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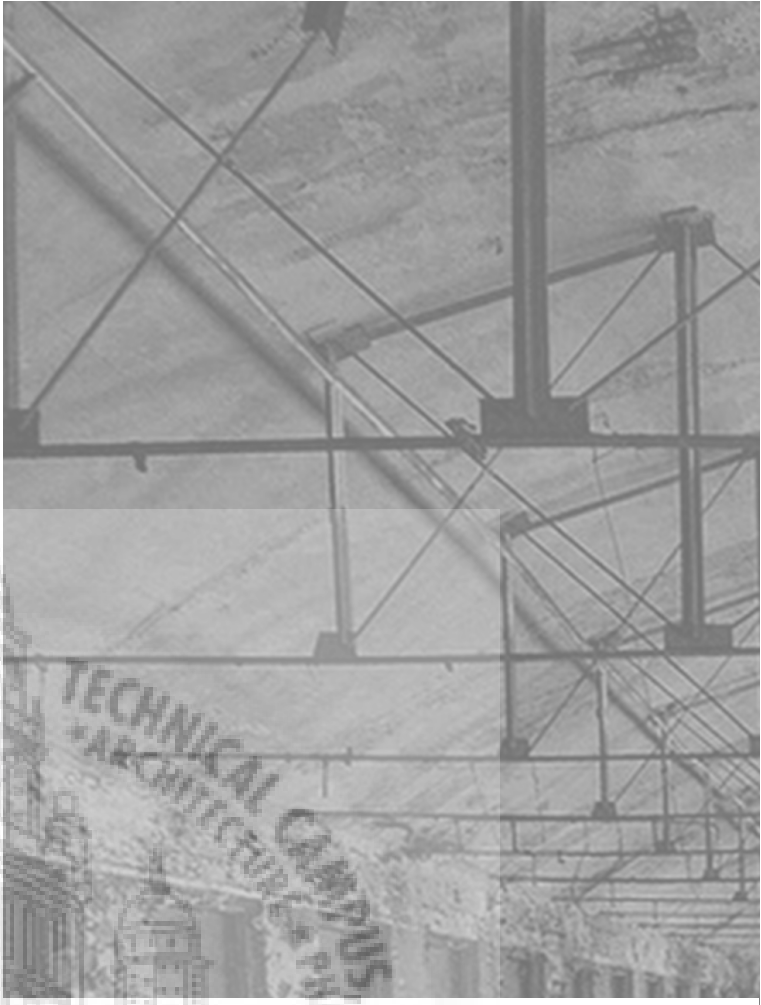

ADAPTIVE REUSE OF URBAN DECAY

Adaptive Reuse of Urban Decay

By
RAZIK NADIR KHAN

A REPORT

Submitted in partial fulfillment of the requirements for
the degree of Bachelor of Architecture.

University of Mumbai

2020-2021

AIKTC
SCHOOL OF ARCHITECTURE

CERTIFICATE

This is to certify that the Design Dissertation titled

Adaptive reuse of urban decay is the bonafide

work of the student Razik Nadir Khan from Final Year B. Arch of

AIKTC School of Architecture and was carried out in college under my guidance.

Sign of the guide:

Name of the guide: Prof. Sandeep Prajapati

Sign of the Dean: Prof. Raj Mhatre

Date: 12-12-2020

DECLARATION

I hereby declare that this written submission entitled

“ **Adaptive reuse of Urban Decay** ”

Represents my ideas in my own words and has not been taken from the work of others (as from books, articles, essays, dissertations, other media and Online; and where others' ideas or words have been included, I have adequately cited and referenced the original sources. Direct quotations from books, journal articles, internet sources, other texts, or any other source whatsoever are acknowledged and the source cited are identified in the dissertation references.

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Signature of the Student:

Name of the Student: Razik Nadir khan

Roll No: 16AR18

Date: 12-12-2020

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For the longest time I wanted nothing more than to write this acknowledgement and yet I find myself short of words This has been a very happening and tumultuous Journey and one that is equally dear to me.

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And most especially to Allah, for giving me the guidance and knowledge as well as good health in constructing this research work.

Thank you

0.2 PREFACE

"The Greenest Building is the One Already Built."

- Scott Sidler

Many cities have residual spaces, neglected areas and urban decay. These sites cause breaks or holes in the urban fabric and leave areas of less than desirable sites as well as activities. They can cause separation between different areas of a cities or fissures within a neighborhood . These residual spaces need catalytic solutions to call awareness to the potential. This thesis will explore how temporary architecture can provide the catalyst needed to reach large audience and leave resonance of the potential of the site in the minds of public. Temporality will be explored through revitalization of abandoned structures.

0.3 ABSTRACT

There is a specific beauty that exists amongst architecture in the absence of routine human interaction; it is the beauty of decay. This beauty develops over time, as buildings cease to function in the way they were originally designed to do so. As this happens, such buildings become leftover, forgotten spaces that go unseen by the bulk of society; they are left to minor, often illicit alternate uses.

The need to preserve architectural urban decay of historical and cultural value is getting more and more significant. At the same time it is very important to develop environment dynamically to sustain life activities in general. The thesis deals with the revitalization method with the purpose to preserve and restore abandoned structures, which assign a new function – to expand areas and adjust abandoned buildings to modern requirements.

This dissertation will also explore an alternative strategy to a conservative adaptive reuse practices for different building typologies that not only complements but challenges that reveals the history through the unique character and the original intent of the design by preserving the spirit of place that is more than often lost in the process of adaptation by considering the meaning of place conveyed through its architectural expressions. The adaptive reuse strategy will be formulated and tested through case studies examples.

Architectural goal

Architectural Strategy

"...Other ways for using and reading the city, for making space in individual ways, creating paths and performing otherwise, sensing, fantasizing and desiring in the city."

- Tim Edensor, Industrial Ruins: Space, Aesthetics and Materiality.

1.0 INTRODUCTION

The interest in temporary or flexible architecture is known worldwide. This type of architecture has been in use for centuries. From the desert tents of Bedouin and Mongolian yurts to the silvery distinctive shapes of the American Air-stream trailer, temporary architecture has inspired designers around the world. With its singular characteristics of lightness, transience and practicality, the possibilities of portable, prefabricated, demountable, dynamic, adaptable, mobile structures are ever-growing.

The world is changing around us. Rapidly developing building technology and new building materials bring revolutionary changes into the architectural world, allowing fantasy to float alongside imagination and produce unique results. What was unthinkable before, finds shape and develops in front of our eyes, pointing towards a different way of thinking about how we live. All these aspects of our ever changing world, along with the great speed of acceleration in the development of high technology, mean that the interest in temporary architecture is steadily increasing. This thesis will aslo investigates the study of different media and research materials that illuminate contemporary temporary architecture in the range of the last century, and touches on the futuristic perspective. It will also explore the development of new architectural ideas in the modern society, and to study historical facts that influenced the way of interaction between society and architecture. It is also important to explore the range of challenges faced by societies today and those that might be part of the future.

1.1 AIM

To discover the various parameters of adaptive-reuse in different types of abandoned building and provide and revitalize, sensitive and ideal approach of adaptive re-use functions and elements of abandoned building.

1.2 RESEARCH OBJECTIVES

- **Preservation**- To preserves the structural clarity of the old building and space.
- **Investigation**- To investigate the relationship between new and old in the adapted and reused buildings as applied to the surrounding history
- **User study**- To use the surrounding area more effectively this will benefit the users by providing opportunity and recreational space.
- **Climate**- To show the culture and climate of particular area.
- **Sustainable strategies**- To study indigenous technologies to understand the sustainable strategies that can be incorporated in ephemeral architecture and reinterpret in contemporary designs.

1.3 SCOPE AND LIMITATIONS

This thesis will explore an alternative solution to conservative adaptive reuse practice for underutilized building, that not only complements but challenges and reveals the history through the unique character.

To portray the potential of adaptive reuse strategies as a viable and socially responsible alternative to demolition and replacement.

Scope is limited to revitalizing abandoned site or building.

1.4 PROBLEM STATEMENT

Carbon footprint is maximum generated by the architecture and construction industry. A building that has lot of memory attached to it, instead of demolishing it, the best way forward is to adaptively reuse it by giving new functions that would not only reduce the carbon footprint but also make them alive once again. The adaptive reuse of underutilized buildings is a technique that can be used to help reduce the number of abandoned or unused buildings and/or prevent demolition of cultural heritage assets; thereby, introducing new programs and functions into a structure and contributing to the maintenance, rehabilitation, development and redevelopment of targeted areas within a community.

CHAPTER 2- BACKGROUND STUDY

2.1 URBAN ROT

The term rot as applied to architecture is commonly accepted as a negative state for a building to exist in. It summarizes what happens to a building once standard maintenance stops taking place, or in other words once a building is abandoned. This abandonment occurs for a breadth of reasons, most of which are tracked back to the discontinuance or perceived discontinuance of the building itself. This discontinuance is either formal (as in the building has become dysfunctional), or simply by preference. Between lack of maintenance and a day-to-day use, decay of architectural features and forms takes place. As this decay lasts, an architectural ruin is eventually born. These modern variations of ruins exist amongst contemporary cities, and are either overlooked or mistreated by urban designers, politicians, land owners, and architects alike.

2.2 Abandonment and Time

Naturally, the process of abandonment takes place over time. It is difficult to comprehend, appreciate, and address the existence of decay without first considering the effects of time on architecture, especially architecture that has been abandoned. As mentioned above "what happens to a building once standard maintenance stops taking place..." It is possible to understand how decay has come to be by observing and researching elements that contribute to the vacancy of buildings that are decaying.

2.3 CATALYST

Catalyst is a thing, action or a person which provokes a significant effect or reaction. In relation to architecture a catalyst should create cause and effect relationship between any variety elements, spaces and a user, space and user, space and site or space and surrounding context. Using architecture as a catalyst is different from simply assigning a program or purpose to a design. It should facilitate an active effect rather than simply assigning the activity that will happen withing the space, In the case of this thesis the effect between intervention and the site will be reasoning awareness of a potential of a previously residual site.

Catalyst are all meant to encourage contemplation and reaction. Utilizing these forces along with temporal quality of a space will take an ordinary visitor to a space, engage them in an experience with site they would have previously ignored.

2.4 EPHEMERAL EFFECT

The combination of catalytic design and temporal experience are important to the success of this thesis. The catalytic nature of space, and temporal experience of message and materiality, will be brought together and will be the driving force behind revitalizing abandoned sites or place.

Through the careful selection of abandoned structures it will be possible to employ these ideas, this ephemeral effect to create effective, successful and resonating space. By creating a focus on the temporal experience and a catalytic effect that place can have, a site or piece of architecture only continues to grow and transforms as it passes to different use and form, This allows urban fabric, surrounding context to grow and change with it.

It provides new opportunities for cities and communities as well as architects and designers to combat residual spaces and urban decay.

CHAPTER 3 - LITERATURE REVALUATION

The following is a literature review on the adaptive reuse of urban decay. The purpose of this chapter is to provide an account of the knowledge and ideas that have been established by peer-reviewed works published by scholars and researchers by conducting a deductive analysis of the literature in order to identify criteria for assessing the outcomes of the adaptive reuse of abandoned buildings.

The goal of this chapter is to identify criteria for assessing the success and challenges facing the adaptive reuse of abandoned buildings.

The goal of this chapter will be achieved by completing the following objectives:

1. Discuss and analyze theoretical and empirical sources related to the adaptation of abandoned buildings;
2. Address how other scholars have discussed the influential factors pertaining to the adaptive reuse of abandoned buildings;

3.1 Brief History and evolution of temporary architecture

Origins

Shelter was just used as tool to survive. Ancestors used what was available to them. They assembled or disassembled according to site conditions and geographical conditions.

Figure 1.0- Origin of temporary architecture

Impermanence in permanent

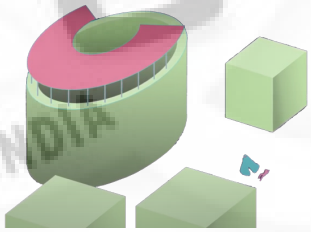


Figure 1.1- Development of temporary architecture

World fairs 1889

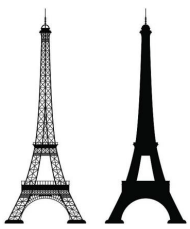


Figure 1.3- Temporary architecture in fests.

World fairs 1889

As time progressed, pavilions became a staple of parks and gardens, then transformed into shows of technological advancements during World's Fairs and World Expos dating back to 1851

Figure 1.4- Temporary architecture in exhibitions

Inference

Temporary urbanism in the form of temporary architecture can reveal the social, economic, or political needs and wants of a community. The temporary architecture can act as a space of freedom from physical needs such as shelter, as well as freedom with the purpose of meeting, exchanging, and thinking . When it is only in place for an intentionally temporary span of time, it is possible for activities, ideas, and communities to form, whereas the implication of permanence may not allow for the same action, due to efficient cost, lower level of planning, and faster development. ***Injecting temporary structures into urban areas can garner attention from communities, developers, or government and suggest a new usage for undeserved lands to be redeveloped for the communities.*** This contributes to the act of place making, in which communities take ownership and use the space that is identified by and identifies a collective cultural space.

3.2 ADAPTIVE REUSE

Defining Adaptive Reuse

There are various definitions of adaptive reuse. Authors Shen and Langston (2010) who have extensively researched adaptive reuse, define it as a way of breathing new life into existing buildings by leaving the basic structure and fabric of the building intact, and changing its use. However, it is important to understand the definition of "adaptive reuse" within a broader context in order to provide a more holistic understanding of the term. Therefore, several additional definitions have been provided.

Further, UNESCO (2015) describes adaptive reuse as finding new use(s) suitable for a place which respects form, character, structure and historic integrity and often requires some careful changes to a place.

According to Burchell and Listokin (1981) adaptive reuse is, "***a neighborhood revitalization strategy which employs series of linked procedures to: plan for, inventory, acquire, manage and reuse surplus or abandoned real estate.*** The underlying concept of adaptive reuse is its attempt to maximize the often-hidden value of real property and provide a process for the reemployment of this property. Adaptive reuse is thus the embodiment of preservation, conservation and recycling objectives for previously used, now-surplus, real property"

Defining Successful Adaptive Reuse

Understanding what exemplifies a successful adaptive reuse project is critical to this research, as it will provide a rationale for case study selections as well as a base from which to help identify assessment criteria. Determining what constitutes a "successful adaptive reuse project" is not simply achieved through a singular definition, but rather, an examination of a variety of factors that, culminate to create a realized success (Burchell and Listokin, 1981).

Successful adaptive reuse can be defined further by Zushi (2005), who explains how ***"successful adaptive reuse projects require not only good design for the building, but also careful planning that considers its surrounding environment"***. According to Conejos et al. (2013) elements and/or criteria that help define an adaptive reuse project as successful often include the following:

makes a positive aesthetic contribution to the streetscape;

- maintains the appearance and feel of the old building;
- preserves the structural clarity of the old building and space;
- conserves and incorporates several significant artefact;
- provides a rewarding and unique environment;
- creates and/or provides a unique visitor experience;
- designed using carefully modulated scale and proportion, juxtapositions of materials, light and
- shade and old and new elements – inside and out;
- resides in an ideal location; and,
- contributes to a sustainable future.

Further, Larkham, 1996; Murtagh, 2006 and UNESCO, 2007, found that successful adaptive reuse

should:

- maintain the economic viability of the heritage place;
- achieve economic efficiency;
- account for the capital costs of the building works;
- account for the future running costs of the proposed use, including maintenance costs;
- account for the potential market for the proposed reuse;
- account for the location of the property; and,
- account for the financial sources required to undertake the project.

For the purposes of this thesis, a combined view of the above definitions of successful adaptation has been adopted. Therefore, the selection of case studies for this research, was based on the criteria for successful adaptive reuse above.

3.3 Factors Influencing Adaptive Reuse

There are challenges associated with the adaptive reuse of buildings which can make the process difficult for its proponents. Factors influencing the outcome of adaptive reuse are not all challenges, some are drivers. According to Bullen and Love (2011b), the major positive influential factors for adaptive reuse are life cycle issues (the "new use"), changing perceptions of buildings (cultural and social), and governmental incentives (economic-based and legislation-based factors).

The challenges to adaptively reuse, on the other hand, include the perception of increased costs (economic-based factors), building regulations (the "new use"), inertia of development criteria and the inherent risk and uncertainty associated with older building stock.

Further, trials with a building's location, incompatibilities with the pre-existing structure's original use and the proposed new use, as well as environmental issues (such is the case with many old industrial facilities) present additional challenges to the proponents of adaptive reuse (Burchell and Listokin, 1981; Florentina-Cristina et al., 2014 and Wong, 2017).

Mısırlısoy and Günçe (2016) found that, there are seven factors that contribute to the success of adaptation. Those factors include physical, ***economic, functional, environmental, political, social, and cultural*** as factors as influencers of adaptive reuse strategies for heritage buildings – something they term "Adaptive Reuse Potentials" (ARPs).

C ultural Factors

E conomic Factors

E nvironmental Factors

S ocial Factors

Cultural Factors

The study of Roseland's (2012 p. 16) notion of "cultural capital" as, ***"the product of shared experience through traditions, customs, values heritage, identity and history which represent the cultural and traditional resources of a community".*** This definition is relevant to this study because abandoned buildings represent part of a community's cultural capital; and, to adaptively reuse one of these buildings entails the alteration of this capital.

Mısırlısoy and Günçe (2016 p. 1) reflect this view in that they found abandoned buildings to be "crucial in terms of transferring cultural identity for further generations".

Wong (2017) adds to this finding in that adaptive reuse doesn't just extend the lives of buildings, it helps to transfer cultural identify from one period to the next through design foundations; ultimately, either conserving past cultures or contributing to cultural regeneration. However, Wong (2017 p. 30) also poses rhetorical questions pertaining to both built and cultural compatibilities/incompatibilities.

For a successful adaptation, is because the proposed new use of a building is compatible with not just the surrounding land uses, but with the former and current cultures as well.

Through adaptation, a community's heritage can be conserved, but without the transfer and/or maintenance of that heritage's essence into the new use, adaptation fails to capitalize on that transfer or regeneration of culture.

The transmission or regeneration of culture is, therefore, one criterion that must be considered when assessing the success of and challenges facing the adaptive reuse of abandoned buildings.

Definition

Cultural Identity

Generations

Figure 1.5- Cultural Factors

Successful adaptation

Economic Factors

Economic-based factors, such as financing or returns on investment for example, have been identified as influencers to the success of and challenges facing the adaptive reuse of abandoned buildings (Burchell and Listokin, 1981; Shipley et al., 2006a and Shipley et al., 2006b).

Similarly, Shipley et al. (2006a) found that some adaptive reuse projects cost more than it would to demolish and build new; however, not all cost more. The key points from these studies are that financial characteristics of certain buildings affect whether they are chosen for adaptive reuse. As finances are part of the broader theme of economics, the findings from these studies confirm the a priori assumption that the feasibility, and to a certain extent, the outcome of adaptive reuse projects is influenced by economic factors. Government assistance is also a key contributor to the feasibility, and to a certain extent, the outcome of adaptive reuse projects (Shipley et al., 2006a and b).

Investments

Finance

Figure 1.5- Economical Factors

Three major factors were identified that affect the outcome of the adaptive reuse from an economic perspective:

1. "**Construction costs**;

2. the **total area of the building** which determines the lease-able or sell-able space of the structure; and,

3. the appraised **value of the property**" (Stas, 2007 p. 144-145).

Factors affecting economic perspective.

The key point from these findings is that they further identify a variety of economic-based factors that should be considered as criteria for assessing the success of and challenges facing the adaptive reuse of abandoned buildings.

Environmental Factors

It is commonplace for properties formerly containing industrial uses to have environmental complications (High, 2003; Hula et al., 2012 p. 1 and Mah, 2012 p. 53-53). Often, these properties are referred to as brownfields. Environmental Impact Studies or Assessments, are just a few of the environmental challenges many adaptive reuse projects face (Canadian Environmental Assessment Agency, 2016; Langston, 2008 and Roseland, 2012).

Carbon emission reduction

According to Conejos et al. (2013) "***building adaptive reuse plays a critical role in emissions reduction and supports global climate protection"***. It was found that, demolition of an old building can increase the disturbance to hazardous materials, contaminated ground and add the risk of falling materials and dust (Xie, 2015). When these former abandoned buildings were demolished, this disturbance was further exacerbated, as their structures and the lands beneath them often contained more contaminants than other structure types. This finding holds importance to this study because it demonstrates how, additional environmental contamination and disturbance caused by demolition, can be avoided through adaptive reuse.

Energy consumption

Goldsmith Borgal and Co. Ltd. (2012), found that in the event of building demolition, various environmental issues related to the loss of structures and a consequent loss of embodied energy are a significant issue. ***"One square foot of brick in a wall is the equivalent of 1 gallon of gasoline in terms of the energy required to make the brick, bring it to a site and erect it" (***Goldsmith Borgal and Co. Ltd., 2012). Similarly, Conejos et al. (2016) found that, "adaptively reusing existing buildings provides a significant opportunity to address climate change by reducing energy use while simultaneously improving the building's environmental performance over their entire life cycles" … as "these buildings have embodied energy and original qualities that cannot be surpassed by demolition and new construction in terms of their environmental, social and cultural contributions".

This reaffirms the understanding that the conservation of a building (especially a large building) is inherently an environmentally-friendly and sustainable process given that “it preserves the potential energy stored within the structure itself” (Goldsmith Borgal and Co. Ltd., 2012).

Not only do these findings identify environmental factors as criteria for assessing the success of and challenges facing the adaptive reuse of abandoned buildings, they also establish reasoning as to why actors may opt for adaptation as opposed to new construction. Environmental benefits included the recycling of materials, the reuse of structural elements, and the reduction in generated landfill waste (Langston et al., 2008). In addition, Langston et al. (2008) noted that older buildings were sometimes preferred, as they were often constructed using a range of higher quality materials that predictably demonstrated a “useful life well in excess of their modern counterparts (e.g. use of solid stone walls, slated roofs, marble floors, etc.)”.

Heath’s (2001) findings demonstrate how adaptive reuse projects can positively impact their surrounding locations and not always the other way around. What the above studies also demonstrate, is how location-based criteria can be used as indicators of success and/or failure when it comes to identifying the challenges, disadvantages and advantages associated with adaptive reuse projects.

Social Factor

The support of residents will collectively impact the success of a building's adaptation. After all, when assessing the feasibility of an adaptive reuse project, proponents must ask themselves, "for whom are we doing this for"? . Understanding importance of abandoned buildings as a derivative of social capital is important, because doing so, will help identify whether social factors are criteria that can be used for assessing the success of and challenges facing the adaptive reuse of abandoned buildings. According to Cho and Shin (2014), ***"local participation and initiatives are crucial in keeping balance between endorsing the cultural content and financial returns of the heritage".***

Participatory Approach

When referring to "social" adaptive reuse potentials (ARP), Mısırlısoy and Günçe (2016) infer
that there are three (3) key ARPs which help garner social support and include:

- social meaning for the local community;
- spirit of the building; and,
- public interest to the building.

The success of adaptively reusing abandoned buildings, isn't just a by-product of conservation principles, but also, a compilation of influential factors working together to assist in overcoming the challenges presented with adaptation projects; of which, social support is a part (Blagojević and Tufegdžić, 2016; Cho and Shin, 2014; McIntyre and Russell, 2016; Mısırlısoy and Günçe, 2016 and Xie, 2015). Therefore, social factor should be used as an indicator of success and/or failure when it comes to identifying the challenges, disadvantages and advantages associated with adaptive reuse projects.

Summary

The goal of this literature review was to identify criteria for assessing the success of and challenges facing the adaptive reuse of abandoned buildings. The outcome of adaptive reuse projects is primarily influenced by cultural, economic, environmental, locational, and social factors. The literature review deduced that, based on those factors, it is possible to identify criteria for assessing the success of and challenges facing the adaptive reuse of abandoned buildings. In summary, this chapter contributed to the knowledge of adaptively reusing abandoned buildings.

