



Repurposing Negative/Abandoned Spaces: Revitalization of Pirana Dump-yard at Ahmedabad

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Abstract : *The world is constantly evolving and so are our cities. Cities comprises of various types of spaces and with the evolution of cities, these spaces are constantly evolving. With the evolution of cities, the negative and abandoned spaces are also increasing. This paper highlights the understanding, formation and problems of negative and abandoned spaces with the examples to revitalize these spaces by taking examples throughout the world and implementing it to propose revitalization strategies and alternatives for Pirana Dump-yard at Ahmedabad. The proposal presented will help in the revitalization of negative/abandoned space in a purposeful manner which will benefit the urban fabric of the area.*

1. INTRODUCTION

Our cities are being influenced by the human impulse to see beyond the present. Future modifications to the structure of cities are likely to occur alongside many other rapidly developing technologies in the urban environment. Unused spaces, industrial regions or unspoiled gaps between buildings are a result of economic, environmental, or political developments. Such deserted areas first started to arise in the middle of the 20th century as a result of the loss of the coal and iron industries. Old industries are still being replaced by new ones, and physical space is being freed up, as a result of the rapid speed of technological advancement and digitization.

A city will always have abandoned regions since it is always changing and growing. Historical or even current structures will undergo further modification as a result of social and technical development.

2. FORMATION OF NEGATIVE SPACES

Negative spaces are created or formed when one of the following factors fail

- Shape size and orientation of the space with the context
- Relationship with the environment
- Activities that the space is meant for
- Lighting provided to the space
- Formation of Negative Spaces from large open spaces being divided into individual spaces is a major factor. (SA 1669 Form and Space, 2008).

3. HISTORY OF NEGATIVE SPACES

The notion of Negative Space Formation is not new. It has occurred throughout history, with various reasons impacting its formation. Historically, changes in rulers resulted in the establishment of Negative Spaces. This was largely due to each ruler's desire to establish his or her own focal point inside the empire. As a result, past capitals were abandoned and a new base was established each time a king came to power. As a result, the current location was left, which eventually deteriorated and became unsuitable. The open or void was cut out by ancient and mediaeval Indian and Arab builders.

In cities, open spaces were frequently used as streets. The streets of Shahajahanabad serve as a prime example of public open space on the street. The streets themselves were the location of all gatherings and meetings.

As time passed and the quantity of accessible space decreased, architects and designers began to move vertically. Thus came the age of skyscrapers. Although it allowed for less use of ground area with residences and workplaces built one on top of the other, it also began to create a disconnect between people and open space. People were no longer closely linked to open or public areas. As a result, they were utilised less frequently, rendering the space ineffective or negative. As a result, the construction of towering structures conserved space but also resulted in the emergence of Negative Space.

4. PROBLEMS WITH NEGATIVE SPACES

- Crime is one of the major problems of Negative spaces. Spaces that are used less often are easy targets for criminals.
- Easy accessibility for criminals
- Vulnerability of targets
- Escape routes
- Unplanned settlements

These are some of the factors for crime. Places like Old Delhi are most vulnerable as they cater to the needs of the criminals. As architects minimizing the presence of Negative Spaces would give better security to the citizens of the city. Ways of minimizing crime in public spaces are by creating an activity which acts as public magnets to attract crowds. Installations, kiosks, pedestrian pathways are some of the solutions in mitigating crime in public spaces. Indirect methods of reducing crime can be done by maintaining a Natural Surveillance (sen, 1992).

5. ABANDONED URBAN SPACE IN OUR CITIES

Unused urban area is left as wasteland or spaces between buildings and other structures. These areas have a tremendous potential for reconstruction and repurposing by integrating them into the community, as well as for creating magnificent places by highlighting their unique characteristics. A old railway track, for example, has the unique feature of connecting two neighbourhoods and may be turned into a green corridor. Abandoned places can be transformed into a variety of amenities depending on their location. Every city has such unoccupied places ready to be adapted to the present urban fabric and become a part of the overall cityscape.

