

In the Shadow
A Study for Utilization of Space under Flyovers in Dhaka

By
Nazia Roushan
07108017

Seminar II

Submitted in partial fulfillment of the requirements
for the degree of Bachelor of Architecture
Department of Architecture
BRAC University

April 2013

ACKNOWLEDGEMENT

All graces to the Almighty whose clemency made this thesis possible.

I take this opportunity to express special gratitude to the Chairperson of the Prof. Fuad H. Mallick and Prof. Zainab F. Ali for constant guidance, mentoring and motivation not just during the course of this thesis but during my entire study at the Department of Architecture at BRAC University. I would also like to thank my supervisors, Abul Fazal Mahmudun Nobi, Nandini Awal, Imon Chowdooree, Shakil Ahmad Shimul for their timely guidance and critique and for pushing me to perform to the best of my abilities.

I thank Huraera Jabeen, Prof. Adnan Morshed, Sirajuddin Raju, Sheikh Rubaiya Sultana and Nesfun Nahar for guiding me and providing valuable learning opportunities, enriching my academic experience with their inspiration and expert knowledge.

I owe my deepest gratitude to Umme Salma without whose help this project would not have been successful. I thank Ali Akbar Khan, Ontu, Rubayat ul Karim, Mahmudul Islam Chowdhury, Imtiaz Hossain, Samiur Rahman, Shireen Jahan, Hiba Sharfuddin, Mehnaz Sultana and Ifreet Rahima, and want to thank all my peers with whom I have shared this journey of five years.

I am very grateful to my parents and brother who stayed up late to support me, gave me all logistical support and always encouraged me to do my best.

Finally, special thanks to my best friend Eshaan, who in spite of being in another part of the city, was always around for me whenever I needed him, constantly providing motivation and helping me to stay focused and cheering me up in my low phases.

Nazia Roushan

ABSTRACT

Inaccessible, an absence and an abscess in the civic life of the city, the spaces under elevated highways canteem with activity. This thesis suggests ways to rehabilitate these forgotten, dark urban spaces without eradicating heterogeneity and fostering exclusion, which often accompany so many regeneration projects. It is a bit of a paradox — elevated highways are meant to connect two sides of a gap, to bring them together, but they often act quite intentionally as barriers because the space beneath them is so problematic. There is a tendency to leave it unused and overgrown with weeds, or to give it up for some perfunctory use, like parking. But there are many creative solutions to dealing with the space underneath an elevated highway. Instead of dividing neighborhoods, the elevated highways in Dhaka can serve as a foci for the city. Tenuously domiciled in invisible urban interstices, their phantom existence can be transformed in to happening urban pockets through careful design and organization.

Key Words: Elevated highway, Dhaka City, Flyover, Overpass, utilization, spaces under

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1. BACKGROUND OF THE PROJECT

Blighted by barren landscape and left over interstices, spaces under elevated highways in Dhaka are severed from the urban fabric by rail lines and the flyovers themselves. As new flyovers emerge out of the dense framework of the city, it is highly likely that most spaces under them will be inaccessible, forgotten and become a haven for illicit activities. This project aims to remedy this problem.

1.1 PROJECT BRIEF

Project Name: **Utilization of Space under flyovers in Dhaka**

Location: Dhaka city

Client: Ministry of Roads and Highways

1.2 INTRODUCTION



Figure 1 High Five Interchange five level stack interchange with multiple overpasses in Dallas, Texas.

The term 'flyover' is used in the United Kingdom and most Commonwealth countries and is defined as a bridge that carries a road or railway over another road ("Flyover"). Its American counterpart is an 'overpass', which is a bridge, road, railway or similar structure that crosses over another road or railway. An overpass and underpass together form a 'grade separation'. 'Stack interchanges' are made up of many overpasses.

A flyover, in America is, however, a high-level overpass, built above main overpass lanes, or a bridge built over what had been an at-grade intersection. Traffic engineers usually refer to the latter as a grade separation. A pedestrian overpass allows pedestrians safe crossing over busy roads

without impacting traffic. Railway overpasses are used to replace level crossings or at-grade crossings as a safer alternative. Using overpasses allows for unobstructed rail traffic to flow without conflicting with vehicular and pedestrian traffic. Rapid transit systems use complete grade separation of their rights of way to avoid traffic interference with frequent and reliable service.

A freeway, known as motorway in UK and Ireland, is a wide road for fast-moving traffic, especially in the US, with a limited number of places at which drivers can enter and leave it ("Freeway"). An expressway is a wide road for fast-moving traffic, especially one in the US that goes through a city, with a limited number of places at which drivers can enter and leave it ("Expressway").

In this write-up, 'overpass' has been used when referring to a road that crosses straight over another, and "flyover" to refer to one that makes a roughly 90 degree turn to connect to another road, 'expressway' as it has been described before, and 'elevated highway' as any grade-separated structure. In Bangladesh, flyovers have been and are being built in two of its cities as of now – Dhaka, the capital city and Chittagong, the port city. Within the next few decades, in Dhaka and eventually in all of the major cities of Bangladesh, flyovers, like the cyberspace, will symbolize connectivity and agility, efficacy and aspiration. Distances from newly built malls to Metro Rail Transit (MRT) stations, and Central Business Districts (CBD) to airports will reduce dramatically. Countless vehicles will flash past a few meters above the ground, with a parallel universe materializing on its own, quietly, away from the common sight, under the country's massive flyovers. This will be "the underworld ... oblivious to the traffic zipping by" (Bhasin).

The predisposition for gentrification (the restoration and upgrading of deteriorated urban property by middle-class or affluent people, often resulting in displacement of lower-income people) of the city under construction without long-term planning has led to a discord in the city life. The near-future will see inhabitation of the homeless under the under-maintained flyovers. Dhaka is fortunate to see its future in the cities of the neighboring countries, where the homeless have taken shelter in the dark and ignored corners of the underbelly of flyovers, the countless laborers and their families have sought refuge in the car parking zones under flyovers "who work hard to build the very cities which do not have a decent roof and four walls to offer them" (Bhasin; Anand). Almost all the cities in India is encountering a new singularity—the predicament of handling this particular brand of homelessness.

This project seeks ways to deter these and the other usual negative effects of the capricious implementations of elevated highways in urban areas including divisions of well-established communities, hampering privacy of adjacent buildings, excessive noise, unwanted views that drastically change the urban landscape, physical and psychological barriers making the pedestrian experience unpleasant, and land misuse (e.g. dumping debris, abandoning cars, illegal activities). The inappropriate use of vacant spaces under elevated highways may lead to social and economic problems in addition to being unsightly and lowering the value of adjacent properties (cited in Irizarry 1). Also, found from a study conducted in Dhaka near Mohakhali and Khilgaon flyovers, the other negative impacts are loss of land, displacement of population, loss of social cohesion, loss of employment and therefore reduced economic activities, damage of public and private infrastructure, increased air pollution, increased traffic congestion and accidents in the adjoining areas (Taleb and Majumder 105).

Undeveloped spaces below elevated highways have the potential to be transformed in to major corridors, gathering areas and/or recreational spaces that integrate the elevated highways and their surrounding environment. According to the president of Bangladesh Institute of Planners Professor Dr. Sarwar Jahan, "The government should take projects keeping in mind the land use pattern of the city. It has to consider how people travel in the city." In Dhaka, about 38 percent of trips take place by rickshaws, 28 percent by buses and 20 percent on foot. He said that some 1.75 lakh trips take place in the city every day with little long-distance travel. The city dwellers usually take short trips within one to two kilometers (Islam).

The flyovers jump over some of the close-knit and most frenetic neighborhoods of the city. It is a pandemonium of traffic above and a bedlam of traffic below. All amenities being aimed at the automated vehicles, the pedestrians are tacitly overlooked. Although the flyovers have started to accentuate the map of Dhaka, the spaces beneath them are curiously overlooked. Planners of Rajdhani Unnayan Kartripakkha (RAJUK)—the key organization to develop, improve, extend and manage the city of Dhaka and the peripheral areas—are absolutely oblivious to the fact that the spaces under flyovers should be considered and integrated in to the planning scheme. When asked by the author, the deputy director (urban planning) of RAJUK, Ashraf Ali Akhand said that they have not started thinking about spaces that result from the building of the elevated highways in Dhaka yet.

Nonetheless, an array of activities happens in some of the spaces. Informal markets and street vendors spring up in the mornings, selling everything from tea to chicken, fish to fruit. Street children play games; peddlers sell small goods in the small leftover spaces of intersections and traffic medians. "Food stalls and shop are set up in the evening, and laborers gather to share food and drink, some eventually falling asleep in the vacated spaces" (Carlisle et al.). In most of the cases, however, the spaces are either used as dead storage spaces or display withering, neglected 'landscaping'.

The Ahmedabad Municipal Corporation in India has proposed to develop the spaces under the flyovers across the city into street markets, libraries, food courts, skating areas and informal public sitting areas, similar to many foreign countries. In 2012, the vacant spaces under the 16 flyovers were merely used as parking spots or impromptu garbage disposal sites. The proposal came after taking into consideration various aspects such as the locality, population and various public amenities available in the surrounding area. The authority hopes that the systematic use of such spaces will prevent accumulation of garbage as well as ease the flow of traffic. As foreseen by its formulators, for example, the issue of vegetable vendors posing as hurdles for vehicles will be resolved once the space has been designed to be a vegetable market, a permanent space to do business. According to officials, AMC had plans to build amenities such as gardens and libraries under five flyovers in 2012 (Dave).

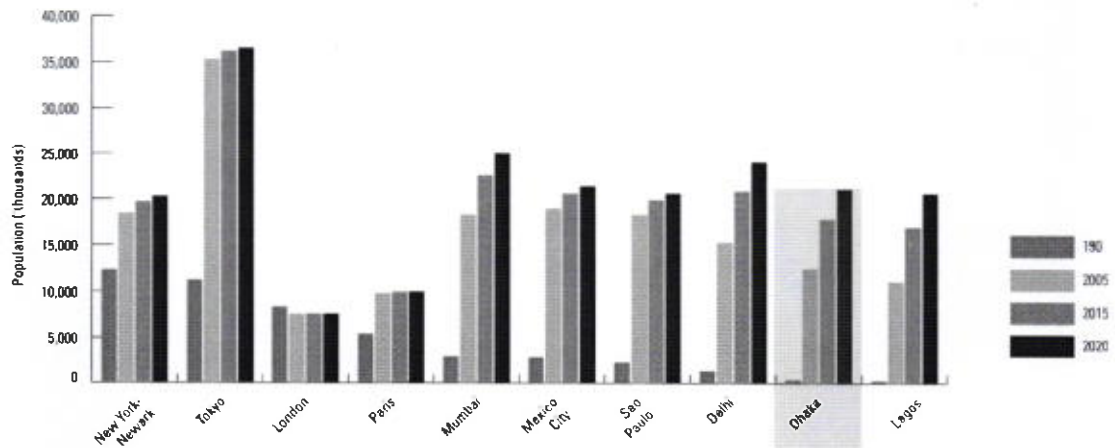
1.3 ELEVATED HIGHWAYS IN BANGLADESH

Dhaka¹, the capital city of a burgeoning country like Bangladesh, is going to be the fourth largest city in the world by 2020 with an estimated population of 22.04 million (*City Mayors Statistics*). By that year, Dhaka will have joined the league of metacities² along with Sao Paulo, New York, Jakarta and Lagos (*State of the World's Cities*). As on 2012, Dhaka's urban agglomeration³ has a density of 115,000 persons per square miles (44,400 persons per square kilometers), the highest in the world ("*Demographia World Urban Areas*").

¹ Dhaka Metropolitan Area

² A major conurbation – a megacity of more than 20 million people

³ Includes the entire urban footprint as a combined urban area



Source: United Nations, *World Urbanization Prospects: The 2003 Revision*.

Note: Population in 2020 was estimated from population in 2010 and 2015 assuming that trends for these years remain the same.

Figure 2 Urban Growth in the World's Largest Cities, 1950-2020

Dhaka is one of the most traffic congested cities in the world with the unusual low per capita income of people of about \$380, most of whom cannot afford private cars. But, as Bangladesh prospers, congestion will get even worse. In Bangladesh, population and traffic growth rate are approximately 1.5 and 7 percent respectively. The road density in Bangladesh is the highest in the South Asia region. There are 2,079 kilometers of road in every 1,000 square kilometers of area ("The Evaluation of Four"). Despite these, our road expansion rate is not at all mentionable with respect to the high traffic growth ("Effectiveness of Flyover Construction"). Bangladesh also has a high rate of traffic fatality – 16.4 per 100,000 – and World Bank considers traffic safety a major public health problem here. Urbanization and more traffic will bring about more traffic accidents. The streets are hostile to pedestrians, the danger and inconvenience of walking or cycling in turn leads people to use rickshaws, CNG driven vehicles or other motor vehicles which make the traffic even worse ("Road Traffic Accidents").

Among the flyovers in Bangladesh, seven have been completed, and the rest are either under-construction or proposed.

Sl.	Name/Vicinity	Type	Status	Opened for Traffic	City	Maintenance Authority
01	Mohakhali	Overpass	Completed	Nov 2004	Dhaka	DCC
02	Khilgaon	Flyover	Completed	Mar 2005	Dhaka	DCC
03	Bijoy Shoroni-Tejgaon Link Road	Overpass	Completed	Apr 2010	Dhaka	
04	Tongi / 'Shaheed Ahsanullah Master Flyover'	Overpass	Completed	May 2010	Dhaka	
05	Banani	Overpass	Completed	Dec 2012	Dhaka	
06	Mirpur-Airport Road	Flyover	Completed	Mar 2013	Dhaka	
07	Kuril	Flyover	Completed	Jun 2013	Dhaka	
08	Jatrabari/ 'Mayor Mohammad Hanif Flyover'	Flyover	Under-construction		Dhaka	
09	Moghbazar-Malibagh	Flyover	Under-construction		Dhaka	
10	Paltan/ Shantinogor-Mawa	Flyover	Proposed		Dhaka	
11	Bohoddar Haat	Flyover	Under-construction		Chittagong	
12	Dewanhat to CEPZ (Chittagong Export Processing Zone) ⁴	Flyover/Elevated Expressway	Under-construction		Chittagong	
13	New-Mooring Container Terminal (NMCT) to Port Access Road ⁵	Flyover	Completed	Mar 2012	Chittagong	RHD (First year), then CPA ⁹
14	Kadamtali Junction	Flyover	Procurement Stage		Chittagong	
15	Dhaka Expressway/ Hazrat Shahjalal International Airport (HSIA) to Jatrabari flyover instead of Kutubkhali/ Dhaka-Chittagong Highway ⁶	Elevated expressway	Procurement Stage		Dhaka	
16	Dhaka-Ashulia Elevated Expressway / Hazrat Shahjalal International Airport (HSIA) to Chandra ^{6,7}	Elevated expressway	Procurement Stage		Dhaka	
17	Amin Bazar to Palashi ⁶	Continuous corridor	???		Dhaka	
18	Golapshah Mazar-Babu Bazar ⁸	Flyover	???		Dhaka	

⁴ ("Elevated Expressway")

⁵ ("First Fly over in Chittagong"; Gupta)

⁶ ("Tk. 5,397 Crore for Improving")

⁷ ("Construction of Dhaka Ashulia")

⁸ ("New Rajuk Plots at Jhilmil")

⁹ Chittagong Port Authority

1.4 PROBLEM STATEMENT

Mushrooming **elevated highways** are **creating spaces** and **new possibilities** under and along them that have unclear territory and ownership. **Desirable destinations** for the city dwellers can be created if these areas are organized and well-maintained through appropriate **delineation of functions** through **regeneration of urban pockets**.

By visually analyzing spaces below elevated highways around Dhaka city, the possibility of incorporating them into the surrounding communities through a comprehensive design that maximizes the functionality of the spaces while improving safety and the aesthetic qualities of the areas would be explored. These spaces exhibit the negative characteristics associated with the development of elevated highways crossing through an urban area and yet can become potential destinations in the civic-space-arid city of Dhaka. Currently, these spaces need to be reorganized and provided with proper accessibility, light fixtures, sidewalks, landscaping, and sundry site amenities. This thesis proposes to address the issues mentioned before through a design intervention supported by comprehensive study of the spaces below elevated highways and their surrounding neighborhoods.

1.5 SCOPE

In order to establish the framework for the study of the spaces below elevated highways in Bangladesh and develop a design for these areas, this thesis includes a discussion of the development of highways in Bangladesh, the impacts of these mega-structures in cities, and an examination of projects developed under elevated highways in urban areas. After the framework for the study of the spaces below is established, the current conditions of the sites are analyzed in order to develop a design for these areas. The outcome of this thesis will be the development of a strategic plan and a set of details of a friendly commercial and pedestrian environment that will provide an identity to the selected neighborhoods that can act as models which can be replicated throughout Dhaka, and eventually in other cities. The work produced on this thesis excludes the production of construction drawing, and design implementation.

There are limitations to the fulfillment of this thesis. Time constraints, distance between the examples selected, and limited availability of information concerning similar projects restrict the discussion of the case studies. The information used to develop the design for the

spaces below the chosen flyovers were obtained from site observations, casual interviews with local business owners, information provided by governmental agencies such as Urban Development Directorate (UDD), Rajdhani Unnayan Kartripakkha (RAJUK), and the Department of Architecture of the Ministry of Housing and Public Works.

