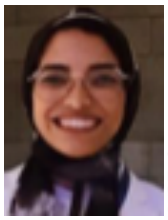
# Public spaces under flyovers: Qualitative data analysis of users' interests in Heliopolis



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Received: 09.07.2021, Accepted: 10.11.2021
DOI: 10.17932/IAU.ARCH.2015.017/arch_v08i1002

***Abstract:*** *Global literature documents many urban agendas related to urban sprawl, traffic transit sequences, and flyovers. Changes in development patterns in Egypt have led to many lost spaces beneath flyovers, affecting the urban fabric. Despite these lost spaces under the flyovers, current Egyptian policies have transformed them into public spaces. This paper analyses the development scheme of some regions under newly constructed bridges in Cairo. This paper explores activities and landscape architecture under the flyovers and identifies their impact on the urban commons using quantitative methods, maps, surveys and semi-structured interviews with users' perspectives. When detecting previously selected states, bridge construction, and passive activities, the results indicate diverse experiences based on the age and species of neighbourhoods. The findings help identify the possible activities useful for the community and can enhance the quality of life. In building flyovers amidst the city's fabric, the recommendations have highlighted the importance of linking the neighbourhood's characteristics of urban configuration, landscape architecture, and socioeconomic parameters.*

***Keywords:*** *Neighbourhood, aesthetic quality, public space, cognition process*

## *Üst geçitlerin altındaki kamusal alanlar: Kullanıcıların Heliopolis'teki ilgi alanlarının nitel veri analizi*

***Özet:*** *Literatür, kentsel yayılma, trafik geçiş sıraları ve flyover köprüleri ile ilgili çeşitli kentsel gündemleri belgelemektedir.Mısır'daki gelişim modellerindeki değişiklikler, flyover köprülerinin altında birçok kayıp alana neden olarak kentsel kumaşı etkiler.Flyover'ların altındaki bu boş alanlara rağmen, mevcut Mısır politikaları onları kentsel kamusal alanlara dönüştürmüştür.Bu makale Kahire'de yeni inşa edilen köprüler altında bazı bölgelerin kalkınma şemasını analiz etti.Bu makale, flyover'ların altındaki faaliyetleri ve peyzaj mimarisini gözden geçirir ve kentsel müşterekler üzerindeki etkilerini tanımlar.Amaç, toplum için yararlı faaliyetler olasılığını belirlemek ve yaşam kalitelerini artırmak için yaşa ve mahalle türlerine göre çeşitli ve çelişkili deneyimleri keşfetmekti.Bu araştırma, flyover'lar altında mevcut koşulları yaşayan katılımcıların haritalarını ve anketlerini kullanarak nicel yöntemler kullanmaktadır.Bulgular, heliopolis'in değerine göre imar planlarının nasıl değiştiğini ortaya koydu.Şehrin dokusunun ortasındaki köprülerin inşasında, bulgular mahallenin kentsel yapılandırma, peyzaj mimarisi ve sosyoekonomik parametrelerin özelliklerini birbirine bağlamanın önemini vurguladı.*

***Anahtar Kelimeler:*** *Konut Mahallesi, estetik kalite, kentsel kamusal alan, biliş süreci.*

## 1. INTRODUCTION

The challenges of population, urbanisations related transport have grown in recent years and have increased the need for growth in the vehicle, including overpasses, as solutions to the existing traffic problems in Egypt. Generally, highways are an essential component of every city; they are often built-in responses to urban growth [1]. Consequently, the government in Egypt has decided to develop the infrastructure with road expansion and highway construction to make an easy traffic flow. Since 1970, bridge construction has been a leading issue in the Egyptian urban plan to solve many traffic problems [2]. According to Central Agency for Public Mobilization and Statistics, this culminated in 2972 bridges throughout Egypt. However, bridges/elevated highways divide neighbourhoods, create unfavourable impressions, and serve as physical and psychological obstacles that make walking uncomfortable [3].

Moreover, the massive expansion of flyovers led to various lost spaces—that might emerge under flyovers—affecting the social, cultural, urban fabric, and identity of the city they move through [4]. Chohan (2014) describes the flyovers and urban areas under them are considered dangerous, overbearing, harmful times [5]. Urban designers and architects have suggested that these places could be transformed into distinguished areas with visual pleasure to decrease the negative impacts [6, 7]. There was no attention given to the bridge aesthetics standards in Egypt and the excellent use of the places' underneath overpasses. However, recently, the government has become more conscious of the ideal utilisation of these places [8].