Abandoned regions typically show fissures in city history, such as the decline of an entire industry. Buildings that have been abandoned are located in the centre of a city, or in an appealing location next to a river or beside a lake, which is where most industrial enterprises used to be.

Many unused buildings in today's cities are unoccupied due to speculation, with property owners expecting for a rise in value. Ignoring a region till market values rise does not inevitably boost a building's worth. On the contrary, keeping a structure unattended might result in a loss of value owing to damage or uncontrolled appropriation by individuals. Temporary use of vacant buildings, such as urban gardening or communal kitchens, can have a positive impact on the image of the neighbourhood as well as the space itself.

Buildings with a dynamic exterior are more appealing and are more likely to be maintained by users. Official regulation for the period of interim usage is necessary to establish the time frame and function, so that the final closure of the temporary facility may take place smoothly.

Gaps in a city can be utilised in a variety of ways based on the demands of the surrounding neighbourhoods. They can help to improve the neighbourhood as community gardens, public or residential structures. When a previously vacant space in the neighbourhood is given a new function, it increases the overall liveability of the area.

6. EXAMPLES OF REVITALIZATION OF NEGATIVE/ABANDONED SPACES

1. High Line by James Corner Field Operations and Diller Scofidio + Renfro, New York City, N.Y., United States

New York City's High Line, by James Corner Field Operations and Diller Scofidio + Renfro, not only plays homage to its original identity as an industrial rail line, but also acknowledges its years of disuse since. The structure — now a long, public walkway floating over the city — still features remnants of its original railroad tracks, and embellishes the extensive greenery which had already begun to overtake it prior to its revamped design.



Fig - 1 : High Line, New York

2. Ptuj Performance Center by ENOTA, Ptuj, Slovenia

In Ptuj, Slovenia, the firm ENOTA transformed a Dominican monastery from the 13th century into a modern Performance Center. The site, which was already a palimpsest of Romanesque, Gothic and Baroque architecture, is a stunning context for the sleek, contemporary forms which make up the newest additions. These many architectural layers do not clash, however, nor do they attempt to conceal their differences. Instead, they complement each other, the aged monastery interiors providing a warmth to match the elegance of ENOTA's design.



Fig - 2 : Ptuj Performance Center, Ptuj, Slovenia

3. Goa: Beer at a mill

This was a project that began with architect and heritage conservationist Raya Shankwalker deciding he wanted to find an old structure and make it an example of adaptive reuse.

The Rice Mill Cafe, in an adapted rice mill in Morjim, Goa, wears a distressed look to retain a sense of what it was — as well as keep costs down. ‘In a lot of such projects, people go overboard with the spending, and then it becomes very difficult to make the venture profitable,’ says owner, architect and heritage conservationist Raya Shankwalker. (Harshan Thomson). Adaptive reuse really works for commercial spaces because people like to be in a space with a story.

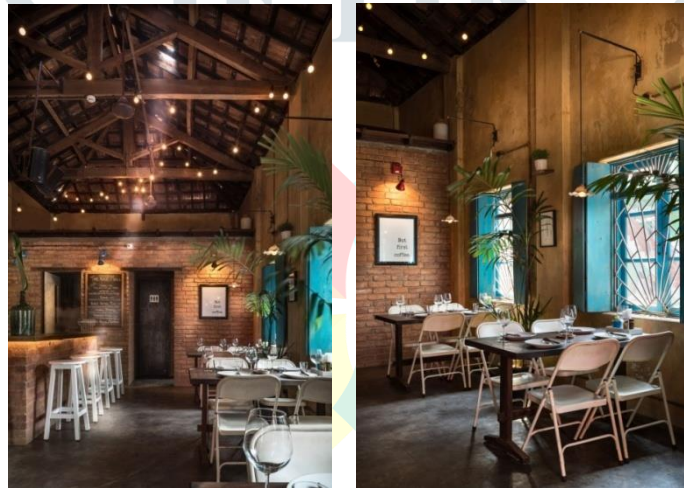


Fig - 3 : The Rice Mill Cafe, Goa

4. Mumbai: Factory floor to office

In Mumbai, an old soap factory is now a posh office and a buzzing café, with silos and chimneys still in place to hint at their history.