Influential Factor	Description
Cultural Factors	Factors which refers to those shared meanings associated with arts and other manifestations of human intellectual achievement regarded collectively that are not, strictly speaking, historic which may impact adaptive reuse, both positively and negatively (de la Torre and Mason, 2002; and Culture, n.d.).
Economic Factors	Factors that may impact the outcome of adaptive reuse which stem from economic circumstances pertaining to value, financing, market characteristics, investments, etc. which can affect adaptation projects both positively and negatively. • Positive Impact Example: Investors/Donors, Government Grants, significant return on investment, etc. • Negative Impact Example: Poor markets, insufficient contingency funds coupled with unexpected costs, undesirable Pro Forma, etc
Environmental Factors	Any potential effects or impacts that the existing structure, its surrounding lands, its former industrial use(s), and its proposed new use(s) could have on the environment, or vice versa, which may impact adaptive reuse, both positively and negatively. • Positive Impact Example: Government Grants for brown field remediation. • Negative Impact Example: Brownfield complications, adverse impacts to Species at Risk, etc
Social Factors	Factors or "values attached to an object, building, or place because it holds meaning for people or social groups due to its age, beauty, artistry, or association with a significant person or event or (otherwise) contributes to processes of cultural affiliation", which may impact adaptive reuse, both positively and negatively (de la Torre and Mason, 2002). • Positive Impact Example: Nostalgia, adequate consultation, community champions, etc. • Negative Impact Example: Tragic event within a building that creates community dislike of a building or area, insufficient consultation, or bad media/political representation.

3.4 REUSE

"..to view something as ruin, is already to have perspective." Brooker, Graemme and Sally stone. Form+ Structure: The organisation of interior space. Switzerland: AVA publishing SA,2007

To reuse is to utilize, what once was discarded and consider as waste. It creates in another language in itself. Such utilization holds a great potential in perceiving something in completely different way, yet retaining the essence of the building.

The reuse of existing buildings and redesign of spaces within them are subjects that are central to the evolution of the urban environment, and issues of conservation and sustainability have become vital to development of cities. As a mannerism of urban environment change, so does attitude towards building environment alters. More or less, such interventions deal with architecture and interior spaces parallely. There are number different reuse methods used in conservation of structure. Restoration is the process of returning the condition of building to its original state.

Renovation is the process of renewing and upgrading the building.

Remodeling is the process of completely altering the building.

All these methods can be achieved with some strategies to deal with existing building. According to cedic price, that can be used to modify existing buildings. They are:

-Addition
-Reduction
-Insertion
-Connection
-Demolition
-Expansion

Addition: When elements are added upon the building.

Reduction: When part of building is removed while retaining the basic form.

Insertion: When elements are inserted in the building.

Connection: When building is connected to adjacent building.

Demolition: When a part of building is demolished changing the architecture.

Expansion:When another space is added to existing building.

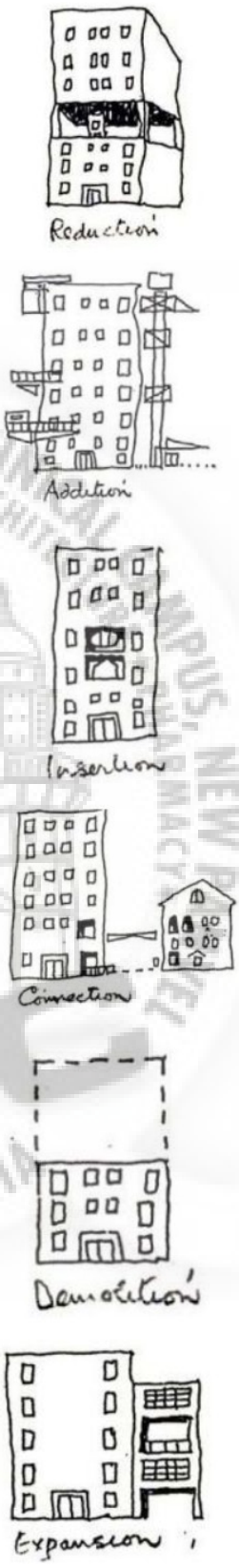


Figure 1.6- Methods of adaptive reuse.

3.5 Hugh Hardy - The Romance of Abandonment: Industrial Parks

Hardy, Hugh. "The Romance of Abandonment: Industrial Parks." Places 17, no. 3 (2005): 32-37.

Architect and critic Hugh Hardy discusses the "Romance of Abandonment" in an article from the fall 2005 journal Places.

The focus of the piece is on the aesthetic and experiential qualities possessed by the "plants, mines, mills and factories" of the Industrial Age. Importance is placed on the historical legacy such works of architecture have, as well as the subjective, yet dominant and startling beauty. In discussing the nature of reuse and development, these focal points are clearly represented. However, the piece proceeds to make other observations, such as the point that innovation is easily sparked by allowing remnants of the past to survive.

Naturally, there is a problem associated with renovation or reuse of any abandoned buildings in terms of preservation of aesthetic. This problem is even greater when it comes to the "behemoths of heavy industry," as Hardy points out.

Figure 1.6- Abandoned structure

The architecture was designed to specifically suit a single purpose, often times perfectly accommodating of machinery or processes housed within. This could be perceived as an example of functional obsolescence leading to abandonment, and thus decay. Because of the unique design and often gigantic size, they have a sort of "startling beauty."

Lack of function leads to abandonment

However, this makes reuse difficult, even in comparison to renovation of similar, or even older historic buildings. The lack of accommodation of new program leads into what Hardy identifies as the three main issues concerning reuse of heavy industrial complexes: ***"The nature of the reuse (what activities to include); the availability of funding; and the aesthetic approach taken."*** While these primary issues are very concrete and normal from most adaptive reuse standpoints, Hardy constantly advocates for the preservation of romantic aesthetic while addressing the problems commonly faced by political.

Issues concerning reuse

groups and developers who possess the fundamental driving force behind any potential reuse. In a sense, Hardy focuses on the aesthetic of abandoned industrial sites while prescribing a solution that fits within the status quo.

There are two extremes in terms of industrial redevelopment. Hardy points out that complete Demolition and new construction lies on one end, and preservation as a museum on the other. Between these are a variety of mixed uses, including "housing, retail stores, offices, and entertainment venues." Using the Landschaftspark in Duisburg, Germany as an example (perhaps because it had won a Places award in 2005) the author points out the interesting juxtaposition created by converting the lands around abandoned, decaying steel mills and coal plants into natural green space. Aside from the aesthetic, the environmental benefits associated with this reuse are often reason enough to pursue such plans. There are other rewards that Hardy points out, namely the potential to spur urban renewal in surrounding communities, create profit and a stronger urban tax base, and even encourage tourism - as a sort of monument to our nation's industrial past.

The second contributing problem associated with reuse is funding. There are often a large group of potential funding sources, and an even larger mix of groups and persons with concerns.

Because of this preexisting setup any plans "require consensus among varied constituencies." The funding sources are often a combination of various private and public organizations, and thus renovation "requires a concerted effort by the surrounding community."

Environmental factors also have a priority in when it comes to funding. In the United States contaminated places known as "brownfields" are subject to federally mandated remediation. Thus, funding is available for this aspect but often significantly slows a project. Even in the extreme case of complete demolition, this remediation work is a requirement in the case of most industrial sites. Hardy cites the problems associated with the Bethlehem Steel plant in Pennsylvania as a good representation of how environmental site conditions have the power to stall a project perpetually.

There are plenty of successful reuses of abandoned industrial era sites, though. In Birmingham, Alabama the Sloss Furnaces have become the only blast furnaces in the United States that are preserved as a museum of industry. A varied program of community uses - educational, cultural, and recreational programs - are currently undertaken at the site. The project was funded by public and private funds, and is now designated a National Historic Landmark. The aforementioned Bethlehem Steel plant, although stalled, was the site of interesting planning. It was once the second largest steel plant in the world, and proposals call for renovating the grounds as a casino, entertainment, and retail complex that would provide the financial justification for preserving the existing facilities. The Landschaftspark in Duisburg, the High Line in New York City, and the Promenade Plantée in Paris are a few more examples that illustrate the key points outlined by Hardy throughout his article.

At Landschaftspark, which Hardy identifies as the most spectacular reclamation effort, the balance between the two extremes (demolition and static preservation) is at a perfect equity. ***The mix of nature and industrial ruin allows a supple modern use, while preserving the true character of the industrial facilities.*** The High Line and Promenade Plantée are other examples of this balanced juxtaposition.

On one extreme end of the reuse spectrum are places like Sloss Furnaces, where the original purpose and character of the site are clearly preserved. On the other are the Tate Modern in London and Dia Beacon in New York. These sites offer hardly any notion of former industry. While still successful as renovations, the romantic beauty of the historic industrial ruin has been erased, and a completely new aesthetic has been applied to the stripped, blank canvas. Hardy arrives at the conclusion that preserving the existing and sinister beauty of industrial ruin should be a priority, and it can be quite successful.

Adaptive reuse strategy

Figure 1.7- Bethlehem Steel Plant

While mammoth ruins of industry still dot the landscape of most industrial age cities, the Processes observed at a number of sites have shown to be successful from a very functional standpoint. There is value to reuse, not only in terms of revitalizing communities and returning profit, but also with regards ***to culture; local urban life, community, arts, and heritage are all greatly affected by reuse of abandoned industrial places.*** Through explaining the past, architects and developers can foster innovation, and the "rich history and off beat aesthetic," of industrial sites are catalysts for that process. Much potential lies within these sites that exist all around the world, especially parts of the American Midwest, and specifically sites in Cincinnati.3 Hardy explains this from an architectural, economical perspective. He writes with prescriptive notions of how to physically bring about the solutions he describes, and takes a very concrete and formal perspective, overall.

Effect of adaptive reuse

3.6 Industrial Ruins: Space, Aesthetics and Materiality

Edensor, Tim. Industrial Ruins: Space, Aesthetics and Materiality. Berg Publishers, 2005

Tim Edensor, a researcher and professor at The Manchester Institute of Social & Spatial Transformations, discusses the "space, aesthetics, and materiality," of forgotten industrial architecture. Edensor focuses his book Industrial Ruins: Space, Aesthetics and Materiality on the abstract program that is so often possessed by abandoned architecture of the Industrial Age. Through photographs and convincing narrative, Edensor shows how neglected sites accommodate certain activities that "overdesigned spaces of the city," are incapable of supporting, and it is the disordered and fragmented sensuality of such places that leads to this. It is the ambiguity and surprise that makes industrial ruins an important cultural element, he argues. In the book's introduction, Edensor presents this statement: "I want to highlight how the contingent, ineffable, unrepresentable, uncoded, sensual, heterogeneous possibilities of contemporary cities are particularly evident in their industrial ruins." While he stops short of suggesting best practice examples, it shows that there exists a certain character of importance with regards to industrial ruin.

Edensor concludes by making a point that is not often considered by designers. It serves as a critique of urban life, stating that we currently live "In a period in which strategies for arranging urban space seem insufficiently nuanced and notions of civic order are gaining a stranglehold which threatens to choke much of the life out of cities." He argues that over-design, be it demolition and replacement of industrial decay, or even adaptive reuse, leads to a sterile urban environment that possesses less character. By appreciating decaying industrial sites, designers allow residents to have "Other ways for using and reading the city, for making space in individual ways, creating paths and performing otherwise, sensing, fantasizing and desiring in the city."

In summary, Edensor believes that (at least in the short-term) ***abandoned buildings can be left as is, and serve as unprogrammed leftover space that has a positive effect on the community as a whole.*** In Cincinnati and similar cities this already occurs, and the problem lies in perception. Urban decay is considered blight, and the sub-cultural service they provide is ignored. While technology and demand may not only make adaptive reuse easier in the long term, but also merit it, the short term purpose of abandoned structures should not be overlooked. Far too often does ignorance and/or negation of the positive contributions abandoned buildings offer to society lead to demolition and loss of historic fabric.

Edensor, as a professor of "Social and Spatial Transformations," is fundamentally perceiving abandoned spaces from the standpoint of their sociological existence. Unlike Hardy, his viewpoint is not from a concrete, architectural perspective. Rather, it is purely analytical and conscientiously thoughtful.

Figure 1.7- Abandoned Hudepohl Brewery.

3.7 Manufactured Sites: Re-thinking Post-industrial Landscape

Kirkwood, Niall. Manufactured Sites: Re-thinking the Post-industrial Landscape. 1st ed. Spon Press, 2001.

Aside from the abstract and ambiguous concepts of aesthetic and unprogrammed functions, there are concrete and objective issues associated with abandoned industrial sites. In a recent book compiled by Niall Kirkwood, a professor of Landscape Architecture at the Harvard Graduate School of Design, some of these issues are studied and presented while the qualities of aesthetic and character are kept in mind. This is described in the introduction by Kirkwood, who states that ***"Two central themes of the book are the range of emerging technologies and design strategies used in reclaiming waste and contaminated urban sites and the creative alliances of technology and design that result."*** He continues throughout the book to discuss modern technology and how it specifically allows designers to approach industrial sites that are often contaminated. Kirkwood, with the assistance of several other contributors, points out several examples that are deemed successful in terms of the two main focus points of the book. Peter Latz, a landscape architect and contributor to the book, discusses a certain industrial ruin that was restored as an attraction within a park.

Using technology as strategy for adaptive reuse.

He states that "The idea to develop the future out of human destruction has obviously existed for some time..." and continues, ***"We have to ask ourselves which spaces from among the dilapidated and redundant places we want to use and occupy, and which of those have to be changed by the mark of a cultural intervention or the remediation of historical contamination."*** Overall, Kirkwood and his contributing authors present a cohesive strategic guide for approaching abandoned industrial sites from a design perspective.

The example discussed by Peter Latz in Manufactured Sites lies in the northern Ruhr Valley of Germany, and is the site of one of the most massive revitalization projects that has taken place Anywhere in the world (Hugh Hardy also refers to this site as an example in the aforementioned article "The Romance of Abandonment: Industrial Parks").

Over 100 projects occupying nearly 600 acres have been undertaken as part of a massive framework plan that has a focus on not only bringing new life into the blighted area, but also on preserving the character and unique beauty of the industrial infrastructure that is characteristic of the region. The redevelopment that can be seen here is important in that creates a link between contemporary cultural and economic needs and the industrial past of the blighted remains. Rather than the popular approach of re mediating blight, the formerly existing conditions of the Ruhr Valley were used as design. From the onset of the design process, a certain beauty was perceived amongst the ruins of industry, and this perception helped to Guide designers. The scope of the work at ***Duisburg-Nord*** contains elements of economic, social, and environmental sustainability; indeed these concepts are all inherent in the nature of reuse. From an economic standpoint, land and buildings that had ceased to operate entirely have now been returned to a use. Through fees, donations, and volunteer efforts the park itself can operate successfully, while the grander impact on the surrounding community is even greater. The hundreds of thousands of annual visitors have also contributed to new growth in surrounding business areas. Nearby housing, as part of the larger framework plan, has also contributed to economic growth. From a social standpoint, eliminating a massive, unproductive site in close proximity to neighborhoods contributes to the success of the social environment The environmental benefits of such a project speak for themselves. Large amounts of chemical contamination that would have otherwise slowly dissipated into the environment causing adverse affects on the surrounding communities were instead dealt with in a way that would cause the least amount of side effects.

To summarize, the overall framework plan instituted in the Ruhr Valley has created semi-urban spaces that have performed successfully over the past twenty years. The combination of some surviving industry, new housing, renovated housing, and business districts were critical to the success of the park areas that have become iconic tourist attractions. The interaction of these community elements is what has allowed the overall framework plan to perform successfully. What Kirkwood writes about is a combination of landscape architecture theory and real world applications. His perspective, that of a landscape architecture professor, is quite clear. The perspective is analytical and based upon that of many built sites. From this analytical position, Kirkwood forms a prescriptive element that encapsulates the primary motivation behind the currently existing places, like the one-described previously (Duisburg-Nord).

Figure 1.8- Post-industrial landscape parks of Duisburg-Nord and Zollverein

CHAPTER 4- CASE STUDIES

4.1 TANK SHANGHAI

Purpose- To investigate the relationship between new and old in the adapted and reused buildings as applied to the surrounding history.

Brief Description- Structure is located along the banks of Shanghai's Huangpu River, five decommissioned aviation fuel tanks once stood abandoned on an empty industrial site.
Open architecture have given life and relevancy to these abandoned tanks and surrounding site.

LOCATION

Longteng Avenue, Shanghai

Site area 60,000 SQ.MT
Bua area 10,000 SQ.MT

TANK Shanghai is a nonprofit institution and a pioneering and multi functional art center. Through contemporary art exhibitions and events, the public is invited to closely experience art, architecture, the city, nature and the exceptional Huangpu river view.

TANK Shanghai consists of exhibition spaces, a parkland, gardens, a plaza, a bookstore, an education center and a café

Figure 1.9- Site plan of Tank Shanghai

TIMELINE

It took over of course of six years, the five tanks were converted from waste containers to a vibrant contemporary art center, with galleries and other public spaces housed within the tanks themselves.

Tank Shanghai has attracted millions of visitors since its opening in March 2019 and has solidified its place in the city's contemporary art scene.

It sets itself apart as a sanctuary for both people and nature.

From the year 2002 structure was under-utilized and abandoned.

For adaptation from five fuel tanks two was demolished .

In the Year 2012 construction of Art museum started.

In the year 2019 construction of Tank shanghai was completed.

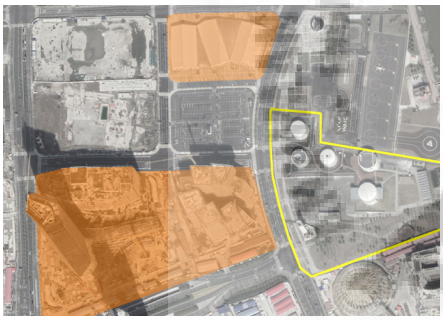
Figure 2.0 - Timeline of Tank Shanghai

Virtual Fluxes

Context has important landmarks and commercial hubs. Due to flux, abandoned fuel tanks were revitalized to mix up with the surrounding context.

Longhua Airport

Commercial Zones



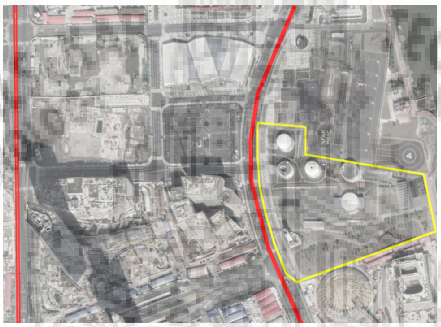
Public Parking Facility

Figure 2.1 - Virtual Fluxes

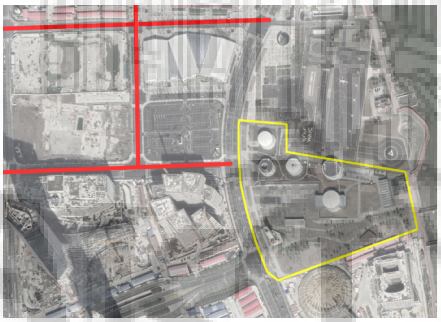
Material Fluxes

Material Fluxes reflects the human activity around the site.

Primary Roads



Secondary Roads



Road networks

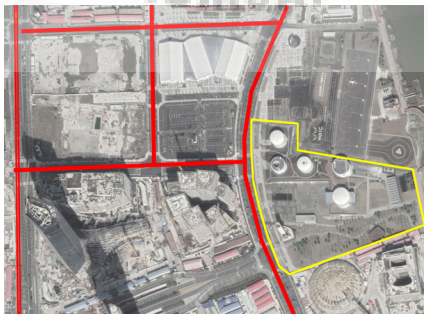


Figure 2.2 - Material Fluxes

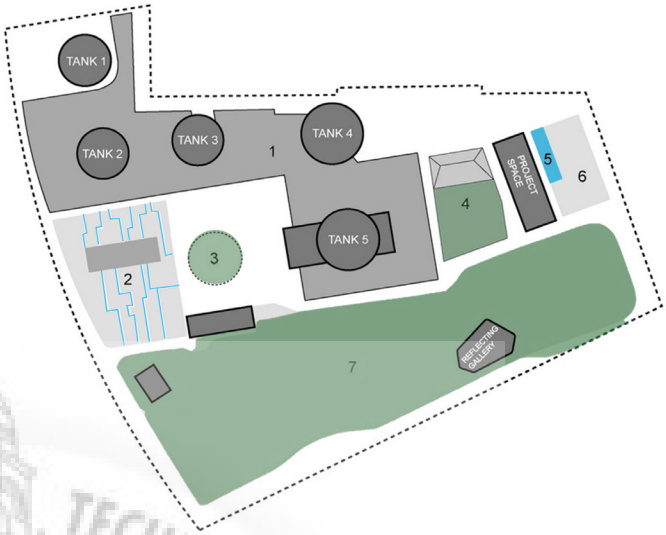
Natural Fluxes

The river pulls out the heart of the neighborhood towards its bank. Initially river was not accessible to public due to abandoned fuel tanks. Revitalization brought back the connection of river with public.

Figure 2.3 - Natural fluxes

ZONING

Conceived of as both an art museum and an open park, Museum sets itself apart as a sanctuary for both people and nature.
Open, accessible, and seamlessly integrated with the surrounding landscape, the project not only pays tribute to the site's industrial past, but also seeks to dissolve conventional ideas of site limitations and demarcations.



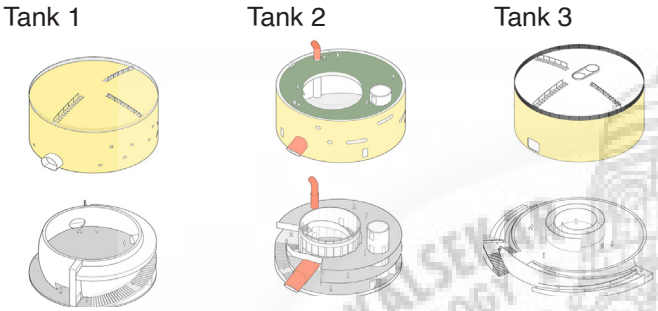


Figure 2.4 - Zoning of Tank Shanghai

GROUND FLOOR PLAN

Museum's design purposefully rejects the idea of a bordered site. Long, sloping landscaped meadows down to and around each tank gallery offer open access to the street and riverside, inviting visitors and passerby to move freely between the city, nature, and art.

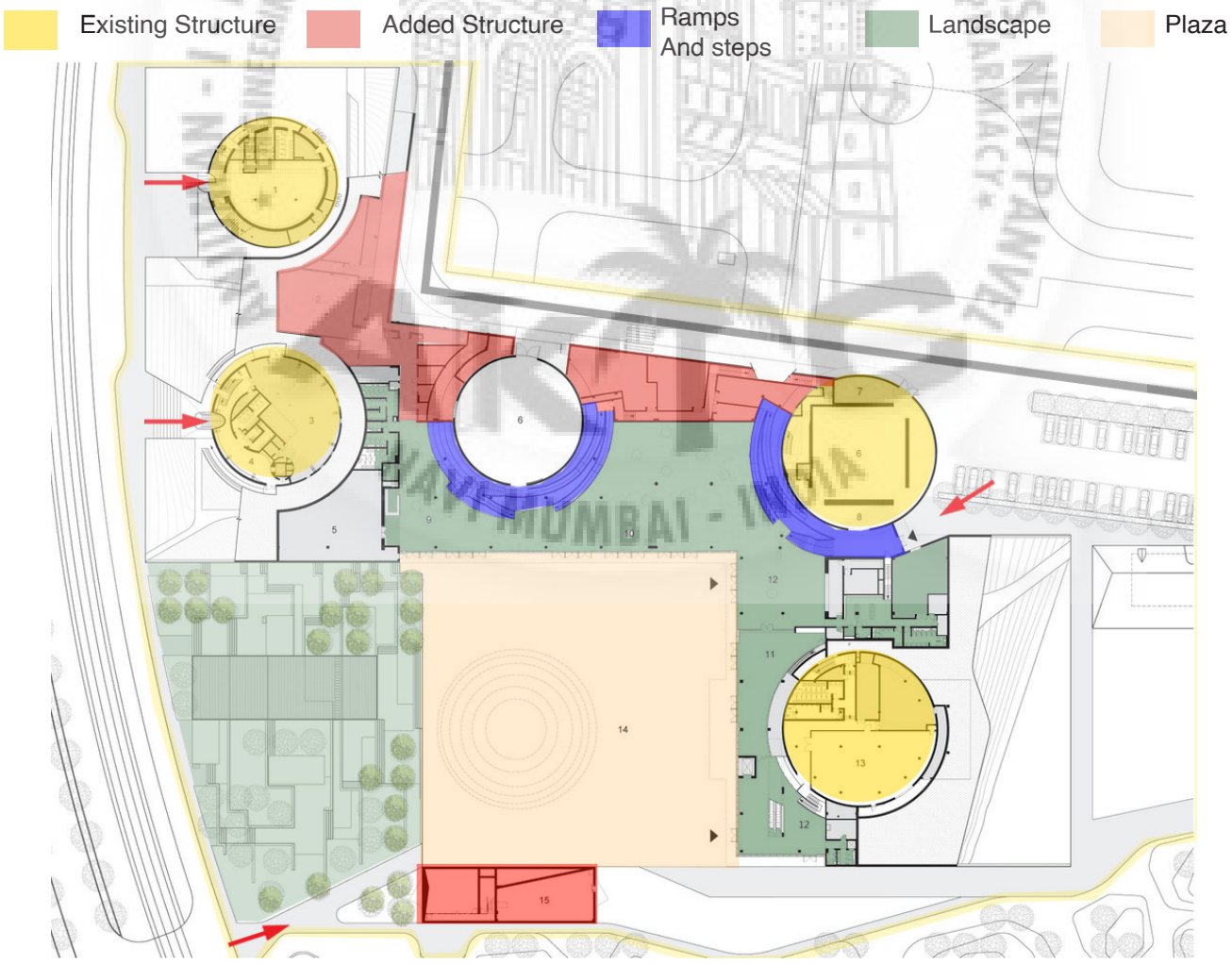


Figure 2.5 - Master plan of Tank Shanghai

FIRST FLOOR PLAN

Conceived of as both an art museum and an open park, Museum sets itself apart as a sanctuary for both people and nature.