1.6 OBJECTIVES

The goal of this thesis is to analyze two local cases to illustrate larger issues associated with the spaces below elevated highways within urban environments. In doing so, this thesis will identify the problems related to the current condition of the spaces below the chosen elevated highways and develop a solution through design intervention. The main objectives of this thesis are described in the following list:

- i. Providing quick and site specific solutions to re-establish the connections between parts of the city detached by the crisscrossing concrete lines of elevated highways
- ii. Regenerating spaces that are dead—literally and symbolically—in the shadow of the elevated highways
- iii. Develop a strategic plan that will improve the current conditions of the spaces below the flyovers in Dhaka.
- iv. Enhance the aesthetic quality of the study areas.
- v. Maximize the use of the space below the flyovers through the improvement of accessibility and pedestrian facilities.
- vi. Provide better public transportation facilities.
- vii. Eliminate unsafe conditions.
- viii. Minimize the impact of the elevated highway in its surroundings.
- ix. Improve the connections among adjacent neighborhoods through the redevelopment of the spaces below the flyovers.

1.7 METHOD

The method of approach to the problem of application of a specific design intervention to the spaces below elevated highways in Dhaka is shaped by several steps. First, a literature review is conducted to establish the framework for the study of the spaces below elevated highways within urban environments. Next, an inventory analysis of these spaces is performed to determine the existing conditions of the chosen sites. This inventory and analysis places a value or judgment on the site conditions based on the designer's perspective. A user analysis is also developed through site observation with the purpose of determining the requirements of the study areas. After completing the analysis of the current conditions of the site the findings are summarized into a program plan. The program elements are then combined into the best overall design solution.

1.8 INITIAL PROGRAM

The following programs have been derived from research on spaces under existing elevated highways around the world. The programs can change according to site-specific requirements and height of the elevated highways, and are not limited to:

Program	Function	Area (ft ²)	Area (m ²)
Play Areas	Skating facilities	1,080	100
	Basketball court	50X94=4,700	437
	Tennis court	36X78=2,808	261
	Volleyball court	29.5X59=1,740.5	162 (Min. height 7m)
	Mini-football pitch	22,605	35X60=2,100
	Cycling path (2-way)	14' w/ clear zone	4.3m w/ clear zone
Shops	Fishmonger/butcher	4X6=24	2.22
	Florist/ Plant nursery	24	2.22
	Groceries	24	2.22
	Vegetable/Fruits	24	2.22
Transport/	Bicycle stand (10)	22X11.5=253	6.7X3.5=24
Conveyance	Pay and Park facilities	54X40=2,160	200
Economically Challenged	Night shelter	12 per person	1.08 per person
	Shift school (40)	700	65
	Toilets	80	7.5

	Library	160	15
Entertainment	Musical venue	600	55
	Exhibition spaces	600	55
	Live performances	800	74
	Open-air theaters (100-135)	45X18(X7)=810	75
Reading	Newspaper/ reading kiosks (10)	40	3.7
	Make-shift bookstores	600	55
	Hawkers' boulevard	24	2.22
Food	Coffee shops	24	2.22
	Salad bars	24	2.22
	Juice stands	24	2.22
	Local fast food	24	2.22
Public Utilities	Waiting spaces for adjacent buildings	--	--
	Landscaped seating	--	--
	Public toilet (single)	25	2.25
	Pocket parks	--	--
	Urban farm gardens	--	--
	Water channel	--	--
	Mural and graffiti walls	--	--
	LED pedestrian lighting	--	--
	Public utilities that obstruct sidewalks (e.g. telephone cables, internet cables, terminal boxes, transformers, access manholes for drainage and water supply, etc)	--	--

1.9 POTENTIALITY

With the construction of highways in urban areas, empty spaces are created. The spaces along and under elevated highways affect the way we experience the city. These spaces are considered shady, dirty and dangerous. People rush through these spaces on the way from workspace to home. But, these substructures have extraordinary potentials. The overpasses are sheltered from the rain and from the heat of the sun most of the time,

while the shades under the flyovers shift throughout the day. Amazingly, they are also “free of much of the politics, land tenure disputes and real estate speculation” that chafe much of Dhaka (Carlisle et al.). The idea of elevated highways as indispensable civic infrastructure can also be extended below the flyovers as well. These places can be opened up for a little room for the citizens of the city, the *Dhakais*.

From wild ideas of housing young people struggling with staggering property prices in shipping containers stacked beneath flyovers in Hong Kong (with of course, lukewarm responses) (Chan), and libraries to more down-to-earth, mundane solutions of pay-and-park facilities, and planting shade-loving plants in lieu of 'beautification' and advertising rights of the sponsors, a lot can be done under the flyovers. Minimal intervention and provision for some basic amenities can transform these patches of land in to spaces that would find a multitude of uses which would be “constantly changing over time, responsive to collective need, present aspirations and seasonal calendar” (Carlisle et al.). These shady underbellies can become spaces for play, for shelter, for community building, for festivity and for celebration.



Figure 3 Underneath Flyover Action members Wallace Chang, Mathias Woo and Chan Yuen-han explain their plan.
Photo: Nora Tam

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

- 2.1 Introduction
- 2.2 Overview of Highway Development
- 2.2 Impact of Introduction of Highways in to Urban Areas
- 2.3 Approaches to Urban Design
- 2.4 Placemaking
- 2.5 What Makes a Successful Place?
- 2.6 Success and Failures of Urban Spaces

2. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 INTRODUCTION

The goal of this chapter is to familiarize the reader with the development of the highway system in Bangladesh, the different types of highway structures and their impact on the urban environment, and to discuss different urban design theories used to study the site. These topics were selected with the intention of establishing a framework for the development of the spaces below the chosen sites. The conceptual framework used in the research is directed to outline possible courses of action, attempt to connect to all aspects of inquiry (e.g., problem definition, purpose, literature review, methodology, data collection and analysis) and to present a preferred approach to the idea or thought behind this project (Jeffels; Jabareen).

2.2 OVERVIEW OF HIGHWAY DEVELOPMENT IN BANGLADESH

The history of modern road development in Bangladesh is not very old. During the British period, water transport and railways served as the two major modes. At that time, road development was considered as a subject of local interest and therefore, the responsibility was given to the provincial governments. They in turn transferred the responsibility to the local bodies – the District Boards (Ali, Seraj, and Ahmad 60). The colonial British Government prepared a master plan for road development in 1938 for India, which included the then Bengal. However, road development according to that plan did not advance much due to outbreak of the World War II in 1939. Consequently, at the end of the British Rule in 1947, there were only few kilometers of inter-urban paved roads in the parts of present Bangladesh.

Realizing the importance of road transportation, the Transport Advisory Council set up by the Government of Pakistan at the time recommended the preparation and implementation of a Six Year Plan. Implementation of this Plan also did not advance much due to non-availability of sufficient funds. After launching of the First Five Year Plan (FFYP) of Pakistan in 1955, the earlier road development plan had to be reviewed and revised. The FFYP was followed by two more successive Plans. Under these plans, about 2,500 miles (4,023 km)

of mostly single lane paved roads and another 1,500 miles (2,414 km) of roads under various stages of construction were built by 1971 (Ali, Seraj, and Ahmad 60).

Road building received a new impetus after the emergence of Bangladesh in 1971. Road transportation became the most popular mode of transportation within a few years. Its shares of both passenger and freight traffic became higher than combined shares of rail and water transport. The system is, however, still being developed and there are various issues that deserve attention for its effective functioning. The system suffers heavily from network failures due to frequent natural as well as man-made disruptions. This is especially prevalent during annual floods and other local disorders. In view of these network failures, it is critical that the vulnerability of the present network should be examined with respect to the present pattern of traffic flow. The road network development is not still complete. Therefore, the element of reliability of the existing network can be considered in future road planning so that in the event of any link disruption, major or strategic traffic flows can be re-routed to keep the system effectively functioning.

The long-term transport plans for Dhaka so far are, the Dhaka Integrated Traffic Study (DITS), the Strategic Transport Plan (STP), and the Dhaka Urban Transport Study (DHUTS) (Choudhury). Dhaka's first comprehensive urban transport study, the Dhaka Integrated Transport Study (DITS) was commissioned by the Government of Bangladesh in 1992-93, conducted under the Planning Commission and UNDP and reported in 1994. Recommendations were made mainly concentrating on the traditional elements of urban transport planning: developing road infrastructure, constructing flyovers, developing bus terminals and bus routes, and improving traffic flow management at intersections and across the road network ("Dhaka Integrated Transport Study").

In 2005, Strategic Transport Plan (STP) for the Dhaka city was prepared for 20 years (2005 to 2025) in order to introduce a transport plan to cope up with the demand of the megacity, Dhaka. The document incorporated sets of objectives to introduce a safe and reliable public transport system which would be affordable to individuals. STP proposed to set up three Bus Rapid Transport (BRT) and three Mass Rapid Transport (MRT) systems throughout the city within the stipulated time frame ("STP").

Dhaka Urban Transport Study (DHUTS) aims at formulating the Urban Transport Network Development Plan integrated with urban development plan of DMA for the period up to 2025. Based on this plan, a general outline of the urban transport projects would be drawn

which will be implemented on a priority basis. The target year of the plan is set as the year of 2025, which consists short term (2010 -2015), medium term (2016-2020) and long term (2021-2025) ("Preparatory Survey Report on Dhaka").

The Ministry of Communication of the Government of Bangladesh comprises of two divisions: 1. Roads Division and 2. Bridges Division. Roads Division shoulders a vast task and plays a vital role in socio-economic development of the country. It governs the following Departments and Organizations:

- (1) Roads and Highways Department (RHD);
- (2) Bangladesh Road Transport Authority (BRTA);
- (3) Bangladesh Road Transport Corporation (BRTC); and
- (4) Dhaka Transport Co-ordination Authority (DTCA),

The principal motto of the Roads Division is to ensure improvement of socio-economic condition of the people of the country through formulating policies regarding roads and road transports, and through construction, development, expansion and maintenance of environment-friendly and user-friendly integrated roads transportation.

The Bridges Division comprises one department, the Bangladesh Bridge Authority, an autonomous organization (*Roads Division Ministry of Communication*). Created in March 2008, the Division deals with all matters relating to planning, implementation, monitoring and evaluation of construction of bridges which are 1500m or over in length, toll roads, flyovers, expressways, causeways, link roads etc. It also undertakes steps to secure required funds both from external and internal sources for implementation of such plan ("Welcome to Bridges Division").

2.3 IMPACT OF INTRODUCTION OF HIGHWAYS IN TO URBAN AREAS

There are some general effects produced by the introduction of a highway into urban areas. Other than accessibility, at-grade highways and elevated highways have basically the same typical features. The U.S. Department of Transportation and the Federal Highway Administration have classified the following types of impacts that might be

produced by development of a highway. It can be concurred that these impacts are created by the elevated highways as well.

- i. **Physical Impacts** include wall or barrier effects produced by elevated highways, increase in noise or vibrations, and shadowing effect.
- ii. **Social and psychological Impacts** include changes in population (such as redistribution of population and loss or increase in population), changes in the interactions of persons or groups, isolation or separation of certain people, changes in social values, and perceived impact on the quality of life.
- iii. **Visual and Environment Impacts** include changes in the aesthetic character of communities.
- iv. **Impacts on Land Use** include the creation or loss of land as the result of the development of an elevated highway, and changes in land use and density.
- v. **Economic Conditions:** The introduction of a highway in an urban area may encourage new businesses to establish in the area or cause the relocation of existing ones. It also may affect the local economy in a short-term during the construction activities or produce a long-term impact by blocking the access to businesses. Other introduced changes could be the increase or reduction of visibility to the commercial area, and changes in property value.
- vi. **Displacements:** This category includes the number residences, businesses or any institution displaced within the same neighborhood and the changes produced in the neighborhood's character due to the displacements.
- vii. **Safety:** This category includes the positive or negative changes in crime levels, accidents and emergency response in the area where the highway is located.

2.4 APPROACHES TO URBAN DESIGN

Understanding some of the basic concepts used to analyze urban environments is crucial to establish a framework for the study of the spaces below the chosen elevated highway. Many of the ideas formulated in this section are based on the works of the landscape architect and urban designer Roger Trancik, the architect Fumihiko Maki, and the urban designer Kevin Lynch.

i. Figure-Ground Theory

Figure-ground is defined by Roger Trancik in his work *Finding Lost Space: Theories of Urban Design* as: "a graphic tool for illustrating mass-void relationships; it is a two-dimensional abstraction in plan view that clarifies the structure and order of the urban spaces" (cited in Irizarry 25). The two basic components of figure-ground drawings are the buildings or solid mass and the surrounding open spaces (ground). These types of studies are used to identify the textures and patterns of the urban fabric as well as the problems associated with the order of the spaces. The figure below is an example of a figure-ground drawing.

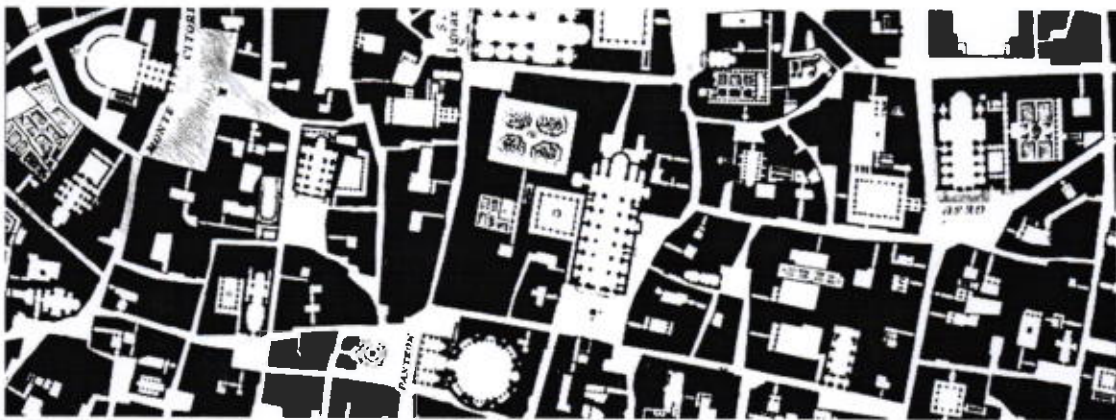


Figure 4 Figure-Ground Drawing Giambattista Nolli. Map of Rome. Illustrates the relationship of traditional open space and building mass (Trancik 99).

Figure-ground drawings have the disadvantage of leading to a static or two dimensional notion of the space. In practice the figure ground relationship is not possible or even desirable but it should be used as a conceptual guidance principle in city design to clarify the structure of urban areas and to establish coherence between spaces of different sizes. Figure-ground theory is the starting point to understand the urban form. This approach to spatial design is considered a valuable tool used to study and manipulate the pattern of solid and spaces in the urban environment (Irizarry).

The easiest way to create positive space is by working with horizontal buildings, which provide an appropriate ground coverage area. Contrasting to this there are numerous vertical elements in the modern urban environments such as skyscrapers and block towers which lack the appropriate ground coverage making it difficult to achieve a cohesive urban space. These vertical elements over a large ground plane are perceived

as objects on the landscape and result in vast open areas hardly ever used or enjoyed (Irizarry).

There are six different urban patterns created by the various combinations between solids and voids, the shape and locations of buildings, the design of site elements, the channeling of movement, the terrain, and natural features. The figure below illustrates the different patterns of solids and voids created in urban areas. In conclusion, figure-ground is a graphic tool based on the manipulation and organization of urban solids and voids used to create a dialog between voids and solids in an urban environment (Irizarry).

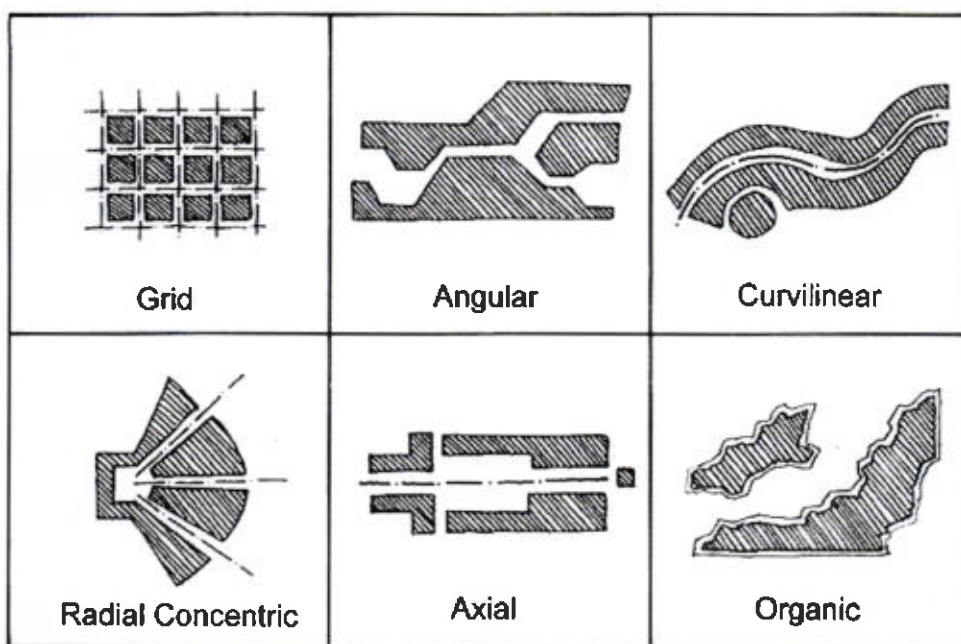


Figure 5 Types of Urban Patterns This image illustrates the patterns created by the different relationships between mass and void (Trancik 101).

ii. Linkage Theory

This theory is described by Trancik as the study of the organization of the lines connecting parts of the city and the design of the spatial datum for these lines relating building to space. "Spatial datum" is described as: "the site lines, directional flow of movement, an organizational axis or a building edge" (cited in Irizarry 27). Some of the physical elements that form connections between parts of the city are the streets, pedestrian ways or linear open spaces. This approach to spatial design emphasizes the circulation diagram rather than the spatial diagram of the figure-ground theory.