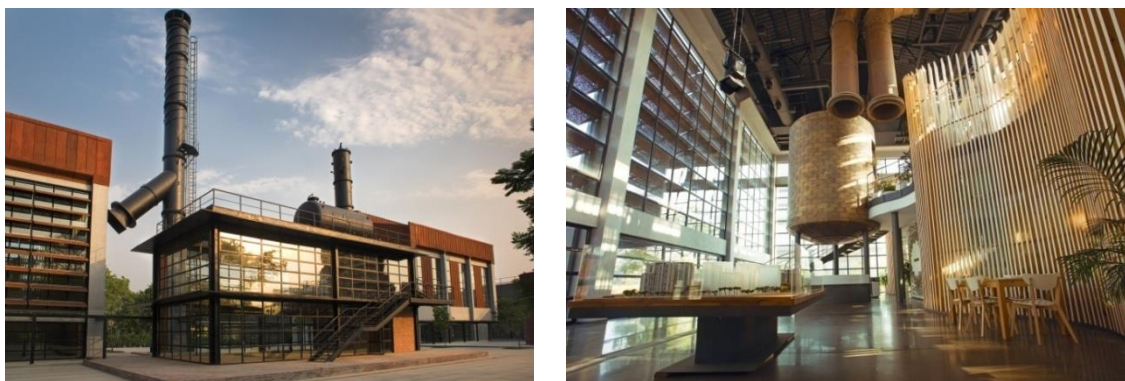


Fig - 4 : Imagine Studio at The Trees

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.

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'.

7. REVITALIZATION OF PIRANA DUMP-YARD AT AHMEDABAD

Land filling of municipal solid waste is a common waste management practice and one of the cheapest methods for organized waste management in many parts of the world. (El-Fadel et al., 1997; Dsakalopoulos et al., 1998, Jhamnani et al., 2009). In most low to medium income developing nations, almost 100 percent of MSW generated goes to landfills. This waste materials results in to contamination of soil, ground water and underground water as leachate produced by water or liquid water moving into through and out of landfill, migrates into adjacent areas.

Some facts around Mount Pirana are as follows:

- Spreading over an area of 84 hectares
- The city's most major dumping yard since 1982.
- Ahmedabad Municipal Corporation collects nearly 4700 metric tonnes of solid waste every single day.
- As of 2017, there were 75-foot-high mountains of garbage, with each weighing nearly 7 million metric tonnes.

This mountain of garbage, because of a lack of segregation among biodegradable and non-biodegradable often results in fires and fumes that are toxic and cause significant health hazards for waste management professionals of the city as well as the communities that live in close proximity to the mountain.

Over the years, the administration has taken cognizance of this growing problem and has taken a variety of steps to slow it down, with the eventual objective of clearing the land-fill site.

- At present, 39 trommel machines are processing about 15,000 MT of garbage daily.
- In nearly 20 months the AMC was able to process and remove 33 lakh MT of garbage, yet another 1 crore MT of garbage is yet to be processed and removed.
- Further, the government is also carrying out pilot projects to use construction waste and plastic waste to integrate them in road construction.
- Moreover, the government is also spreading awareness around the segregation of dry waste and wet waste as it helps cleanliness workers to better manage the waste from a ground level.