Open, accessible, and seamlessly integrated with the surrounding landscape, the project not only pays tribute to the site's industrial past, but also seeks to dissolve conventional ideas of site limitations and demarcations.

1. Live Music Club 2. Restaurant 3. Art Gallery 5. Multi-functional Space 6. Terrace
7. Urban Plaza 8. Electrical Room
Platform

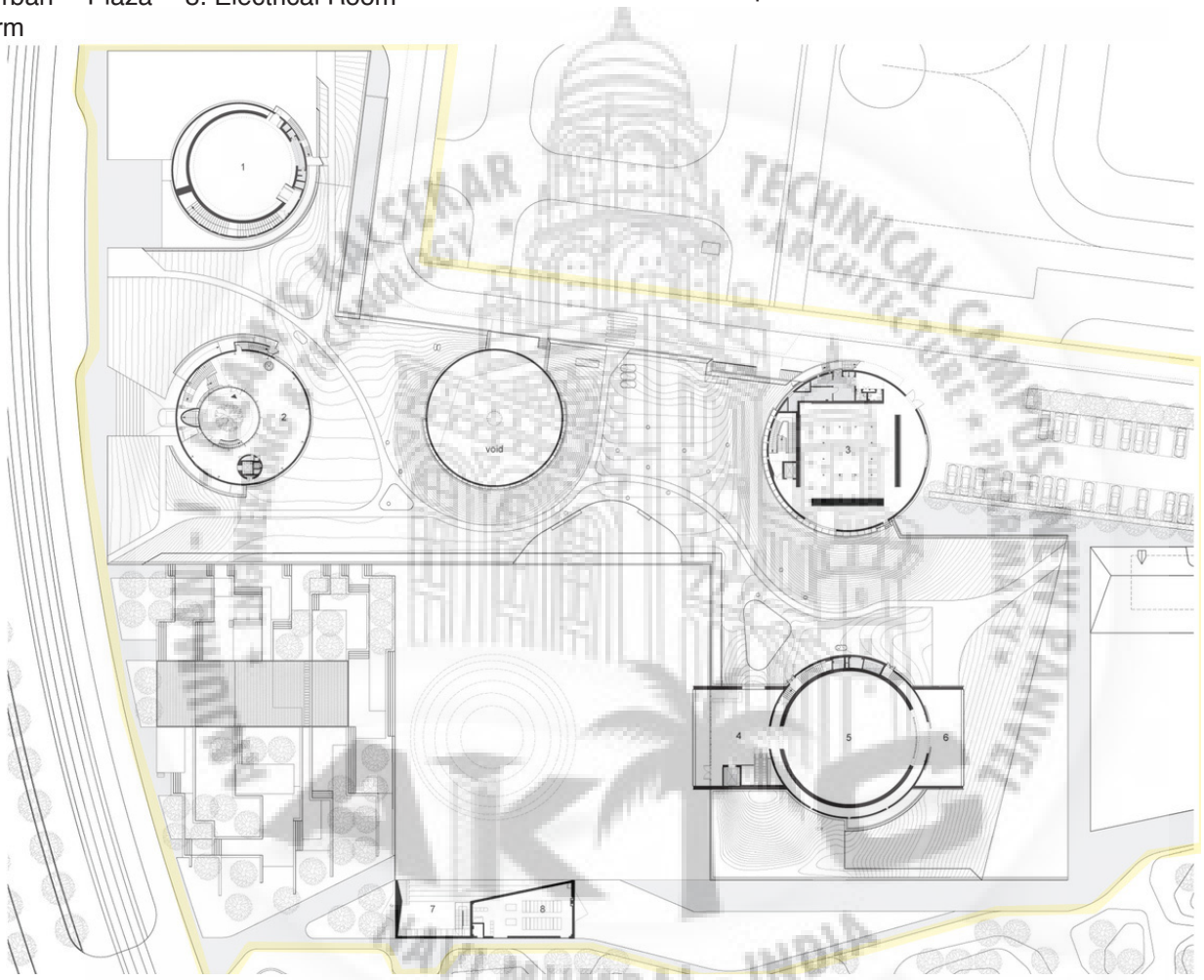
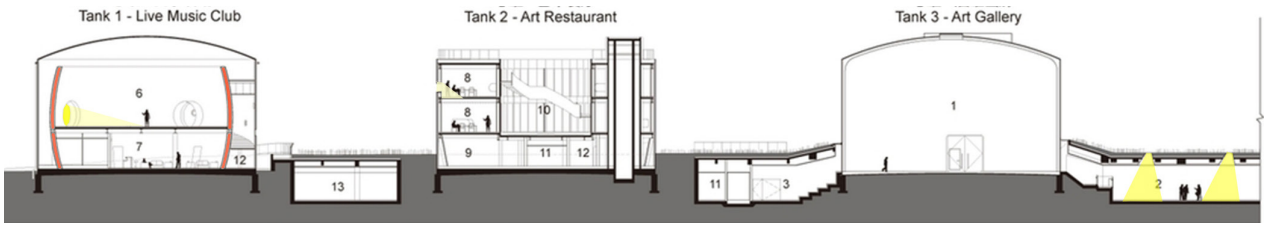


Figure 2.5 - Floor plan of Tank Shanghai

DESIGN FEATURES

Two of the tanks sit above the Super-Surface, while the other three sit halfway below, creating free-flowing indoor public spaces and offering opportunities to access each of the tanks' galleries from beneath.



Overall Section A-A'

Figure 2.5 - Section a-a of Tank Shanghai

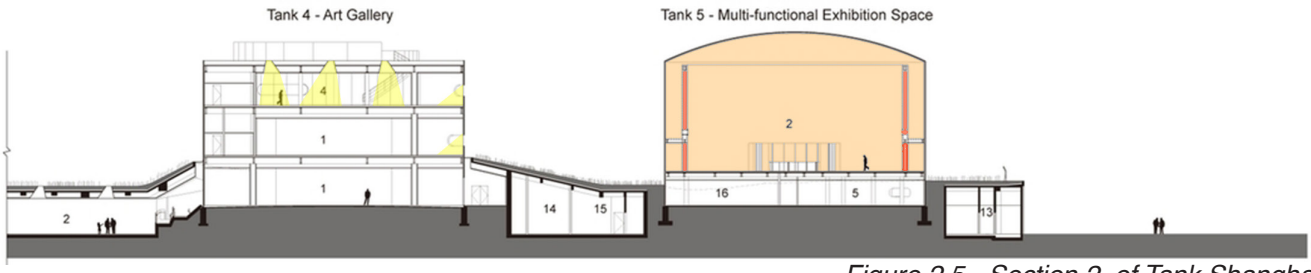


Figure 2.5 - Section 2 of Tank Shanghai

Section B-B'

1. Art Gallery
2. Multi-Functional Space
3. Cafe
4. Office
5. Open Office
6. Live music club
7. Bar
8. Restaurant
9. Kitchen
10. Atrium
11. Restroom
12. Facilties Room
13. Service
14. Security Service
15. Lockers Room
16. HVAC

Natural Lighting in Interior Space

Floor-to-ceiling windows and skylights flood these otherwise dimmer underground spaces with light and allow gallery visitors to observe seasonal changes in the park landscape beyond.

Figure 2.6 - Natural lighting (Tank Shanghai)

Landscape Features

Central to the project's design is the merging of architecture and landscape through a Z-shaped "Super-Surface"—a 5 hectare landscaped swath of trees and grasses which connects the five tanks and weaves different elements of the site together.

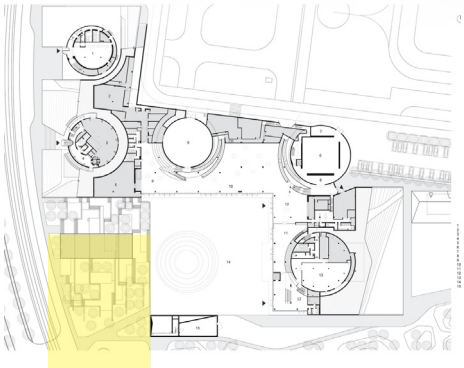


Figure 2.7 a - Landscape feature (Tank Shanghai)

Figure 2.7 b- Landscape feature (Tank Shanghai)

SOCIAL PARTICIPATION

Many of those who come to the Tanks do so not only to view an art show, but also to jog or picnic on the project's undulating landscaped lawns.

This unusually open approach to the museum space has already brought about unexpected benefits and inspired new operational models for the art center.

By introducing new audiences to the traditionally closed-off space of the art center, Tank Shanghai has brought unprecedented energy to the formerly industrial neighborhood and to the southwest banks of the city at large.

Reflecting Gallery

Figure 2.8- Reflecting gallery

Urban Forest

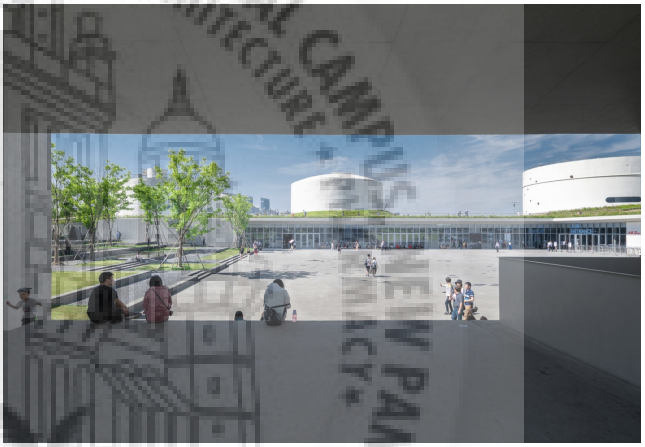


Figure 3.0 - Urban forest

Super surface

Figure 2.9- Super surface

Plaza Platform

Figure 3.1 - Urban plaza

DESIGN STRATEGY

The design strategy employed to retrofit the five tanks varies according to the requirements of the different programs housed within them.

From the exterior the surface of all of the tanks preserve their original industrial aesthetics; only occasional round or capsule-shaped openings and portholes were added.

Tank Shanghai represents a new type of urban art institution—one linking the past and the future, reconnecting people with the natural environment, and fusing art with nature.

Tank 1

Tank 1—a two-story live-house and bar—contains a drum-shaped inner tank with curving walls that improve the space's acoustics for musical performances.

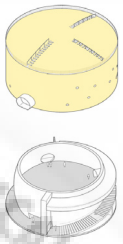


Figure 3.2(a) - Tank 1

Tank 2

Tank 2—a restaurant—is organized around a circular central courtyard, on top of which rests a roof deck for alfresco dining.

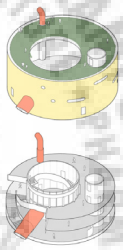


Figure 3.2(b) - Tank 2

Tank 3

It remains intentionally unchanged, with its original interiors offering a unique domed space for displaying large artworks and installations.

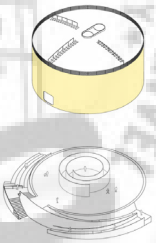


Figure 3.3(c) - Tank 3

Tank 4

Tank 4 contains a three-level cube that offers more conventional spaces for gallery and canvas art.

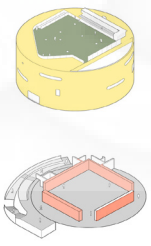


Figure 3.4(d) - Tank 4

Tank 5

Tank 5 features an additive rectangular volume that passes through the body of the tank and emerges on either side to form two stages on both ends.

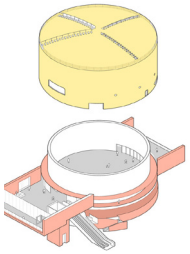


Figure 3.4(e) - Tank 5

DESIGN CLUES

PRINCIPLES OF ADAPTIVE REUSE

1. Preservation

From the exterior the surface of all of the tanks preserve their original industrial aesthetics; only occasional round or capsule-shaped openings and portholes were added.

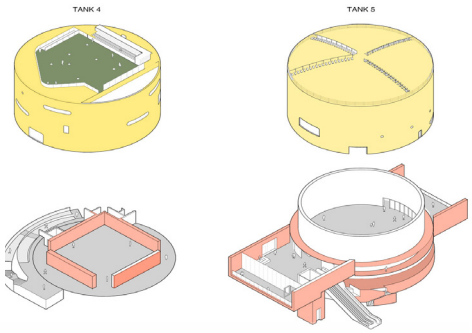


Figure 3.5 - Preservation principles of adaptive reuse

2. Additon

Adding an element but keeping the beauty of existing structure preserved.

Figure 3.6 - Addition principles of adaptive reuse

3. Subtraction

Subtracting an element but keeping the beauty of existing structure preserved

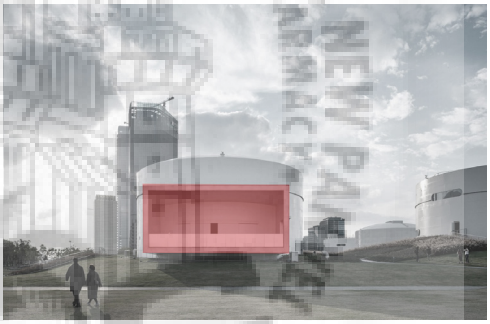


Figure 3.7 - Subtraction principles of adaptive reuse

SWOT ANALYSIS

Strength

Tank Shanghai represents a new type of urban art institution—one linking the past and the future, reconnecting people with the natural environment, and fusing art with nature.

Weakness

No connectivity between the tanks

Opportunities

Two tanks that was removed should have been incorporated in the new design.

Threat

Disturbances from nearby airport.

4.2 TRANSFORMATION OF POWER STATION

Purpose- To study the extension project without disturbing existing historical structure.

Brief Description- Tate Modern is a modern art gallery located in London. It is Britain's national gallery of international modern art and forms part of the Tate group.

LOCATION

Bankside, London, SE1, United Kingdom

Architect- Herzog & de Meuron

Figure 3.8 - Location plan of Tate modern.

TIMELINE

London's Bankside Power Station stood disused from 1981 until 2000. It took over of course of 18 years, the power station were converted from unused powerstation to a vibrant contemporary art museum.

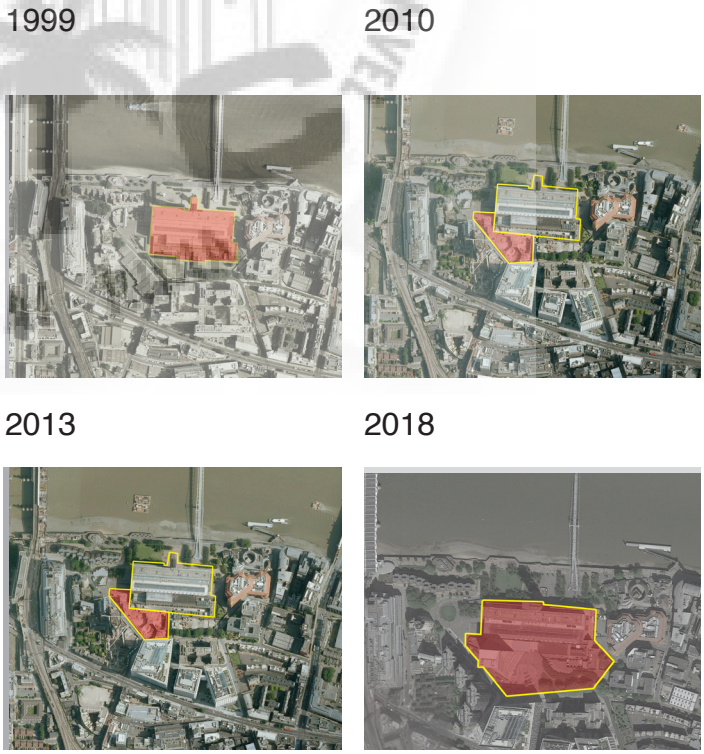


Figure 3.9 - Timeline of Tate modern.

CONTEXT

Virtual fluxes

Context had different types of buildings such as institutes, banks and art galleries. This powerful context encouraged Government to revitalize the abandoned structure.

Material Fluxes

Material Fluxes reflects the human activity around the site.

Natural fluxes

The river thames pulls out the heart of the neighborhood towards its bank.

Institute

Art Galleries

Hsbc Bank

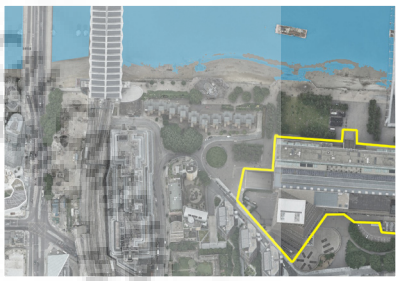
Figure 4.0 - Virtual fluxes of Tate modern

Primary Roads

Secondary Roads

Road networks

Figure 4.1 - Material fluxes of Tate modern



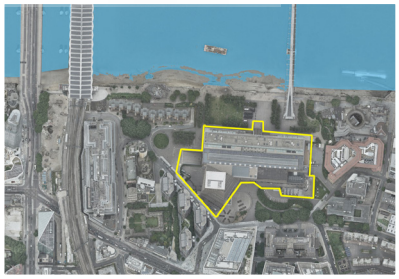


Figure 4.2 - Natural fluxes of Tate modern

DESIGN PROCESS

The Tate Modern. Swiss architects Herzog & de Meuron approached the conversion with a relatively light hand, creating a contemporary public space without diminishing the building's historical presence. The impressive cultural icon has since become the most visited museum of modern art in the world, revitalizing its formerly sequestered, industrial neighborhood.

Unused switch station on south of building

Oil Tanks once part of the old power station.

Structure of the new vertical building

Transformed new building.

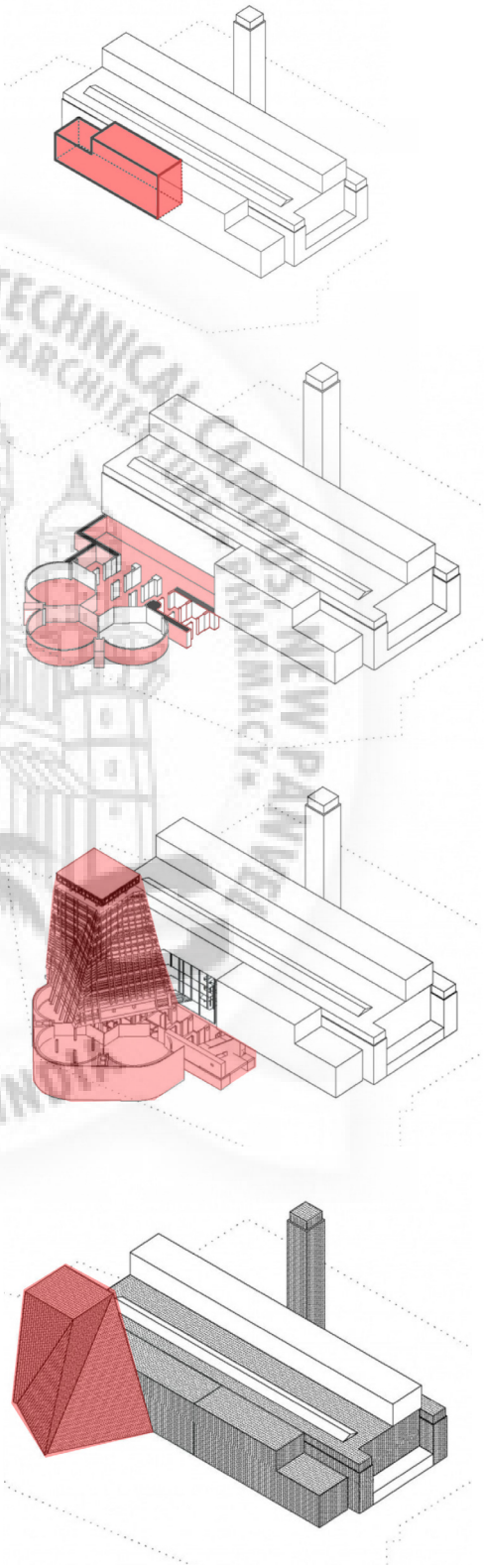


Figure 4.3 - Design process of Tate modern

GROUND FLOOR PLAN

In order to accommodate a broad range of art, Herzog & de Meuron replaced much of the power station's interior with galleries of differing sizes. They share an understated aesthetic, but range in height from five to twelve meters, illuminated by a variety of natural and artificial lighting.

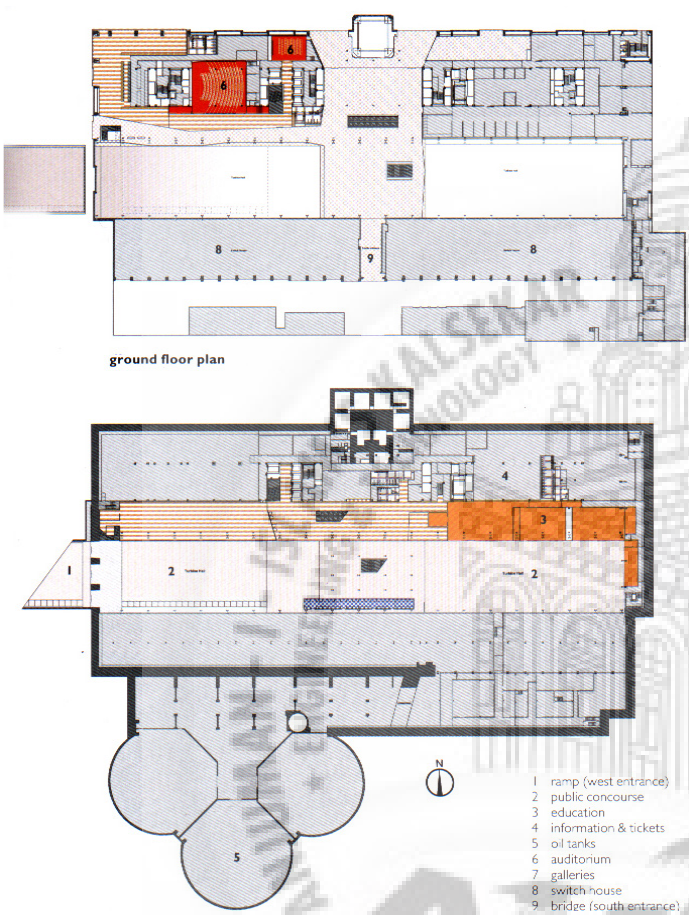


Figure 4.4 - Floor plan of Tate modern

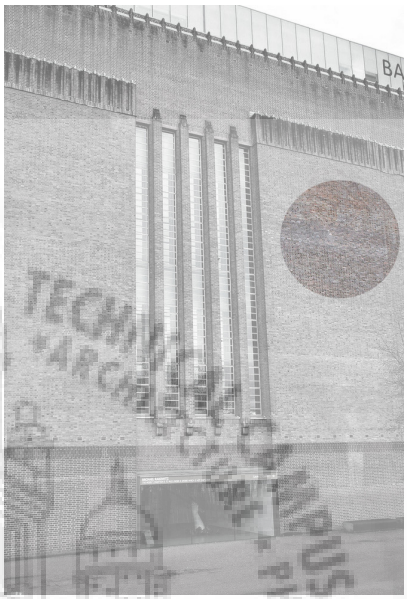


Figure 4.5 - Material pallete of Tate modern

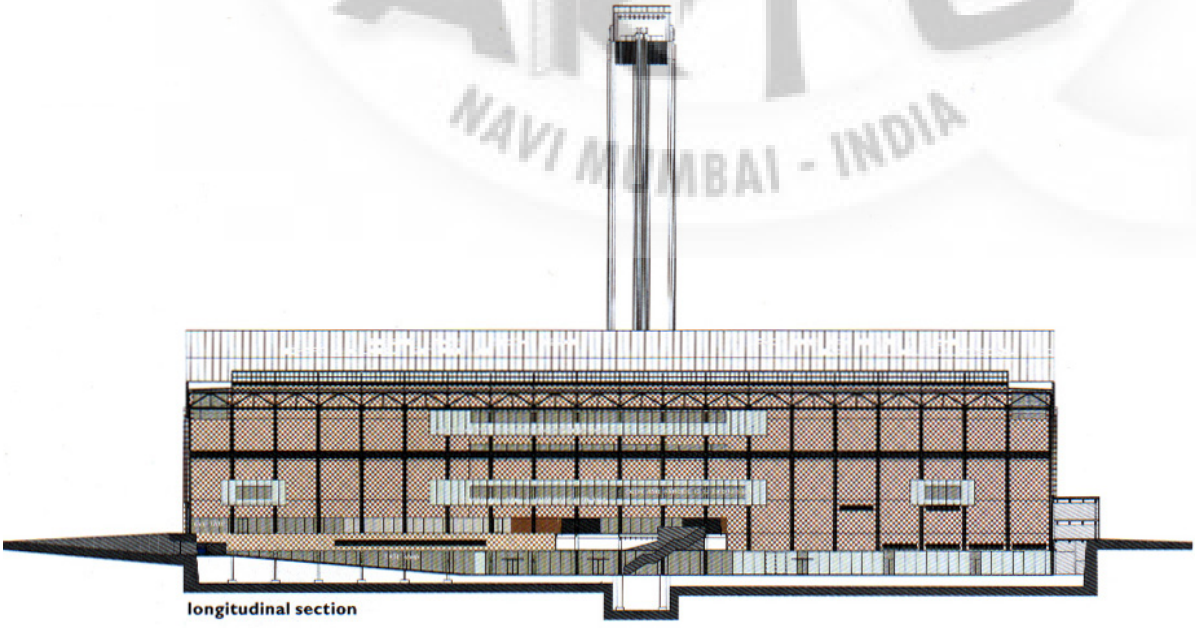


Figure 4.6 - Longitudinal Section of Tate modern

CONSTRUCTION

The façade is used of brick to match the surface of the existing structure, while creating something radically new – a perforated brick lattice through which the interior lights will glow in the evening. Windows and the terrace will appear as cuts in the brick surface.

