically involves several steps to ensure that the research is rigorous, structured, and valuable. The process starts with a course on Research Methodology in VIII Semester followed by Research Proposal in IX semester. Here's an overview of the process:

1. Choosing an Area of Interest

- **Exploration:** Students begin by exploring various topics within architecture, such as sustainable design, urban planning, architectural history, construction technology, or digital architecture.
- **Narrowing Down:** After exploring, students narrow down their interests to a specific research question or problem. This could be based on current trends, gaps in existing literature, or personal interest.

2. Defining the Research Question

- **Problem Statement:** Students formulate a clear problem statement or research question that their work will address. This defines the scope of the research and sets the direction for the study.
- **Objectives:** Setting clear objectives helps in focusing the research. These could include understanding certain architectural phenomena, proposing new design solutions, or evaluating existing practices.

3. Literature Review

- **Existing Research:** A thorough review of existing literature helps students understand what has already been done in their area of interest. This involves reading academic papers, books, case studies, and other scholarly articles.
- **Gap Identification:** Through the literature review, students identify gaps or areas where further research is needed, which helps in refining their research question.

4. Research Methodology

- **Qualitative vs. Quantitative:** Depending on the nature of the research, students choose between qualitative methods (such as case studies, interviews, or observations) and quantitative methods (such as surveys or statistical analysis).
- **Data Collection:** Students plan how they will collect data. This might involve fieldwork, archival research, simulations, or experiments.
- **Data Analysis:** Once data is collected, students analyze it using appropriate tools and methods. This could involve software for statistical analysis, 3D modeling, or comparative analysis techniques.

5. Design and Proposal Development

- **Conceptual Framework:** Students often develop a conceptual framework that guides the design or theoretical aspects of their research.
- **Prototyping:** In some cases, students create physical or digital models to test their ideas. This is particularly common in research that leads to a design proposal.

6. Documentation and Presentation

- **Writing the Thesis:** The research findings are documented in a thesis, which includes the introduction, literature review, methodology, findings, discussion, and conclusion.
- **Visual Presentation:** Architecture students often need to prepare visual presentations of their research, including drawings, models, or digital renderings.
- **Defense:** Students may be required to present and defend their research in front of a panel of faculty members and peers.

7. Conclusion and Future Research

- **Summary of Findings:** The thesis concludes with a summary of the findings and their implications for the field of architecture.
- **Suggestions for Future Research:** Students may also suggest areas for further study based on their findings, contributing to ongoing academic discourse.

8. Submission and Review

- **Final Submission:** The completed thesis is submitted for review. This may include peer review, faculty evaluation, and sometimes publication in academic journals.
- **Feedback:** Based on the review, students may be asked to make revisions before the final acceptance of their research work.

This process not only helps students gain a deep understanding of a particular area within architecture but also equips them with the skills to conduct independent research, a valuable asset in their professional careers. Some of the research works undertaken by students are listed, examples of the some are also elaborated further.

Approaches for Adaptive Reuse of Abandoned Industrial Sites:
A case of Teliya Mill Compound and Prasad Mill Compound

Student Name: *Sanjoli Kumawat*
Guide: *Ar. Foram Bhavsar*
Batch: *2018-2022*

Current Scenario of the textile mills of Ahmedabad

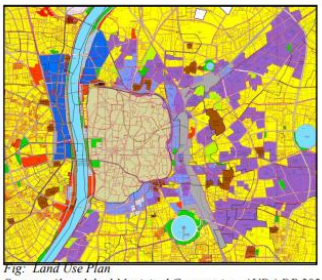


Fig: Land Use Plan
Source : Ahmedabad Municipal Corporation, AUDA DP 2021

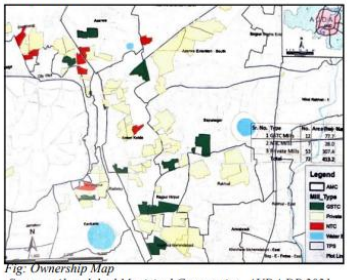


Fig: Ownership Map
Source : Ahmedabad Municipal Corporation, AUDA DP 2021

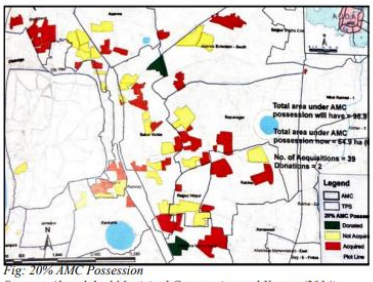


Fig: 20% AMC Possession
Source : Ahmedabad Municipal Corporation and Kumar (2014)

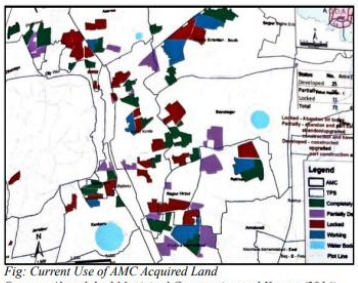


Fig: Current Use of AMC Acquired Land
Source : Ahmedabad Municipal Corporation and Kumar (2014)