Movement systems and efficiency of the infrastructure takes precedence over patterns of defined outdoor spaces. The scheme of organizational lines in an urban area when studied as a whole indicates a system of connections or "linkages" that need to be considered when proposing changes in the spatial environment of an urban area. According to the architect Fumihiko Maki in his work *Investigations into the Collective Form*, these lines are considered to be "the glue of the city" and when all the layers of activities of the city are united physical form emerges as a result (cited in Irizarry 28). The main purpose of the circulation studies is to make comprehensible connections between elements of a city making the entire urban space comprehensible by articulating its parts (Irizarry).

The architect Fumihiko Maki lists three different types of urban forms created by the systems of connective lines (see figure below). These forms represent the basic shapes that emerge from the combination of all the connective lines in an urban environment.

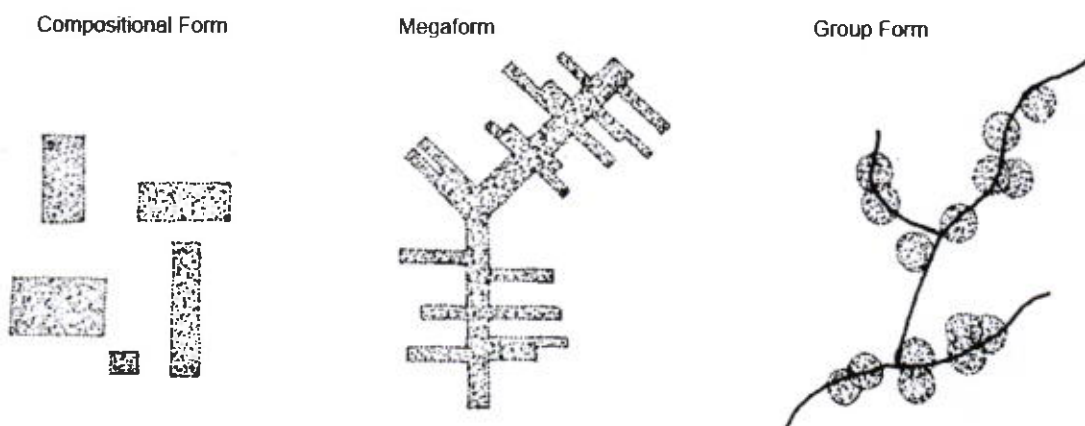


Figure 6 Types of "Linkage": These are forms derived from the connection previously established or imposed. (Trancik 107).

The first type is the "Compositional Form" and is made by individually tailored buildings in abstract pattern when viewed in plan view. "Linkage" is implied here rather than being obvious. As a result of this random pattern, a reciprocal tension results from the positioning and shapes of the freestanding objects. "Linkage" elements in this class of form are static and formal in nature (Irizarry).

The second form described is the "Megaform" (see figure above). This type of urban space is created by individual components that are integrated into a larger framework with the "linkages" physically imposed (Irizarry). The structure of megaform encloses the

internal space and the perimeter is formally defined. This structure is unresponsive to exterior space, it tends to turn its back on the physical context and create its own environment (Irizarry). "Group Form" is the third type of form created by the connective lines in urban areas (see figure above). This form is present typically in the organization of many historic towns. In Group Form, the "linkage" evolves naturally as part of the organic structure that generates it. This form is characterized by a consistency of materials, a response to topography, respect to human scale, and by sequences of spaces defined by buildings, walls, gateways, and tower rising steeply to a point, as on a church (Irizarry).

iii. Place Theory

In order to understand this theory we must define place as: "a space that has a distinct character" (cited in Irizarry 29). "Place Theory" or the study of place is an attempt to understand the context of the physical place. The essence of this theory resides in considering the social and cultural values of the place, visual perceptions of the users and an individual's control over the immediate public environment. This approach to urban design recognizes the unique character of each place given by its surroundings. The contextual meaning of a place is an outcome of the cultural or regional content of the area and consists of concrete things such as colors, shapes and textures, as well as intangible things like cultural associations, and the flavor given by the human use over time. The practitioners of this theory give physical space richness by incorporating unique forms and details native to its setting as means of enhancing the sense of the place (Irizarry).

According to Roger Trancik some of the approaches to the "place theory" are:

- The organic or vernacular: a response to the natural systems.
- The new classicist: looks at the formal devices to connect the old and the new elements of an urban area.
- The contextuallist: a nostalgic approach to the city, an emulation of the evolution of the city.
- The Mental mapping of Kevin Lynch: approaches the urban environment, using as a base the way people perceive and experience the city.

Other approaches manipulate the way people experience the urban environment through a sequence of spaces or let people determine the design of certain places by letting them decide which will be used for certain spaces.

2.5 PLACEMAKING

According to the Metropolitan Planning Council of Chicago, 'Placemaking' is both an overarching idea and a hands-on tool for improving a neighborhood, city or region. It has the potential to be one of the most transformative ideas of this century. Placemaking is a multi-faceted approach to the planning, design and management of public spaces. Put simply, it involves looking at, listening to, and asking questions of the people who live, work and play in a particular space, to discover their needs and aspirations. This information is then used to create a common vision for that place. The vision can evolve quickly into an implementation strategy, beginning with small-scale, do-able improvements that can immediately bring benefits to public spaces and the people who use them.

Placemaking capitalizes on a local community's assets, inspiration, and potential, ultimately creating good public spaces that promote people's health, happiness, and wellbeing. Public responses suggest that this process is essential—even sacred—to people who truly care about the places in their lives.

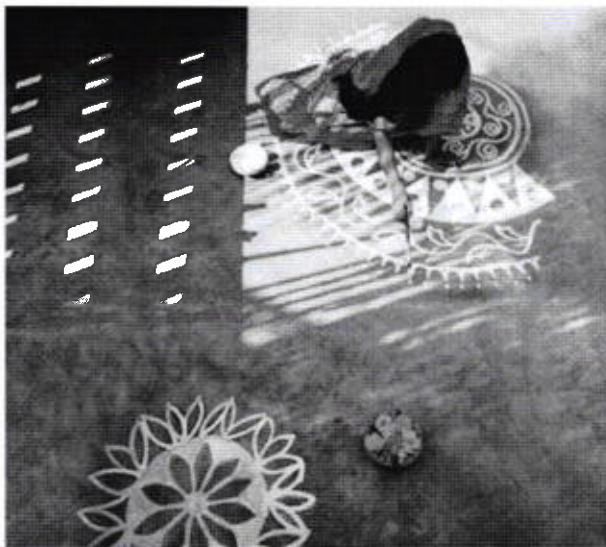


Figure 7 True Placemaking begins at the smallest scale ("Bengali Traditional Art - Alpona").

Placemaking is both a process and a philosophy. It takes root when a community expresses needs and desires about places in their lives, even if there is not yet a clearly defined plan of action. The yearning to unite people around a larger vision for a particular place is often present long before the word "Placemaking" is ever mentioned. Once the term is introduced, however, it enables people to realize just how inspiring their collective vision can be, and

allows them to look with fresh eyes at the potential of parks, downtowns, waterfronts, plazas, neighborhoods, streets, markets, campuses and public buildings. It sparks an exciting re-examination of everyday settings and experiences in our lives.

Unfortunately the way communities are built today has become so institutionalized that community stakeholders seldom have a chance to voice ideas and aspirations about the places they inhabit. Placemaking breaks through this by showing planners, designers, and engineers how to move beyond their habit of looking at communities through the narrow lens of single-minded goals or rigid professional disciplines. The first step is listening to best experts in the field—the people who live, work and play in a place.

When developers and planners welcome as much grassroots involvement as possible, they spare themselves a lot of headaches. Common problems like traffic-dominated streets, little-used parks, and isolated, underperforming development projects can be avoided by embracing the Placemaking perspective that views a place in its entirety, rather than zeroing in on isolated fragments of the whole.



Figure 8 Cities ultimately fail or succeed at the "place" scale (Roushan, "Waiting for the Ride").

What Placemaking is and What it is not

Placemaking IS:

- Community-driven
- Visionary
- Function before form
- Adaptable
- Inclusive
- Focused on creating destinations
- Flexible
- Culturally aware
- Ever changing
- Multi-disciplinary
- Transformative
- Context-sensitive
- Inspiring
- Collaborative
- Sociable

Placemaking IS NOT:

- Imposed from above
- Reactive
- Design-driven
- A blanket solution
- Exclusionary
- Monolithic development
- Overly accommodating of the car
- One-size-fits-all
- Static
- Discipline-driven
- Privatized
- One-dimensional
- Dependent on regulatory controls
- A cost/benefit analysis
- Project-focused
- A quick fix

2.6 WHAT MAKES A SUCCESSFUL PLACE?

Great public spaces are where celebrations are held, social and economic exchanges take place, friends run into each other, and cultures mix. They are the “front porches” of our public institutions – libraries, field houses, neighborhood schools – where people interact with each other and government. When the spaces work well, they serve as a stage for our public lives.

Community input is essential to the Placemaking process, but so is an understanding of a particular place and of the ways that great places foster successful social networks and initiatives. Using the Place Diagram, below, citizens can bring immense changes to their communities—sometimes more than stakeholders ever dreamed possible.

Successful public spaces around the world have four key qualities: they are **accessible**; people are engaged in **activities** there; the space is **comfortable** and has a good image; and finally, it is a **sociable** place: one where people meet each other and take people when they come to visit. ("What Is Placemaking?"). The **Place Diagram** is a tool to help people in judging any place, good or bad.



Figure 9 The Place Diagram ("What Is Placemaking?").

The Place Diagram is one of the tools that can help communities evaluate places. The inner ring represents key attributes, the middle ring intangible qualities, and the outer ring measurable data. Improving public spaces and the lives of people who use them means finding the patience to take small steps, to truly listen to people, and to see what works best, eventually turning a group vision into the reality of a great public place. A great public space cannot be measured simply by physical attributes; it must serve people as a vital place

where function is put ahead of form. Placemaking strikes a balance between the physical, the social and even the spiritual qualities of a place.

The center circle on the diagram is a specific place that can be a street corner, a playground, a plaza outside a building. That place can be evaluated according to four criteria in the red ring. In the ring outside these main criteria are a number of **intuitive or qualitative** aspects by which to judge a place; the next outer ring shows the **quantitative aspects** that can be measured by statistics or research.

i. Access and Linkages

The accessibility of a place can be judged by its connections to its surroundings, both visual and physical. A successful public space is easy to get to and get through; it is visible both from a distance and up close. The edges of a space are important as well: For instance, a row of shops along a street is more interesting and generally safer to walk by than a blank wall or empty lot. Accessible spaces have a high parking turnover and, ideally, are convenient to public transit.



Figure 10 La Défense, Paris, France (Roushan)

ii. Comfort and Image



Figure 11 Jardin des Tuileries, Paris's most visited gardens located between the Louvre and Place de la Concorde (Roushan)

Whether a space is comfortable and presents itself well – has a good image – is key to its success. Comfort includes perceptions about safety, cleanliness, and the availability of places to sit – the importance of giving people the choice to sit where they want is generally underestimated. Women in particular are good judges on comfort and image, because they tend to be more discriminating about the public spaces they use.

iii. Uses and Activities

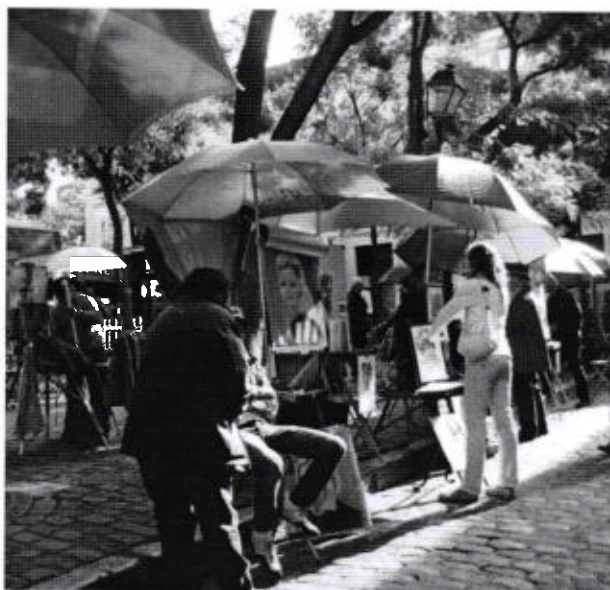


Figure 12 Place du Tertre, the artist-filled square atop Paris's Montmartre (Roushan)

Activities are the basic building blocks of a place. Having something to do gives people a reason to come to a place – and return. When there is nothing to do, a space will be empty and that generally means that something is wrong.

iv. Sociability



Figure 13 Guinness O'reilly's café, Brussels, Belgium overlooking La Bourse (Roushan)

This is a difficult quality for a place to achieve, but once attained it becomes an unmistakable feature. When people see friends, meet and greet their neighbors, and feel comfortable interacting with strangers, they tend to feel a stronger sense of place or attachment to their community – and to the place that fosters these types of social activities.

2.7 FAILURE AND SUCCESS OF URBAN SPACES

Effective public spaces are extremely difficult to accomplish, because their complexity is rarely understood. Transforming public spaces into vibrant community places, whether they're parks, plazas, public squares, streets, sidewalks or the myriad other outdoor and indoor spaces that have public uses in common requires the knowledge of the key attributes that make an urban space a failure or a success. These attributes have been compiled from Project for Public Spaces studies conducted around the globe.

i. Failures

- Little or no activities on the edges that generates people access; functions fail to generate sufficient activity
- Does not invite urban recreation
- The great distance lessens the desire to walk
- Not enough users in ordinary days
- Blank walls or dead zones around the edges of a place
- Location is detached from city fabric and usage
- Overly vast space lacking in design articulation
- Space badly maintained, poor choice of materials
- Exposure users to full sun and wind with little sheltering space
- Discomfort from leftover character of site in such scale enhanced by impersonal mega-structure overhead
- No visual continuity: a lot of designed areas cannot be seen from main space with walls blocking views, corners turned
- Over segmentation of space, not user-friendly
- Attraction elements like fountain and sculptures misplaced and unnoticed
- Use of fence; prohibition of use of lawn areas
- Activity around edges discouraged from neglected seating environments
- Vast space with little definition or programmatic elements
- Preference of air-conditioned space inside shopping centers rather than open spaces (bad air quality and hot humid climates)
- Lack of good places to sit
- Lack of gathering points
- Poor entrances and visually inaccessible spaces
- Dysfunctional features
- Paths that do not go where people want to go
- Domination of place by vehicles
- Inconveniently located transit stops

CHAPTER 3

CASE STUDIES OF SIMILAR PROJECTS

- 3.1 Bridgemarket, Queensboro Bridge, Manhattan, New York
- 3.2 Zaanstadt, The Netherlands
- 3.3 IM Viadukt, Zurich, Switzerland
- 3.4 Folly for a Flyover

ii. Success

- Separation of levels for fast and slower pace circulations
- Harmony of workmanship and materials with surroundings
- Water features for mental and physical cooling effect.
- Cafes and bars at edges loosen formality of space and invite people in
- Clear and simple visual access
- Good articulation of design e.g. seating and area divisions
- Popular location for activities like festive fireworks, lighting show at night, etc.
- Strong identity from use of landmarks like towers or follies
- Excellent use of mixed use functions with traditional elements, multifunctional space: different options of use
- Proximity of the transport hub
- Mixed activity that attracts people of all gender, age, throughout the hours
- A sense of the belongingness of the spaces
- Friendly design features that invites people to stay
- Created from high public demand and sponsorship from both private organizations and common people
- Fountains and sculptures creating visual focus.
- A range of varied activities occur simultaneously.

3. CASE STUDIES OF SIMILAR PROJECTS

To establish the base for this thesis, reviewing some of the most significant precedents to the development of the spaces below elevated highways within urban environments is important. Through the analysis of the bridge market under the Queensboro Bridge in Manhattan, New York, A8ernA, Zaanstadt, The Netherlands, IM Viadukt, Zurich, Switzerland, and Folly for a Flyover, London, England, some of the basic issues associated

to these types of urban space will be established. Some of the problems that are associated with these example spaces could be generalized as a typical characteristic of the spaces below highway overpasses.

3.1 Bridgemarket, Queensboro Bridge, Manhattan, New York

Located at 409 East 59th Street between 1st Avenue and York Avenue the Queensboro Bridge opened to traffic on March 30, 1909. Architect Henry Hornbosteland and engineer Gustav Lindenthal designed the Queensboro Bridge which was originally called the Blackwell's Island Bridge. The main section underneath the bridge consisted of a buff colored canopy of tile vaults designed by Rafael Guastavino, an architect from Barcelona. Rafael Guastavino and his son worked together and adapted a centuries-old vernacular technology called the "boveda Catalan" or Catalan vault.



Figure 14 Bridgemarket, Manhattan, New York

This beautiful arcade underneath the Bridge served as a year-round marketplace where vendors sold fruits and vegetables and quickly became to be known as the Bridge market. With the onset of the depression, the market closed during the 1930's and was later used by the New York City Department of Transportation. On November 23, 1973, the New York City Landmarks Preservation Commission designated the Queensboro Bridge a landmark (cited in Irizarry 38).



Figure 15 Bridgemarket, Manhattan, New York

Over the next 20 years, several different entrepreneurs attempted to develop space below the Queensboro Bridge but community groups were opposed against their habilitation of the area fearing an increase in traffic. This situation deferred any ideas for a restoration of the spaces below the bridge. It was not until July of 1995 that all parties agreed on a design concept and The Landmarks Preservation Commission unanimously approved all revisions for the future development of 98,000 square feet under the Queensboro Bridge (cited in Irizarry 38).