The building rises 64.5 meters above ground in 11 levels, its height responding to the iconic chimney of Giles Gilbert Scott's power station.

Figure 4.7 - Construction process of tate modern

STRUCTURAL SYSTEM

-Walls were designed to coordinate with the services design, ensuring that all cables were cast into the walls during construction and none were left exposed.

-Floor plates are formed of **long span in-situ concrete ribs**, which support both the concrete floor plate and the precast concrete soffit planks.

The services are located in the raised floor, dropping through carefully coordinated holes in the rib beams into the service slots below and cast-in cooling coils within the precast concrete soffit panels.

-On level 10 an open terrace is located around the perimeter of the building.

The "open" terrace, with hanging perimeter columns to the north elevation, is achieved by spanning deep steel beams from the main core and cantilevering from the central and perimeter columns where required.

In order to distribute the loads effectively, whilst not allowing any deflection to occur, the **spreader** beam was supported on a series of 16 jacks.

These were closely monitored during the construction of the north elevation, and jacking operations undertaken at strategic times to minimize impact on the construction above.

Once the final brick was installed, the jacks were grouted with maximum differential movement between roof beams having been limited to the required 2mm.

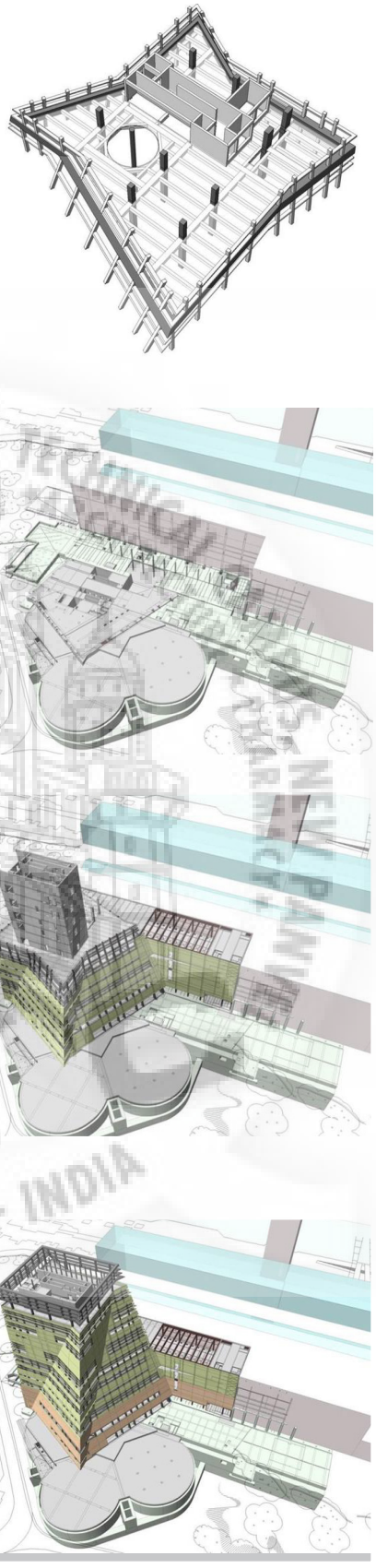


Figure 4.8 - Structural system of tate modern

SOCIAL SPACES

Landscaped spaces outside the new building

A new walkway through the building links the City to the heart of Southwark.

Two landscaped areas either side of the building provides tranquil places for everyone to use. There is an elegant piazza with a café and bookshop, adjoined by an undulated landscape of trees and lawns and a large area to the west that offers a peaceful setting where visitors and local residents can sit and relax.

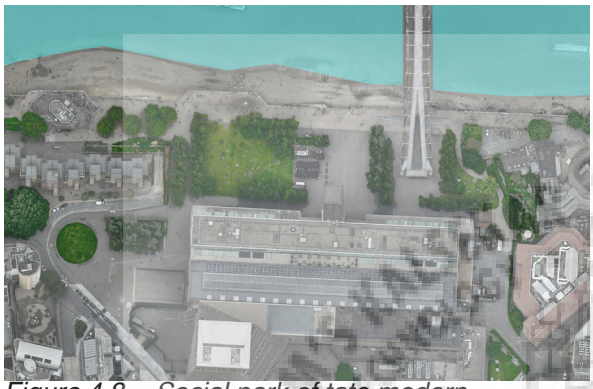


Figure 4.8 - Social park of tate modern

A new planted area on the eastern side created for the use of the local community and staff. The landscape facing the river remains and continues to be used for large-scaled events.

Social spaces in the new building

Figure 4.9 - Social space of tate modern

The top three floors of the new building are spaces dedicated to the enjoyment of all our visitors. At the top of the building the public terrace offers a spectacular views over the River Thames

Divided into different areas, the lounge offers a spaces for eating, spaces for families to relax and areas with further views across the river.

GALLERY SPACES

There are three new floors of flexible gallery spaces, enabling 60% more artworks from the Collection to go on display.

A dedicated children's gallery

Figure 5.0 - Children's gallery

Performance and installation space

Figure 5.1 - Installation space

DESIGN CLUES

PRINCIPLES OF ADAPTIVE REUSE

1. Preservation

Bold brickwork, matching the existing industrial building (former power station), but contorted into a new rising form.

2. Additon

Adding an element but keeping the beauty of existing structure preserved

3. Subtraction

In order to accommodate a broad range of art, architect replaced much of the power station's interior with galleries of differing sizes.

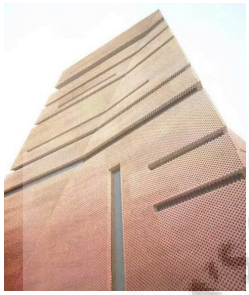


Figure 5.2 - Preservation- adaptive reuse principles (tate modern)

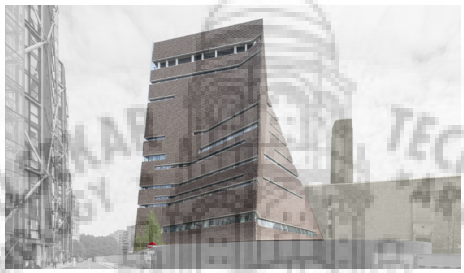


Figure 5.3 - Addition- adaptive reuse principles (tate modern)

Figure 5.4 - Subtraction- adaptive reuse principles (tate modern)

SWOT ANALYSIS

Strength

Due to revitalization of the structure connection with the river got restored.

Weakness

Cost of the project increased due to addition of new structure.

Opportunities

Planning of gallery and exhibition spaces should be taken care of.

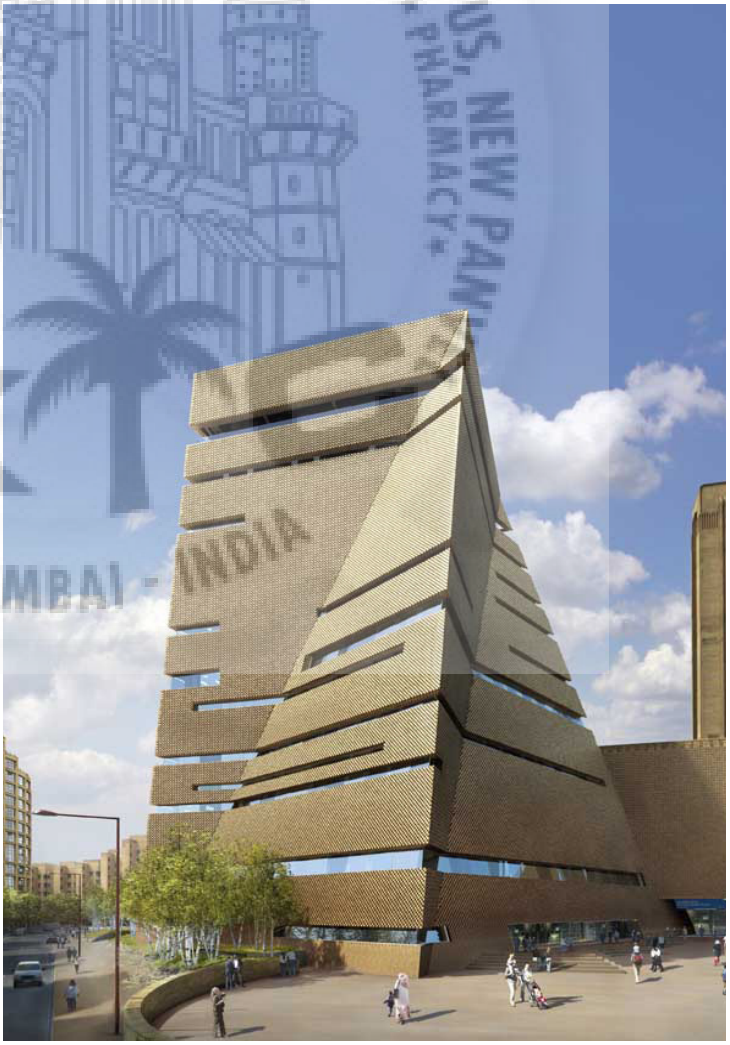


Figure 5.5 - Tate modern

4.3 ADAPTIVE REUSE OF THERMAL POWER PLANT

Purpose-To study how to preserve the structural beauty of the old building and space and still adaptively reusing it and giving it a new function.

Brief Description- The dry ash tanks at the east of the wharf is turned into Ash Gallery. Its design starts at 2015. Due to uncertainty of the programming, the project is targeted towards art gallery with high flexibility and openness.

LOCATION

Yang Shupu Road, Shanghai, China

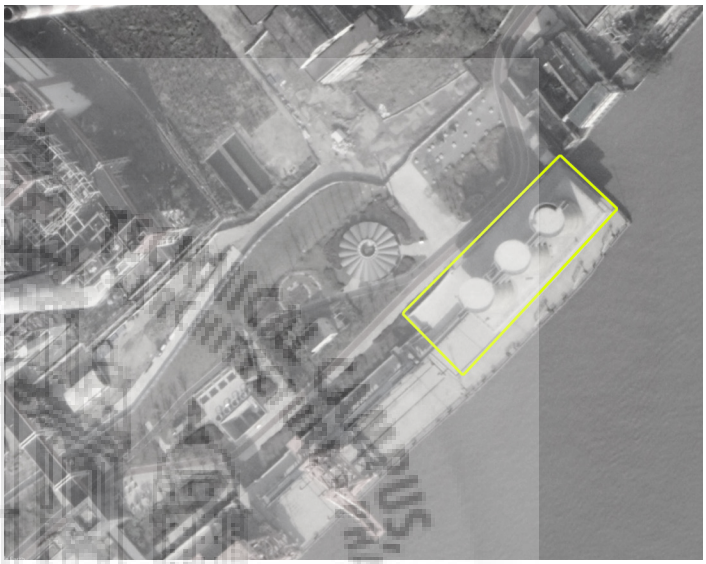


Figure 5.6 - Location plan of thermal power plant

SITE AREA

3840 sqm

ARCHITECT

TJAD Original Design Studio

YEAR

2019

Function of power plant before reuse.

Yang Shupu Power Plant, the once biggest thermal power plant in the Far East, which was built by the **British investors in 1913**.

The site is left over with 105-meter-high chimney, huge crane-mouth hanging along the riverside, trestle works that used to carry the **coal, clean water pond, damp and dry ash tanks** and etc., which boasts spectacular space and impressive form and occupies a crucial position in the public project of Yangpu Waterfront.

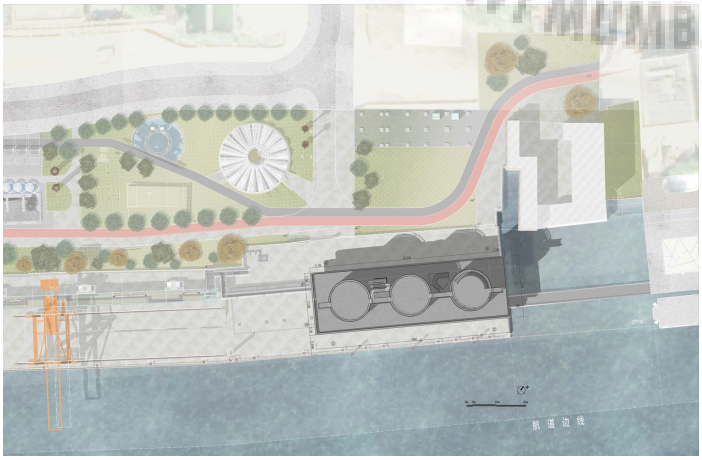


Figure 5.7 -Site plan of thermal power plant

Figure 5.8 -View from riverside

DESIGN PROCESS

Via adding two platforms, the three isolated ash tanks are united into one.

The original 15-meter-high steel surface of the tanks is tore down and replaced by thin horizontal bands, forming an ambiguous interface. The art space is designed as a public promenade, curling from the entrance carved by concrete framework to the top platform.

Six boxes with a set of staircases are plugged into the tanks, whose functions are to be decided together with people's behavior with the warehouse.

1- Original Structure 2-Subtraction 3-Addition

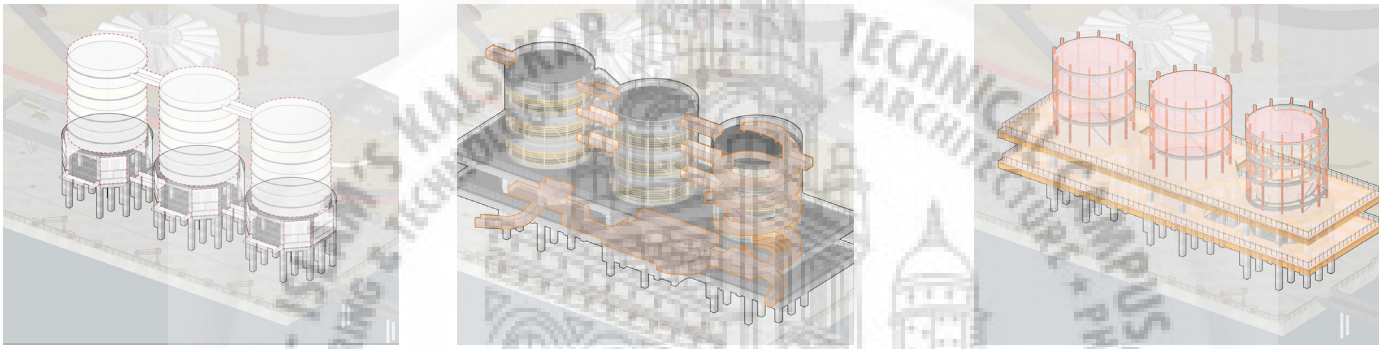


Figure 5.9 -Design process of thermal power plant

Architectural intervention

On the dock at the easternmost end of the power plant section, the original dry ash storage ash tank was converted into a gray silo art gallery. The design of the grey silo retrofit began in 2015. Due to the uncertainty of function, after many rounds of modification, the final art exhibition-oriented strategy with strong flexibility and openness is designed and implemented.