This study evaluates the uses and explores whether the construction patterns of the bridges are changing the urban context and pedestrians' needs in Egyptian cases. First, the study investigates how places cocooned the split community and/or trees to revitalise the area without losing car entry in the Heliopolis suburb district as a case study. Given this case study, the sections are characterised by distinctive architectural, urban, and environmental values. These cases draw attention to the importance of integrating the work between different stakeholders, including urban planners, highway agencies, the community, and other stakeholders, to conserve the public spaces. The rehabilitation or reclamation of public spaces is considered an essential solution and alternative for the areas under the flyovers, especially in the existing neighbourhood, to make the environment friendly.

In achieving the present study goals, the followings discuss three questions including:

- How do users of different ages and social classes cope with the activities in areas under flyover?
- How have places under the flyovers in Heliopolis changed although the context has a unique value and community?
- What are the design principles of landscape architecture and conventions guidelines that should be used to create a relevant neighbourhood in places under the elevated streets?

To attain these objectives, this paper investigates the development of Heliopolis based on the construction of highways and street expansion and how this improvement moves away from a coherent city fabric. Theoretically, this research investigates the theories of social areas, public areas, and urban layout ideas of what makes a city public space successful. This theoretical background discovers the causes and solutions for creating high-quality communities with social accuracy and the prevailing characteristics of these areas. Empirically, this research follows the qualitative method. The findings from qualitative surveys launched in early 2021 should provide evidence of the coherence of the city. Figure 1 describes the structure of this study.

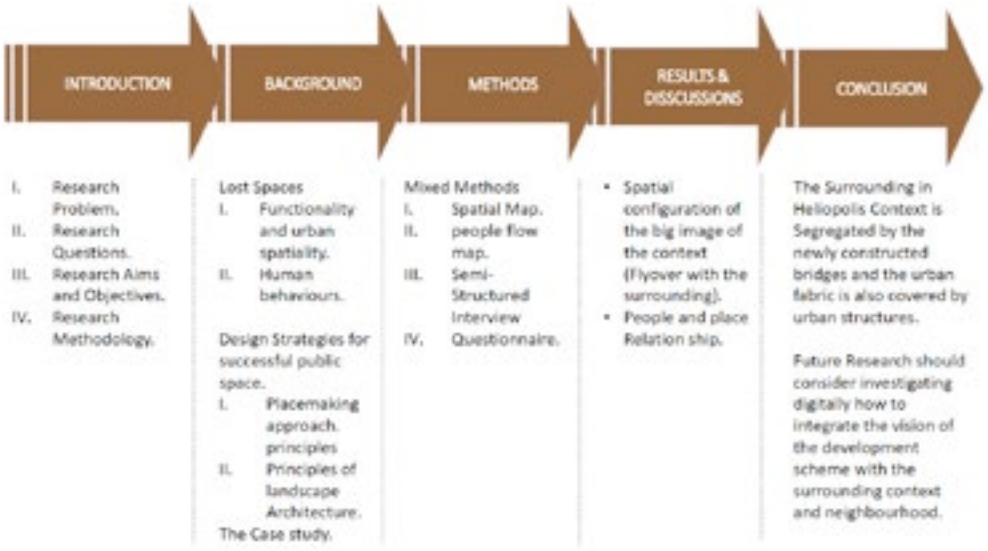


*Figure 1. Research structure*

## 2. LITERATURE REVIEW

This research tackles social spaces, public spaces urban design principles that take please convenient to users. This section aims to find out the causes and solutions for the debate of how to create the best communities to conserve the characteristics of these places, understanding landscape elements with referring to many scholarly views for identifying the factors of contemporary landscape in the context.

### 2.1. Functionality and Spatial Structure

Malterre-Barthes (2011) proposes five better spaces under elevated highways in densely populated towns [9]. In the early stages of exploring these places in literature. This typology is accommodated with no use [10]. However, the function of these places is determined by surrounding uses. Generally, the design of these places in cities is maintained by the local authorities. In some examples worldwide, these areas with services are mainly used for parking, and some benches and street furniture exist. In other instances, these places are used for industrial and business purposes. Finally, the literature describes these transit places as hubs for public usage like trains, depots, bus stop shelters [11, 12, 13]. Trancik [3] presents urban challenges in contemporary cities in his book *Finding Lost Space* in the same line of thinking concentrated on the centre of the city, the current planning position. Trancik's (1986) approach is to figure out the spatial relations between two and three-dimension and their use by the inhabitants. He also pointed out that the trouble with modern movement today has led to many unsuitable vacant lands. It left many dead spaces in cities. In this respect, "The usual urban development process treats buildings as isolated objects sited in the landscape" [3].