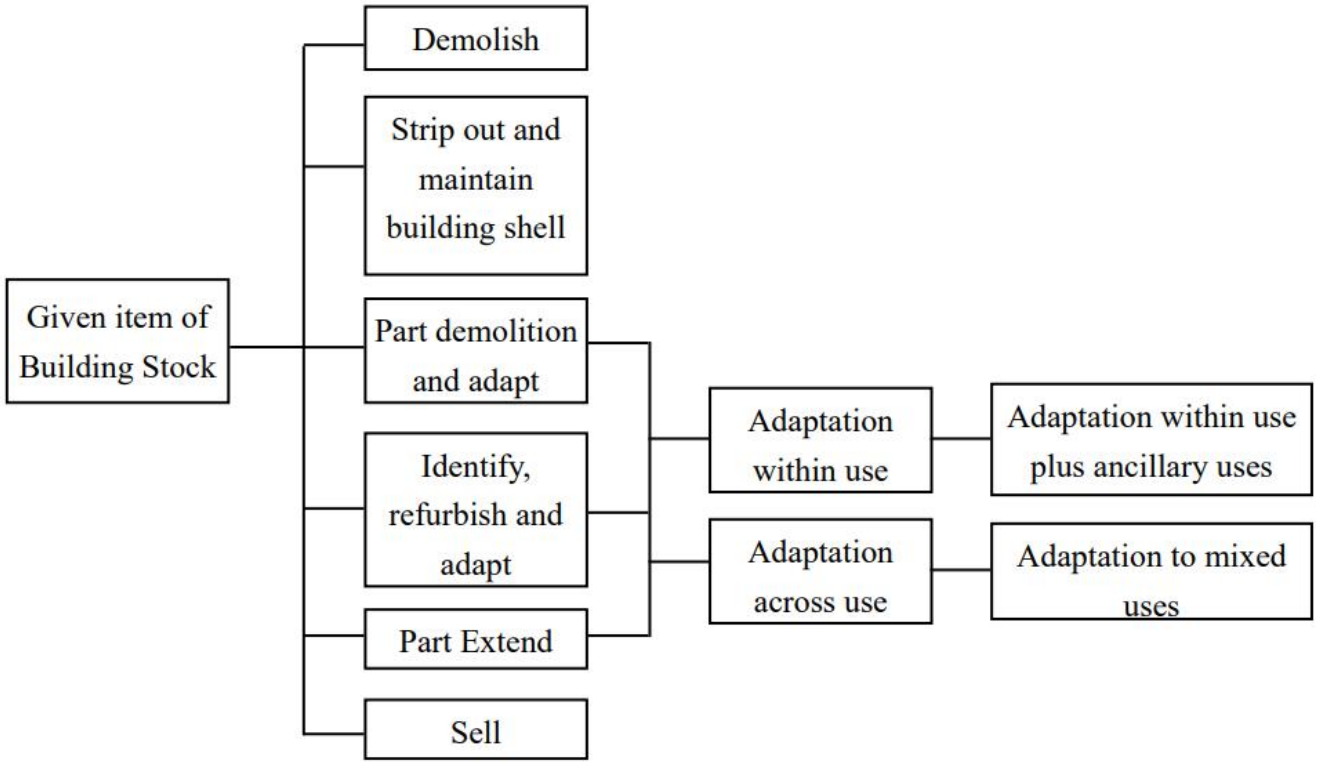


Fig: Process of Adaptive Reuse
Source: Wilknison, 2009

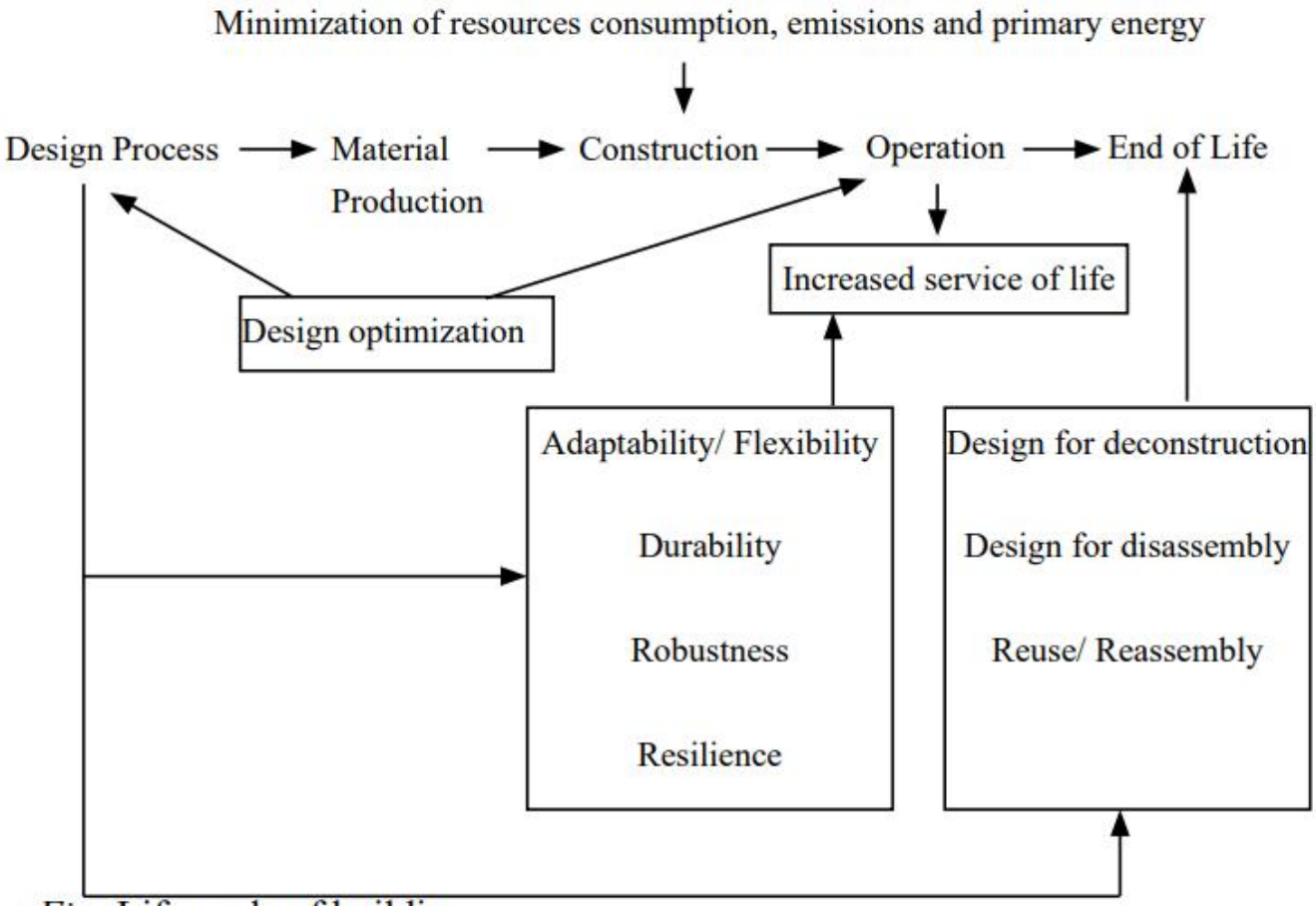


Fig: Life cycle of buildings
Source: Gervasio & Dimova, 2018

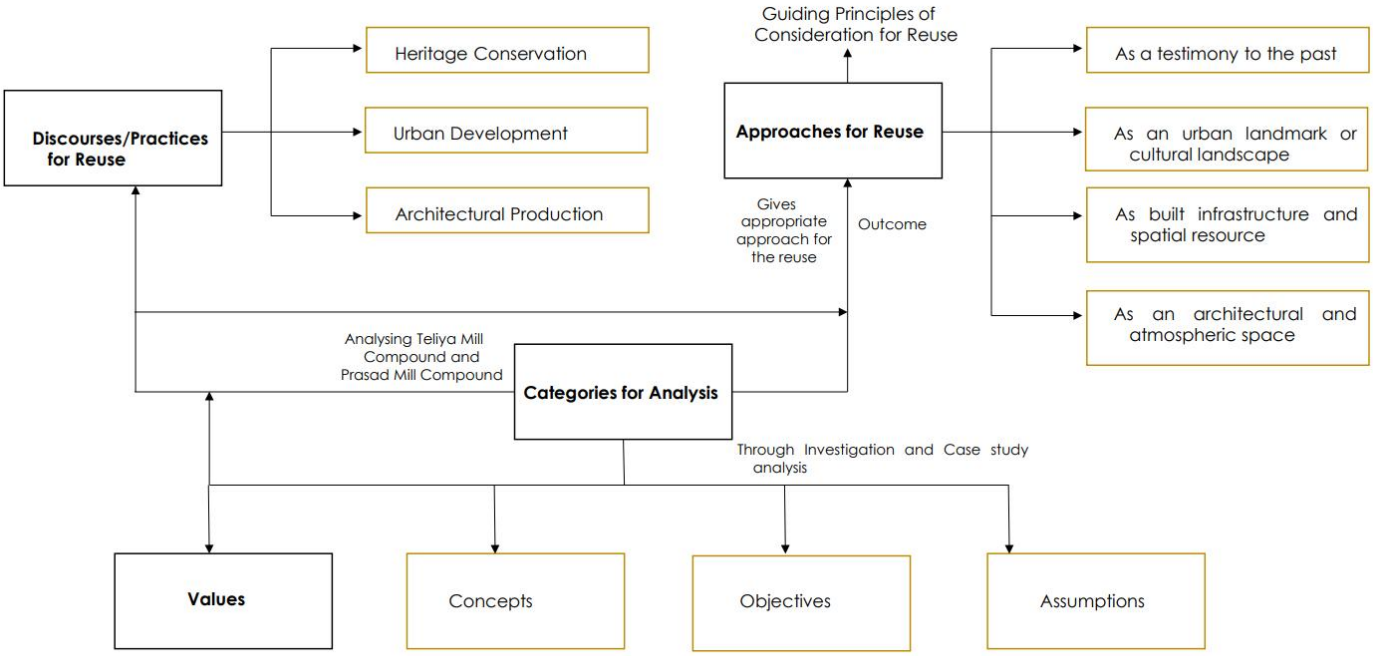


Fig: Framework

Values
Locational value
Environmental value
Health and well-being
Urban value
Aesthetic value
Use value
Economic value

Values
Educational value
Historical value
Cultural value
Image value
Exchange value
Social value

→ Since this research studies only urban and architectonic aspects of reuse, the highlighted values will be analysed

The framework uses an **assessment framework based on values as suggested by Historic England (2020), ICOMOS (2011) and drawing from the fields of heritage conservation and urbanism.**

Values and their Parameters

Parameters for analysis	Values
Accessibility Connectivity	Locational Value
Functionality Adaptability	Use Value
Legibility	Urban Value
Spatial Quality	Aesthetic Value
Evidentiality	Social Value
Socio cultural activities	Historical value

Values and their Relevant Discourses

Values	Discourse
Core – Historical Value Sub - Locational, Urban, and Social Value	Heritage Preservation
Core – Aesthetic Value, Use Value Sub – Locational Value	Architectural Production