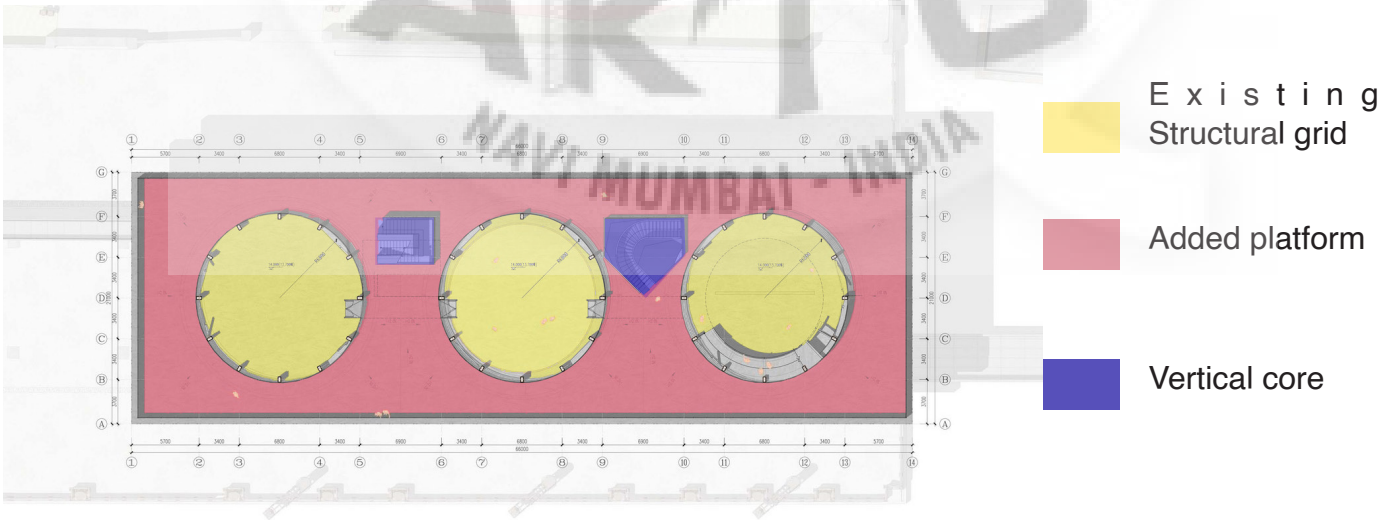


Figure 6.0 -Floor plan of thermal power plant

GROUND FLOOR PLAN

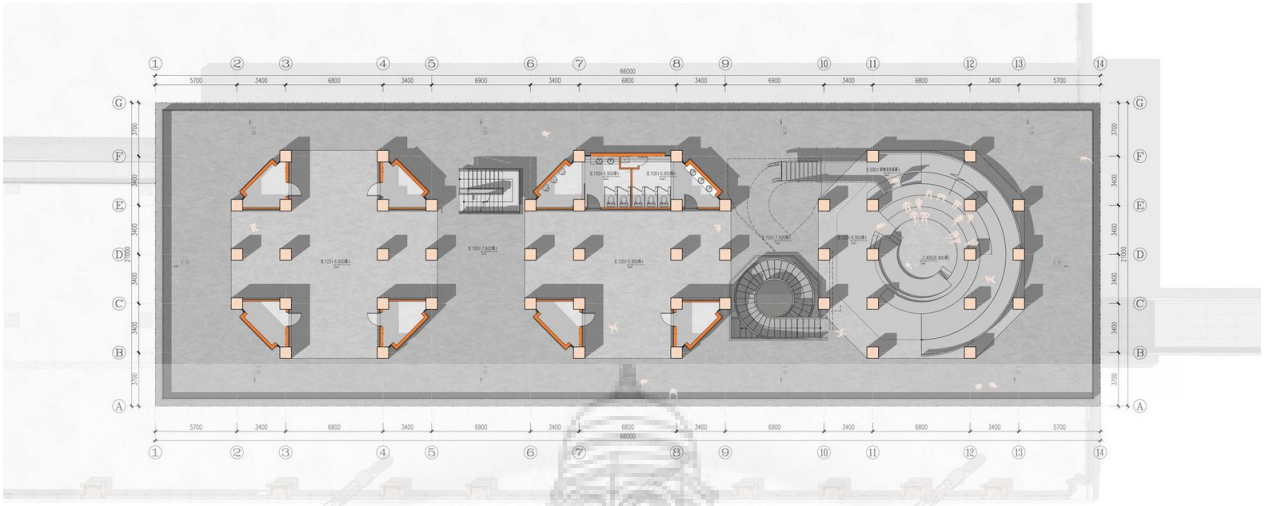


Figure 6.1 -Ground Floor plan of thermal power plant

FIRST FLOOR PLAN

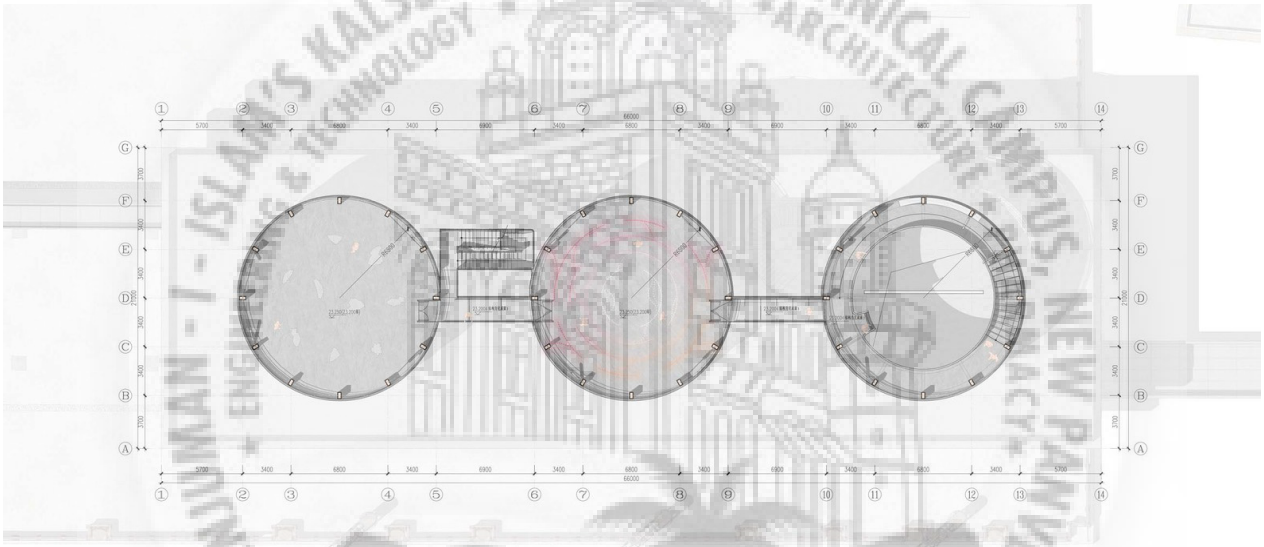


Figure 6.2 -First Floor plan of thermal power plant

SECTION

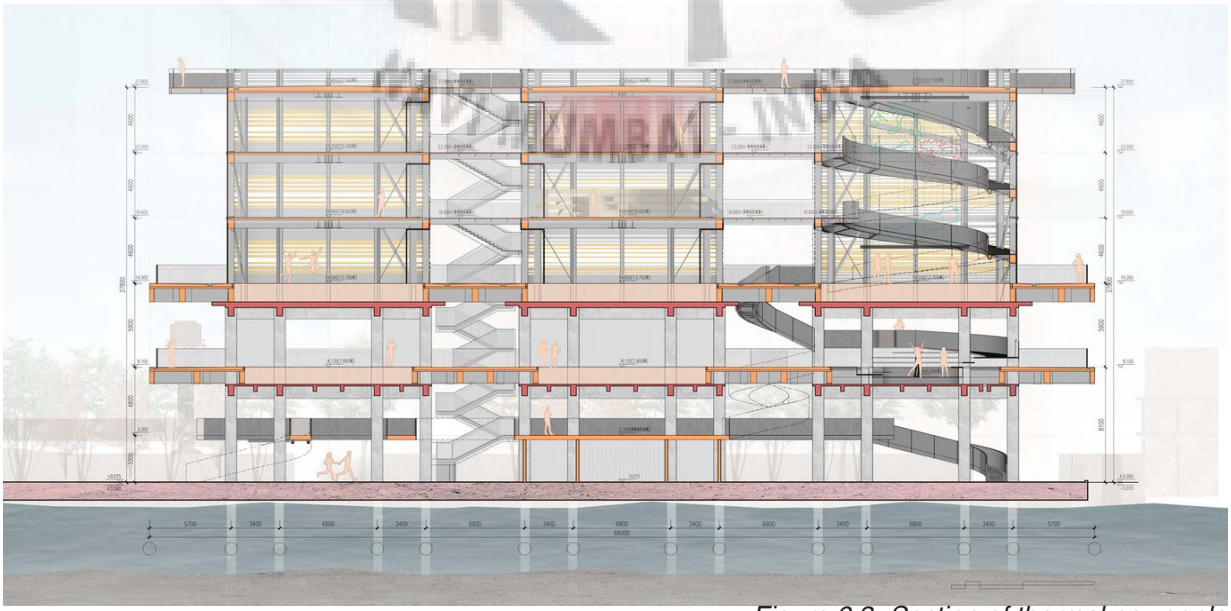


Figure 6.3 -Section of thermal power plant

ELEVATION

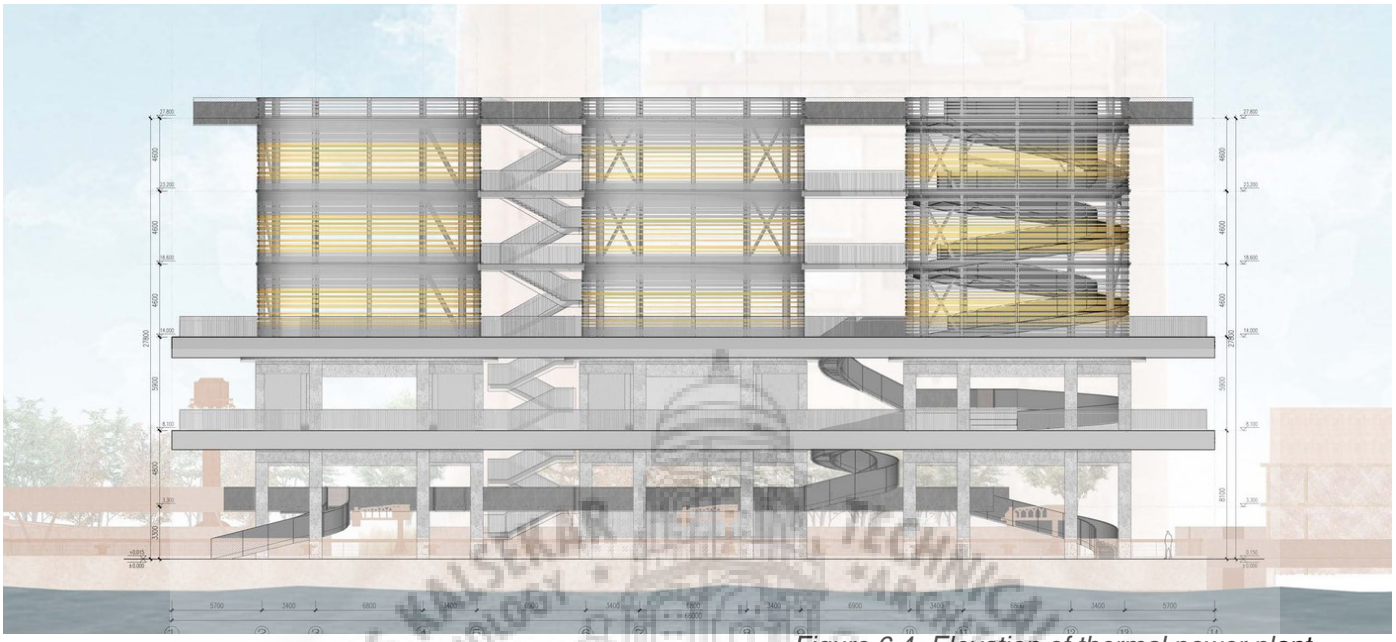
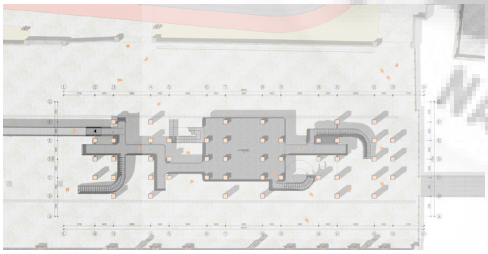


Figure 6.4 -Elevation of thermal power plant

Before and after revitalization

Figure 6.5 -Revitalization of thermal power plant

STRUCTURAL SYSTEM



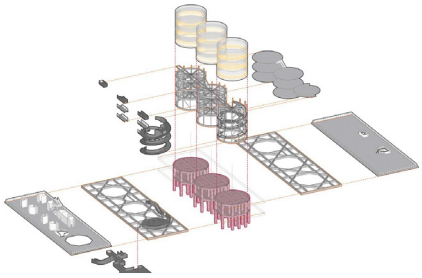


Figure 6.6 -Structural system of thermal power plant

Impact on context

In the Shanghai Urban Art Season, held from September to November 2019, the Grey Canggu Art Museum, as the Dongdang Pavilion, has become an important node of the entire space art season, built by Portuguese artist Guimares, Japanese artist Takahashi Kaixuan and Chinese designers Han Jiaying and Zhang Ming.

SWOT ANALYSIS

Strength

All the old industrial elements such as boilers, chimneys were merged with the new programme

Weakness

Lack of landscape
There is no connection of structure with natural flux present nearby.

Opportunities

There should have been more spaces and programme.

Threat

Chances of Corrosion.

4.4 REVITALIZATION OF INDUSTRIAL COMPLEX INTO MIXED-USED CAMPUS

Purpose-To study how to preserve the structural beauty of the old building and space and still adaptively reusing it and giving it a new function.

Brief Description- 'The Trees' is a flagship development for Godrej Properties Ltd. It is an adaptive reuse project in Vikhroli, Mumbai, it was designed by Imagine studio.
The Imagine Studio project replaces a large industrial campus in Vikhroli, a site integral to the Group's history. It is here that seeds of a modern, integrated industrial township were planted, realized and are now being taken forward into the 21st century with the contemporary mixed-use master plan of 'The Trees'.

LOCATION

Godrej 1, Vikhroli

An adaptive re-use project in Mumbai, the Imagine Studio weaves nature, heritage and urbanism through a compelling narrative of evolving contexts.

The scheme, which initiated as a design for a marketing office, shaped into an exercise for place-making in 'The Trees', a flagship development for Godrej Properties Ltd., which is part of Godrej, one of India's biggest industrial houses.

Figure 6.7 -Location plan of The trees.

CONCEPT

Set in a 1-acre site, the Imagine Studio complex spans 1000 sqm in area. Conceptualized by Studio Lotus and the GPL Design Studio, the collaborative project transforms a small cluster of industrial buildings and its surrounding landscape into commemorative identities seeped indelibly in the developer's legacy yet an invigorating part of its new purpose.

The design teams presented the Imagine Studio complex through an attempt to re-envision the customer journey for 'The Trees'. The storyline for this experiential journey was grounded in authenticity and a larger vision for the city germinated with timeless values.

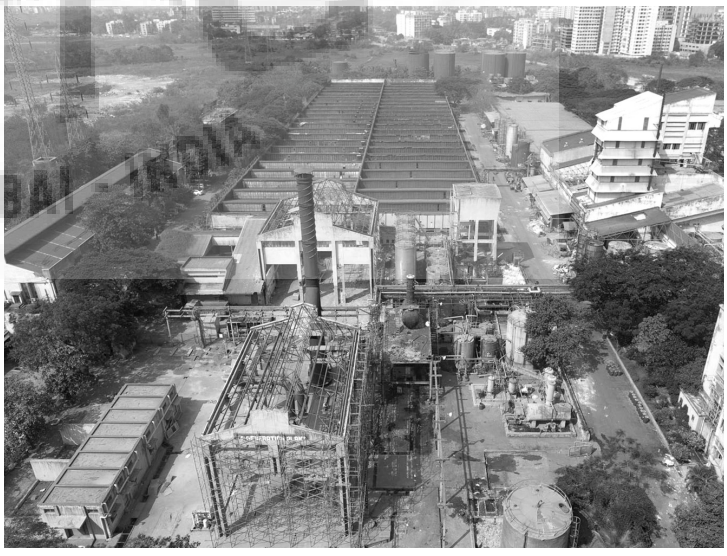


Figure 6.8 -Godrej industries

CONTEXT

The Imagine Studio project replaces a large industrial campus in Vikhroli, a site integral to the Group's history. It is here that seeds of a modern, integrated industrial township were planted, realized and are now being taken forward into the 21st century with the contemporary mixed-use master plan of 'The Trees'. Designed as the Experience Centre for 'The Trees', the Imagine Studio addresses the challenging need to relate the forthcoming chapters of Godrej's vision through the realm of its origin.

VIRTUAL FLUXES	MATERIAL FLUXES	NATURAL FLUXES
Godrej industries.	Material Fluxes reflects the human activity around the site.	Last mangroves of Mumbai.

Figure 6.9 -Virtual fluxes of the trees.

DRAWINGS

Existing buildings and its elements were recycled not only to underline their relevance in the bygone eras but also add meaning as important design punctuations in the narrative.

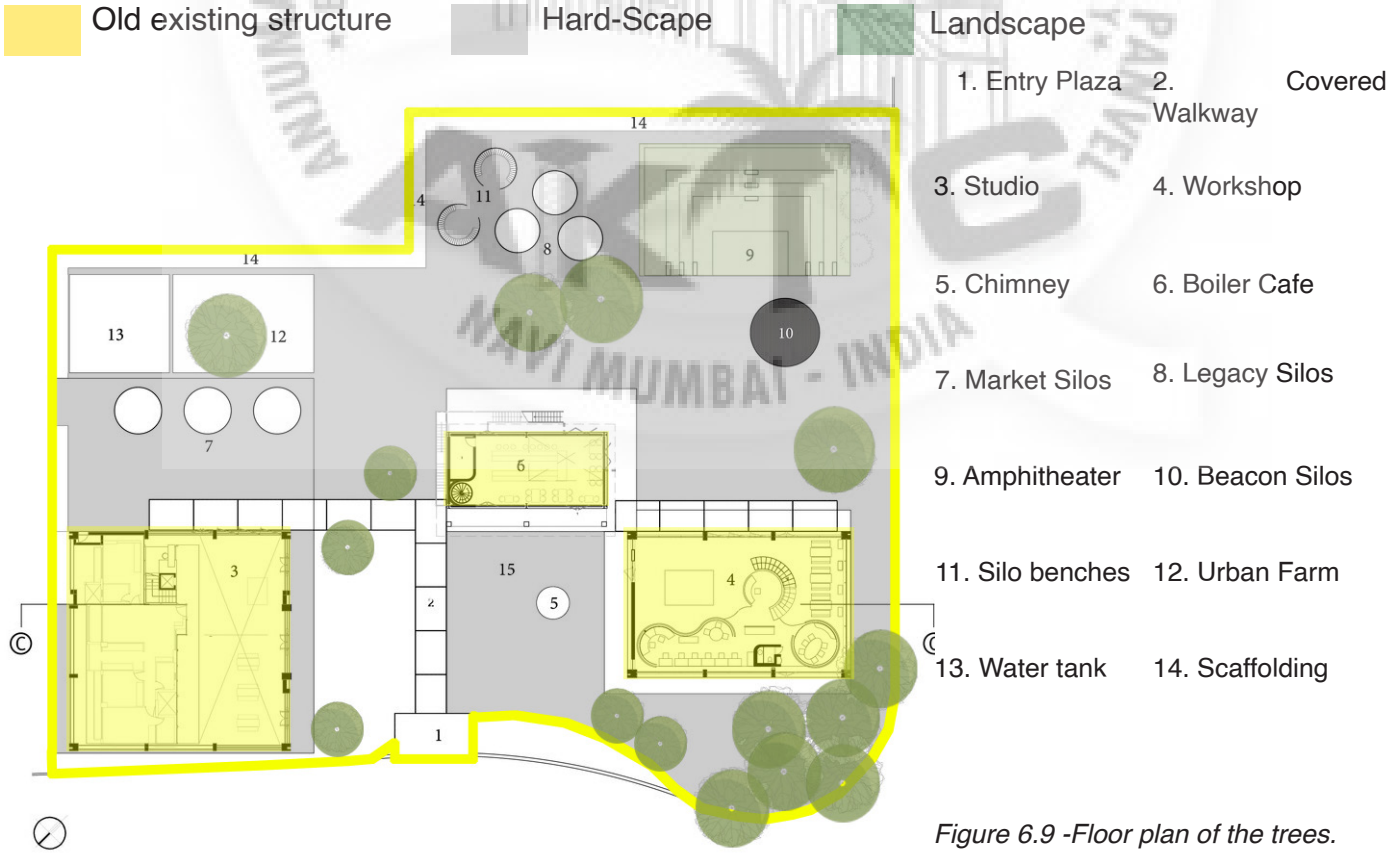


Figure 6.9 -Floor plan of the trees.

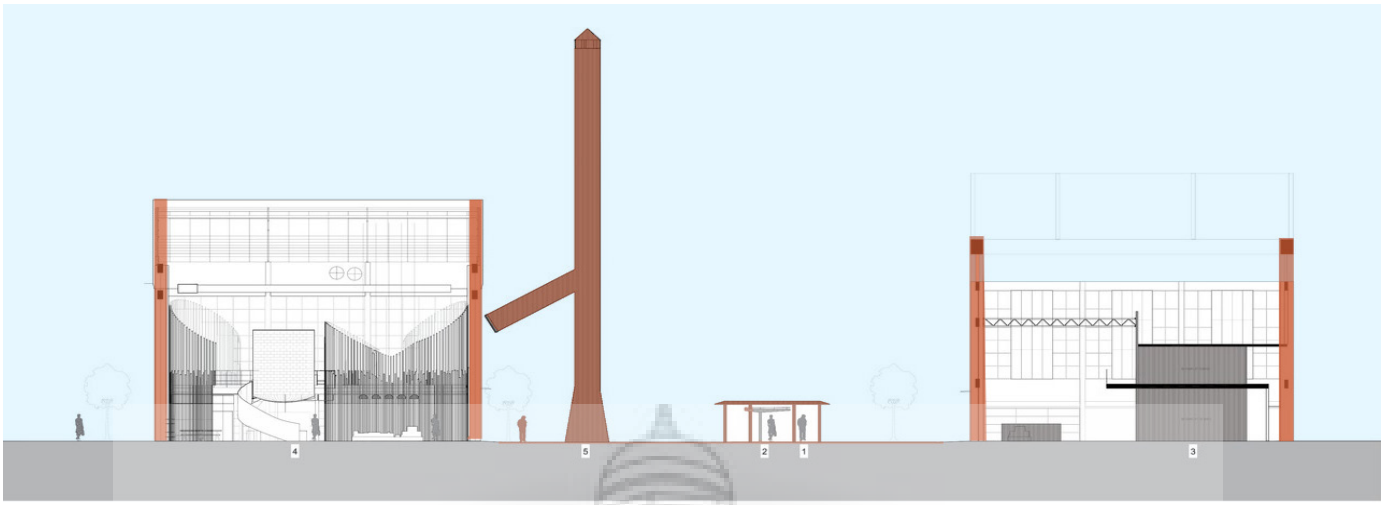


Figure 7.0 -Section of the trees.

The timeless architectural forms derived from the current industrial sheds and the materiality of Concrete, Corten steel, Brass and Timber work on the principle of 'Wabi-Sabi', which would allow the buildings to age beautifully with the passage of time. The materials were deliberately chosen to add layers to the sequence of events planned for the project. While Concrete indicates the existing shell work, Corten Steel reinterprets the idea of the original form, which over a period of time bleeds over Concrete.

ISO-METRIC VIEW

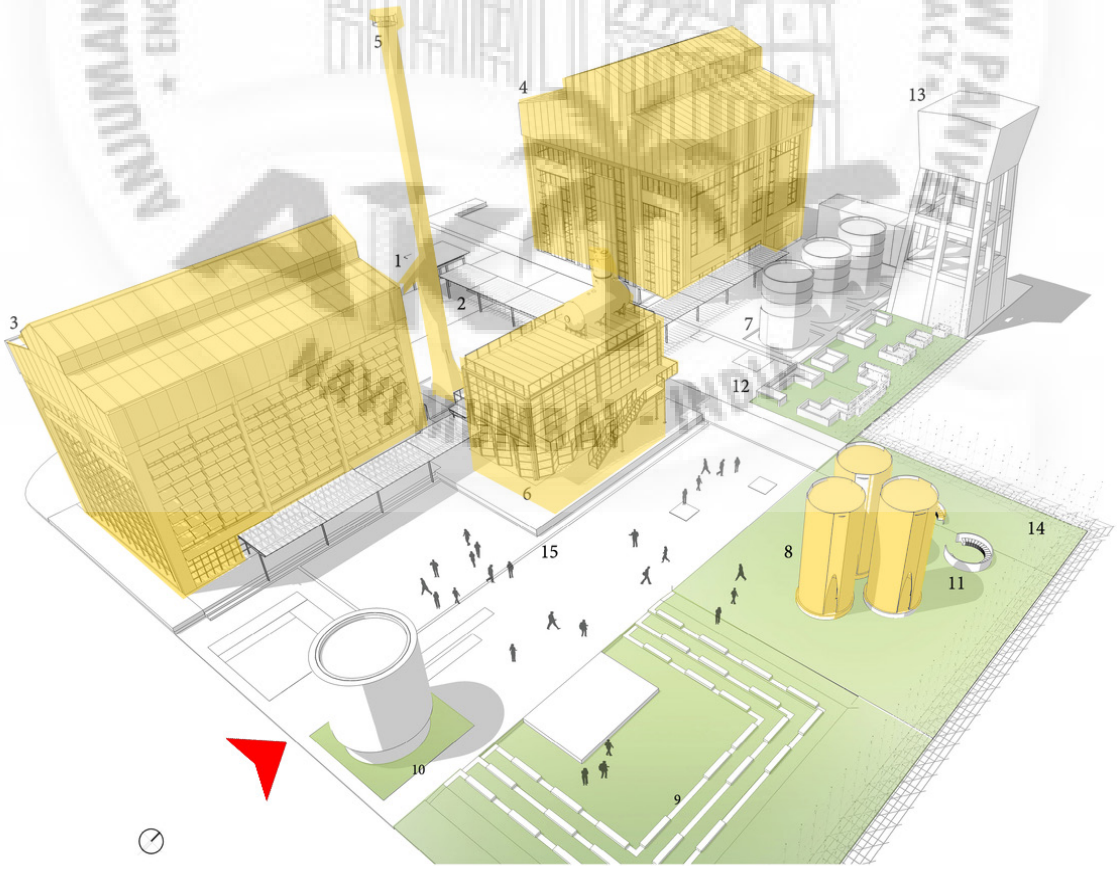


Figure 7.1 -Isometric view of the trees.

DESIGN FEATURES

The silo and chimney suspended within the space root it as a recall of the industrial process and are used internally as a cycloramic projection for the marketing team.

Silo has been revitalized to show the legacy of godrej industries

These sit sculpturally into a landscape, which with its places for public engagement and participation, will go on to evolve new ideas for the future.

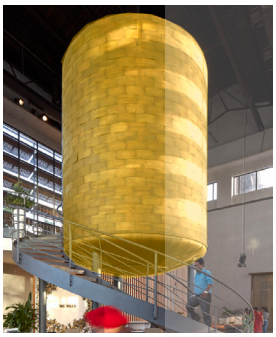



Figure 7.2 -Design features of the trees.

SWOT ANALYSIS

Strength

All the old industrial elements such as boilers, chimneys were merged with the new programme.

Weakness

Lack of natural ventilation

Opportunities

Two tanks that was removed should have been incorporated in the new design.

Threat

Lack of transportation access.

Figure 7.3 -The trees

4.5 ADAPTIVE REUSE OF ABANDONED MALL INTO URBAN LAGOON

PURPOSE- To study how the use of surrounding area more effectively that will benefit the users by providing opportunity and recreational space.

Brief Description- An unused shopping mall in Tainan, in southern Taiwan, has been removed and transformed by MVRDV into a sunken plaza dominated by an urban pool and local vegetation. MVRDV noticed Tainan is a very grey city and wanted to insert much needed greenery to reconnect the city with nature and its waterfront.

LOCATION

West central district, Taiwan

SITE AREA

3840 sqm

ARCHITECT

MRDV

YEAR

2019

Figure 7.4 -Location plan of Tainan spring

MVRDV's strategy for Tainan Spring was to bring the greenery to the city. As a result, both the public square and Haian Road see the introduction of large areas of planting, which makes use of local plant species

DESIGN OBJECTIVES

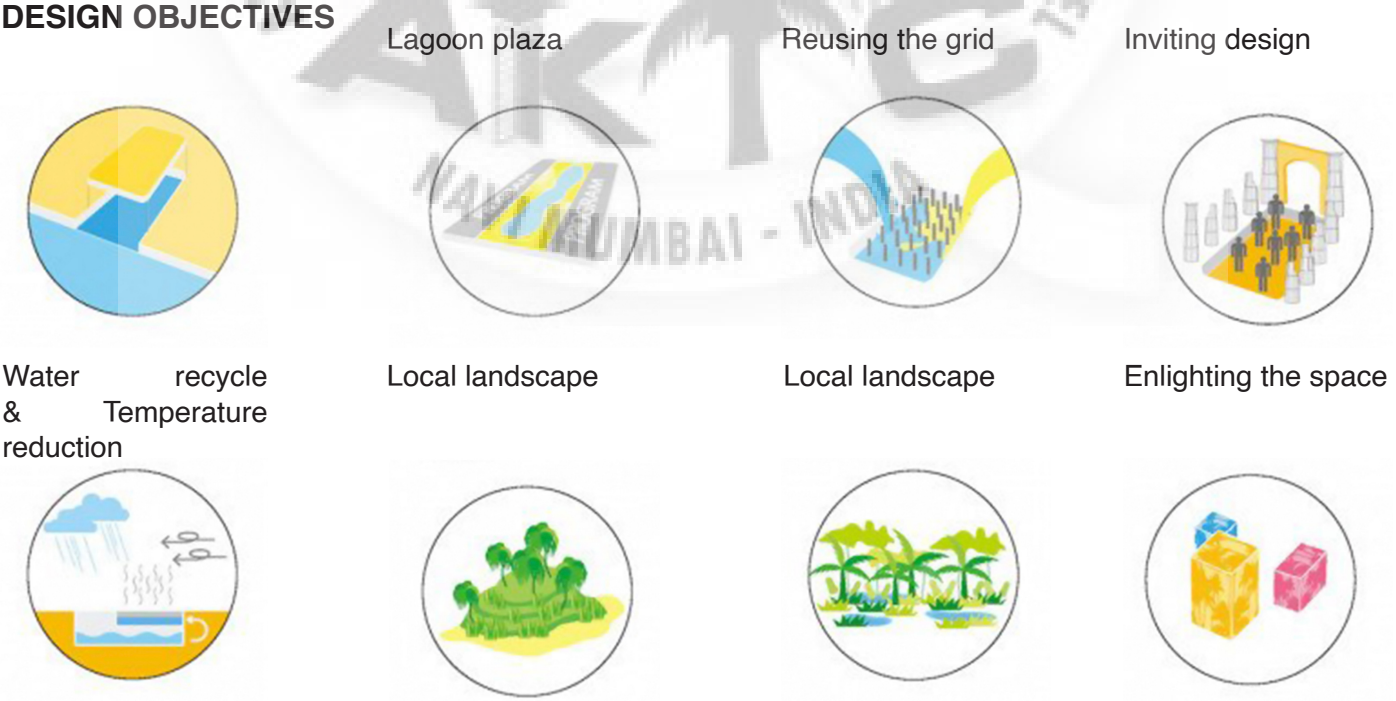
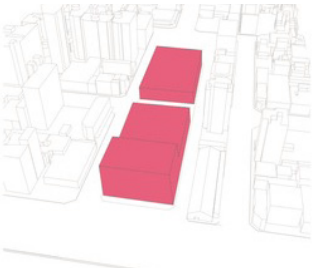