In 1997, London based company Conran Holdings signed a lease for 42,000 square feet for a furniture and house wares store "The Terence Conran Shop", and 25,000 square feet for two restaurants named Gustavino's and Club Gustavino's. The Conran shop was the first tenant under the Queensboro Bridge opening on December 8, 1999. On February 14, 2000, Guastavino's restaurant opened. Named for Rafael Guastavino, and located on the ground floor, the restaurant has seating accommodations for 300 people. On March 16, 2000, Club Guastavino's opened on the second floor, serving up to 100 people (cited in Irizarry 39).

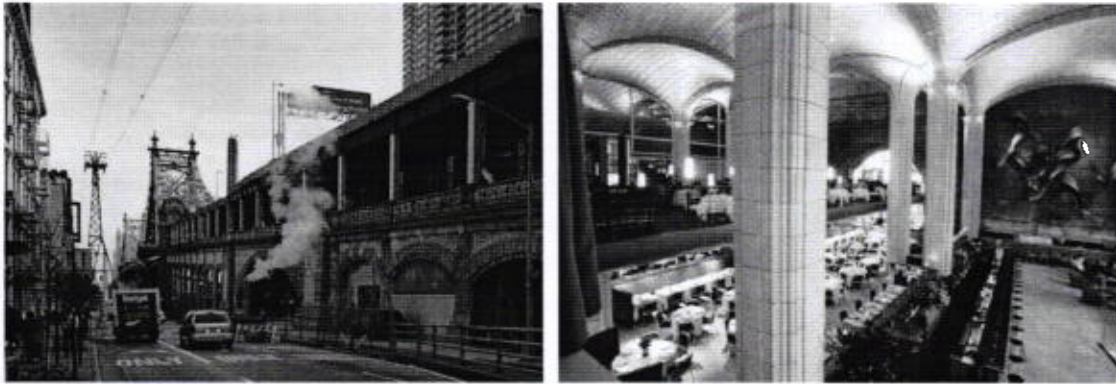


Figure 16 Bridgemarket, Manhattan, New York

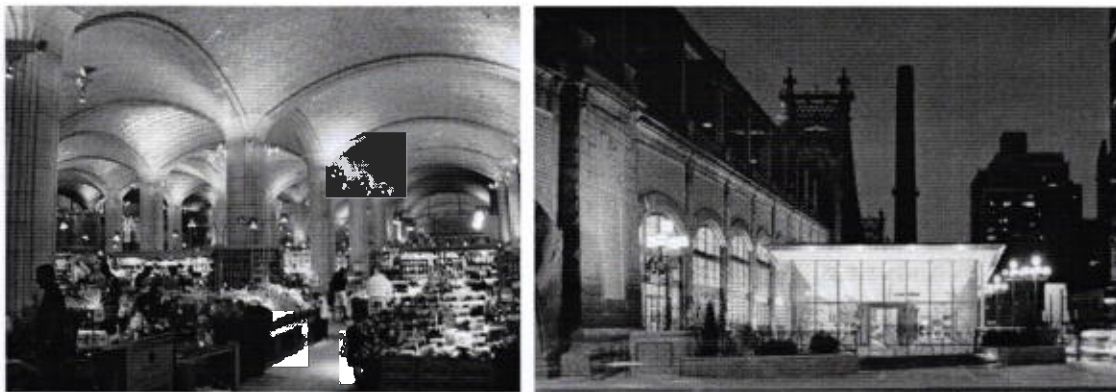


Figure 17 Gustavino's and Conran Shop, Bridgemarket

Program Elements

The design program for the spaces below the Queensboro Bridge included a new plaza fully landscape with street trees, and architectural furnishings, a market, two restaurants and a furniture/house ware store. Through careful planning the designers were able to reincorporate the original historic market fountain at the eastern end of the plaza. The design by the architectural firm Hardy, Holzman, and Pfeiffer incorporated the program elements mentioned before while preserving the original vaulted ceilings creating a unique space that displays the unique architecture of the spaces below the Queensboro Bridge (cited in Irizarry 38).

Maintenance and Management

Both, the restaurant and the market are independently managed and maintained but the maintenance of the plaza in front these places is responsibility of the city. Limitations
The spaces below the Queensboro Bridge have been successful despite the constantly changing trends among the commercial areas within New York City. It is unclear if the early

success enjoyed by establishments below the Queensboro Bridge will be sustained over a long period of time. Other noticeable limitations of the spaces below the Queensboro Bridge are the lack of parking spaces, the complex spaces surrounding the bridge which conceal the commercial establishments below the bridge, and the highly transited streets surround the site which creates difficulties to access the commercial establishments (cited in Irizarry 40).

Significance of the Project

The successful rehabilitation of the once existing bridge market and the ability of the designers to incorporate new and existing elements of the Queensboro Bridge are the unique features of this place. The main attractions of the spaces below the Queensboro Bridge are the vaulted ceiling and columns designed by Rafael Gustavino which has been successfully showcased with the renovation of the bridge. Furthermore, the rehabilitation of the spaces below the bridge reclaimed valuable land for public use and provided the community with an open space (cited in Irizarry 40).

3.2 A8ernA, Zaanstadt, The Netherlands

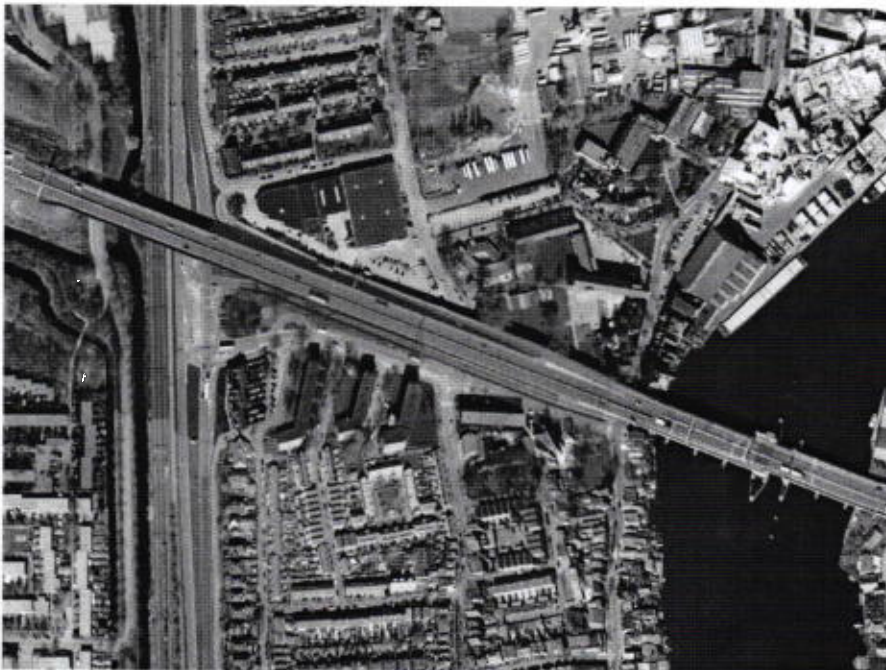
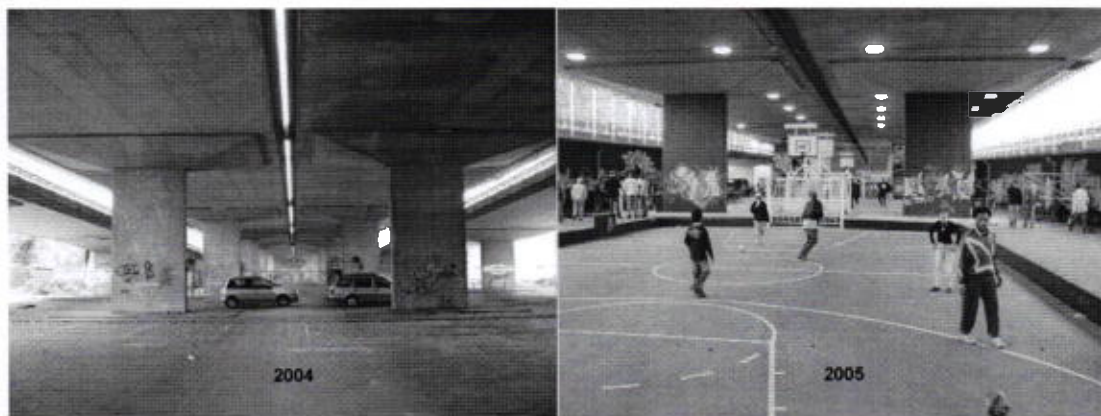


Figure 18 A8ernA, Zaanstadt, The Netherlands

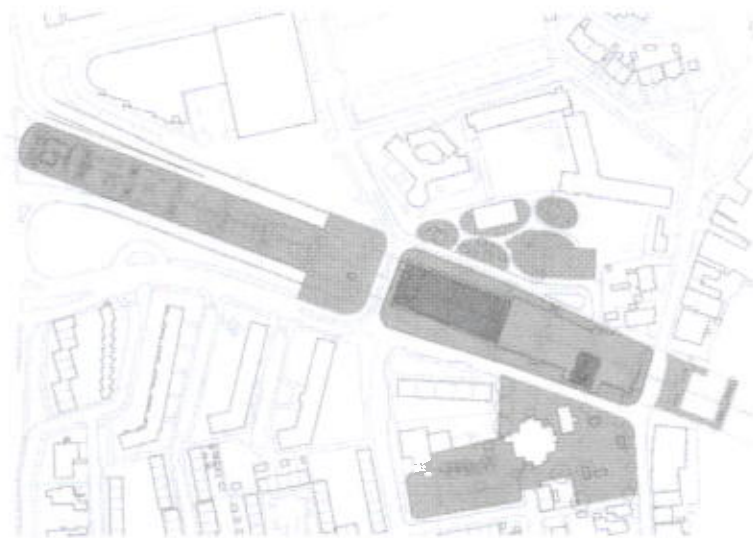
Koogaan de Zaan, eleven kilometers north-west of Amsterdam, is a small city on the banks of the River Zaan. In the 1970s, as part of a rough territorial organization of the region, the river banks were densely built up and the city was assimilated into the new municipality of Zaanstadt with six other urban nuclei. At the same time the A8 was built, which passes through the city center on stark seven-meter high pillars just after crossing the river.

In an ironic application of the modern separation between state and church, this dramatic slashing of the urban fabric passed over the High Street leaving the church on the south side and the town hall on the north side. For over thirty years, beneath the slab of the monumental infrastructure there remained a strip about forty meters wide and four hundred long at the mercy of badly parked cars and partially occupied by a small shooting range.



Under the A8, Zaanstadt, The Netherlands

In 2003, Zaanstadt City Council decided to carry out a town planning intervention to restore the connection between the two sides of the city and enliven the strip covered by the motorway, returning to it the condition of public space for the community. In a highly participatory process, a document entitled A8ernA was drafted, containing the citizens' demands and establishing a program of uses that had to include a connection with the River Zaan, a park, an exhibition space understood as a 'graffiti gallery', a car park for 120 vehicles, a supermarket and a flower and pet shop. The conservation of the small shooting range was also required. The project proposed is based on an optimistic attitude which views the monumental presence of the infrastructure as an opportunity rather than an obstacle. The opportunity lies in the fact that, owing to its morphology and its central location close to the river, the slab of the motorway can be understood as a large civic arcade perfectly capable of housing all the citizens' programmatic requirements and even extending them (Trevi).



A8ernA site

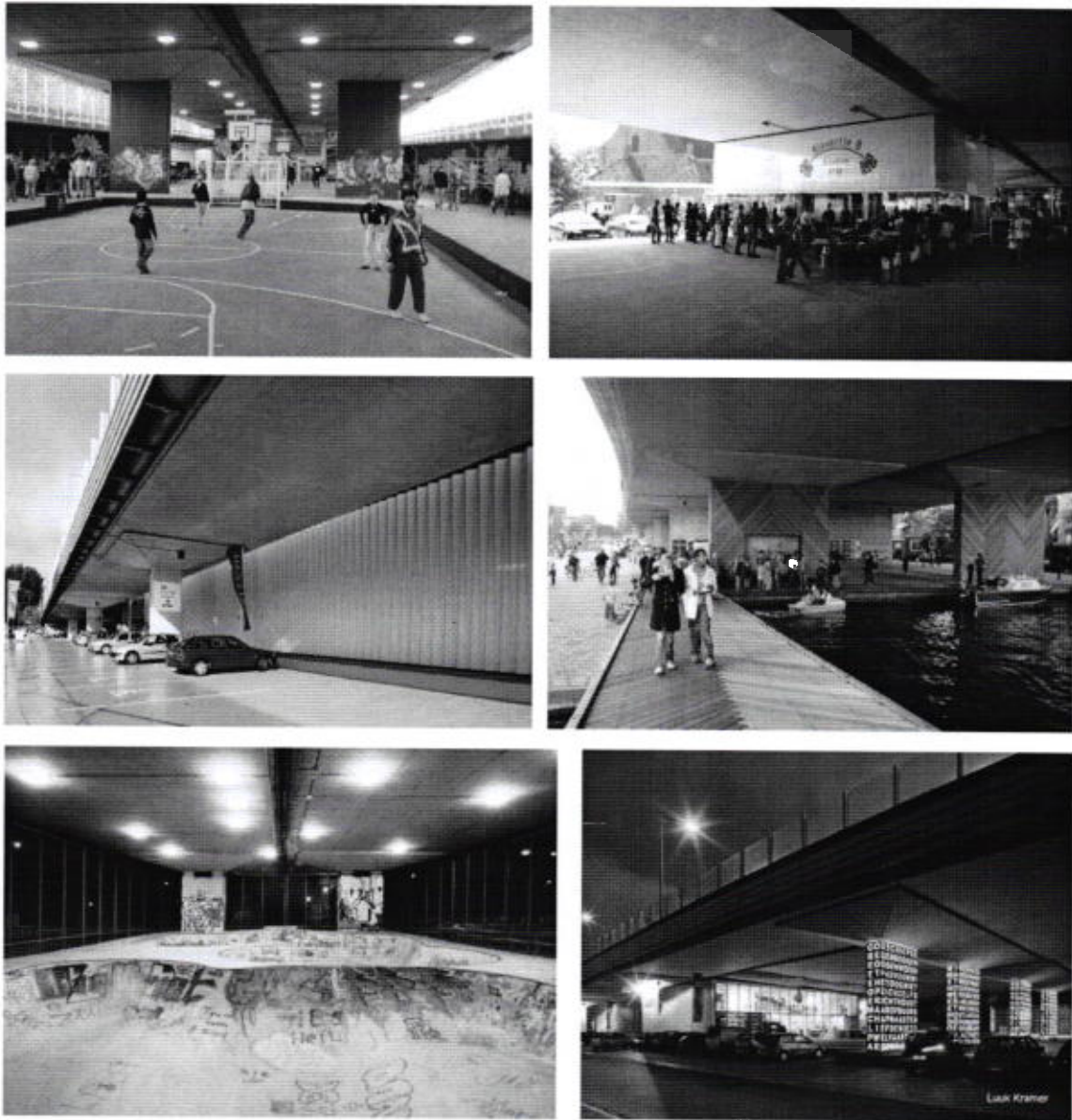
Program Elements

Two intercrossing streets divide the large arcade into three differentiated zones. In the central one is a covered square where we find the supermarket, the flower and pet shops, some letter boxes and a luminous fountain. At the eastern end, crossing the High Street, there is a 'sculptural' bus stop and a small harbor with a panoramic platform. The harbor brings the water as far as the High Street and fills the ceiling of the new public space with light reflections when it is sunny. The panoramic platform provides the citizens with an exceptional window over the River Zaan which, given the high density of industrial buildings on the banks, had until now been left out of the public domain.

At the western end there is a children's and teenagers' playground consisting of a 'graffiti gallery', a skateboarding park, a break dance stage, some football and ping-pong tables, a seven-a-side football pitch, a basketball court and the 'lovers' benches'. The skateboarding park consists of a series of large semi-spherical concavities built with a sophisticated technique using blocks of polystyrene cut to measure with a computer-controlled saw and coated with concrete. There was also work done outside the space covered by the motorway, at the height of the covered square, on both the town hall and the church sides. It generated a succession of public spaces following an axis perpendicular to the motorway and parallel to the High Street.

In front of the church, it was decided to free the square of the existing greenery to make the space flexible for housing open air fairs and celebrations. On the paving of the refurbished square, with a change in the color of the blocks, the urban fabric that preceded the building of the motorway is redrawn. From time to time pieces of wood set into the paving point to the position of the living rooms of old demolished houses. On the town hall side there is a

new park with topographical features that adds a little green to the intervention. The park includes a bowling ground, a small grassy hill planted with birch trees, a space for barbecues and a football pitch surrounded by a metal fence. The shooting range has been kept beneath the motorway exit ramp (Trevi).