Trancik (1986) also mentioned that "designers of the physical environment have the unique training to address these critical problems of our day, and we can contribute significantly toward restricting the outdoor spaces of the urban core" [3]. Since there is a lack of appropriate architecture in the dispute between developers and architects, dead areas have a strong capacity for attracting people to abandoned places. There are numerous vacant, misused, or unused lands in virtually every city worldwide, and the gaps under elevated highways seem to be a significant portion of them. Although these outdoor areas are beautiful, attractive, or unities, planners today preserve them. In this line of allocation, "Lost space can be seen as the unstructured landscape at the base of high-altitude towers to the unused darkened area, away from the flow of pedestrian activities in the area". Trancik (1986) [3] described lost space in cities as unstructured patterns.

Furthermore, the lost areas are deserted waterfront train yards, empty military sites, and factory sites [3]. Practitioners in some cities ignore social contact in deserted places and repel any constructive social contribution, "these are undefined and have no observable boundaries and fail to connect the elements consistently" [3, p. 4]. He also referred to five critical reasons for the problem mentioned [3]:

- Increasing automobile dependency.
- The position of modern movement architects against open space.
- Urban-renewal zoning and land-use policies that fragmented the city.
- The ability of contemporary (governmental and private) institutions to take public and civic responsibility.
- The abandonment in the heart of the city in commercial, military, or transport locations.

Trancik (1986) has examined three key urban elements which focus on the success of these spaces. Three-dimensional frames define the area borders. The first border is the flyover structure, the enclosure level, and the human scale for the flyover structures. The pattern is the second type of border defining the places under flyovers that concern the textures, materials, and ground pattern composition.

Finally, the space borders are affected by complex scenes like benches, lighting poles, statues, plants, and all objects that focus on themselves.

### 1.1. Human Behaviour in the Urban Commons

In understanding peoples' behaviours, this section of the literature addresses the human problem. Several studies have concerned the way people behave in urban environments and explain how people interpret and communicate with these spaces.

Whyte (1980) has developed a research project into how urban spaces interact with people's experiences [14]. He watched various plazas and parks to see which worked for users effectively and which did not. Through behavioural observation, he detected those variables to explain the complexities of people's relationships and why they choose space rather than another. As the author called "triangulation", people seem to be drawn by some events, like musical acts or art installations, as the author called "triangulation", making strangers likely to talk. "Sculpture can have strong social effects. People are drawn to the sculpture, and drawn through it: they stand under it, beside it; they touch it; they talk about it" [14, p. 78].

Whyte (1980) concentrated on the movement of individuals inside urban areas and how double-sided instructions can influence or slow down movement speed in small conversations [14]. The attraction of people is the main factor; the bulk of people who sit, chat, or eat will make a sort of crossroads in the room, for example, through a food cart, and thus contribute to corners. Crowds add a sense of security and assurance in some open areas. Furthermore, its potential to create shade areas is a good shield and a sense of security; Whyte (1980) [14] deals with natural elements such as trees. Breezes are also essential for the liveliness of parks and public spaces, as are winds, heat, and water. Islands usually surround areas under the highways; thus, the street is essential for public space achieving. It must finish cohesively at the end of the square or public space. The connection between the findings of Whyte (1980) in his project and the ones described in the study brings us to the core of following people's behaviour patterns, which can be applied in public spaces. It is usually the ultimate preparation and application for building a large, socially entangled city.

There are numerous public spaces between buildings and roads in any city in the world. They are essential for people in the first place. They play a vital role in the behaviour of people. They affect the quality of their lives [15]. Therefore, it is an essential part of the construction process in the region. The literature analysis

showed that several writers had addressed the negative consequences. Bog communities propose the effects of these systems in six main categories [16]:

- Increased mobility and accessibility.
- The urban structure was dominant.
- Physical and psychological obstacles and visual invasions of separate privacy communities.
- Unclear and often misused space.
- Low natural light and under the elevated structure create a negative or lost space.

In the context of transforming places under the elevated highways into the public domain, practitioners may assign a goal for making a perfect public space where people gather and go immediately to escape from the lauds of the city [17, 18, 19]. The literature recommends the design of successful public spaces if we give one excuse to simulate successful public spaces where individuals interact and where individuals temporarily avoid the city clamour. The reason for this avoidance is that practitioners should make the places under the highway into public use. In addition, public space enables all people of different origins to use available space, regardless of their personal, social, and social contrasts [17]. In the same line of thinking, open spaces should accommodate variation and the proper flexibility and consistency for persons from all backgrounds [7, 20].