Core – Urban Value, Locational Value Sub – Aesthetic Value, Use Value	Urban Development

Discourses and their Relevant Approaches

Discourse	Approaches
Core – Heritage preservation Sub – Architectural production	As a testimony to the past
Core – Heritage preservation Sub – Urban Development	As an urban landmark or cultural landscape
Core – Urban Development Sub – Heritage preservation	As a built infrastructure and spatial resource
Core – Architectural production Sub – Heritage preservation	As an architectural and atmospheric space

Mill Name	Mill Type	Earlier zone	Zoning 2011	Zoning 2021	AMC-20%	Status
New Swades Mill	GSTC	Industrial zone	Industrial zone	Industrial zone	Yes	Partially developed
Teliya Mills	Private	Industrial zone	Restricted zone	Commercial zone	No	Abandoned
Nutan Mills Ltd.	Private	Industrial zone	Industrial zone	Industrial zone	Yes	Completely developed
Prasad Mill	Private	Industrial zone	Core Walled City	Core Walled City	No	Abandoned
New Gujarat Synthetic No 2	Private	Industrial zone	Industrial zone	Commercial zone	Yes	Completely developed
The Gujarat Ginning Mills	Private	Industrial zone	Restricted Residential zone	Commercial zone	No	Abandoned

For the entire table refer thesis page no. 82-87

Fig: Current Status of Textile Mills
Source: Base data (Kumar, 2014)