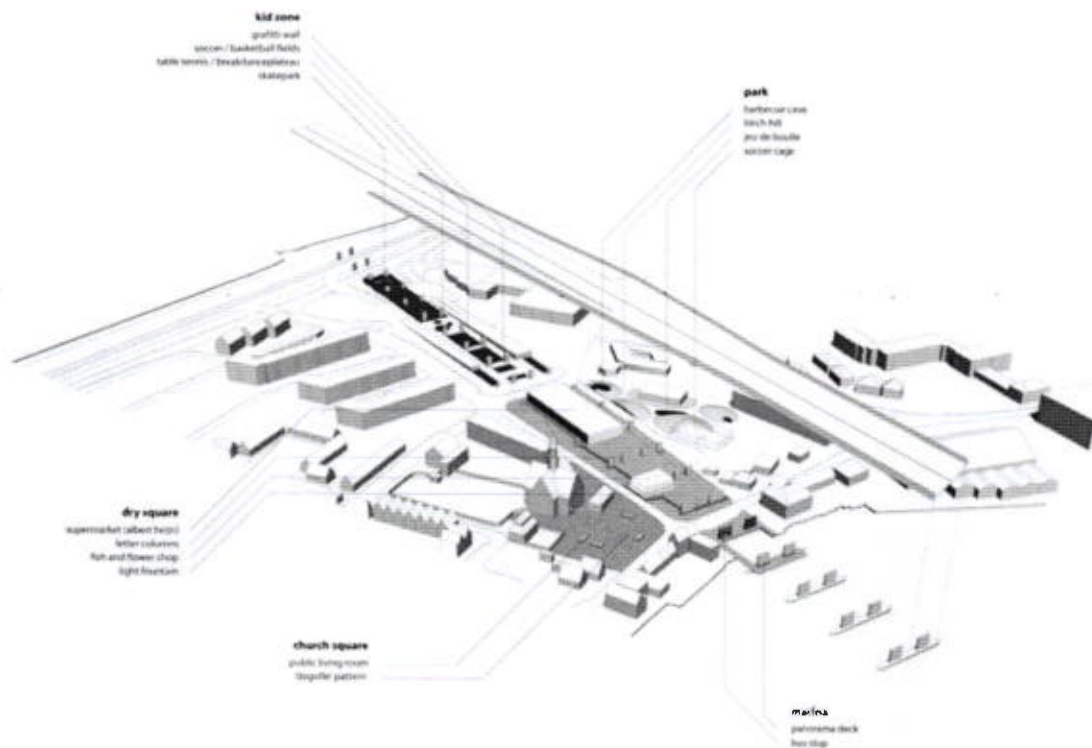


From top left clockwise, mini football pitch, supermarket, water body connected to harbor, covered square with parking and lighting, skateboarding rink, and adjoining parking area

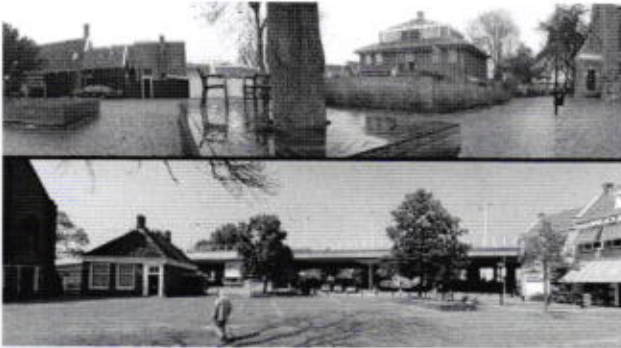
Significance of the Project

The outstanding merit of this intervention – both the commission and the resolution – lies in the treatment of a great paradox. With no modification to its morphology, the motorway, which before was an impenetrable town planning barrier, has now become a large threshold

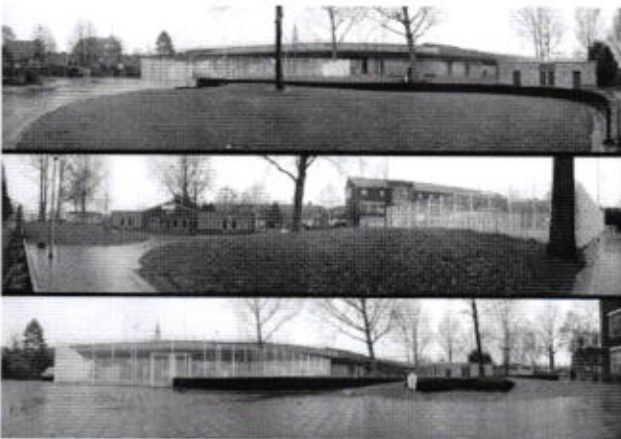
which reunites the city in two senses: first by bringing its three parts back in touch: the south, the north and the River Zaan; second by bringing the citizens together under a single roof which covers the host of uses they demanded and proposed. In this sense A8emA is an occupation rather than a work or a construction, to be understood as a reinterpretation of the way to inhabit a pre-existing space. With an attitude which is unusual in interventions on the public space, the solution proposes a new content instead of a new container. As if it were a matter of furnishing an unfriendly house to make it into a home, the pieces are juxtaposed in an amalgam of heterogeneous objects. This deliberately eclectic and fragmentary arrangement counteracts the Unitarian character of the monumental presence of the porticoed slab. David Bravo Bordas, architect (Trevi).



Exploded axonometry that schematizes the distribution of the different uses. In the central zone is the covered square, a small harbor with a panoramic platform. On the left there is a children's and teenagers' playground. Outside the space covered by the motorway, work has also been done on the church square and in front of the town hall.



In front of the church, it was decided to free the square of the existing greenery to make the space flexible for housing open air fairs and celebrations. On the paving of the refurbished square, with a change in the color of the blocks, the urban fabric that preceded the building of the motorway is redrawn. From time to time pieces of wood set into the paving indicate the position of the living rooms of old demolished houses.



On the town hall side there is a new park with topographical features that adds a little green to the intervention. The park includes a bowling ground, a small grassy hill planted with birch trees, a space for barbecues and a football pitch surrounded by a metal fence.



The football pitch surrounded by a metal fence.

3.3 IM Viadukt, Zurich, Switzerland

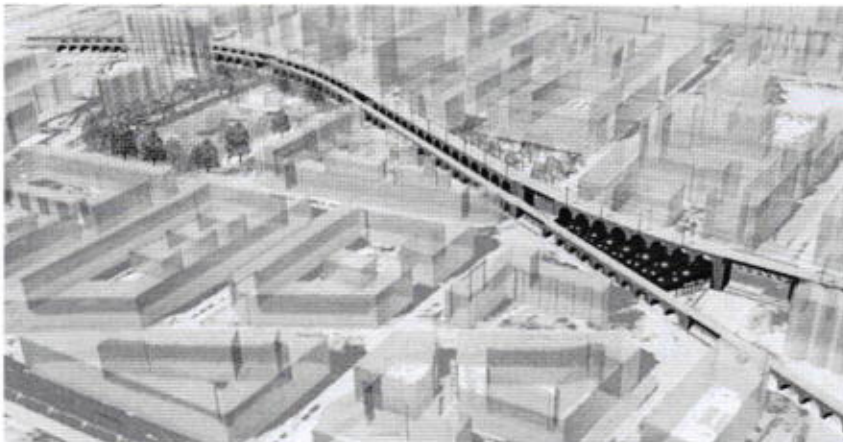
'Im Viadukt' is a unique shopping center built into the arches of one of Zurich's historic, but still fully operational railway bridges. From an urban barrier to connecting city building block: a monumental listed train viaduct near Zurich's main station has been transformed into the 500-metre long shopping strip.

In the last century, the railroad had a decisive influence on the urban development in the industrial district of Zurich. The trains ran on embankments, which stood as an impenetrable bar the expansion of the district in the way. In 1894, the dams were replaced by viaducts, when space was created for an extension of the city. In the late 1980s, the Zurich Transport Network (SBB) wanted to extend the viaduct under the project name "Fil Rouge" by one or two tracks eastward. The new track was higher compared to the existing one by two to three meters. As a result, trains would pass by three meters in front of the windows or houses near the viaduct.



IM Viadukt, before and after

Finally, in the summer of 2004, the project architect and inflow of EM2N Seippel Schweingruber landscape architects were commissioned to design new use of the viaduct arches. Now a pedestrian and bicycle path runs through the retired lower level of the two railway lines.

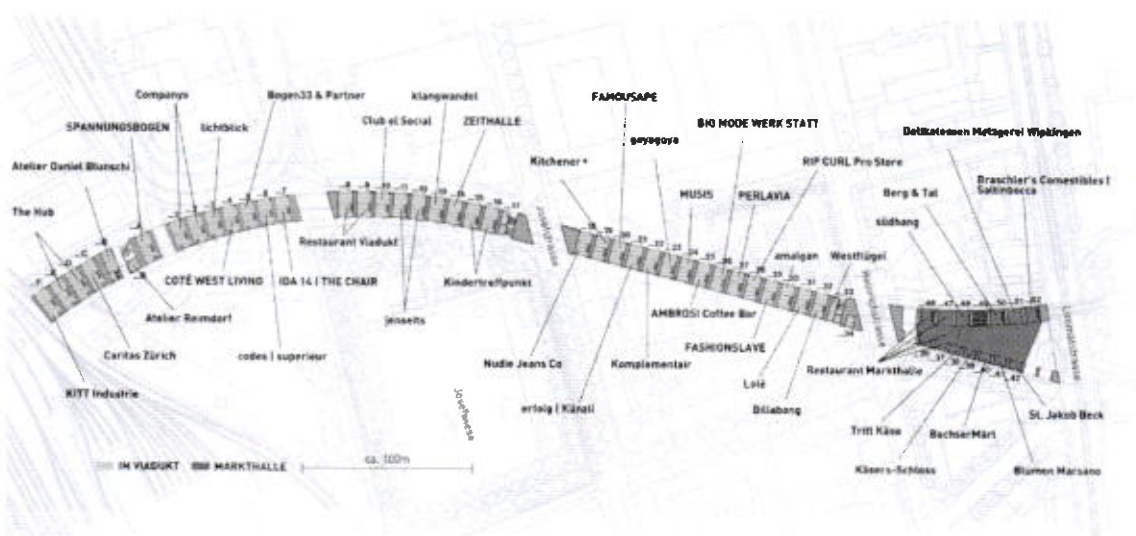


IM Viadukt

Program Elements

In the 53 viaduct arches, shops and cafés have been set-up; the front of the building creates the market hall through triangle spaces between both rail tracks. The new installations are kept inconspicuous – their clear design highlights the linear structure and the character of the quarry stone construction. As a consistent element it visually connects the band-like shop fronts between the arches.

The roof areas covered with ethylene propylene-diene-monomer (EPDM) rubber is where the overhead skylight domes are located. An accent is given to the folded roof landscape of the market hall: the rising and falling segments optically interlace the two viaducts.

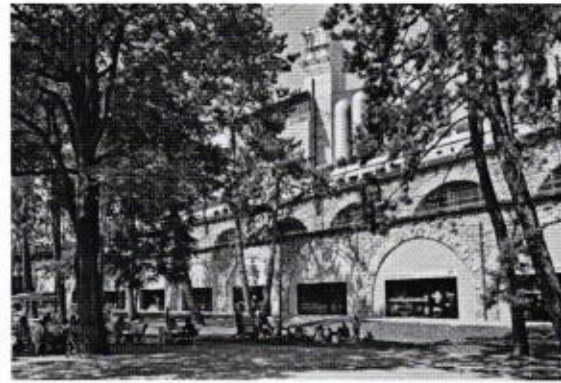
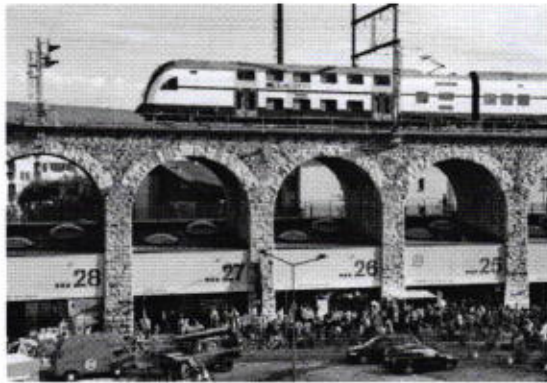


IM Viadukt

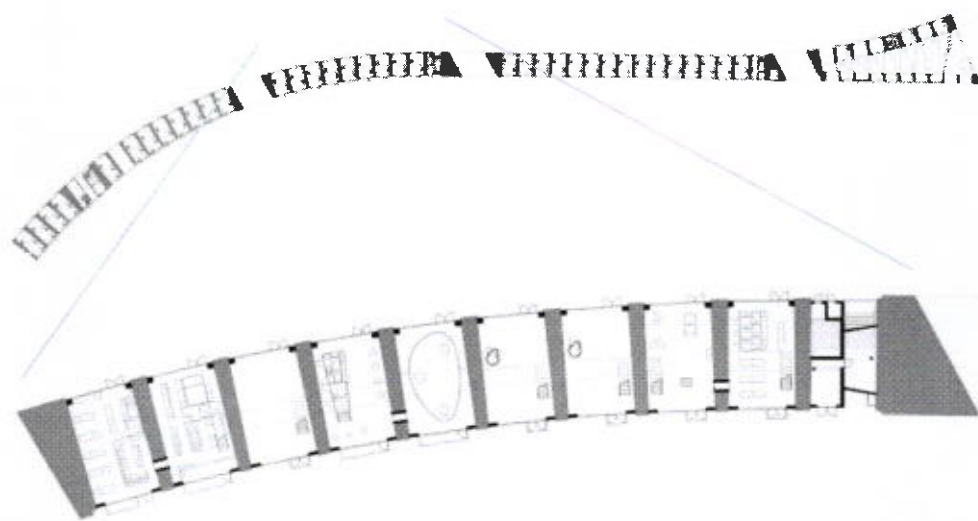
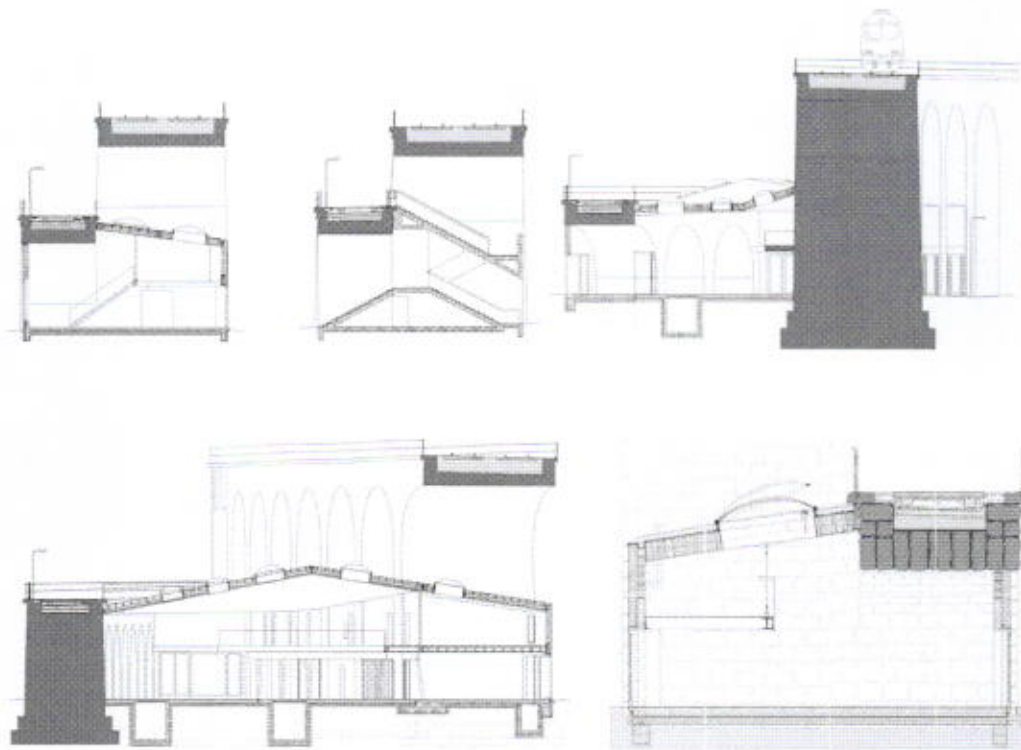
Significance of the Project

The shops have no storage facilities, and everything is free standing as drilling into the viaduct itself is forbidden by the SBB. This has led to store holders coming up with interesting and innovative ideas for making the most of the space, creating a chic, modern, and surprisingly cozy environment.

The hall's interior lends an impressive effect to the roof soffit and the transparent overhead lights. The supporting framework is a mixed construction made from steel and timber: pre-fabricated timber panel elements with integrated glue-laminated timber brackets are clamped between steel lattice frames.



IM Viadukt exterior and interior



IM Viadukt sections and blow up plan

3.4 A8ernA, Zaanstadt, The Netherlands



Folly for a Flyover, London From top-left counter-clockwise, restaurant, movie-theater, outdoor seating area and the main structure jutting out through two flyover lanes.

CHAPTER 4

SITE APPRAISAL

- 4.1 Introduction
- 4.2 Neighborhood Character
- 4.3 Figure-Ground
- 4.4 Circulation
- 4.5 Photographs
- 4.6 SWOT Analysis

Folly for a Flyover was assembled by a team of volunteers over the course of a month, using reclaimed and donated materials. It remained in place for six weeks, staging a series of movies and performances as part of the "Create" festival. By day the folly hosted a café, workshops and events and boat trips exploring the surrounding waterways. Transforming the cavernous undercroft where the motorway crosses the Lea Navigation Canal, Folly for a Flyover hosted a six week program of waterside cinema, performance and play. Built from bricks of clay and wood and supported by scaffolding, the structure encloses a cafe, bar and cinema stalls. Having served one purpose it was disassembled at the end of the summer, and the components found new uses across the local area.

4. SITE APPRAISAL

4.1 INTRODUCTION

This chapter examines the existing site conditions and analyzes their impact as precursors of strategic plans for the spaces below elevated highways. According to the urban design theories discussed in Chapter 2, the analysis of the existing site conditions were divided into neighborhood character, figure-ground, and circulation patterns. The evaluation of these conditions is based on the opportunities and limitations as perceived by the designer during site observations. Six elevated highways were chosen for site appraisal for this thesis – Banani Overpass and Mirpur Flyover at Banani rail crossing, Bijoy Shoroni-Tejgaon Link Road at Tejgaon, Mohakhali Overpass at Mohakhali, Khilgaon Flyover at Khilgaon, and Kuril Flyover at Kuril.