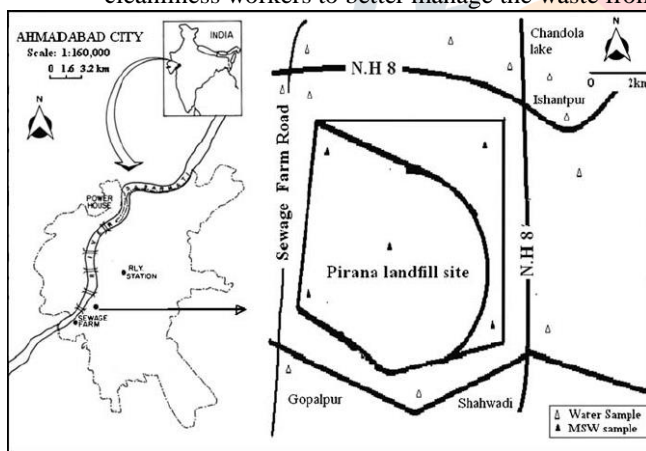


Fig - 5 : Location of Pirana landfill site in Ahmedabad



Fig - 6 : Image showing mountain of garbage at Pirana dump site

8. EXAMPLES OF REVITALIZATION OF LANDFILLS FROM AROUND THE WORLD



Russia, Vladivostok.

Source: Press Service of the Administration of Vladivostok



USA, Las Vegas



The Netherlands



Singapore

Fig - 7 : Reclaimed landfills and dumps of MSW

9. PROPOSAL IDEAS FOR REVAMPING PIRANA DUMP SITE

The following are the suggested proposals for revamping Pirana Dump site:

1. Solar Parks

Solar Parks can be made on the Pirana dump site to generate electricity which will help to reduce the city’s electricity dependence on fossil fuel. Some of the benefits of constructing solar parks are:

- Solar parks uses a reliable, clean energy source.
- Solar parks does not cause pollution which will help in reducing the greenhouse gases which in-turn will help to reduce global warming.
- More villages will benefit from the solar parks, as the electricity generated can be provided to remote areas and villages.



Fig - 8 : Solar Park made on landfill site

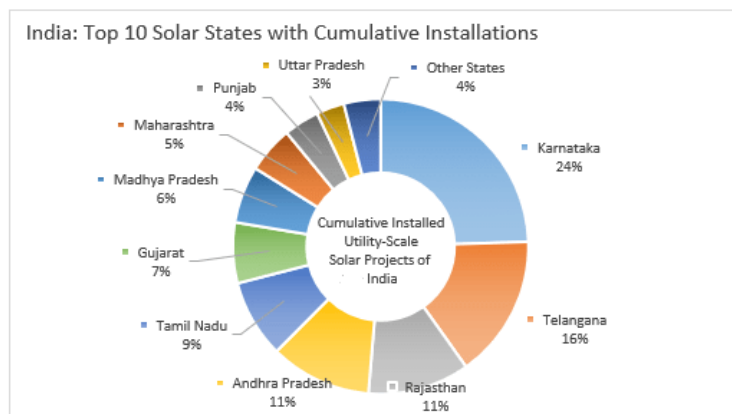


Fig - 9 : India's Top 10 States with Solar Installation (Source: Kenbrook Solar)

Cost-Benefit Analysis of the project:

a) If a 500kw Solar Power Plant is installed at the site:

Average Global Horizontal Irradiation (GHI) in GUJARAT state is 2026 W/sq.m. 1kWp solar rooftop plant will generate on an average over the year 4.53 kWh of electricity per day (considering 5.5 sunshine hours).

Table - 1: Analysis for a 500kw Solar Power Plant (Source: Adani Solar Calculator)

1. Size of Power Plant	
Feasible Plant size as per the Capacity :	500 kW
2. Required land area	
	2.5 acres
3. Cost of the Plant :	
MNRE current Benchmark Cost :	Rs. 53000 Rs. / kW
Without subsidy (Based on current MNRE benchmark) :	Rs. 26500000
With subsidy 0 % (Based on current MNRE benchmark) :	Rs. 26500000
4. Total Electricity Generation from Solar Plant :	
Annual :	679500 kWh
Life-Time (25 years):	16987500 kWh

5. Financial Savings :	
a) Tariff @ Rs. 8 / kWh (for top slab of traffic) - No increase assumed over 25 years :	
Monthly :	Rs. 453000
Annually :	Rs. 5436000
Life-Time (25 years) :	Rs. 135900000
6. Carbon dioxide emissions mitigated is	13930 tonnes.
7. This installation will be equivalent to planting	22288 Teak trees over the life time. (Data from IISc)

b) If a 5MW (5000kw) Solar Power Plant is installed at the site:

i. Area needed for the construction of a 5 MW solar energy power plant

Before setting up a Solar Plant, it is necessary to investigate the size of land required for its construction.