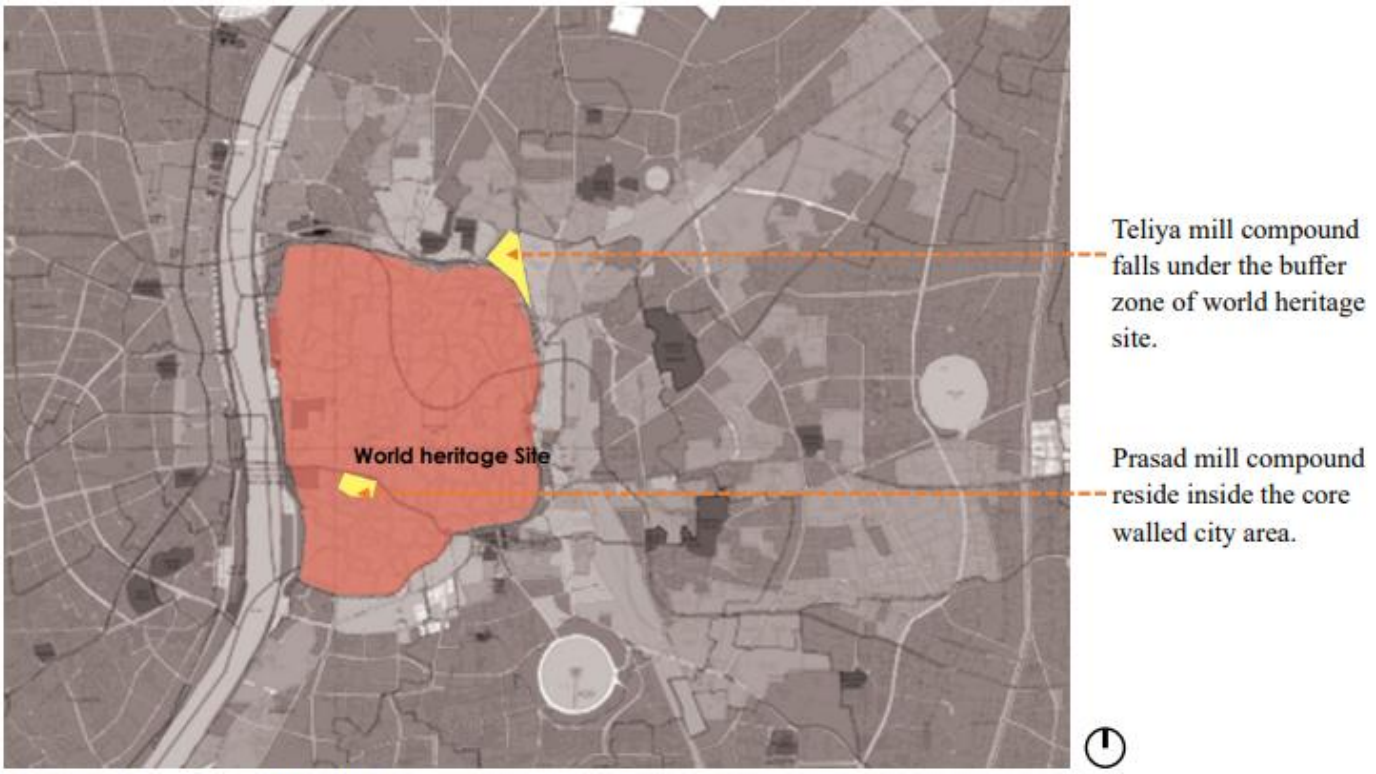


Fig: Sites in the context of World Heritage Site
Source: Base Plan, Google earth

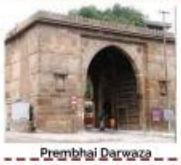
Initially this site was occupied by New Manek Chowk Mill. Currently it is used as a warehouse and whole sale facility. Some area of the site is dedicated to affordable housing as a part of redevelopment.

City Center

These are the residential quarters of the mill workers which were constructued in early 1900s. Most of the houses are still occupied by the present generation of mill workers family.

Telia Mill Chaalis

Prembhai Darwaza was constructed in 1864 by the British governmentand is one of the 12 gates of the walled city of Ahmedabad. It is presently an ASI protected monument.



Prembhai Darwaza

Telia mil compound consists of the main factory building, a weaving shed, boiler room and chimney which was demolished due to the weakness of the structure and the chaalis.

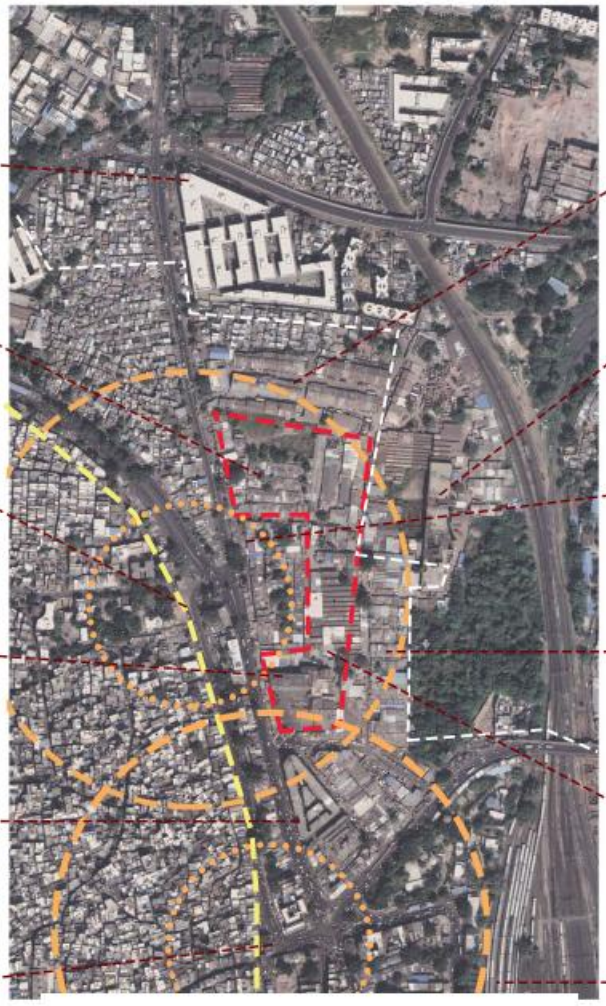
Telia Mill

Chokha Bazaar also known as Sindhi Bazaar is a major comercial center in the city. The shops here sells spices, groceries, nuts and pulses, cosmetics and textiles. Some of the shops use warehouses as stores.