The first part of this chapter is dedicated to the analysis of the neighborhood characteristics of the chosen sites. This discussion will help to establish the context of the corresponding study areas. The neighborhood characters include: site location and background, demographics of the area, existing land uses, zoning, community capacity, architecture, views, topography, drainage, soil, climate, and vegetation. Once the neighborhoods' characters are defined, the physical forms of study areas are analyzed by using figure-ground drawings. The final discussion of this chapter corresponds to the analysis of the circulation patterns within the study areas, including pedestrian and vehicular circulation, parking conditions, and public transportation.

4.2 NEIGHBORHOOD CHARACTER

The purpose of this section is to analyze and understand the cultural, human, and physical characteristics of the study areas. These key elements will help to define the essence of the site therefore helping in the development of a design that corresponds to the needs of the community while respecting the unique flavor of the area.

Site Location and Description | BANANI OVERPASS and MIRPUR FLYOVER

The site is a rectangular strip of land 70 feet wide by 1,500 feet long, located under the overpass at Banani approximately 300m to the northwest of the army stadium. Its boundaries are the Mirpur-Airport Road Flyover on the North, Dhaka Cantonment on the East and West. The site is divided into three sections by the level crossing and DOHS Baridhara bypass Road. The site basically cuts through the cantonment area. The location of the sites within the city are shown below in red.



Banani Overpass and Mirpur Flyover

Background

The site is a byproduct of the development of the overpass at Banani rail crossing. The present built up areas of Banani, have been developed on the crease of the undulating topography and developed mainly on earth filled platforms. Due to the conspicuous presence of Dhaka Cantonment in the middle of the city, the north-south connecting road, the New Airport Road takes a 90 degree turn just before crossing the railway that runs east-west. The Banani overpass construction project was launched in 2010 along with the Mirpur-Airport Road Flyover. The Roads and Highways Department (RHD) launched the Mirpur-Airport flyover and Banani overpass project under the supervision of Special Works Organization West.

The 805m (2640 feet) long overpass is the biggest such enterprise of the country with six lanes for traffic movement, including two lanes for dedicated bus service - BRT. It was completed at a cost of Tk. 1.03 billion. The overpass was built with the hope of reducing traffic jam on the Airport road enabling vehicles to cross the rail line without stopping during train crossing. Some 72 trains pass the Banani level crossing everyday which forces to stop all modes of vehicles for 10 to 15 minutes every time making long queues on both sides of the rail line.

Land Use and Ownership

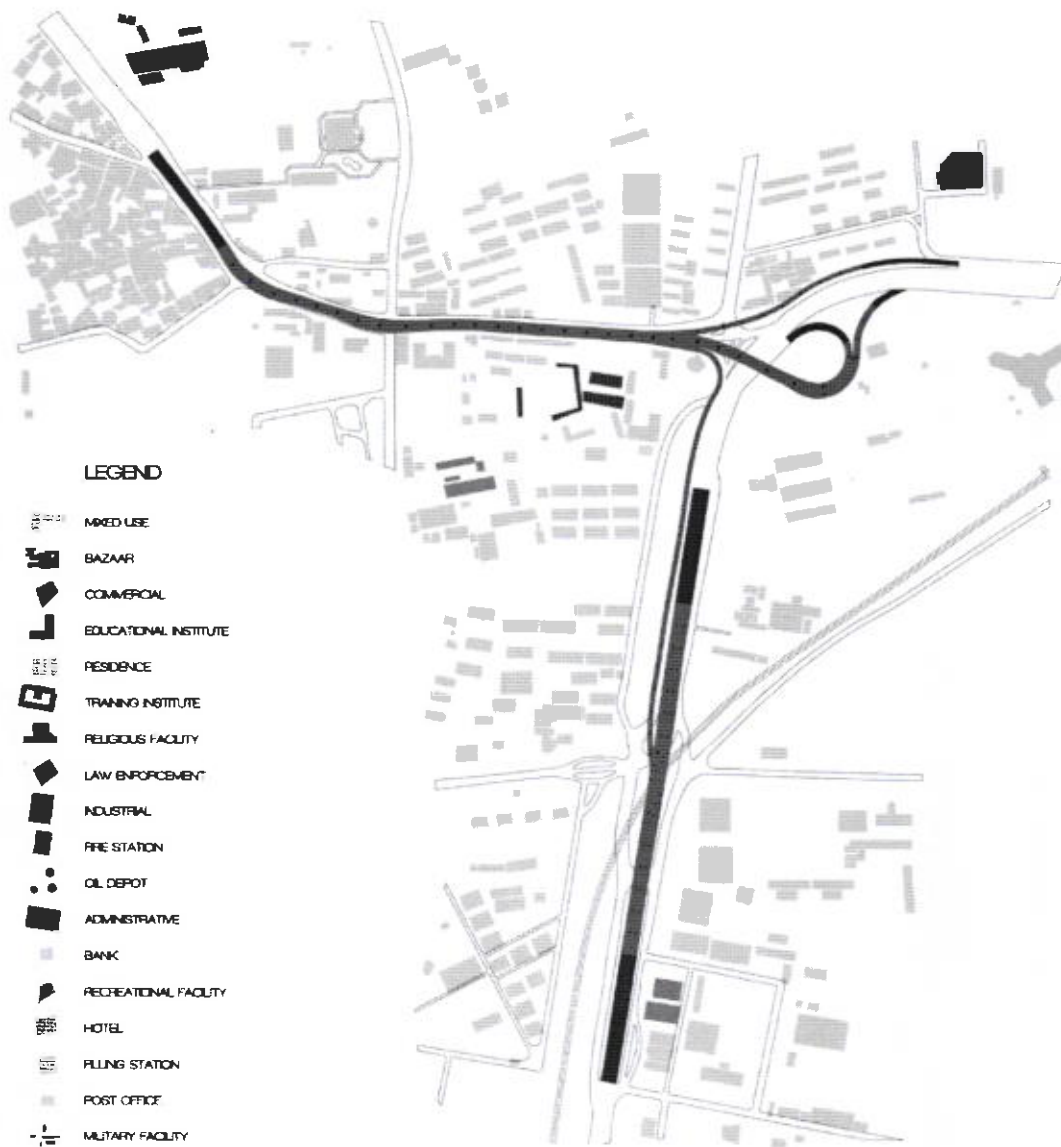
Banani is a high income residential area and is more or less well planned. Existing land use is divided into two major categories: residential and open spaces. The second category comprehends the lots that contain no physical structure within their boundaries, and can be water bodies as well. Residential areas also were divided into light residential, which includes single-family dwellings, and high-density residential, which includes high-rise dwellings, and officer's mess for the army. The general land uses are illustrated in the following figure. The land including and surrounding the site are all owned by Dhaka Cantonment.

Zoning

There are 13 DPZs in Group-C area. It is the central part of Dhaka City and it includes most of the parts of Dhaka City Corporation (DCC) area. For effective and efficient planning, the entire area has been divided into 13 planning zones, which are called Detailed Planning Zone (DPZ). Banani falls under DPZ-11.

Community Capacity

Community Capacity is defined as the community's total available resources and the ability of these resources to adequately serve the needs of the community. A neighborhood with high community capacity is one that has many resources, which serve as a binding force, promote social interactions, and provide for the need of the community members (Irizarry). The figure below illustrates the community capacity.



Community Capacity of study area

The lack of mixture of commercial establishments, offices and institutions within the study area fail to form the ideal community capacity. This residential area at Banani does not cater the needs of local residents. However, it has the potential to create a neighborhood geared atmosphere of the area that will attract customers from all around Dhaka.

The commercial capacity of the studied area includes one post office, one secondary and high school, one physical training and sports school for the army, and Armed Forces Institute of Pathology. The built-forms that are not colored are all residential buildings.

Site Location and Description | TEJGAON OVERPASS

The site is a rectangular strip of land 70 feet wide by 1,500 feet long, located under the overpass at Tejgaon. Its boundaries are Tejkunipara on the North-East and South-East, and Tejgaon industrial area to its West. The site is divided into two sections by the level crossing. The East wing is more vibrant and the West wing is comparatively quieter. The location of the site within the city are shown below in red.



Tejgaon Overpass

Background

The site is a byproduct of the development of the overpass at Banani rail crossing. The present built up areas of Banani, have been developed on the crease of the undulating topography and developed mainly on earth filled platforms. Due to the conspicuous presence of Dhaka Cantonment in the middle of the city, the north-south connecting road, the New Airport Road takes a 90 degree turn just before crossing the railway that runs east-west. The Banani overpass construction project was launched in 2010 along with the Mirpur-Airport Road Flyover. The Roads and Highways Department (RHD) launched the Mirpur-Airport flyover and Banani overpass project under the supervision of Special Works Organization West.

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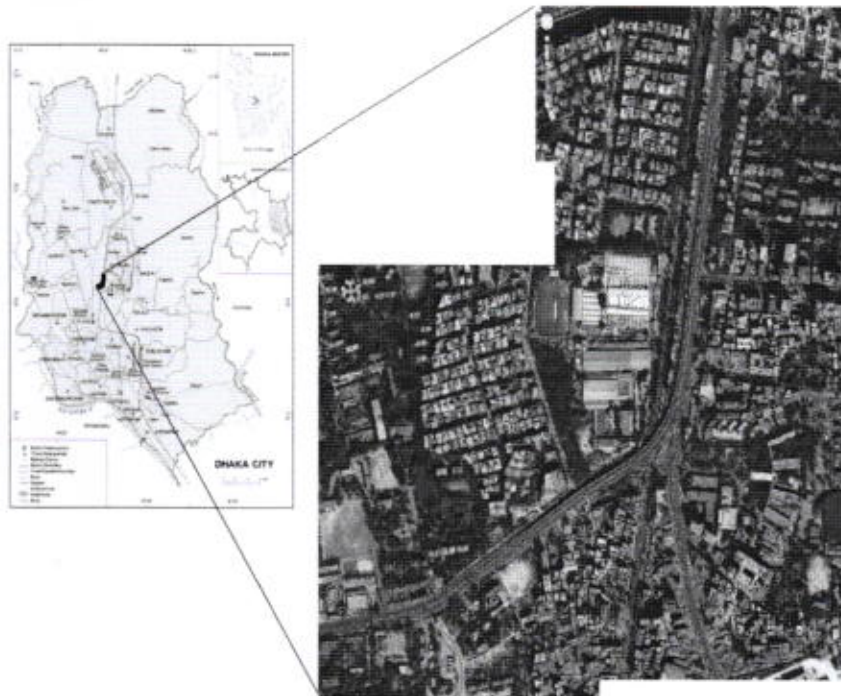
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Site Location and Description | MOHAKHALI OVERPASS

The site is a rectangular strip of land 70 feet wide by 1,500 feet long, located under the overpass at Tejgaon. Its boundaries are Tejkunipara on the North-East and South-East, and Tejgaon industrial area to its West. The site is divided into two sections by the level crossing. The East wing is more vibrant and the West wing is comparatively quieter. The location of the site within the city are shown below in red.



Tejgaon Overpass

Background

The site is a byproduct of the development of the overpass at Mohakhali rail crossing. The present built up areas of Banani, have been developed on the crease of the undulating topography and developed mainly on earth filled platforms. Due to the conspicuous presence of Dhaka Cantonment in the middle of the city, the north-south connecting road, the New Airport Road takes a 90 degree turn just before crossing the railway that runs east-west. The Banani overpass construction project was launched in 2010 along with the Mirpur-Airport Road Flyover. The Roads and Highways Department (RHD) launched the Mirpur-Airport flyover and Banani overpass project under the supervision of Special Works Organization West.

The 805m (2640 feet) long overpass is the biggest such enterprise of the country with six lanes for traffic movement, including two lanes for dedicated bus service - BRT. It was completed at a cost of Tk. 1.03 billion. The overpass was built with the hope of reducing traffic jam on the Airport road enabling vehicles to cross the rail line without stopping during train crossing. Some 72 trains pass the Banani level crossing everyday which forces to stop all modes of vehicles for 10 to 15 minutes every time making long queues on both sides of the rail line.

Land Use and Ownership

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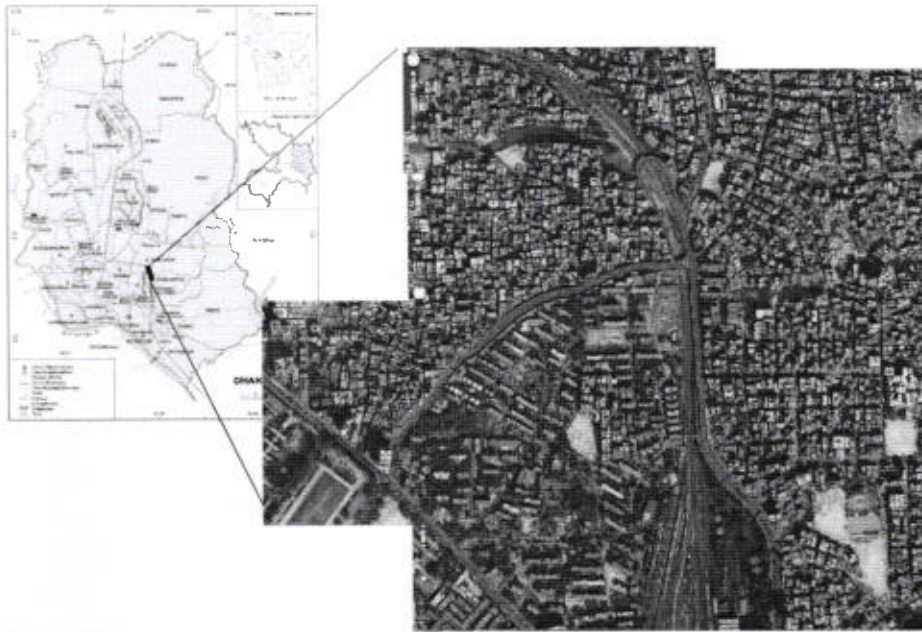
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Site Location and Description | KHILGAON OVERPASS

The site is a rectangular strip of land 70 feet wide by 1,500 feet long, located under the overpass at Tejgaon. Its boundaries are Tejkunipara on the North-East and South-East, and Tejgaon industrial area to its West. The site is divided into two sections by the level crossing. The East wing is more vibrant and the West wing is comparatively quieter. The location of the site within the city are shown below in red.



Tejgaon Overpass

Background

The site is a byproduct of the development of the overpass at Khilgaon rail crossing. The present built up areas of Khilgaon, have been developed on the crease of the undulating topography and developed mainly on earth filled platforms. Due to the conspicuous presence of Dhaka Cantonment in the middle of the city, the north-south connecting road, the New Airport Road takes a 90 degree turn just before crossing the railway that runs east-west. The Banani overpass construction project was launched in 2010 along with the Mirpur-Airport Road Flyover. The Roads and Highways Department (RHD) launched the Mirpur-Airport flyover and Banani overpass project under the supervision of Special Works Organization West.

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Land Use and Ownership

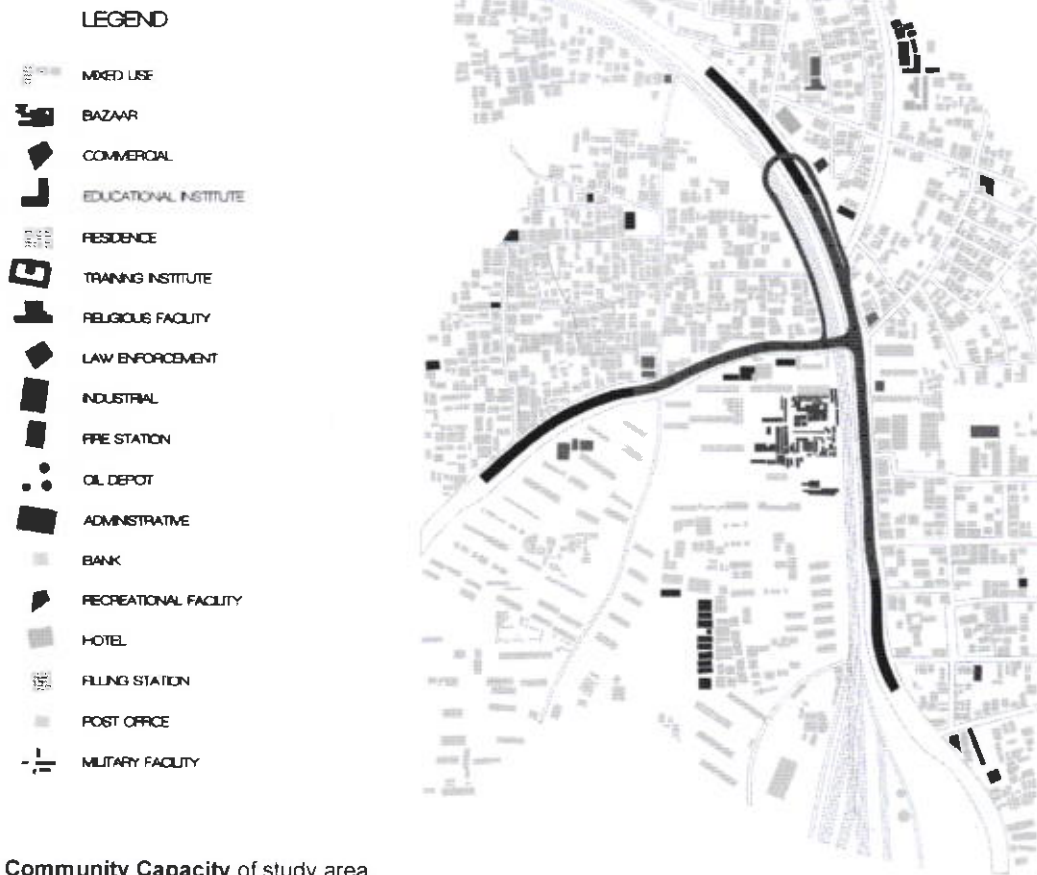
Khilgaon is a low income residential area and is more or less well planned. Existing land use is divided into two major categories: residential and open spaces. The second category comprehends the lots that contain no physical structure within their boundaries, and can be water bodies as well. Residential areas also were divided into light residential, which includes single-family dwellings, and high-density residential, which includes high-rise dwellings, and officer's mess for the army. The general land uses are illustrated in the following figure. The land including and surrounding the site are all owned by Dhaka Cantonment.