- Solar Plants require considerable space because large arrays of photovoltaic panels need to be exposed to sunlight.
- Solar Power Plants occupy at least 5 acres of land per 1 MW output, which means for generating 5 MW energy, an area of 25 acres is required.

But choosing the location is not enough. Legal authorization is also required to develop the project. Moreover, the project must be approved by environmental, safety, health, etc., bodies.

ii. Cost of land for construction of 5 MW solar plant

- The cost of land comes to Rs.5 Lakhs per acre (1MW plant requires a minimum of 5 acres of land).
- The estimated land cost is Rs.5 lakhs per acre. Here, a minimum of 5 acres of land is required for a 1 MW plant, which means a 5 MW Solar Power Plant will be Rs. 1 crore 25 lakh.
- The cost of Grid extension can be up to Rs. 15 lakh/km, which depends on the capacity of extension lines (range-11kV to 123kV). Therefore we can infer that the cost of grid extension is dependent on the distance of the site from the nearest substation.
- An extra amount of Rs. 2 crores (Rs. 40 lakh/ MW) is added to the project cost if trackers are used in the power plant.

Therefore, considering all the factors, approximately **Rs. 4 crores** is required for setting up a **1 MW Solar Plant**, which means the estimated cost of **5 MW Solar Plant** construction will be **Rs. 20-30 crore**.

iii. Profit earned by a 5 MW solar plant

The estimated cost for a 5MW plant would be near about 34.5 to 35 crores in India. Hence, with **20k - 20.5k units** of electricity daily, **Rs.45,000 to Rs.60,000** can be generated. Accordingly, after excluding the minor O&M expenses, a total of Rs 1.75 crores approx. can be made after a year.

A 5 MW Solar Plant would make 6000 MWh per year due to the national average of four peak sun hours per day. So it can be said that a 5 MW Solar Plant can lead to annual revenue of about **Rs. 1.5 - 1.75 crores per year**.

2. Recreational Spaces

Traditionally, rural areas have played host to many landfills. As these areas became more densely populated, available land for development became more difficult to find. Now, communities that need recreational areas can use closed landfills for open space. Recreational space in urban areas has always been scarce. Therefore, recreational spaces can be planned on the Pirana dump site with several recreational activities to provide citizens with a place to enjoy.



Fig - 10 : Proposed area for Recreational activities at Pirana Landfill Site

The area proposed for the recreational activities/spaces is approximately 60 acres.

The recreational facilities at Pirana dump site will include the following:

- Garden - Flower garden, Vegetable garden, Nursery garden etc.
- Amphitheatre
- Oxygen Parks - The Ahmedabad civic body has decided to clear almost 25 acres (out of 80 acres) of space at the dump site here to build an oxygen park.
- Library
- Golf Course
- Water Bodies
- Playgrounds
- Food courts and kiosks
- Cycle Tracks
- Pedestrian Tracks
- Nature Parks



Fig - 11 : Images showing the recreational activities on landfill site



Fig - 12 : Current and Future model of landfilling

The benefits of the proposed Recreational Area at Pirana Dump site will be :

- It will contribute to community identity.
- It will provide active and passive recreational opportunities.
- It will appeal to all age groups.
- It will contribute to the health and wellness of a community.
- It will create valuable green space in the dense urban fabric of the city.
- It will help in clearing the impurities from the air.
- It will help in reducing crime.
- It will help in lowering temperature which will help mitigate the effects of urban heat island.
- It will improve environment in the surrounding areas.
- It will also help check water pollution in the Sabarmati, which flows near the site.