Chokha Bazaar

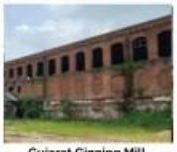
Kalupur Darwaza was built in the 15th century by Mohammad Begada and is one of the 12 gates of the walled city of Ahmedabad. Presently the structure is ASI protected.

Kalupur Darwaza



New godowns

Since the mills closed down in 1950s, the vacant land of the mil compound were developed as godowns and warehouses. This particular use was the best suited for the locality since it has always been a transportation hub.



Gujarat Ginning Mill

Gujarat Ginning Mill is much larger in size than the Telia Mill compound consists of a main factory building, weaving sheds and chaalis along with two standing chimneys. Some structures have been demolished.

Shops along Prem Darwaza Road

Due to the development of mills and chaalis, a stretch of shops came along the major streets. Some of the shops are under the ownership of mil owners. These shops provided for all the basic necessities.

Kalupur Vegetable Market

Kalupur vegetable market is commonly known as Kalupur Sabzi mandi. It is the major fruit and vegetable market in the city. It is located in the area probably due to the proximity of Railway Station.

Masjid

There is a masque in the Telia Mill Compound which dates back more than 100 years and has been modified and is still in use.

Kalupur Railway Station

Kalupur Railway Station was established in the year 1864 by the British Government. It is an important factor as it resulted in the industrial and commercial growth of the area.

Teliya Mill Compound

World Heritage Site Boundary

Buffer zone of the World Heritage Site

Regulated zone

Protected zone

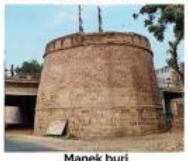
0 100 200m

N

Shahi Jam-e- masjid is the oldest mosque of Ahmedabad. It is one of the 28 ASI protected monuments in Ahmedabad. The chambers of the mosque are lit with delicately carved stone jalis.

Shahi Jam - e - masjid

Manek Burj is the foundation bastion of Bhadra Fort. It was constructed in 1411. It once contained a roofed stepwellwhich was filed and sealed in 1886 after Sabarmati river changed its course.



Manek burj

The market was started in the 15th century as a weekly affair for the public to buy things of daily use.It was operated between Teen Darwaza and Bhadra Taar in the old part of town and was shifted on Rivefront in 1954.

Ravivari Market

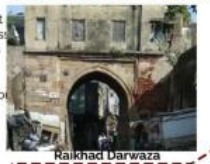
Victoria Garden was built over 200 years ago by the British. It is spread across the area of 23,000 sqm. the garden was city's center in that era and people from all over the Ahmedabad would visit but now is only used by the the people who live nearby.

Victoria Garden

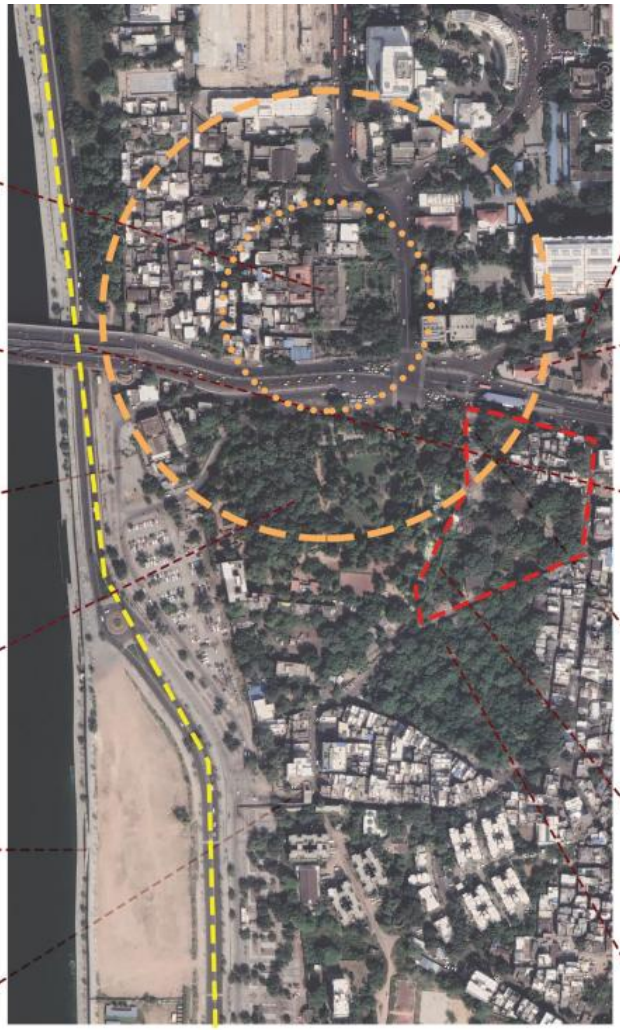
The Sabarmati Riverfront was built in 2012 and is the atractor point of the city as people from all over the city visit here. ALong with the walkway it has parks, markets and a sports complex.

Riverfront

Raikhad darwaza was built in 1611 and provided access to the river in the past. It is one of the 12 gates of the walled city. It has stone arches and iron plated doo



Raikhad Darwaza



IP Mission High School

IP Mission School is one of the first British buildings in Ahmedabad. It was built in 1863 and is stil in function. The school is largely European in style with Gothic windows.

CNI Church

The Church of Raikhad is one of the oldest church in the city of Ahmedabad and it was built in 1901. The facade has a rose window and the layout of the church is in the shape of cross.

Ellisbridge

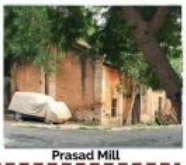
Ellisbridge is a century old bridge and was the first bridge in the city, built in 1892. It bridges the eastern and western parts of the city across Sabarmati river.The original stel bridge is preserved as a heritage landmark.