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Site Location and Description | KURIL OVERPASS

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Tejgaon Overpass

Background

The site is a byproduct of the development of the overpass at Kuril rail crossing. The present built up areas of Kuril, have been developed on the crease of the undulating topography and developed mainly on earth filled platforms. Due to the conspicuous presence of Dhaka Cantonment in the middle of the city, the north-south connecting road, the New Airport Road takes a 90 degree turn just before crossing the railway that runs east-west. The Banani overpass construction project was launched in 2010 along with the Mirpur-Airport Road Flyover. The Roads and Highways Department (RHD) launched the Mirpur-Airport flyover and Banani overpass project under the supervision of Special Works Organization West.

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Land Use and Ownership

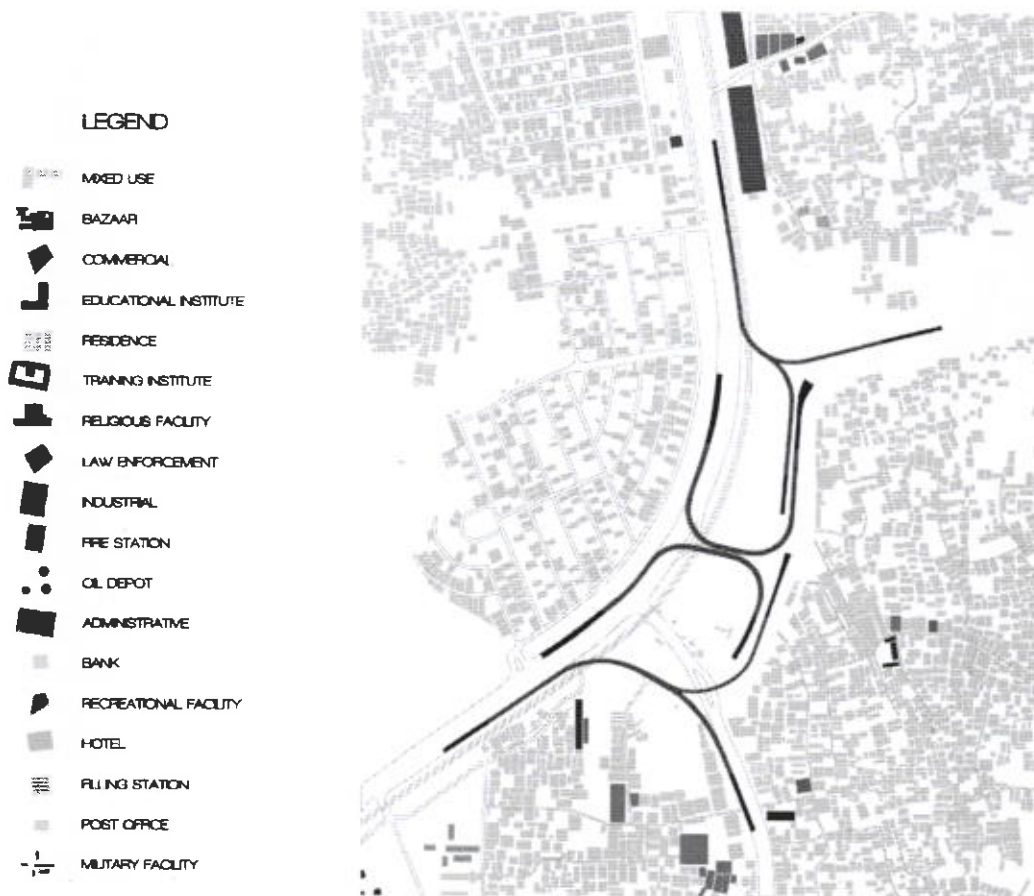
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4.3 FIGURE-GROUND

The figure-ground drawings of the study area help to understand the relationship between the building mass of this area and the open spaces surrounding them. Through the analysis of these diagrams three distinct spaces were recognized within the study area. The first space identified is the area below the overpass. This space is characterized by the

numerous structural columns of the overpass that divide the area into a series of small spaces. The residential Cantonment area surrounding the site forms the second type of space. This area is defined by the close formation of the buildings along New Airport Road. The last distinctive space corresponds to the neighborhood to the north-east corner of the study area. The form of the spaces within these neighborhoods is scattered and follows a biaxial grid pattern. The figure below illustrates the figure-ground drawings of the study area and spaces below the Banani overpass.

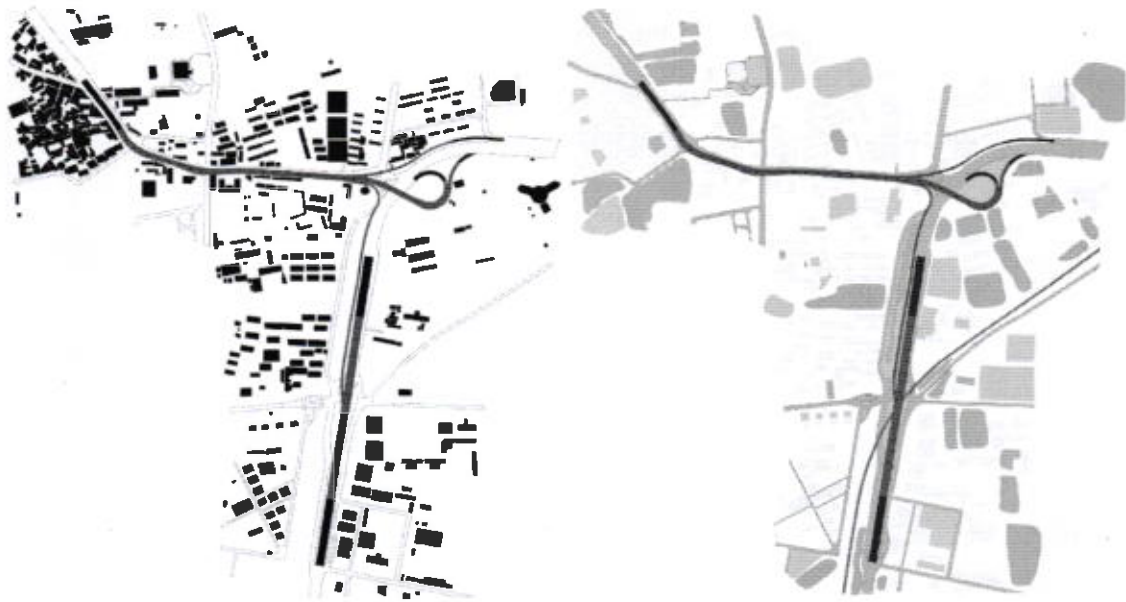


Figure-Ground of the Study Area illustrates the solid structures in black and the space as white showing the forms created by the buildings; with water bodies and open spaces such as vacant land and playground

Analysis: The complex spaces created below the overpass by the numerous columns can be confusing and create voids that separate the residential areas along New Airport Road. The tight formations of the buildings along the road give form to the space along the street in a desirable manner but this form is not carried all the way through this residential area. There are some spots within the study areas where the continuity of these spaces is lost, especially at the rail-crossing.



Vegetation of the Study Area

4.4 CIRCULATION

The analysis of the circulation patterns is important to establish the desired circulation lines within the study area. These lines are the connection between important places in this area. Circulation within the study area is divided into vehicular circulation, pedestrian circulation, parking areas, and public transportation.



Road Circulation of the Study Area

Pedestrian Circulation

The pedestrian activity within the study area is almost zero. Some pedestrian activity takes place along the New Airport Road and under the overpass to the south of the rail-crossing. Currently, walkways within in the study area are not clearly defined, in poor condition or nonexistent. Connections to the residential areas to the North of the site are through narrow sidewalks along New Airport Road viaduct or over vehicular roads.

Vehicular Circulation

Vehicular circulation in the study area is mainly two-way excluding a section of DOHS bypass Road, which is one way from New Airport Road to DOHS Baridhara. The highest volume of cars within the study area appears to be from 7:45 am to 12:00pm, and between 5:00pm and 7:00pm.

Parking

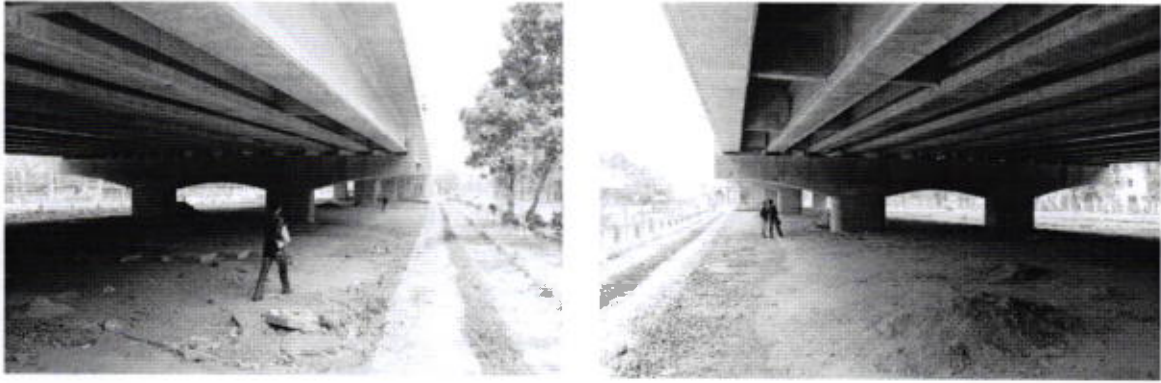
Currently there is no space allocated for parking in under the overpass. But it has the capacity to accommodate 90 to 100 cars in the spaces below the Banani overpass.

Public Transportation

There are no bus stoppages in the study area. This route has stoppages near the Mirpur-Airport Road flyover towards the north and Kakoli-Banani towards the south. The only means to access the spaces under the overpass are by foot, a CNG auto-rickshaw or by private cars. Public transportation services during the week are from 6:00 am to 12:00 pm and on Saturdays are from 7:30 am to 11:00pm.

4.5 PHOTOGRAPHS





4.6 SWOT ANALYSIS

i. Strengths

- Ample space under, unlike other elevated highways in Dhaka
- Surrounded by numerous water bodies
- Surrounded by abundant greenery

ii. Weaknesses

- Falls within the cantonment area
- Cannot be developed without the approval of the army
- No public transportation infrastructure available
- Poor condition of walkways

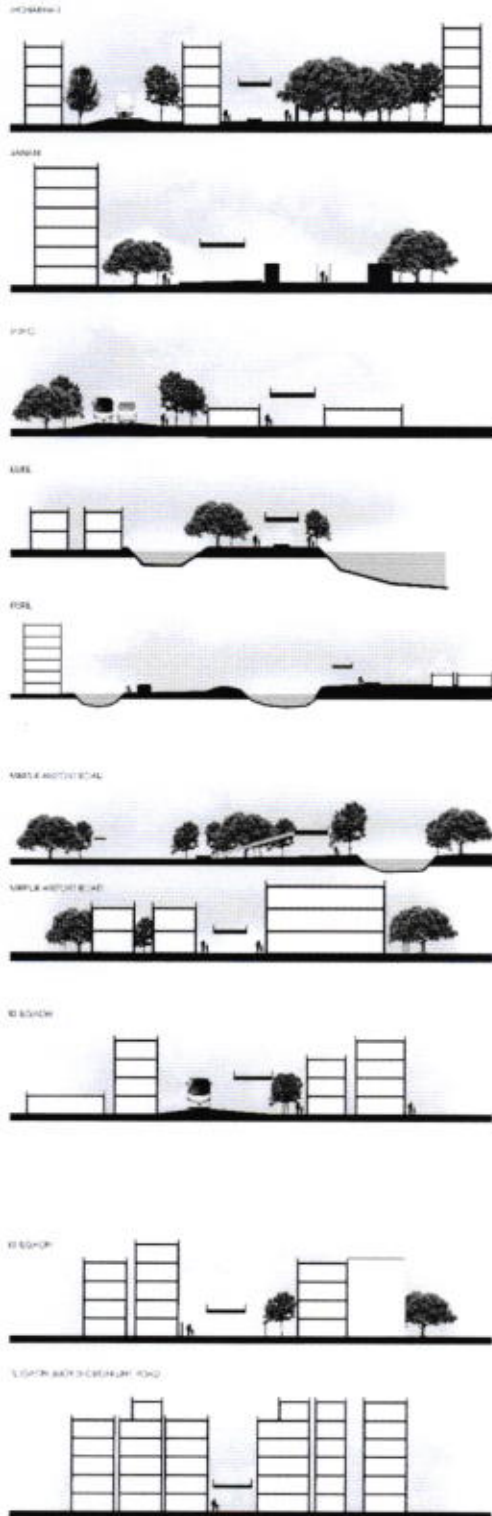
iii. Opportunities

- Potential for becoming a highly accessible recreational urban area if the cantonment is relocated outside the city

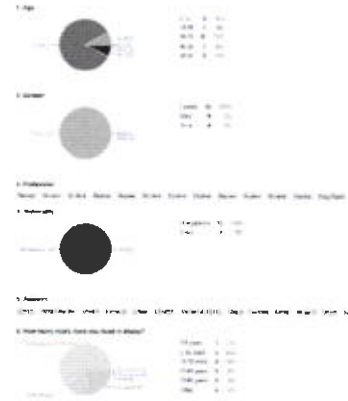
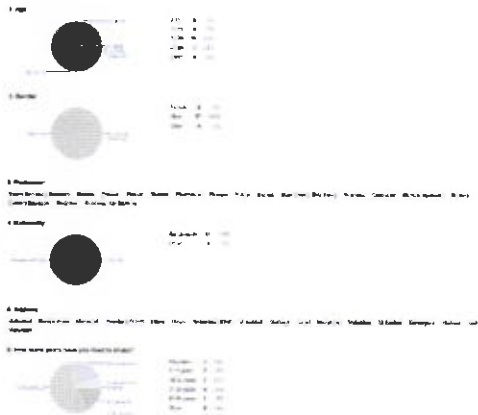
iv. Threats

- Becomes dead at night
- Confusing directions

4.7 EXISTING SECTIONS



5. SURVEY



Survey Details

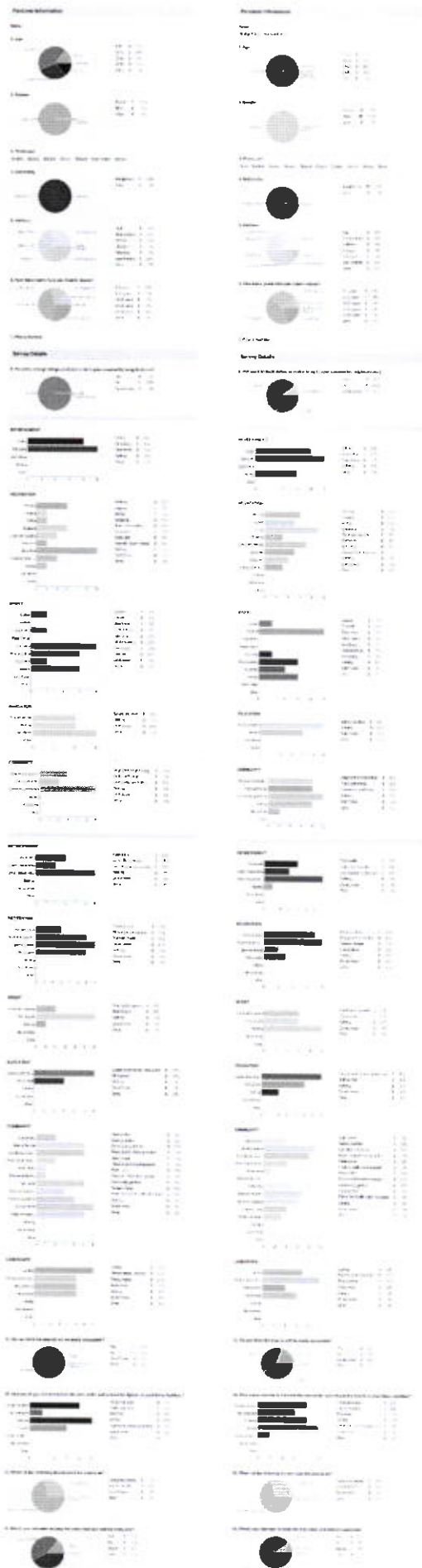
Survey Details



How do you describe the following parameters of the area under the company?

How do you describe the following parameters of the area under the company?





PROGRAMMED?

Could be
abit bigger in size
not readable!