Schematic Section :

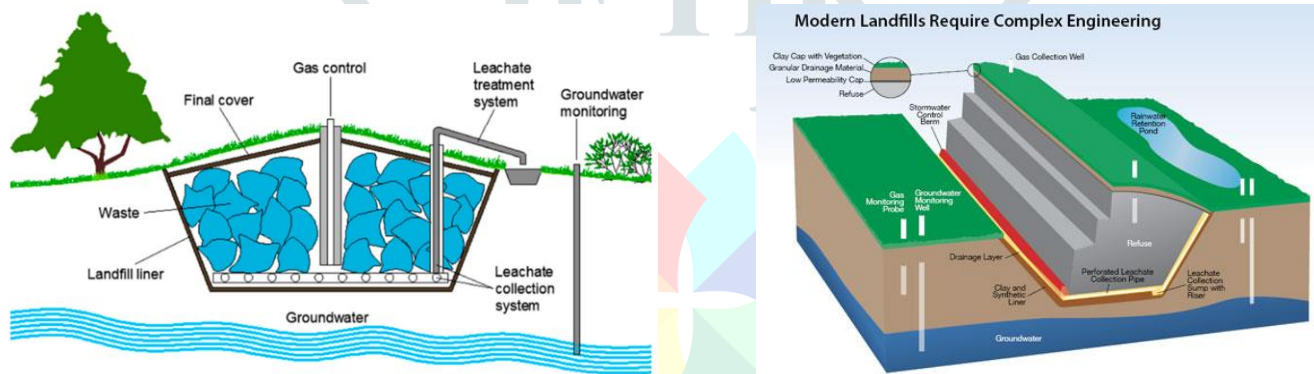


Fig - 13 : Schematic Section showing utilization of landfill

10. IMPACTS OF THE PROPOSED RECREATIONAL SPACES ON THE URBAN FABRIC OF THE CITY

Following are the impacts of the proposed recreational spaces on the urban fabric of the city:

1. Economic worth :

- **Increased economic vitality** - High-quality and well-maintained public spaces boost the number of people who frequent market areas, resulting in increased economic vitality for traders.
- **Lower public spending on health care and urban management** - Parks and open spaces lower health-care expenses by increasing overall physical and mental health and well-being.
- **Increased property values** - Land located adjacent to well-designed, accessible, and high-quality green space can raise property values.
- **Attracted human capital** - The characteristics of open public space also attract human beings.
- **Increased business confidence** - Companies are frequently drawn to sites that provide well-designed public spaces that attract consumers, workers, and services.

2. Social worth :

- **Better quality of life** - It will play a significant role in improving the quality of life in cities.
- **Greater actual and perceived security and safety** - The real and perceived security and safety dimensions are also taken into account in public space planning.
- **Social equality and mobility will be promoted** - It will also encourage social equality and mobility.
- **Increased cultural life** - It will serve as a focal point for promoting cultural activities and entertainment.
- **Social integration and civic pride** - It will give a space for social interactions while also serving as a source of civic pride for the people due to the presence of parks and open spaces.

3. Environmental worth :

- **Lessened pollution (noise, air, and water)** - This will also aid in lowering pollution.
- **Environmental Sustainability** - Through environmentally friendly design and practises, it will preserve environmental sustainability.

11. CONCLUSION :

Urban public spaces have been an integral part of habitations since ancient period. Public Spaces are constantly evolving and so are the negative and abandoned spaces in the cities. These spaces are formed when the place becomes unusable or are left abandoned. Negative and abandoned spaces have adverse impacts on the people and their surroundings. The impacts of negative and abandoned spaces can be mitigated through proper revitalization of these spaces which in-turn will have wide range of benefits for the urban fabric of the city. The revitalization of negative and abandoned spaces will have positive impact on economic, social and environmental worth of the city and the urban fabric. Revitalization of these spaces will help improve the quality of life for the people residing near negative and abandoned spaces and will add to the sustainable development, improvement and betterment of the entire city and its surroundings.

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