Temple

The temple in the mill compound is older than the mill compound. The temple is still used by the chali residents and the nearby residents. It adds to the social value of the place.

Prasad Mill Chaali

The chaalis of the Prasad Mill dates back to more than 100 years ago. The 4th and 5th generation of the mill workers are still living here. More than 25 families of the mil workers live in the mil compound chalis.



Prasad Mill

Prasad Mill was set up in 1865 by Bechardas Lashkari and was registered as textile mill in 1914. It is the only mill left in the core walled city area. The toatal area of the mill compound is approx 37,000 sqm.

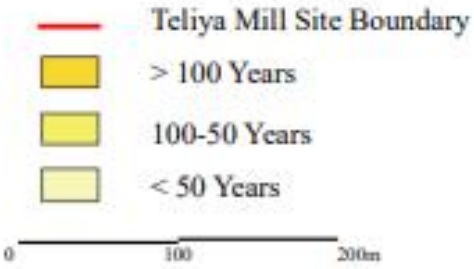
Prasad Mill Compound
World Heritage Site Boundary
Regulated zone
Protected zone
0 100 200m
N

1878 - Gujarat Spinning and weaving mill was established in the land between Walled city and Railway Station.

1881 - Gujarat Ginning mill was established to cater to the needs of the Gujarat Spinning and Weaving mill.

1889 -Seth Motilal found the ***Teliya mills*** which was directly connected to the Gujarat Ginning mill, which catered to the needs of mill operation.

Building age of the site



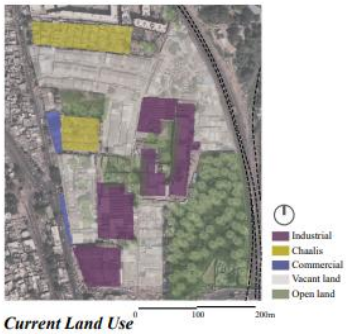
1912 - *Railway siding* was built on the request of the three mills to serve as a branch railway line towards the Sabarmati.

1920s - In the 1900s, the mill owners were required to provide housing for the workers, and hence in 1920s the chaalis were developed.

1920 to 1960 - After the 1920s, there were disagreements and the mills were divided into 3 parts. In 1960s, after World War II, the mills were closed.

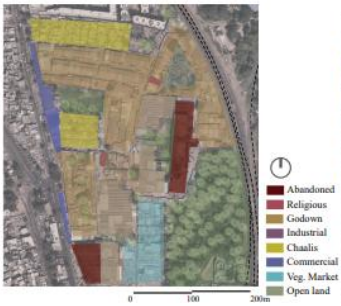
Teliya Mill Compound

Original Land Use



Prior to 1950, when the mills operated as textile production units involved in spinning, weaving, and finishing processes, the compound only consisted of factory buildings and worker accommodations.

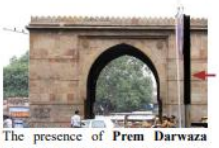
Current Land Use



After the mills closed in the mid-20th century, **the entire vacant land was redeveloped for the construction of go-downs,** taking advantage of their proximity to the railway line and the city center.

Since then, both mill compounds have been used as storage facilities. In the Teliya mill, the ground floor and basement of the **main factory building are used as warehouses and offices, while the upper two floors remain vacant** due to safety concerns.

Nodes, Paths and Landmarks



The presence of **Prem Darwaza** makes this node important. The three major roads – **Prem Darwaza Road, Idgah Road, and Bhandari ni Pol Road** meet on this node.

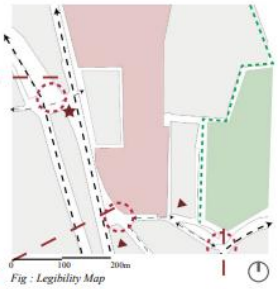


Fig : Legibility Map

- The major landmarks near the site are the ASI protected monuments - **Prembhai Darwaza and Kalupur Darwaza.**
- The minor landmarks are the local markets present in the vicinity - **Kalupur Vegetable Market, Kalupur Fruit market and Sindhi Market.**
- The major roads are **Prem darwaza road, Idgah Road, Kalupur Bridge and Bhadra ni Pol Road** and the secondary roads diverge the traffic into the inner areas.

Kalupur Darwaza is the major landmark on this node . This road remains busy because of the presence of Kalupur fruit market.

The Kalupur vegetable market road leads to a small bridge which merges with the Kalupur bridge. The **Kalupur Bridge** connects Saraspur Circle and Kalupur Darwaza .The chimneys of the Gujarat Ginning Mill compound are visible from this bridge.

Teliya Mill Compound

Districts and Edges

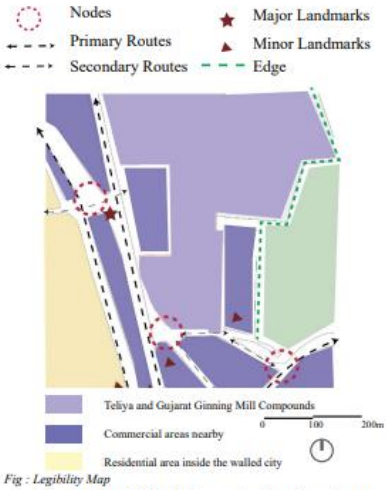
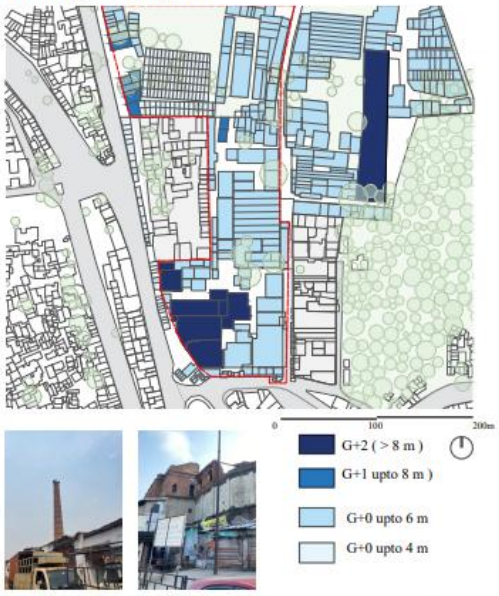