CHAPTER 6

CONCEPTUAL STAGE AND DESIGN DEVELOPMENT

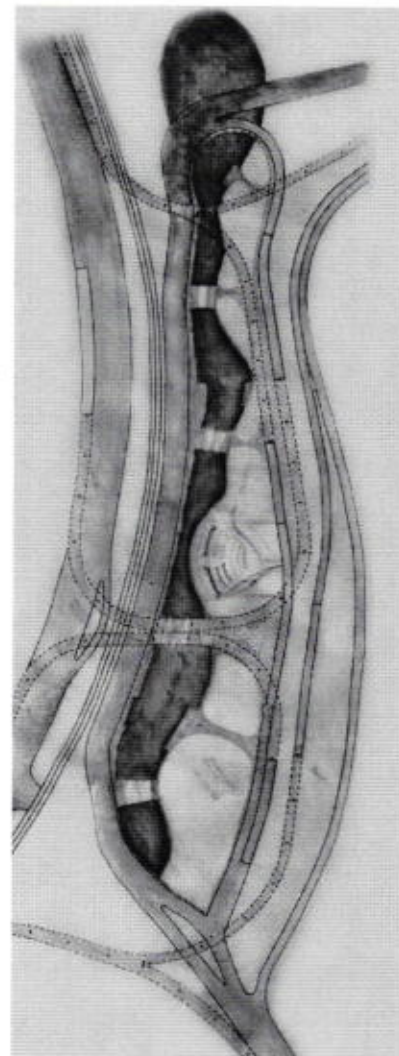
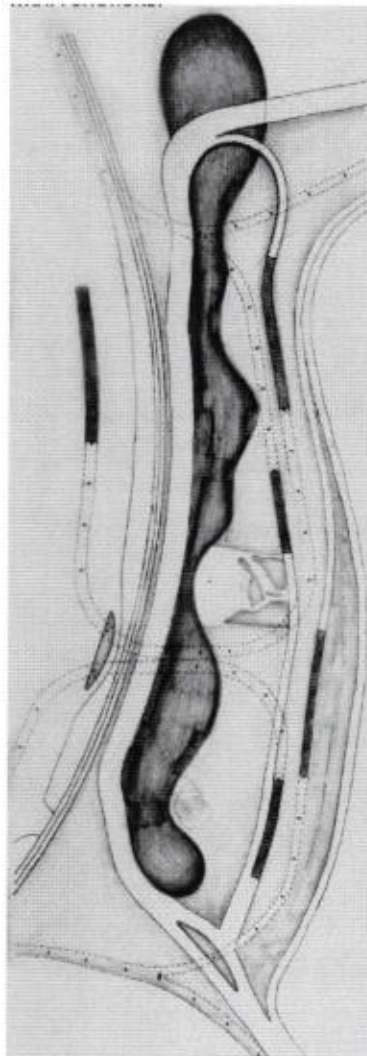
- 6.1 Stage I
- 6.2 Stage II
- 6.3 Stage III
- 6.4 Master Plan/ Structure Plan

6. CONCEPTUAL STAGE AND DESIGN DEVELOPMENT

6.1 STAGE I

6.2 STAGE II

6.3 STAGE III



6.4 STRUCTURAL PLAN



This structure plan is only a guide for future development of the spaces below the Kuril Flyover. It is meant to be an example that will help the decision makers within the communities of this area during the decision making process directed towards the development this site. Inevitably, unexpected events will require changes in the master plan. However, in order to develop a unified design changes to the master plan should take place only after careful consideration. The final master plan is presented in figure 6.3 followed by a description of major changes in the area. Details and sketches of scenes from this plan are illustrated in Appendix C.

Description of Master Plan

This section presents a description of the principal elements of the final design. Explanations are included for walkways, parking, pedestrian deck, plaza, cycle path, passive recreation area, and new commercial establishments.

Walkways

Sidewalks along the new roads formed due to the flyover are designed for safety and easy access to the different commercial establishments in this area. This design eliminates the problem of vehicles parked on sidewalks by developing sidewalks with 6-inch curbs. Access ramps are provided on specific crossings and in all corners to make this area completely accessible to the physically challenged. Street trees are planted along sidewalks to enhance the character of the street, provide shade, and to screen the views of the Kuril flyover. The new sidewalks should be designed using brick pavers at the joints and around the planting beads to integrate the design of the new sidewalks with the architecture of existing buildings.

Currently the neighborhoods surrounding the considered area lack proper pedestrian connections to the central zone forcing the residents of the area to walk on the roads creating a dangerous conflict between vehicles and pedestrian within these residential areas. The design solution suggested is to provide sidewalks and foot-over bridges that will connect the neighborhoods to the Kuril flyover area.

Parking

Developing the area will require new parking spaces. The new parking lot will also provide pay and park facilities for nearby commercial facilities. The variety of commercial establishments in this area experience different parking needs throughout the day depending on their specific operating hours. For example: retail establishments will require

parking between 8:00am - 5:00pm while restaurants need parking availability at lunch hour or between 5:00pm - 10:00pm.

Bus Stops

Major bus stops within the study area are provided with seating spaces, overhead protection, and new signage to identify them clearly. These improvements along with the addition of a major bus stop facility located in the new plaza under the Kuril flyover should increase the number of visitors to the area but further study of the public transportation service should be considered in order to maximize the services offered to this area.

Pedestrian Deck

Creating a pedestrian corridor running under and along the Kuril flyover from North to South between the two decks of the highway structure was considered after realizing the potential of this area to become a connecting corridor between the commercial and residential areas surrounding the highway structure. Developing the pedestrian deck in this location will take advantage of the linear axis created by the elevated highway. This central axis is terminated by two focal points on both ends.

Plaza

The concept of developing a plaza under the Kuril flyover came from the idea of creating a transition center between the residential areas to the East and the central activity zone to the West. Other influential aspects considered during the development of a plaza under the overpass was the need of a multi-use area in which residents and business owners of this area could celebrate different types of activities. On a regular basis this plaza will function as a transitional space and main focal point offering features such as an auditorium, an amphitheater, a wading pool for children, restaurants, and different seating areas. An important aspect of the location of this plaza is its accessibility from Perkins Road, which allows easy access to the public transportation services.

Bicycle Path

A bicycle path running throughout the site will act as a link of this design. In order to integrate the highway structure and the new bicycle path, this design incorporates some of the structural columns of the Kuril flyover into the water feature adding a dramatic touch to this area.

Water body

The water body consists of waterfalls, stairs, *ghaats* and seating walls allowing the visitors to interact with the water. Including waterfalls into the design of the fountain will help to cover some of the noise produced by the cars traveling through the Kuril flyover.

Passive Recreation Area

This design incorporates a passive recreation area into the East of the water body. This area is ideal for this type of activity due to the low vehicular traffic and the number of residences that are located in the vicinity. The play area will include seating spaces for the adults supervising children, a small playground, and will be visible from nearby streets. Incorporation of this recreation area into the spaces below the Kuril flyover is designed because this will bring activity into the spaces below the overpass thus creating safer conditions.

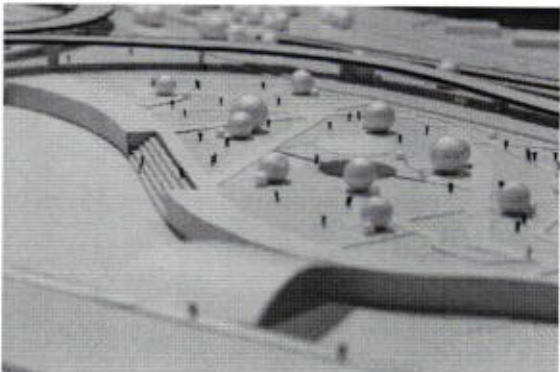
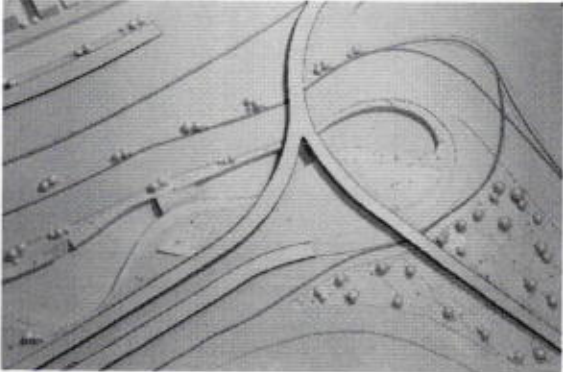
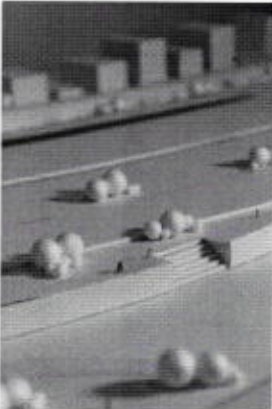
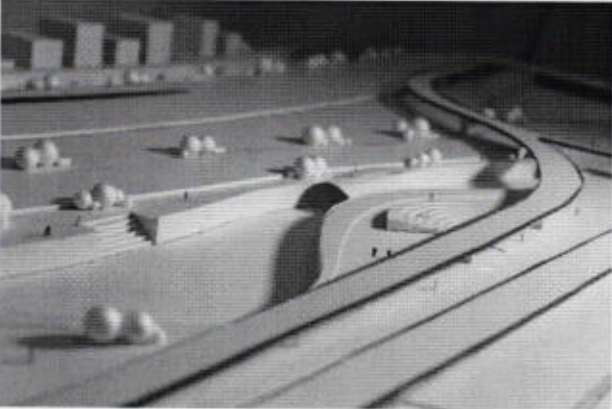
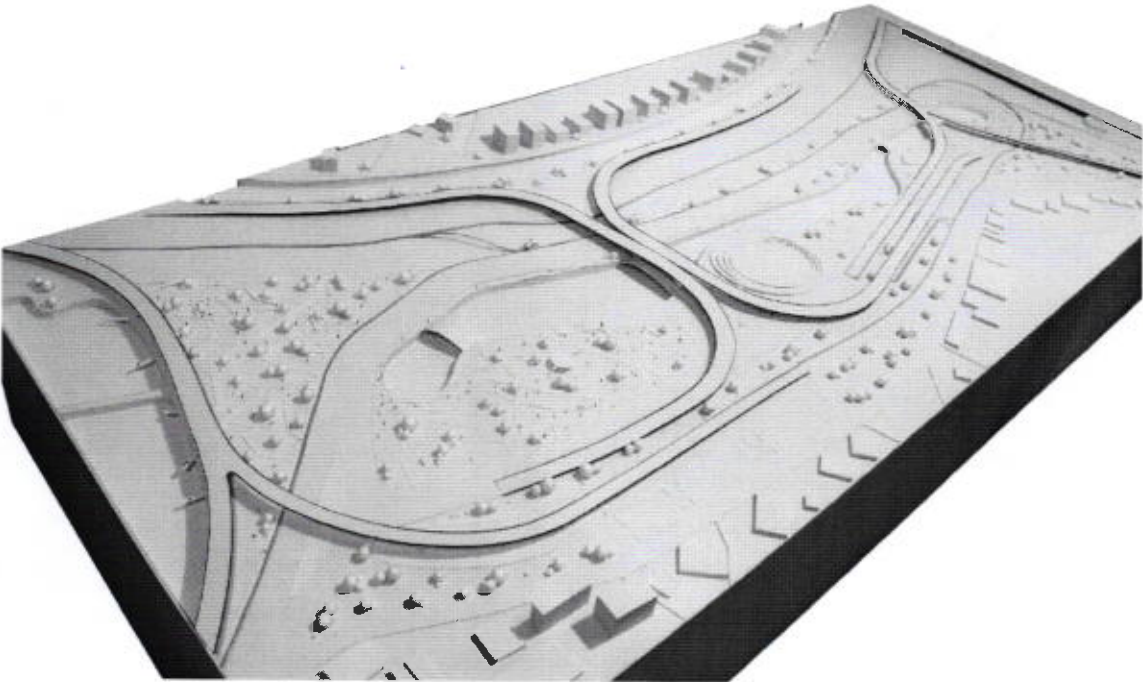
7. CONCLUSION

Study of the six examples of informal spaces emphasizes their significance in the lives of the people, as people develop strong attachments with the place. For instance, in Mohakhali, people who use the pocket highway park enjoy spending time there and do not differentiate it from a regular park. In fact, the highway parks serve as a community space where families and friends come together creating a social bond. Every social group irrespective of their economic status needs a space for socialization and so the availability of highway parks for use and appropriation compensates for the lack of open space in their neighborhood. This opportunity is especially crucial for the disadvantaged and deprived populations because in its absence, there can be potential unrest causing social conflicts.

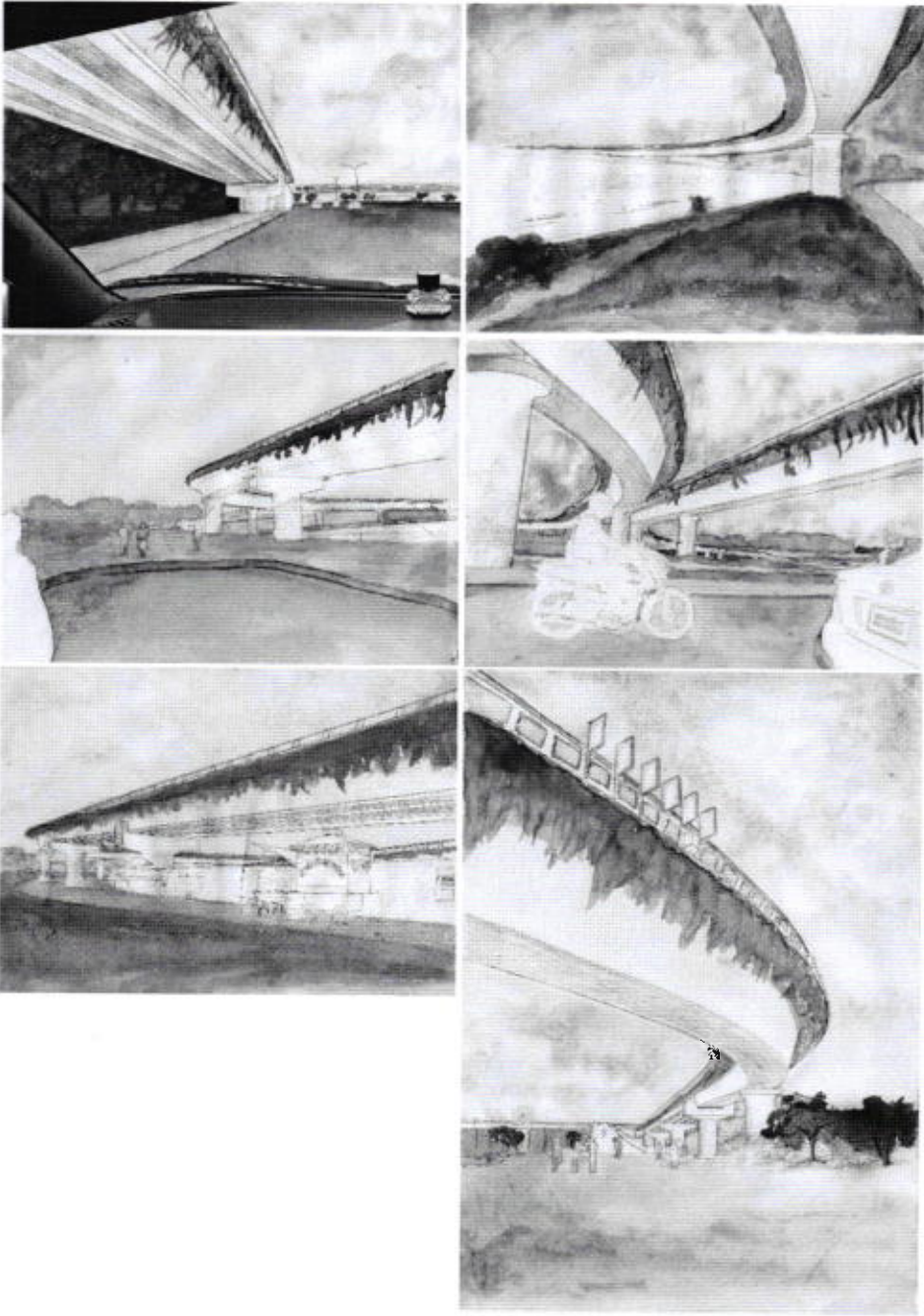
Similar is the case with informal vending that takes place in the all of the old overpasses in Dhaka. These informal spaces provide an alternative to those who cannot afford to own a formal space for business where they can operate from, without a huge investment; it forms a parallel system of informal economy operating along with the formal one.

Together, the communities that have remained and grown make up a varied whole; a community which itself is rich in social, spiritual, and cultural diversity. As such, spaces under and around the elevated highways in Dhaka can become a snapshot of modern, multicultural Bangladesh in a time of change.

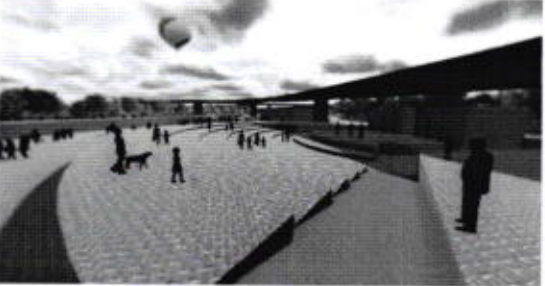
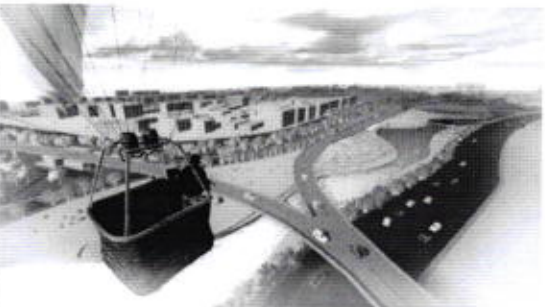
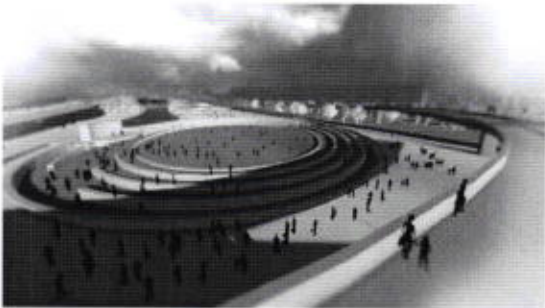
MODEL



VISIONS



VISIONS



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