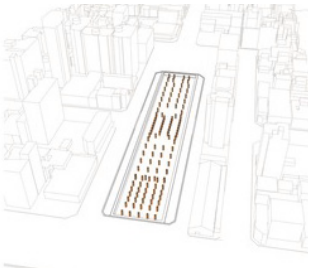
Figure 7.4 -Design objectives of Tainan spring

DESIGN PROCESS

1. Demolish existing mall

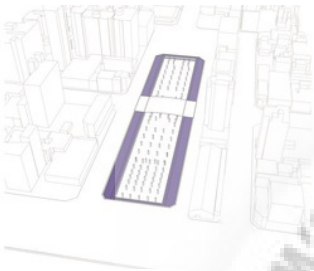


2. Keeping the basement

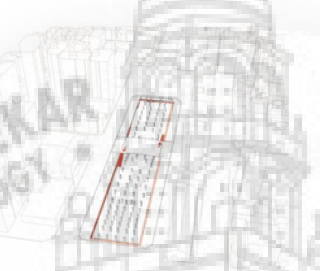


3. Defining the plaza with two basements

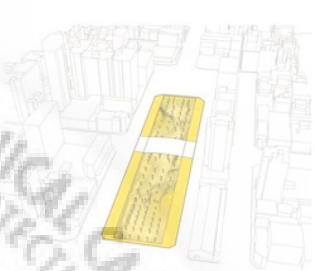
4. Adding linear programs



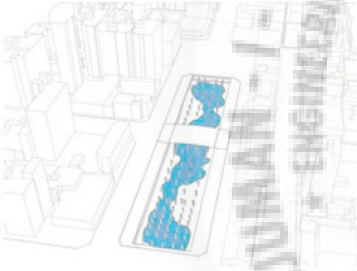
5. Adding Boardwalk



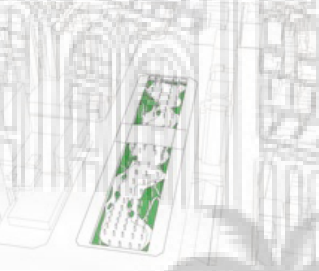
6. Adding bridge for access



7. Adding water.



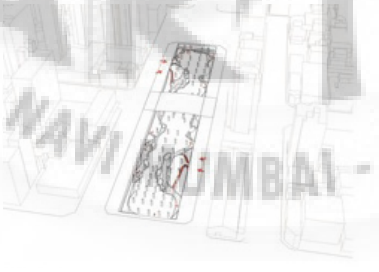
8. Landscape in cutout areas



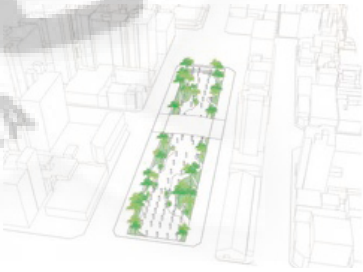
9. Adding sand for sunbath

10. Adding bar

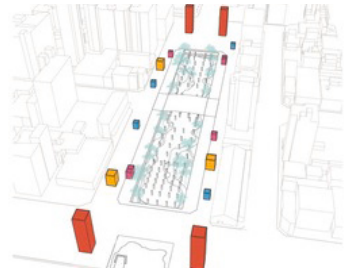
11. Lowering the quay for access



12. Adding lagoon plantation



13. Adding lanterns



14. Adding terraces for access to lanterns

15. Adding palm and other species

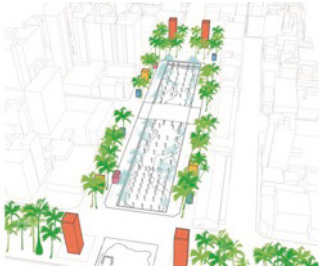


Figure 7.5 -Design process of Tainan spring

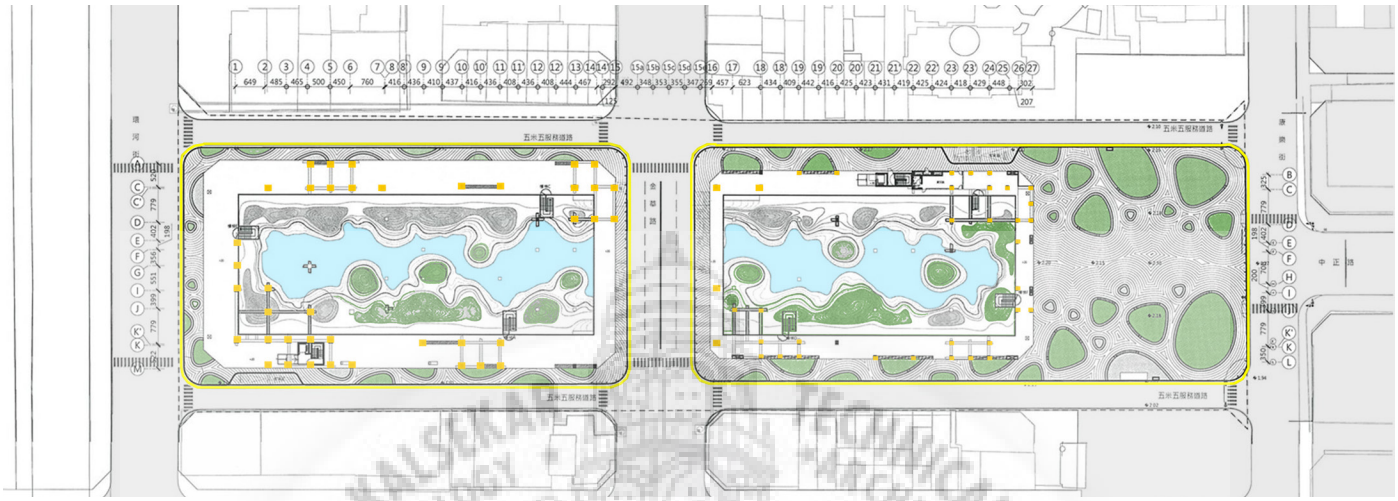


Figure 7.6 -Ground floor plan of Tainan spring

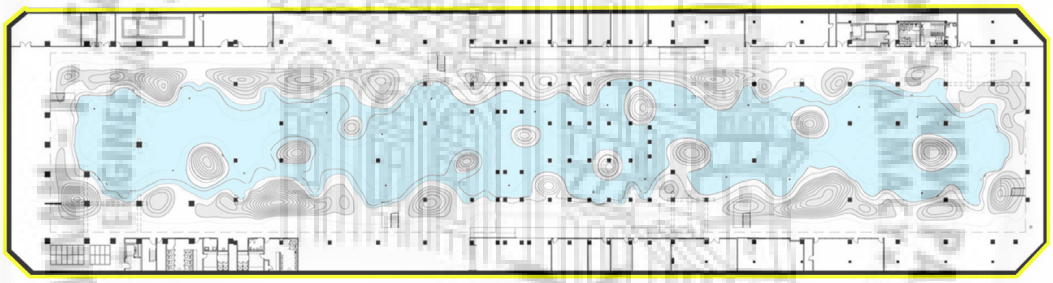


Figure 7.7 -Basement floor plan of Tainan spring

Basement Floor plan

The mall's underground parking level has been transformed into a sunken public plaza dominated by an urban pool and verdant local plants and surrounded by a shadowed arcade.

The pool has been carefully planned to be a perfect gathering spot for all seasons: the water level will rise and fall in response to the rainy and dry seasons, and in hot weather mist sprayers will reduce the local temperature to provide welcome relief to visitors, reducing the use of air conditioning in the summer months.

This space hosts playgrounds, gathering spaces, and a stage for performances, while the artful deconstruction of the building's concrete frame has left a number of follies that can in due course be converted to shops, kiosks, and other amenities.

SOCIAL PARTICIPATION

In Tainan Spring, people can bathe in the overgrown remains of a shopping mall. Children will be swimming in the ruins of the past.

The Tainan Spring includes playgrounds, gathering spaces, and a stage for performances. The selective deconstruction of the former mall's concrete frame left a number of follies that allow for a conversion into shops, kiosks or other amenities.

In addition to a new public square and urban pool the master plan introduces improved public pathways that reduce traffic and add local plants to rejuvenate an important city axis.

Figure 7.8 -Tainan spring

Figure 7.9 -Tainan spring

Figure 8.0 -Tainan spring

Impact on context

Inspired by the history of the city, both the original jungle and the water were important sources of inspiration.

Tainan is a very grey city. With the reintroduction of the jungle to every place that was possible, the city is reintegrating into the surrounding landscape.

That the reintroduction of greenery was an important thread in the master plan can be seen in the planting areas on Haian Road. Design was mixed local plant species so that they mimic the natural landscape east of Tainan.

SWOT ANALYSIS

Strength

In this case context is concrete jungle but it is strength of the project because the site is getting highlighted with such dense context.

Weakness

No parking space provided.

Opportunities

There should have been connectivity from the above floor also.

Threat

Traffic due the users who are coming to this project.

4.6 REVITALIZATION OF XINTIANDI OLD FACTORY INTO MULTI-PURPOSE AREA

Purpose-To study how abandoned factory can be transformed into to new multipurpose area.

Brief Description- Renovation and reconstruction of an old cast iron workshop into a multi functional modern complex for shopping, offices and hotel in order to
Maximize the preservation of the industrial heritage

LOCATION

Hangzhou

An adaptive re-use project in Mumbai, the Imagine Studio weaves nature, heritage and urbanism through a compelling narrative of evolving contexts.

The scheme, which initiated as a design for a marketing office, shaped into an exercise for place-making in 'The Trees', a flagship development for Godrej Properties Ltd., which is part of Godrej, one of India's biggest industrial houses.

Figure 8.1 -Location plan of Hangzhou machine factory

EXISTING SITE CONDITIONS

The site is the historical Hangzhou Machine factory, the building concept aims to create a harmony of the sites inherent industrial character with a modern interior aesthetic. The Xintiandi old factory will be renovated into a high quality building with a combination of functions including offices, retail, hotel and multi-purpose area.

Before revitalization site conditions

Before revitalization site conditions

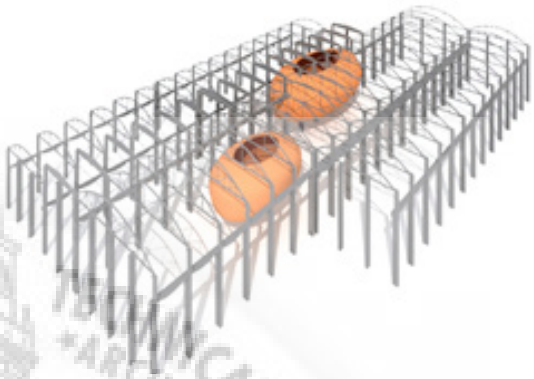
Figure 8.1 -Existing site condtitionsHangzhou machine factory

CONCEPT

The most important aspect of design proposal is to maintain the existing industrial structure and characteristics as much as possible.
The existing concrete façade and window to the south and north sides is completely removed.

Existing Structure

New free Shapes



Added Cores

New Ceilings

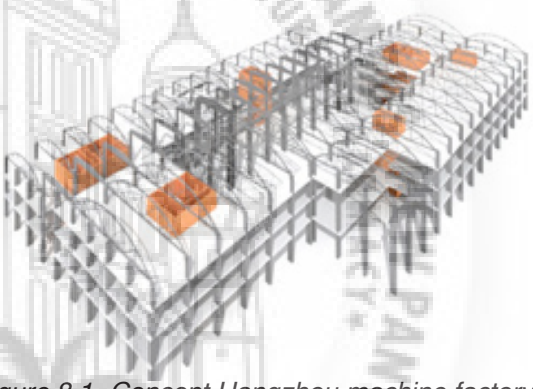
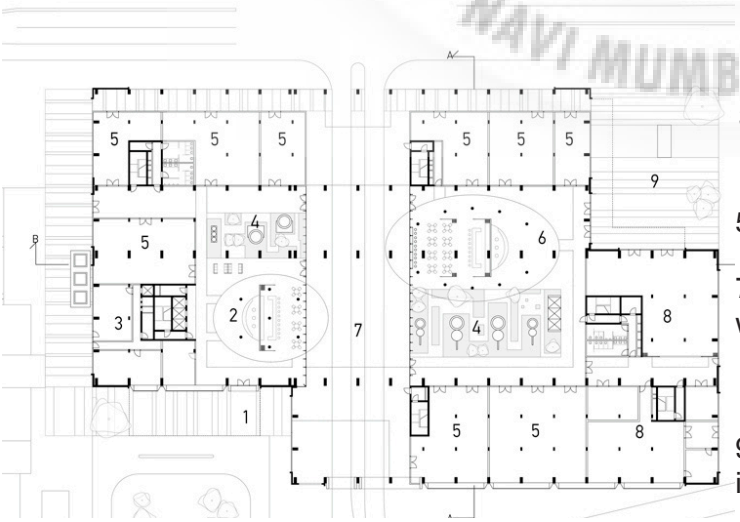


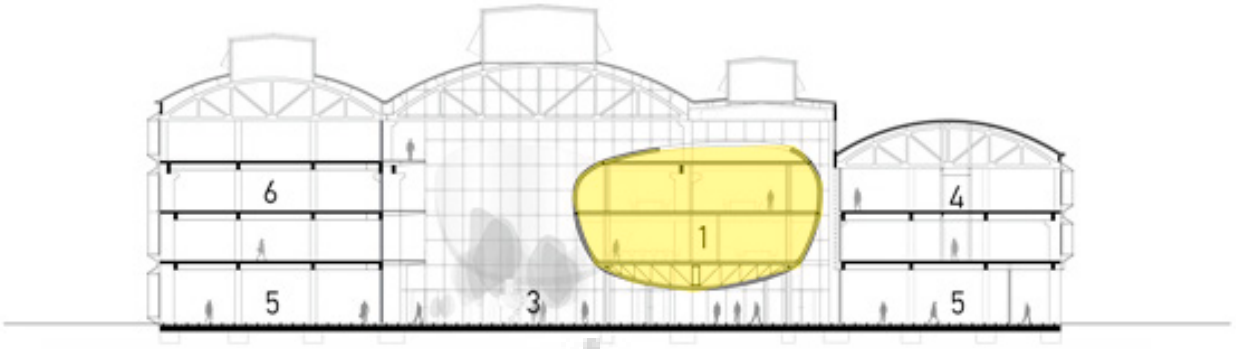
Figure 8.1 -Concept Hangzhou machine factory

The energy of the architecture and its surroundings will flow through the capacious lobby in an undulated way and exert positive influence on the architecture.



1. Hotel Drop-off
2. Hotel lobby
3. Hotel back office
4. Water Garden with industrial relicts
5. Retail
6. Office lobby
7. Inner street and side walk
8. Restaurants, VIP rooms, kitchen delivery
9. Business plaza with industrial relicts

Figure 8.2 -Floor plan of Hangzhou machine factory



Section A-A'

SUSTAINABILITY

Winter Heat recovering system

Natural ventilation

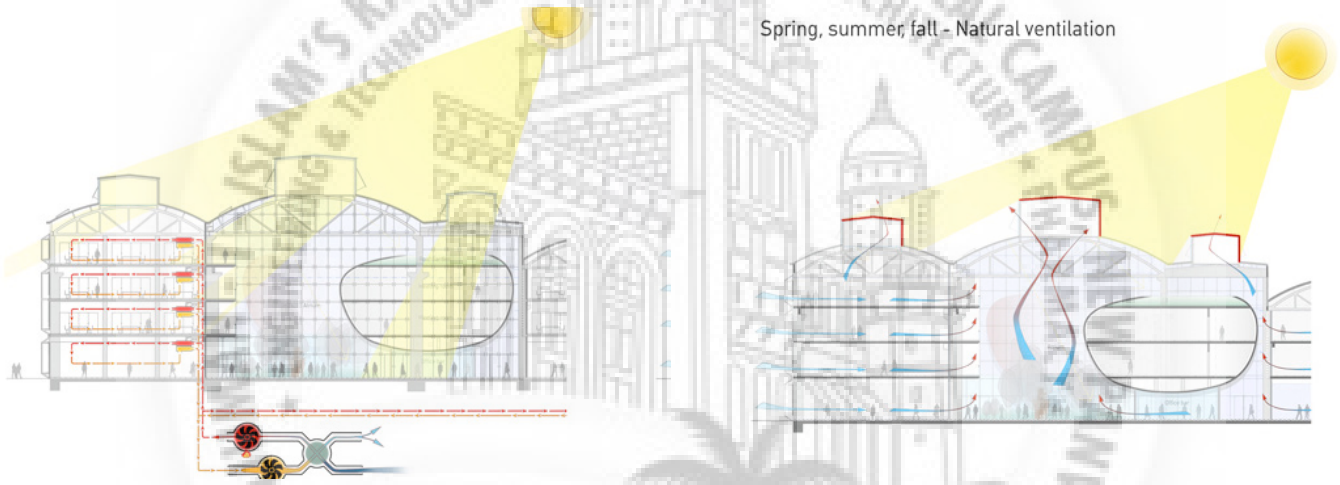


Figure 8.3 -Sustainability features of Hangzhou machine factory

DESIGN

The design of this new facade not only demonstrates the harmony between modern and historical industrial structures, but also establish a unique architectural language that considers both past and present.

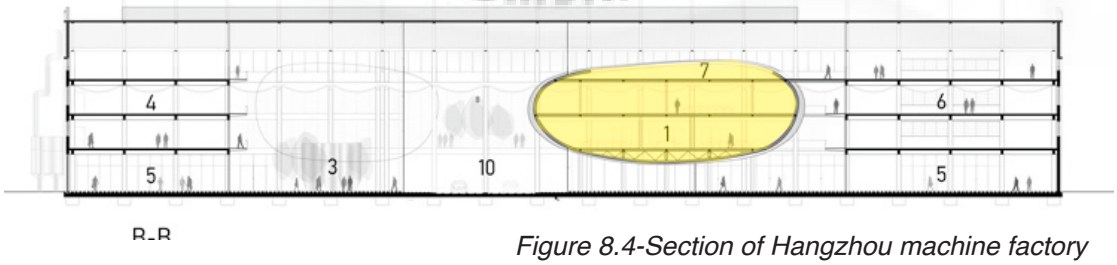
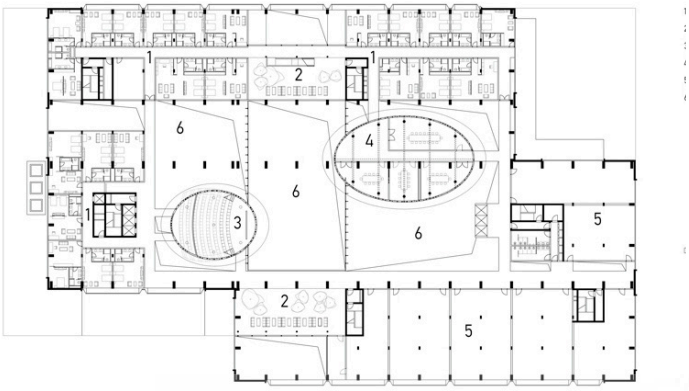


Figure 8.4-Section of Hangzhou machine factory

The form of the building conserves the structure of the foundries old steel funnel.

The regular structure of the steel frame echoes the horizontal and vertical grids of the architecture. Consecutively, the protruding parts of the steel-frame structure on all floors highlights the wall new connection of the existing brick walls.



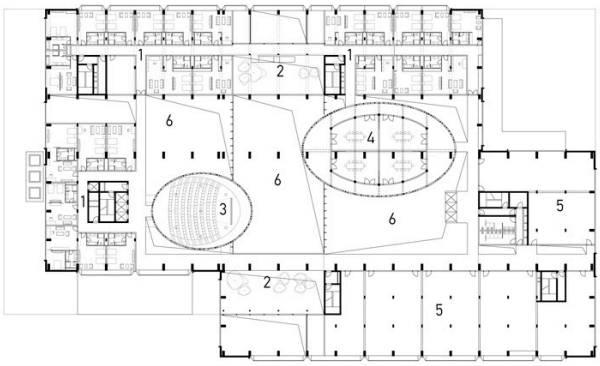


Figure 8.4-Floor plan of Hangzhou machine factory

First floor plan

1. Hotel Rooms 2. Inner Gardens 3. Conference Hall
4. Meeting Rooms 5. Offices 6. Void above

Second floor plan

1. Hotel Rooms 2. Void above 3. Conference Hall
4. Meeting Rooms 5. Offices 6. Void above

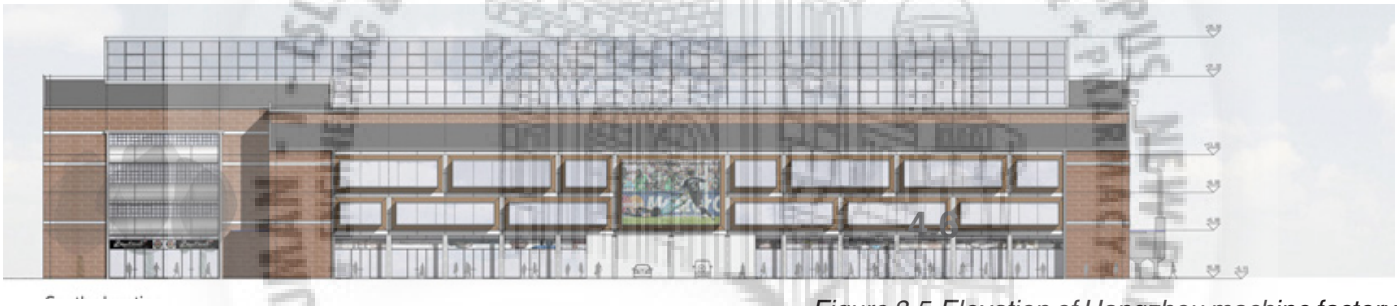


Figure 8.5-Elevation of Hangzhou machine factory

SWOT ANALYSIS

Strength	The existing industrial structure and characteristics is maintained as much as possible.
Weakness	Lack of landscape.
	- Landscape element should be added for enhancement of beauty.
Opportunities	

4.7 REVITALIZATION OF BHADRA FORT PLAZA

Purpose-To study how the culture and climate of particular area affect the adaptive reuse project.

Brief Description- Funded by the JNNURM (Jawaharlal Nehru National Urban Renewal Mission), the project became the first of its kind as a redevelopment and pedestrianization of a public space in an Indian old city. The redevelopment plan focuses on very basic aspects of the city to be considered in details; traffic congestion, no pedestrian demarcation, dense built fabric, unorganized informal activities, scarcity of open spaces, noise and air pollution.

LOCATION

Court Rd Old City, Bhadra Ahmedabad, Gujarat

Figure 8.6-Location plan of Bhadra fort

EXISTING SITE CONDITIONS

In 2009, the scenario was of a plaza whose original outline could still be traced, but that had been greatly encroached upon and suffered from intense traffic congestion, no pedestrian demarcation, unorganized informal activities, underutilized open spaces, haphazard parking, as well as noise and air pollution.

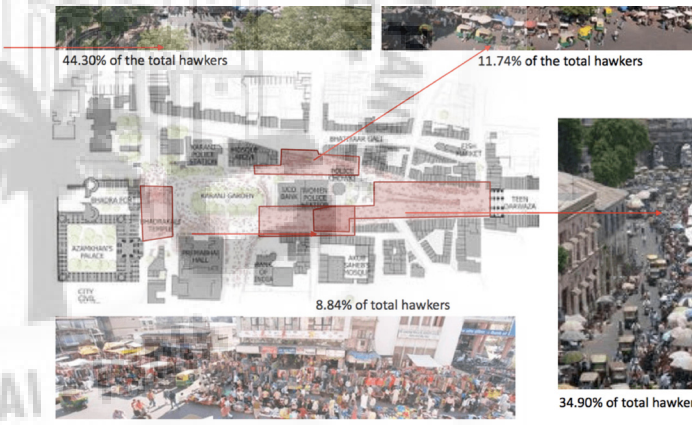


Figure 8.7-Existing site conditions of Bhadra fort

The project started in 2011 and completed November 2014 in collaboration with different public, private and independent organizations such as the Ahmedabad, Municipal Corporation and the Archaeological Survey of India, Vastu Shilpa Foundation for Studies and Research in Environmental Design and CEPT University; as well as multidisciplinary team of professionals like planners, engineers, architects, historians and conservationists; in a dialogue with the local organized groups of temple and mosque representatives as well as informal vendors and shop owners.

VIRTUAL FLUXES

Bhadra fort and busy market is an immediate context of the plaza

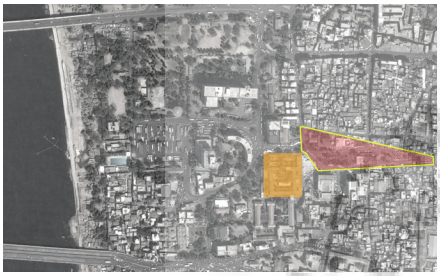
MATERIAL FLUXES

Material Fluxes reflects the human activity around the site.