Fig : Legibility Map

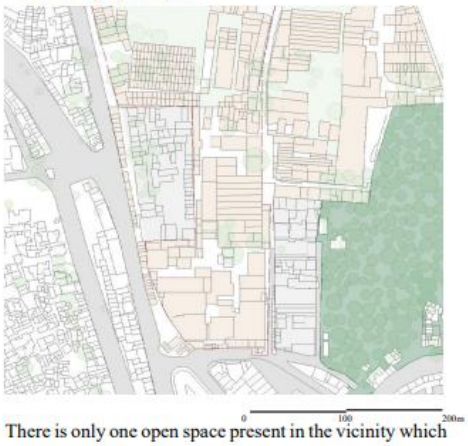
- The **edge** defined here is the imaginary boundary **between the built and unbuilt.**
- There is a clear distinction between the different zones in the neighborhood. The areas near the industrial site are the commercial districts as they are on the major roads and the area inside the walled city is the residential district.

Visibility of the builtform



The mills' chimneys and the distinctive three-story structures possess unique architectural features that set them apart from modern buildings. They are **noticeable even from a distance, making them significant elements in defining the character of the area.**

Presence of open space

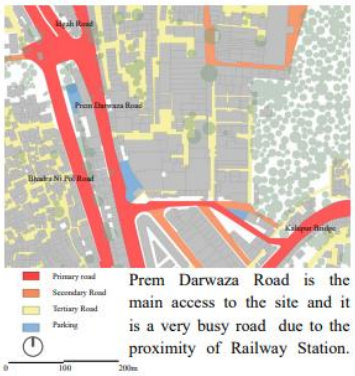


There is only one open space present in the vicinity which is also unusable as it is the buffer zone of the Railway line.

Teliya Mill Compound

Accessibility

Road Network



Prem Darwaza Road is the main access to the site and it is a very busy road due to the proximity of Railway Station.

Transit Points

There are **5 bus stops in the vicinity of 300 m** and one bus stop is in front of the entrance of mill compound which makes the site very accessible.

The **Kalupur railway station is less than 500 m away from the site.**

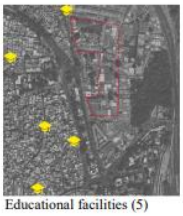
Connectivity

Distance from the city center

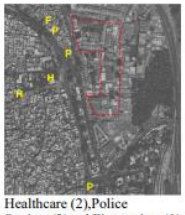
Teliya Mill Compound is located 4 kms from the city

Entrance to the site

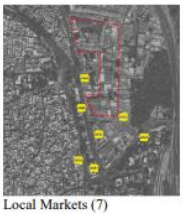
Access to facilities within 400m



Educational facilities (5)



Healthcare (2),Police Stations(3)and Fire stations(1)

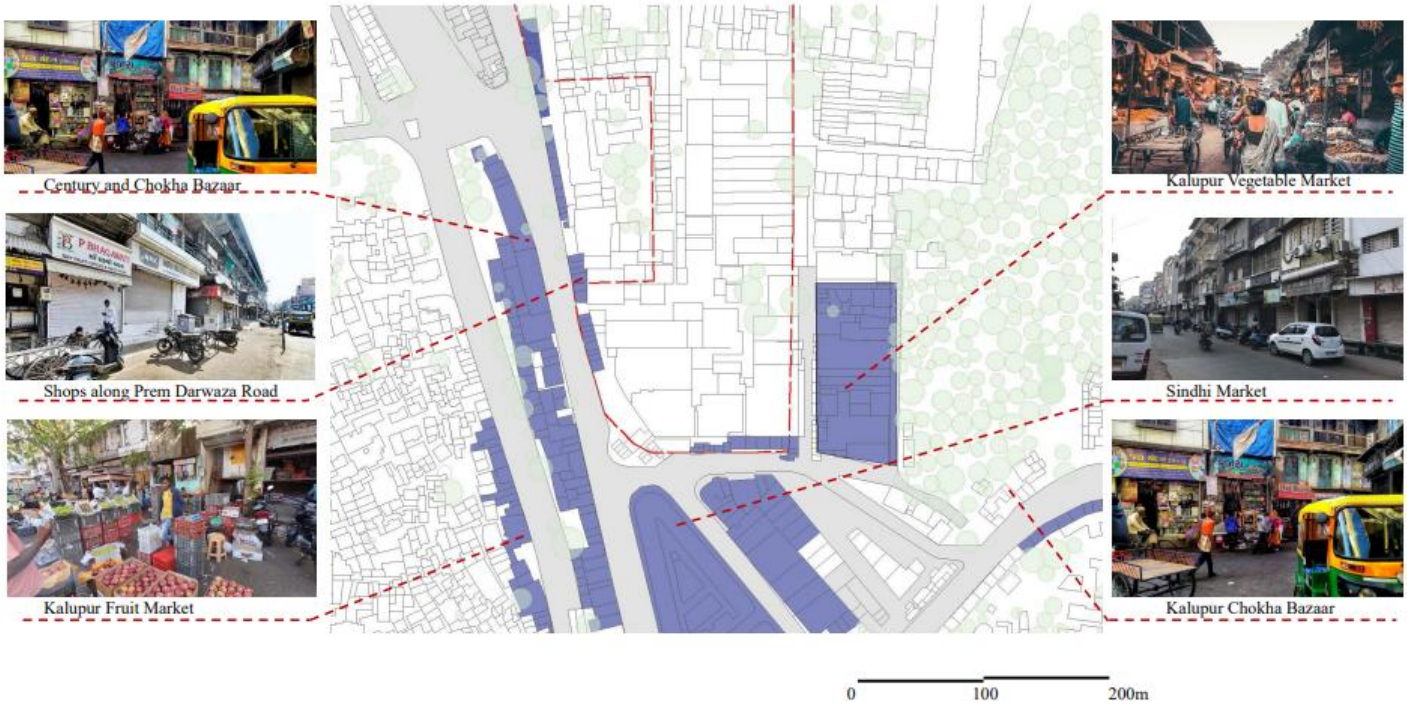


Local Markets (7)

Physical and Virtual Inclusivity

The site edge has a compound wall and gated entrance. Due to the height and siting of the main building on the road edge, it is visible from the main Prembhai Darwaza Road. The mill compound **has virtual inclusivity but lacks in physical inclusivity.**

Proximity to local markets



Teliya Mill Compound

Functionality and Adaptability

Climate Control

The older buildings in the compound are mostly East-West oriented with shared walls to reduce the heat gain but in the newly added go-downs this hasn't been kept in mind.

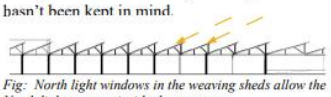
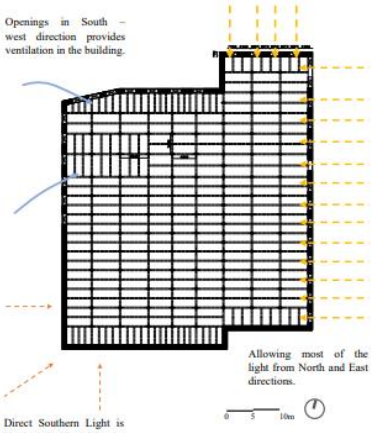


Fig: North light windows in the weaving sheds allow the North light to come inside the structure

Fig: The section of chaali unit showing the air circulation inside the unit

Fig: The units are placed closely packed with the distance of 1.5 m keeping the streets shaded



The main factory has been designed considering climatic factors. The weaving sheds are still used as go-downs as the northern lights keeps the space lit with adequate amount of light. The chaalis are two-room units with opening only from one side, for the ventilation in the back room clearstory window has been provided. The units are closely placed with a bay of 1.5 meters keeping the bay always shaded.

Flexibility

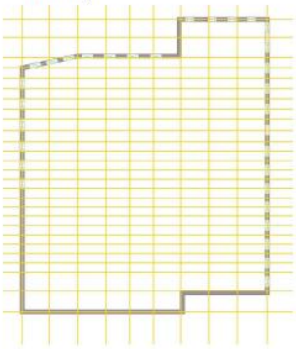


Fig: Structural grid of the main factory building

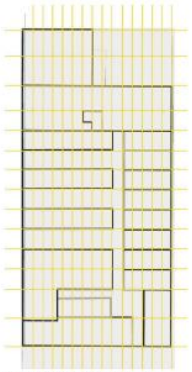


Fig: Structural grid of the weaving shed

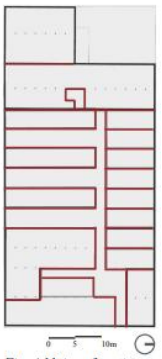


Fig: Addition of partition walls in the weaving shed to use it as a go-down space

- The flexible layout of the main factory building and weaving shed enables it to be adapted and expanded in the future, opening up possibilities for adaptive reuse as seen in the live example of weaving shed.
- The open plan also provides with easy internal circulation, spatial flow mobility, fluid and continuous nature of the space.
- Hence, the structures are to be inserted, expanded, modified, or reused as it is in the future.

Teliya Mill Compound

VALUE ASSESSMENT

LOCATIONAL VALUE	URBAN VALUE	AESTHETIC VALUE	USE VALUE	SOCIAL VALUE	HISTORICAL VALUE
Close proximity to -Railway station -World Heritage Property -Kalupur vegetable market -Kalupur fruit market -Sindhi market -City center -Prembhai and Kalupur Darwaza	Rapid urbanizing zone in the city Visibility from the main streets Visibility due to the height of the chimney Falls under the TOD zone Access from the main road (Prembhai Darwaza road) Presence of 2 ASI monuments within 300 m - Prembhai Darwaza and Kalupur darwaza; Kalupur Railway station within 500 m	Intact structural grid Presence of the arched windows on the façade Main factory building has opening on all the floors Materials used - Waste coal concrete - I section beams - Cast iron pipe columns - Exposed brick structure	Original structure still retained Continued use over a century Weaving sheds and the ground floor of the main factory used as go-downs at present. Chaalis are still used by the newer generations of the mill workers Flexible layout of the structures The compound is not pedestrian friendly as there is a movement of transportation vehicles from morning to evening. The structural system is intact and the structures are in usable condition.	Mill workers' families have still occupied the chaalis Chaali residents work in the go-downs present in the mill compound More than 100yrs old mosque and dargah is present in the compound	One of the few exisiting old mills in the city Role in the history of the city Role in riots and migration Presence of chimneys and architectural elements Presence of weaving sheds and chaalis Ornamented elements like arches and columns with capitals are present. World war II has a major role in the closure of the mill.
Access to facilities (within 500 m) Educational - 4 schools and 1 college Retail and Local Markets - 6 markets and retail shops along the Prem darwaza road Health care - 2 hospitals Firestation - 1 Police station - 3					
Access to the site Bus stop - 5 bus stops within 300m Railway station - Kalupur railway station within 500m The site is easily accessible from the Prem Darwaza Road.					

The major influencing values observed are - Historical Value, Urban Value, Locational Value, Aesthetic Value, and Use Value.

The presence of industrial architecture elements such as cast iron pipe columns, jack arch ceilings, I section beams, arched windows and the usage of chaalis and weaving sheds till now marks the significance for Historical Value and Aesthetic Value of the mill compound. The mill resides in a rapid urbanizing zone makes it an important location for the urban development. The close proximity to the Kalupur Railway Station increases the connectivity across cities. The presence of local markets such as Kalupur Vegetable Market, Kalupur Fruit Market and Sindhi Market increases the Locational Value of the site. The fact that the weaving sheds are still used as go-downs proves the flexibility and adaptive nature of the industry, making it easy to use and increases the Use Value of the building.