NATURAL FLUXES

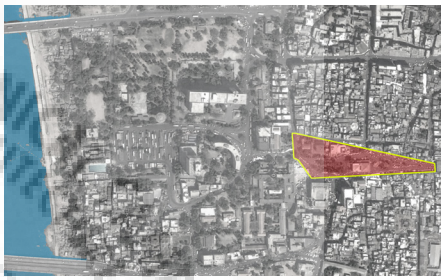
River, fort and plaza together makes an axis

Bhadra Fort

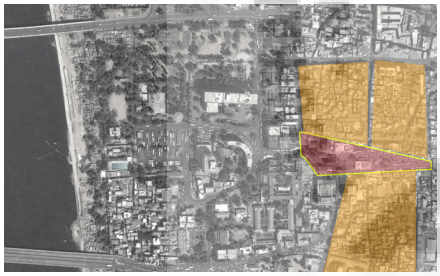


Primary Roads

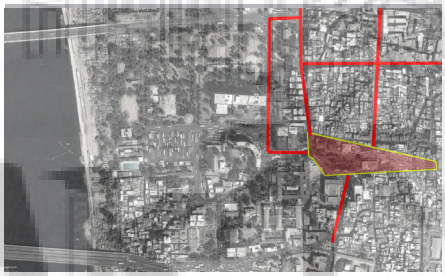
Sabarmati river



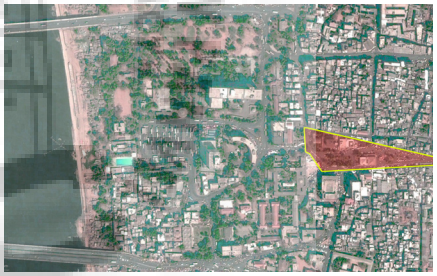
Markets



Secondary Roads



Landscape



Virtual fluxes

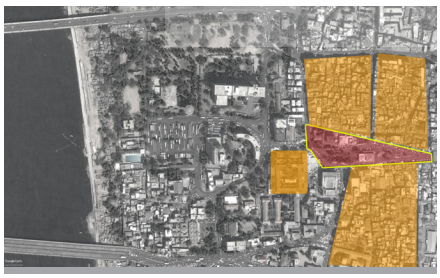


Figure 8.8-Virtual fluxes of Bhadra ort

Road networks

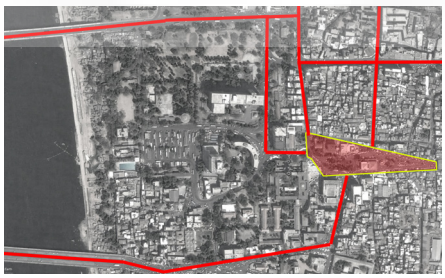


Figure 8.8-Material fluxes of Bhadra ort

Natural Fluxes

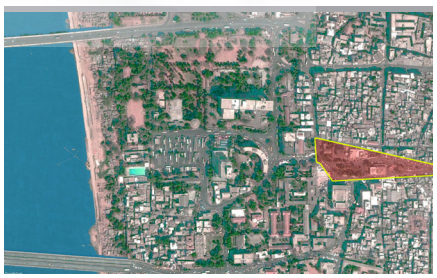


Figure 8.9-Natural fluxes of Bhadra ort

BEFORE AND AFTER INTERVENTION

Before Redevelopment

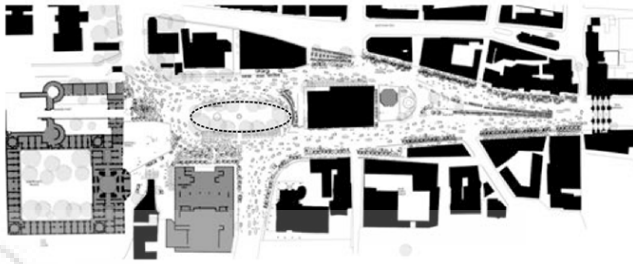


Figure 8.9-Before development of Bhadra ort

After Redevelopment

Figure 9.0-After development of Bhadra ort

1. BHADRA FORT & AZAM KHAN'S SARAI
2. BHADRAKALI TEMPLA AND RAISED PLATFORM
3. PREMABHAI HALL
4. KARANJ BAUG
5. BHADRA PUBLIC TOILET
6. UCO BANK & MUSEUM
7. ELV ROOM & CHABUTARA
8. BHADRA PLAZA FLOORING
9. HAWKERS & RESTAURANTS
10. TEEN DARWAJA
11. HAWKERS RELOCATED NR TEEN DARWAJA
12. HAWKERS RELOCATED NR. ELV ROOM
13. HAWKERS RELOCATED NR. UCO BANK
14. HAWKERS RELOCATED NR. BAHUCHAR TEMPLE
15. HAWKERS RELOCATED NR. ALIF MASJID
16. HAWKERS RELOCATED NR. BANK OF INDIA
17. HAWKERS RELOCATED NR. HIMABHAI INSTITUTE

Figure 9.1-Plan of Bhadra fort plaza

LIST OF INTERVENTIONS

The design allows the informal and formal activities occur while maintaining the quality and character of a vast public space with leisure zones with trees and shade, fountains and seating areas. Some of the other issues the project addresses are the up gradation of physical elements such as signage, lighting, landscaping and street furniture. Designed portal columns, arranged along the market space demarcate the commercial activity. These vertical elements will guide the new location of the stalls and the zones for street vendors, as well as provide light and structure for the awnings required in monsoon or summer seasons.

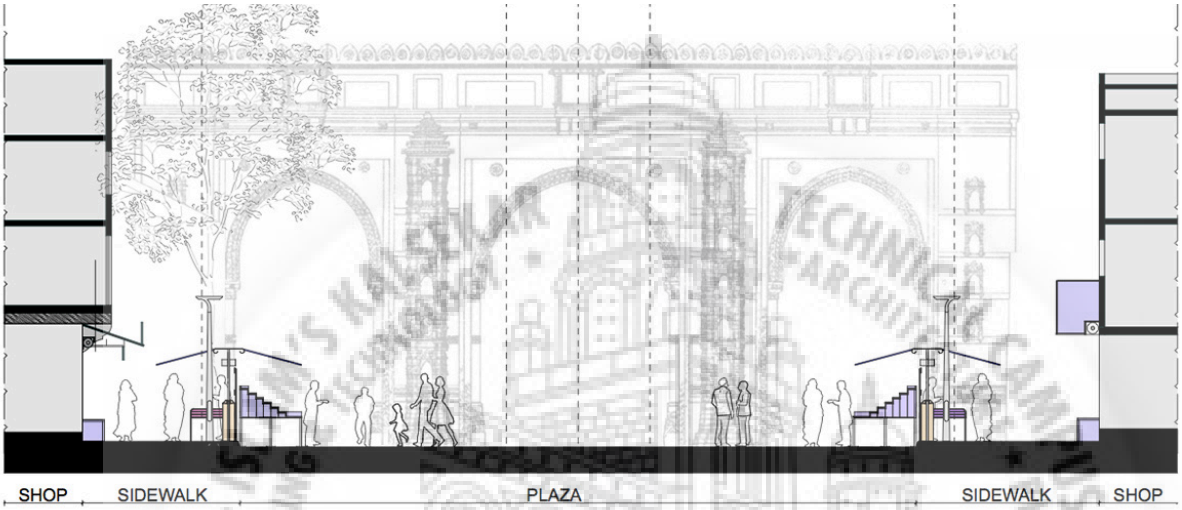


Figure 9.1-Section of Bhadra fort plaza

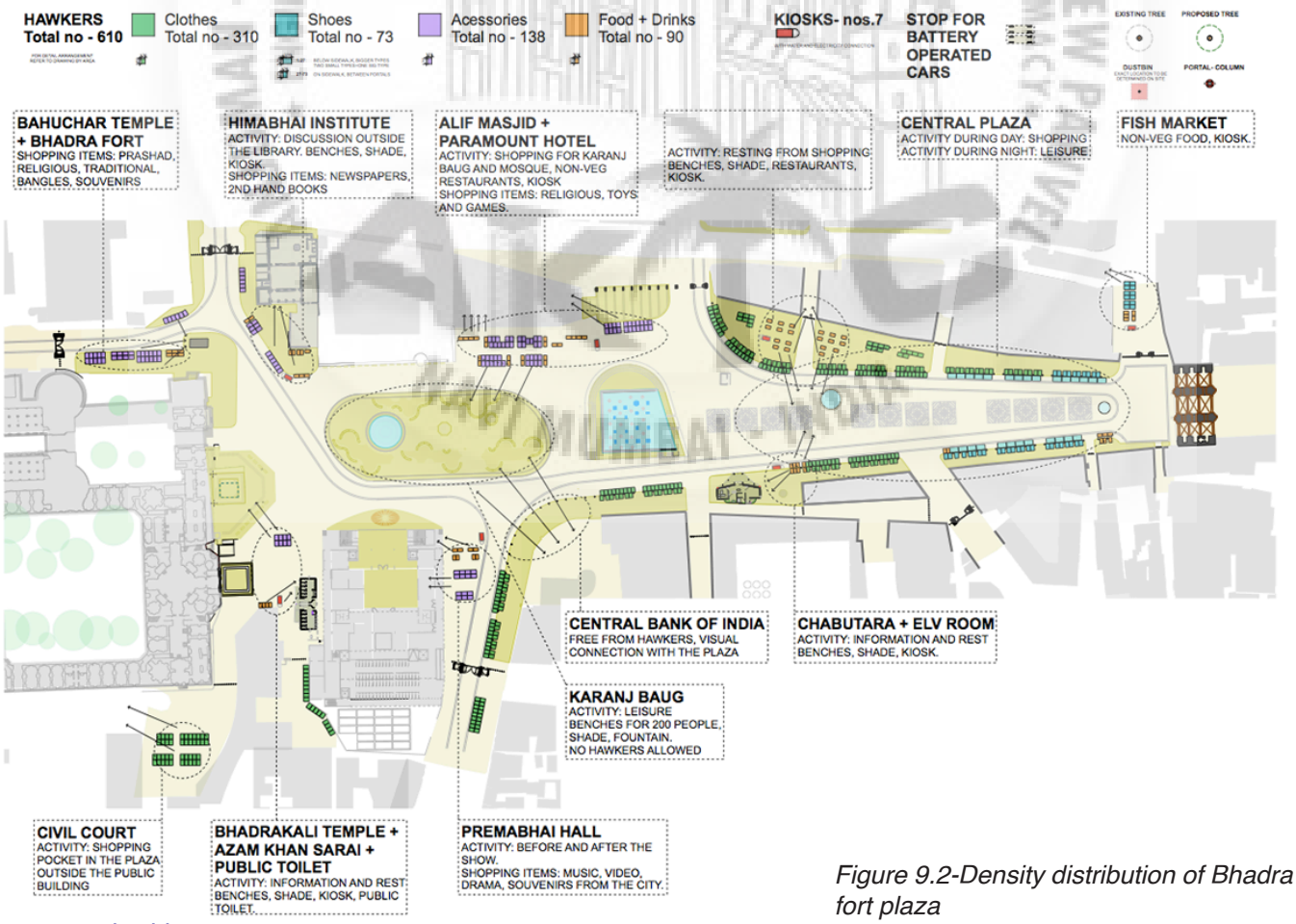


Figure 9.2-Density distribution of Bhadra fort plaza

DESIGN CLUES

BENEFITS OF ADAPTIVE REUSE:

Save Money

Demolition and new construction can certainly be costly. By simply making use of an existing structure precious funds and resources can be saved. There are even some incentives such as eligible tax credits covering up to 20% of the cost of restoration.

Save the Environment

New buildings have higher embodied energies than adaptive reuse buildings. In 2001 new construction accounted for about 40% of annual energy and raw materials consumption, 25% of wood harvest, 16% of fresh water supplies, 44% of landfill, 45% of carbon dioxide production and up to half of the total greenhouse emissions from industrialized countries. Adaptive reuse retains a building's original embodied energy by bypassing wasteful demolition and construction, adaptive reuse saves precious time, energy and materials.

Save History

Locals are proud of their neighborhood's architectural landscape. By updating historical buildings, or buildings that have meaning to the existing community, developers can preserve the neighborhood's identity and charm.

The Spaces Can Be Useful for Fledgling Businesses

The adaptive reuse of existing buildings in general can be 16 percent less costly than other forms of construction. Many of these spaces also become ideal settings for start-up businesses because cost efficient shell space can be made available at a lower leasing rate than the market for new construction.

Principles of adaptive reuse used in above studies

1. Preservation

In this example steel frame and industrial elements such as chimneys etc. was preserved.

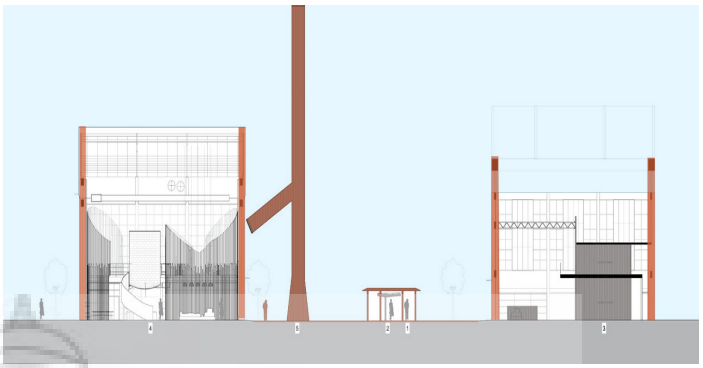


Figure 9.3 (a) -Preservation (principles of adaptive reuse)

2. Additon

A platform was added that connects all three fuel tanks

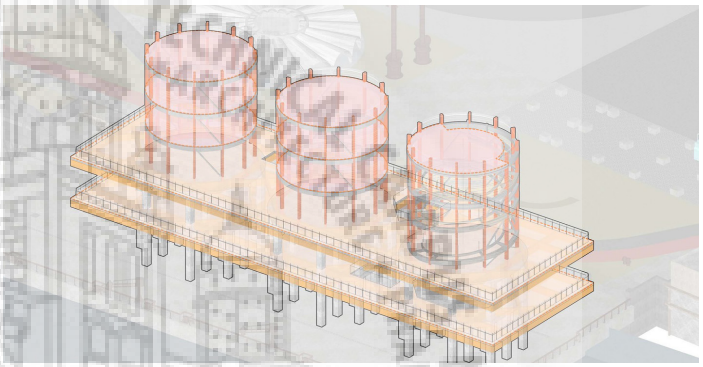


Figure 9.3 (b) -Addition (principles of adaptive reuse)

3. Subtraction

Two tanks were removed.

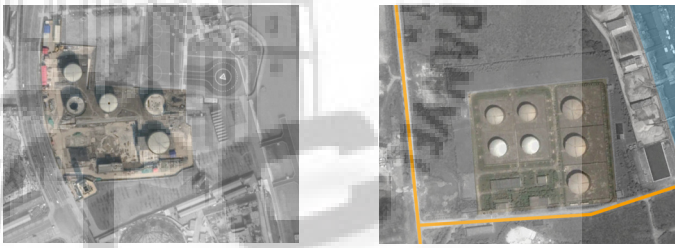


Figure 9.3 (c) -Subtraction (principles of adaptive reuse)

4. Extension

Extension of new building.

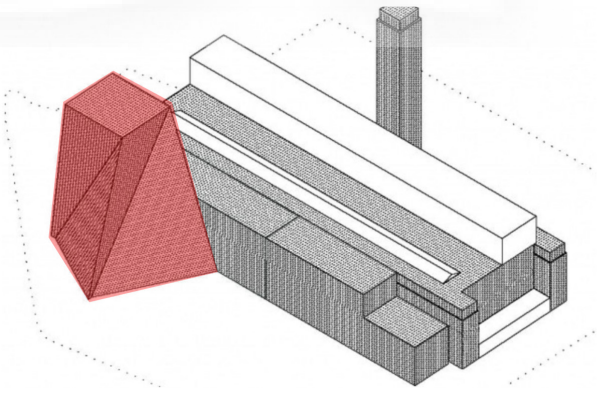


Figure 9.3 (d) -Extension (principles of adaptive reuse)

COMPARITIVE ANALYSIS

Elements of analysis	Tank shanghai	Adaptive reuse of thermal power plant	Transformation of power plant	Revitalization of industrial complex into mixed-used campus
				
Category	Contextual	Innovation in programme	Innovation in programme	Innovation in programme
Purpose	To investigate the relationship between new and old in the adapted and reused buildings as applied to the surrounding history.	To study how to preserve the structural beauty of the old building and space and still adaptively reusing it and giving it a new function.	To study the extension project without disturbing existing historical structure.	To study how to preserve the structural beauty of the old building and space and still adaptively reusing it and giving it a new function.
Area	Site Area- 60,000 SQ.MT Gross Floor area- 10,000 SQ.MT	Site Area- 6,400 Sq.mt Gross Floor area- 3,840 sq.mt	Site Area- 40,000 Sq.mt Gross Floor area- 34,800 sq.mt	Site Area- 1800 Sq.mt Gross Floor area- 929 sq.mt
Function before and after	Abandoned fuel tanks Art center	Abandoned thermal power plant Art gallery	Underutilized power station Contemporary art museum	Abandoned godrej industries Mixed used campus
Principles of Adaptive reuse	Subtraction of two tanks from 7 tanks.	Addition of platforms to connect three tanks	Refurbishment of existing building. Addition of new building with same fabric.	Preservation of existing industrial aesthetics.
Flux that influence the transformation	Natural Flux- Huangpu River	Natural Flux- Huangpu River	Virtual Flux- Institutions, Art galleries Natural flux- River thames	Virtual Flux- Godrej industries
Inference	- The project catapults visitors into an environment which is entirely the opposite, one which has never existed before	By interconnecting three tanks with a platform, it became viewing deck for the visitors.	The seamless extension of project without disturbing the existing structures beauty, culture and heritatage value.	The project replaces a large industrial campus in Vikhroli, a site integral to the Group's history. It is here that seeds of a modern, integrated
Impact on context	Tank Shanghai has brought unprecedented energy to the formerly industrial neighborhood and to the southwest banks of the city at large.	It has brought new energy to the formerly industrial neighborhood and to the of the city at large.	The gallery is a highly visited museum, with 5.9 million visitors in 2018, making it the sixth-most visited art museum in the Britain.	Site is located next to Mumbai's mangrove so project did not harm the context. It promotes in adaptively reusing industrial sites in Mumbai.

Elements of analysis	Adaptive reuse of abandoned mall into urban lagoon	Revitalization of old factory into multi-purpose area	The revitalization of Bhadra fort square
			
Category	Experiential	Innovation in programme	Contextual
Purpose	To study how the use of surrounding area more effectively that will benefit the users by providing opportunity and recreational space	To study how abandoned factory can be transformed into to new multipurpose area.	To study how the culture and climate of particular area affect the adaptive reuse project.
Area	Site Area- 3840 Sq.mt Gross Floor area- 3840 sq.mt	Site Area- 3840 Sq.mt Gross Floor area- 3840 sq.mt	
Function before and after	Abandoned shopping mall Urban lagoon	Abandoned factory Multipurpose area	Congested plaza due to traffic Historic core a walkable precinct, develop pedestrian plazas.
Principles of Adaptive reuse	Subtraction of upper floors of the mall and insertion of urban lagoons.	Addition of roof and preservation of existing structural grid.	Diverting the existing vehicular traffic.
Flux that influence the transformation	Virtual Flux- Dense concrete jungle	Virtual Flux- Developing context.	Virtual Flux- Bhadra fort. Material flux- Dense traffic.
Inference	-Understanding the need of surrounding and then adding a new function into a space is necessary.	By preserving the external structure and structural grid transforming it into a new multipurpose area.	By revitalizing the external plaza , Bhadra fort got its historical and cultural value back.
Impact on context	The project has reintroduced the lost greenery of Tainan.	The design of the project demonstrate the harmony between modern and historical.	The design allows the informal and forma activities occur while maintaining the quality and character of a vast public space.

DESIGN INTENT

Adaptive reuse of urban decay as Social Hub

CHAPTER 5- SITE SELECTION

5.1 INTENT STATEMENT

The structure and framework of old urban areas have esteem, in that they uncover the history through their actual structures.

The existence of the old with the new, where both hold importance in the service they provide is what generates the genius loci of these cities.

It is only the physical presence of these structures that conveys the history of the growth of the city, and imparts the spirit of the city. ***To completely wipe them off the fabric of the city would be like blanking off completely an important era of the history.***

The fabric, though functionally obsolete, represents an important era in the development of this metropolis. Here is an *opportunity to preserve old mill Architecture and social hub , playgrounds, cafeterias, green promenades along with new office spaces* to bring new business to the city that drives the economy of the country.

Design opportunity

The progressing improvement is supportive of tall structure living arrangements, exclusive class clubs and lodgings without focusing on the city's issues.

Current trend

The question arises: *who has the first claim to such lands. Is it the mill owner, who have been given countless concessions by the government to run their industries and who had surrendered their mills to government when they were unable to run? Or the workers / public, where up to 40% of people do not even have roof over its head? Or the public at large, who are reeling under acute shortage of open space, one of the lowest in the world.*

Questions

Along with preserving these buildings, it is my opinion to ***create public open spaces in different mill plots and merge new functions giving public access to the premise which was restricted in the past and now even after it is abandoned.***

Design approach

5.2 SITE REGION - MUMBAI

Figure 9.4 -Mumbai city view

India's first and world's 6th greatest metropolitan region, capital of Maharashtra state, business, monetary and amusement capital of the nation, home to more than 21 million individuals, density of ***25000 individuals for every square kilometers*** , ***Mumbai is the most crowded city in India and second most crowded city on the planet.***

It indicates more than simply the land region and material abundance. It isn't only a city yet it's an idea, a fantasy valued my great many residents.

In the past Mumbai was considered as the main port and a door to the west on account of its geological position.

Situated on the western bank of Maharashtra,***Mumbai ranges an absolute region of 603 sq. km (233 sq. mi) with a complete seaside length of 180 km. (112 mi)*** Mumbai is limited by Arabian Sea toward the west.

All pieces of the city are productively associated by Mumbai's mass travel framework comprising of trains and transports. Overwhelmingly natural in its metropolitan structure, the city comprises of 10% vehicular street coverage.Northern area of the city comprises a National park (S. Gandhi National park) that reaches out more than 40 square miles, making it 1/sixth the size of the city. .

Mumbai's three significant lakes (Tulsi, Vihar and Powai) are situated inside this forested zone. The coastline of the city is indented with various springs and straights. The eastern waterfront is covered with huge mangrove swamps though the west coast is sandy and rough.

Figure 9.5 -Three lakes of Mumbai

The city lies in the tropical climate zone resulting in harsh monsoons & hot summers. With an average annual temperature of about 80F, ***Mumbai receives a lash of rainfall equaling to an average of 96 inches per year.***

City's downtown is located to the south & it is popularly known as South Mumbai or the Island City.

Because of its tapering peninsular form, urbanization of the city continued towards the north.

This region today is considered as Suburban Mumbai. Whereas towns like ***Thane, New Mumbai & Panvel*** serve as Mumbai's satellite towns. Both the districts (south & suburban are administered by city's municipal council known as ***BMC - Brinhanmumbai Municipal Corporation. Mumbai is divided into 17 wards for the purpose of civic administration.***

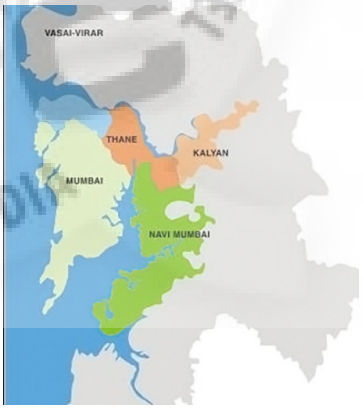


Figure 9.6 -Satellite towns of Mumbai

5.3 ENVIRONMENTAL ISSUES OF MUMBAI

Mangrove Destruction

Mangroves are an integral part of the landscape of Mumbai. The city was originally surrounded by 5000 acres of mangrove swamps. Among these, the city has lost almost 40% to reclamation of land for construction and development projects. As a result, Mumbai became more vulnerable to natural disasters.

Land Use Changes

Salt Pan Lands: Similar to its mangrove cover, the city has a chunk of land dedicated to salt production. However, the lack of land for residential accommodation has pushed the developers to convert the salt pan lands into residential and commercial zones. Salt pan lands are an important barrier between land & sea. And with their land use change, the danger of flooding has increased.

Forest Depletion

Urban development didn't spare Mumbai's only breathing lung too. Illegal construction continues to develop on National Park periphery. Consequently this rich and unique forest which acts as an essential green cover and carbon sink is shrinking day by day.

Rapid land reclamation

Mumbai once had numerous creeks flowing into the island. But as urbanization of the city continued, these water bodies got filled up. Such excessive coastal land reclamation is unhealthy for an island city like Mumbai.

Pollution, population and lack of space are traditionally described as the ultimate problems of Mumbai. These issues consequently lead to environmental degradation of this global city. Leopard attacks in a bustling city, landslides, abnormally high temperatures in summers, erratic rainfall have long since warned the city of the impending doom. It is believed that the environmental problems of Mumbai have emerged due to the creation of the city itself.

With change in climate and global temperature rise, Mumbai now receives extravagant monsoon showers making city's drainage system inadequate.

On 26th November 2005, Mumbai was lashed with 39 inches of rainfall within 24 hours. This day was an eye opener when the city came to a standstill. Disasters like 26/7 not only cause a distress among the citizens but they also drain the city economically. Mumbai's urban environmental issues might not have a water tight solution at the moment. But it's important that they are studied, analyzed & addressed in the best possible way.

Over the last few years Mumbai has witnessed several signs of 'sanity' in terms of environmental protection. Some of the leading organizations in the city along with active environmentalists are persistently fighting for city's sustainability. Their efforts are essential & could turn out to be one of the most crucial steps towards Mumbai's environmentally healthy future.

Mumbai is still in the need of similar efforts. Considerable damage has already been done to the 600 acres of land belonging to the textile era of the city. Yet there exists a small ray of hope for Mumbai since some of the major chunks of derelict mills indicate a strong potential for a sustainable development.

5.4 THE MILL PRECINCT

Location 5.4(a)

"Girangaon" is a Marathi word for "Factory town" or "Mill Village", which is characterized by industrial architecture of ***more than 50 mills***.

More than ***600 acres of land*** in this area was devoted to textile industry in early 19th century. Girangaon was home to thousands of mill workers and their families.

The exceptional lodging settlements by workers, their informal organizations and networks ruled Mumbai's mill precinct for quite a long time. The area extends from Lalbaug to Parel and Worli to Sewri and spreads over an area of 25sq.km. The whole mill region is productively coordinated into Mumbai's mass travel framework and all around associated with significant roads in the city

Figure 9.7 -Location of mill precinct

Origin **5.4(b)**

The origin of material industry in Mumbai returns to late nineteenth century when the main factory was set up by ***Cowasji Davar*** in the time of 1856 with the assistance of 50 finance managers in the city. By 1862, four factories were added and this number increased to 21 by 1885. By mid twentieth century there were in excess of 50 textile mills in Mumbai which changed it from an exchanging town to an assembling place.

Expanded work openings in plants drew a large number of travelers from towns and towns everywhere on the state. By 1931 portion of the city's populace was monetarily reliant on material industry.

Figure 9.8 -Timeline of Mumbai's mill history

Development 5.4(c)

Residential, institutional and infrastructure development had already commenced in the south region of the city and development plans were now being modified and extended towards the north.

To encourage the development of textile industry and promote industrial production, acres of lands in Central Mumbai were given to the mill owners at concessional rates by the colonial Bombay Government. Mumbai's development as an economic hub was greatly enhanced by these very mills.

Areas where mills were located grew to become the heart of the city. Eventually central Mumbai witnessed a distinctive skyline of tall chimneys and gigantic mill structures.

Characteristics 5.4(d)

Over 50 mills in less than a 3 mile radius converted this portion of the city into an incredibly crowded, lively and dynamic hub. Almost all of the workers employed by mills lived in close proximity of their place of work. Such an aggregation of workers within a smaller region of the city increased the social and cultural involvement of the workers in the community.

This led to stronger community ties and a rich network of ***physical and social infrastructure*** The map above shows the locations of ***58 mills*** in Girangaon that establish a unique urban fabric of this region. Mill workers ***housing, recreational grounds (for worker colonies), places of worship and entertainment*** are some of the dominant elements in the urban characteristics of Girangaon.

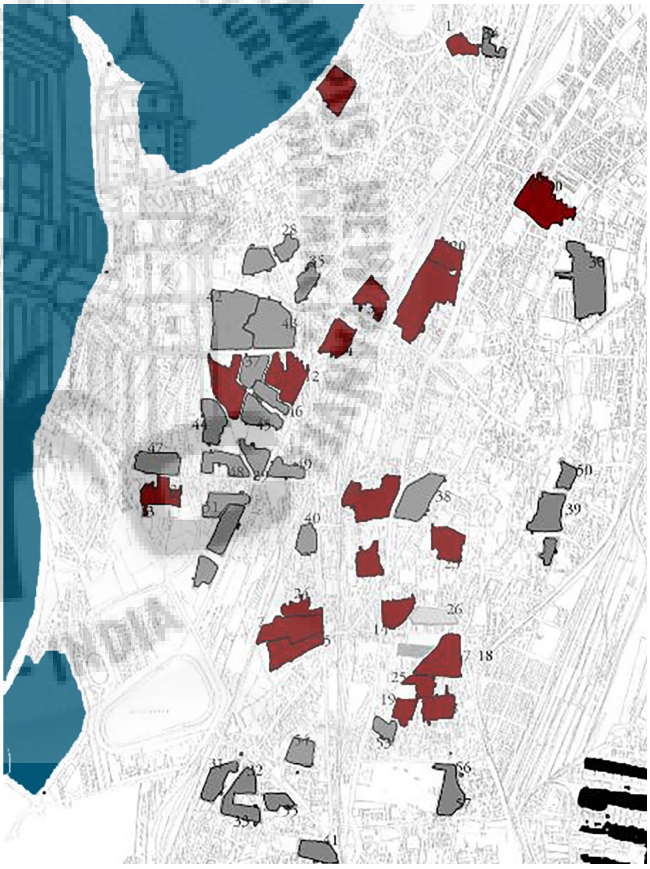


Figure 9.9 -Location of textile mills.

DECLINE OF THE TEXTILE MILLS 5.5

In mid-nineteenth century, textile industry experienced several ***technological changes all over the world***. The conventional handloom technology faced a severe competition from the advanced power loom techniques.

The mill owners did not update the machinery in the Mumbai Mills to keep up with the changing trends and the lowskilled workers were also comfortable with this policy.

During the same period the ***fuel prices and costs of raw material increased.*** Reservation policies and adverse taxation discouraged the mill owners from investing more in the industry. By 1980's it became uneconomical to maintain large scale industrial units within the city limits on account of high power and tax costs.

Also, the economic and technological change struck major mill towns like Manchester in UK and Lowell in Boston and eventually there was an overall slump in the world textile market. By 1990's the employment rates of service industries increased by large numbers.

Another reason for the ultimate shut down of mills is the 18 month long strike by mill workers' union in 1982. Nearly 250,000 workers & more than 50 textile mills went on strike.

Rashtriya Mill Majdoor Sangh (RMMS) the largest workers union in the city led by Congress (political party) fought the government and mill owners for their rights.

The ***Bombay Industrial Relations Act, 1946 (BIR Act)*** sought to establish a single union, the Congress-led RMMS as the only approved union. This move was taken primarily to renounce the option of strikes and focus on other means of resolution.
The ***strike of 1982*** was called for primarily to strike down the BIR Act along with increase in wages.

Figure 10.0 -Unionists scaling the walls of Saksaria Mills

The strike did no good for the workers instead it opened a new strategy for mill owners. During the strike, ***mill owners outsourced the work to workers in Bhiwandi,*** a distant suburb who were paid almost 50 percent of the wages in spite of longer working hours and no legal compensation.

All this led to huge losses and the running of the Cotton Textile Mills became unviable. S***everal mills were declared sick and a few even shut down their operations***. Only a few managed to survive. There were 58 cotton textile mills in Mumbai. Of these, 26 were deemed 'sick' and, therefore, taken over by the Government of India. The remaining 32 mills continued in the private sector.

Figure 10.1 -Mukesh mills

SWOT ANALYSIS 5.6

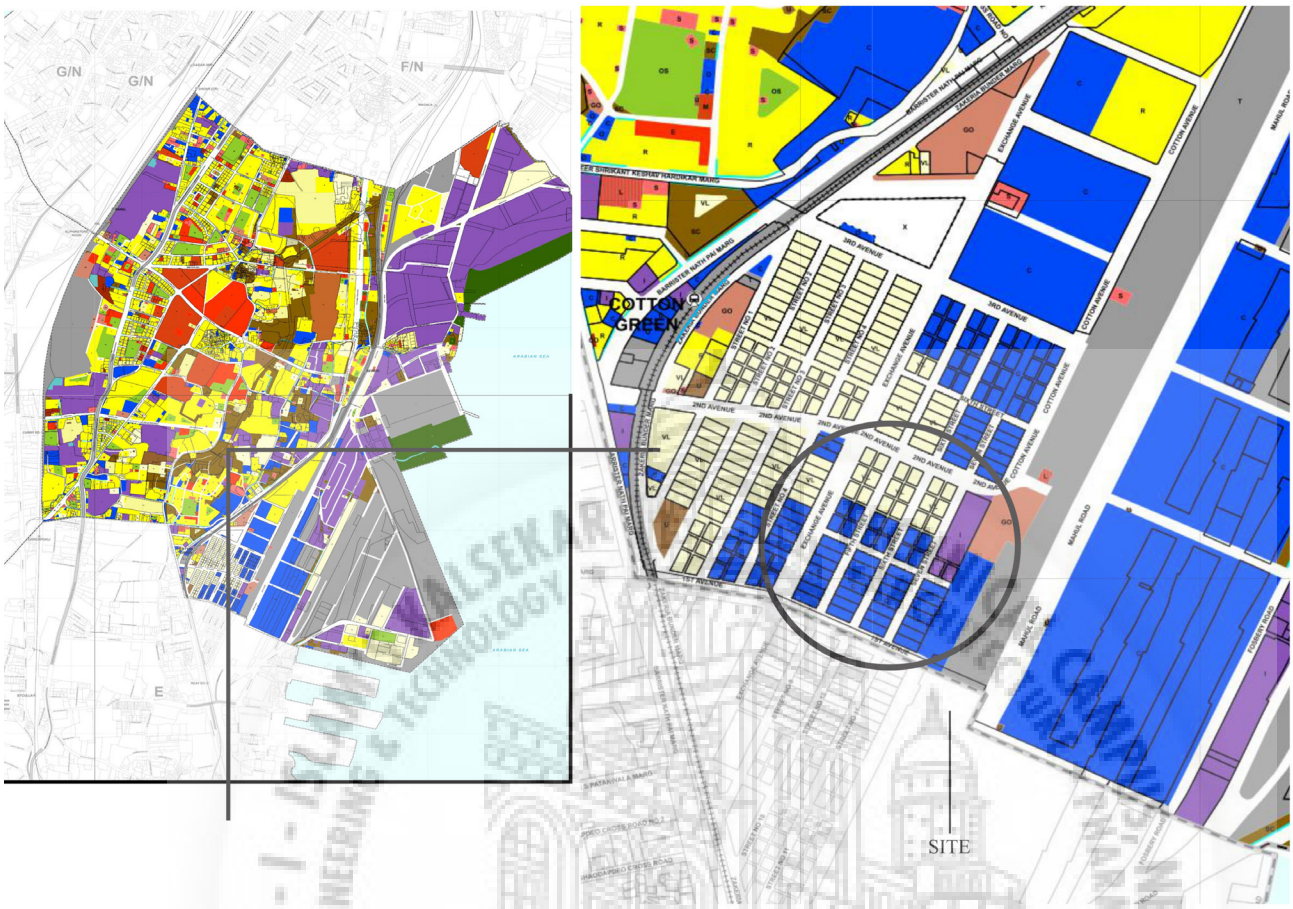
Name of Mill land	Strength	Weakness	Threat	Opportunity
India United Mill Land No.1	1. Located along the most important road in central district. 2. More than75% of the mill buildings on site are in a good condition. 3. Close to a railway station and several bus stops. 4. Land use around it is mostly residential.	1. Located along a very busy street. 2. Lesser site area compared to other mill lands.	1. Opportunity for a midsize public park or garden. 2. Existing mill buildings can be converted into a small publi school or community center. 3. Helpful in revitalizationnof the street front.	1. Site contamination is possible in some areas. 2. Unstable structures on site will have to either demolished or repaired. 3. Part of site area might be reserved for road widening in the future.
Madhusudan Mills	1. Part of a bigger mill district. 2. Considerably large site area for redevelopment. 3. Thick existing vegetation.	1. No easy access from any of the railway station or bus routes. 2. Isolated position	1. Opportunity for a midsize public park or garden. 2. Existing mill buildings can be converted into a museum or theater.	1. Isolated position may encourage crime.
India United Mill Lands 2 & 3	1. Large site area. 2. Strategic central position in a dense residential zone. 3. Close to 3 railway stations and several bus stops.	1. Away from the main street. 2. Central yet isolated position.	1. Good opportunity for adaptive reuse of mill buildings. 2. Ideal for a public park or plaza. 3. Opportunity to revitalize central district.	1. Number of unstable structures on site. 2. Isolated position may encourage crime.

Name of Mill land	Strength	Weakness	Threat	Opportunity
Digvijay Mills	1. Located along the most important road in central district. 2. Close to a railway station and several bus stops. 3. Land use around it is mostly residential.	1. Located along a busy street as well as near a fly-over. 2. Limited site area compared to other mill lands. 3. Single huge mill building might be a challenge to reuse.	1. Opportunity to convert the existing mill building into a marketplace or bazaar. - Helpful in revitalization of the street front.	- Part of site area might be reserved for road widening in the future.
India United Dye Works	1. Located along a sea front to the west and an important road to the east. 2. Considerably large site area for redevelopment. 3. Several bus routes and stops along the adjacent road.	1. No easy access from any of the railway station. 2. Transportation to the site or site access will be car-driven.	1. Opportunity for a midsize public park or garden. 2. Existing mill buildings can be converted into a small public school or community center. 3. Helpful in revitalization of the sea front.	1. Part of site area might be reserved for road widening in the future. 2. Proximity to the sea makes it prone to floods

SITE PROPOSAL 5.7

Location- Ranbhau Bhogle Marg, Kala Chowki, Mumbai, 400033, Maharashtra, India

Figure 10.2 - Site Location



Warehouses

Vast stretches to the east of Reay road and cotton green with grid of long brick sheds.

Some 200- odd warehouses were built by cotton traders in 1920s for storage of cotton bales to export to Manchester.

To the east of cotton depot, is a charcoal and grain depot that's now is abandoned

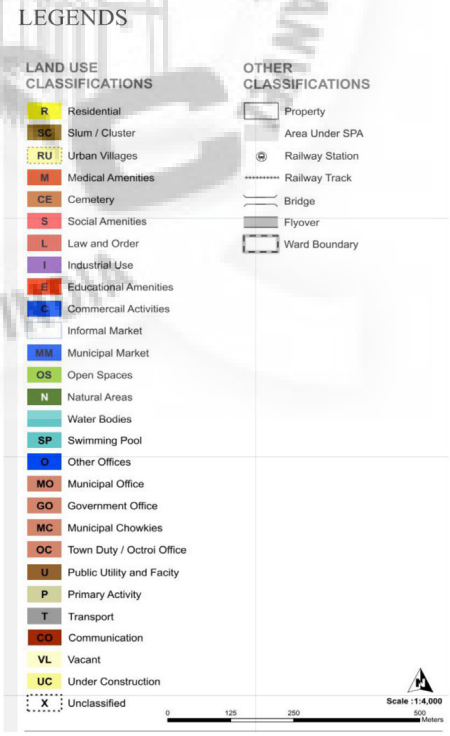


Figure 10.3 - Existing Land use plan

DEVELOPMENT CONTROL REGULATIONS (DCR) FOR MILL LANDS 5.8

1. Lands of sick and / or closed cotton textile mills-

With the previous approval of the Commissioner to a layout prepared for development or redevelopment of the entire open land and built-up area of a sick and/or closed cotton textile mill and on such conditions deemed appropriate and specified by him and as a part of a package of measures recommended by the Board of Industrial and Financial Reconstruction (BIFR) for the revival/rehabilitation of a potentially viable sick and/or closed mill, the
Commissioner may allow:

(a) The existing built-up areas to be utilized-

(i) For the same cotton textile or related user subject to observance of all other Regulations;

(ii) For diversified industrial user in accordance with the industrial location policy, with office space only ancillary to and required for such users, subject to and observance of all other Regulations;

(iii) For commercial purposes, as permitted under these Regulations;

(b) Open lands and balance FSI shall be used as in the Table below:-

NO.	Plot Area Extent	Percentage to be earmarked for Recreation Ground/Garden/ Playground or any other open user as specified by the Commissioner	Percentage to be earmarked for Recreation Ground/Garden/ Playground or any other open user a specified by the Commissioner	Percentage to be earmarked and to be developed for residential or commercial user (including users permissible in residential or commercial zone as per these Regulations) or diversified Industrial users as per Industrial Location Policy, to be developed by the owner.
	Up to and inclusive of 5 Ha.	33	27	40
	Between 5Ha and up to 10 Ha.	33	34	33
	Over 10 Ha.	33	37	30

Notes-

(i) In addition to the land to be earmarked for recreation ground/garden/playground or any other open user as in column (3) of the above Table, open spaces, public amenities and utilities for the lands shown in columns (4) and (5) of the above Table as otherwise required under these Regulations shall also be provided.

(ii) Segregating distance as required under these Regulations shall be provided within the lands intended to be used for residential/commercial users.

(iii) The owner of the land will be entitled to Development Rights in accordance with the Regulations for grant of Transferable Development Rights as in Appendix VII in respect of lands earmarked and handed over as per column (4) of the above Table. Notwithstanding anything contained in these Regulations, Development Rights in respect of the lands earmarked and handed over as per column (3) shall be available to the owner of the land for utilization in the land as per Column (5) or as Transferable Development Rights as aforesaid.

(iv) Where FSI is in balance but open land is not available, for the purposes of column (3) and (4) of the above Table, land will be made open by demolishing the existing structures to the extent necessary and made available accordingly.

(v) Where the lands accruing as per Columns (3) & (4) are, in the opinion of the Commissioner, of such small sizes that they do not admit of separate specific uses provided for in the said columns, he may, with the prior approval of Government, earmark the said lands for use as provided in Column (3).

(vi) It shall be permissible for the owners of the land to submit a composite scheme for the development or redevelopment of lands of different Cotton textile mills, whether under common ownership or otherwise, upon which the lands comprised in the scheme shall be considered by the Commissioner in an integrated manner.

(II) Lands of cotton textile mills for purpose of modernization- - With previous approval of the Commissioner to a layout prepared for development or redevelopment of the entire open land and/or built-up area of the premises of a cotton textile mill which is not sick or closed, but requiring modernization on the same land as approved by the competent authorities, such development or redevelopment shall be permitted by the commissioner, subject to the condition that it shall also be in accordance with scheme approved by Government, provided that, with regards to the utilization of built up area, the provisions of clause (a) of sub-Regulations (i) of this Regulation shall apply and, if the development of open lands and balance FSI exceeds 30 per cent of the open land and balance FSI, the provisions of clause (b) of Sub-Regulations shall apply as per

(i) The exemption of 30 per cent as specified above may be availed of in phases, provided that, taking into account all phases, it is not exceeded in aggregate.

(ii) In the case of more than one cotton textile mill owned by the same company, the exemption of 30% as specified above may be permitted to be consolidated and implemented on any of the said cotton textile mill lands within Mumbai provided, and to the extent, FSI is in balance in the receiving mill land.

(III) Lands of cotton textile mills after shifting-

If a cotton textile mill is to be shifted outside Greater Mumbai but within the state, with due permission of the competent authorities, and in accordance with a scheme approved by Government, the provisions of sub-clauses (a) and (b) of Sub-Regulation (1) of this Regulation shall also apply in regard to the development or redevelopment of its land after shifting

(IV) The condition of recommendation by the Board of Industrial and Financial Reconstruction (BIFR) shall not be mandatory in the case of the type referred to in subRegulations (II) and (III) above.

(V) Notwithstanding anything contained above, the Commissioner may allow additional development to the extent of the balance FSI on open lands or otherwise by the cotton textile mill itself for the same cotton textile or related user.

(VI) With the previous approval of the Commissioner to a layout prepared for development or redevelopment of the entire open land and / or built up area of the premises of a cotton textile mill which is either sick and / or closed or requiring modernization on the same land, the Commissioner may allow:-

(a) Reconstruction after demolition of existing structures limited to the extent of the built up area of the demolished structures, including by aggregating in one or more structures the built up areas of the demolished structures;

(b) Multi-mills aggregation of the built up areas of existing structures where an integrated scheme for demolition and reconstruction of the existing structures of more than one mill, whether under common ownership or otherwise, is duly submitted, provided that FSI is in balance in the receiving mill land.

(VII) Notwithstanding anything contained above--

(a) if and when the built up areas of a cotton textile mill occupied for residential purposes as on the 1st of January, 2000 developed or redeveloped, it shall be obligatory on the part of the land owner to provide to the occupants in lieu of each tenement covered by the development or redevelopment scheme, free of cost, an alternative tenement of the size of 225 sq. ft. carpet area; [Provided that no such occupants shall be evicted till such time, he/she is provided with alternative accommodation of the size 225 sq. ft. carpet area in such development or redevelopment scheme.](3)

(b) if and when a cotton textile mill is shifted or the mill owner establishes a diversified industry, he shall offer on priority in the relocated mill or the diversified industry, as the case may be, employment to the worker or at least one member of the family of the worker in the employ of the mill on the 1st January 2000 who possesses the requisite qualifications or skills for the job;

c) For purposes of clause (b) above, the cotton textile mill owner shall undertake and complete training of candidates for employment before the recruitment of personnel and starting of the relocated mill or diversified industry takes place.

VIII)(a) Funds accruing to a sick and/or closed cotton textile mill or a cotton textile mill requiring modernization or a cotton textile mill to be shifted, from the utilization of built up areas as per clause (a) of Sub-Regulations (1) and as per clauses (a) and (b) of Sub-Regulations (6) or from the sale of Transferable Development Rights in respect of the land as per columns (3) & (4) of the Table contained in clause (b) of Sub- Regulations (1) or from the development by the owner of the land as per column (5), together with FSI on account of the land as per column(3), shall be credited to an escrow account to be operated as hereinafter provided.

(b) The funds credited to the escrow account shall be utilized only for the revival / rehabilitation or modernization or shifting of the cotton textile mill, as the case may be, provided that the said funds may also be utilized for payment of workers dues, payments under Voluntary Retirement Schemes (VRS), repayment of loans of banks and financial institutions taken for the revival / rehabilitation or modernization of the cotton textile mill or for its shifting outside Greater Mumbai but within the State.

(9)(a) In order to oversee the due implementation of the package of measures recommended by the Board of Industrial and Financial Reconstruction (BIFR) for the revival / rehabilitation of a potentially sick and / or closed textile mill, or schemes approved by Government for the modernization or shifting of cotton textile mills, and the permissions for development or redevelopment of lands of cotton textile mills granted by the Commissioner under this Regulations, the Government shall appoint a Monitoring Committee under the chairmanship of a retired High Court judge with one representative each of the cotton textile mill owners, recognized trade union of cotton textile mill workers, the Commissioner and the Government as members.

(b) The Commissioner shall provide to the Monitoring Committee the services of a Secretary and other required staff and also the necessary facilities for its functioning.

(c) Without prejudice to the generality of the functions provided for in clause (a) of this Sub-Regulation, the Monitoring Committee shall:-
(i) Lay down guidelines for the transparent disposal by sale or otherwise of built up space, open lands and balance FSI by the cotton textile mills;
(ii) lay down guidelines for the opening, operation and closure of escrow accounts;
(iii) Approve proposals for the withdrawal and application of funds from the escrow accounts;
(iv) Monitor the implementation of the provisions of this Regulations as regards housing, alternative employment and related training of cotton textile mill workers.

(d) The Monitoring Committee shall have the powers of issuing and enforcing notices and attendance in the manner of a Civil Court.

(e) Every direction or decision of the Monitoring Committee shall be final and conclusive and binding on all concerned.

(f) The Monitoring Committee shall determine for itself the procedures and modalities of its functioning. (2)

(10) [Notwithstanding anything stated or omitted to be stated in these Regulations, the development or redevelopment of all lands in Gr. Mumbai owned or held by all cotton textile mills, irrespective of the operational or other status of the said mills or of the land use zoning relating to the said lands or of the actual use for the time being of the said lands or of any other factor, circumstance or consideration whatsoever shall be regulated by the provisions of this regulation and not under any other Regulation.](4)

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