## 1.1. Design Strategies for Successful Public Spaces

When researching the social community and its connection to the urban types, the issue is why people go to public spaces. Many of the reasons people spend time in public areas are avoiding the urban crowd and the noise [21]. That is why they find places where they can practice any tasks that can fulfil their needs. To attract and meet the need to spend time in public places, we learn the market people seek in regions. Five critical reasons for the need for people are comfort, relaxation, passive participation, active involvement, and experimentation in the public space [22]. The design process might need to consider users' needs and how they can be met to prevent the misuse or displacement of people into areas. The Project of Public Space (PPS) website clarifies the place making challenges [23]. PPS researchers have attempted to develop the latest modern module to understand public space needs by recapping users' needs into four primary attributes which can be achieved to meet the public sphere, as illustrated in (Figure 2):

• In **access and linkage**, the entrance to areas is also an important issue. Dense neighbourhoods need more open public space for meetings, and people use which places are available if they are not accessible to social events [17]. However, elevated highways and bridges next to districts are primarily located in high-density high traffic flow areas. They are strategically located on the axial land of the vehicle-dominated road. A furthermore, it's hard to access. In addition, the relationship between these areas and the main street is mainly restrictive. If you are unable to access it, people are less likely to use the space. Until then, a direct connection between space and the environment must be established to attract many people. The literature review outlined the critical factor in the efficiency of the relationship between streets and public space. A great spot begins at the corner of the road; if it's a lively corner, it has a vibrant social life [14].

• In **comfort and image**, the sense of convenience is discussed by PPS in terms of what causes people to stay in a plaza or public place. The importance of this factor comes because they want an escape from the city's weather, calm the sight and hearing. However, several studies have emphasised these systems' adverse health impacts, particularly road-noise, a significant urban noise [24]. Noise is viewed as an environmental stressor and annoyance and is described as an "unwanted sound." Noise effects can be described as all the health and wellbeing effects caused by noise levels [25]."Environmental and government authorities have in recent years been particularly concerned about the noise levels of different travel modes because of the serious discomfort they are bringing to communities around them" [26].

Evidence from literature shows that the highways' visual consistency can act as physical and psychological barriers that create undesirable views [27]. The visual character makes the pedestrians' experience unpleasant [3]. In their book, *Safe Cities: Guidelines for planning, design, and management*, Whitzman & Wekerle [28] have actively taken this approach and began to get people familiar with the views of the highways. When most of our knowledge is obtained visually, these structures may provide a potentially positive effect measurement approach. Visual intervention, especially in urban environments, is the most significant effect of high systems. At the same time, highways will act as physical and mental obstacles that generate incredible views that disturb the pedestrian experience [3, 29, 30].

• The literature was reviewed for possible methods to the factors of uses and activities. In this respect, the practices inside the public space are among the main attributes of a successful play. They are the principal justification for people to turn a place into a group of components and a dynamic field of daily activity [31]. It is challenging to have a specific use or public action in these places, but it seems like it is widely overlooked to manipulate these remains. New cooperation, some of which may be temporal, and some become long-lasting, is being established by promoting and participating in urban activities that provide an alternate model of behaviour and reform routines and configurations [32].

• In sociability, the challenge here is what makes space is people's participation. Zygmunt and Tine said: "The key characteristic of the places' public but not civil' is the redundancy of activity, a space without individuals, just coordination, only static" [33]. Public spaces may be officially public and/or private, either in whole or part; they can essentially be people-oriented development. Therefore, the site programming can probably target user groups that use the space and promote various subgroups of the probable user community [17].


*Figure 2. Placemaking principles. Source: the authors based on PPS*

After reviewing the concepts of making the correct area under the highway, this article explores how people communicate and stimulate dialogue. The social level of contact between individuals is hugely varied and unstable. Still, it is essential to consider the model and the optimum atmosphere for a small conversation as a landscape architect. Whyte (1980) said it as 'triangulation,' as stated previously [14]. This method, whereby certain external stimuli bind people and encourage strangers to speak as though they did not [3]. Mainly from these two outlets, the following recommendations are taken. Other sources, such as safe cities: Whitzman and Wekerle (1997) recommendation strategy, design, and management, were included in the framework to improve or present additional concepts [28]. Many urban areas, neighbourhood parks, and linear park rules converge are shown in the topical sense. Where necessary, specifics are given. The subjects

discussed are design elements that include access, safety, programming, physical connection to communities, and nature. Figure 3 also shows the factors that can make nature be incorporated into an under-highway space. A previous deduction for assessing business value was decided by reviewing many literature materials, guidelines, and standards. The four main types of requirements are traffic, climate, economy, culture, and visual image.

*Figure 3.The criteria for appearing the value of the transformation of the space under overpasses. (Improved by authors)*

## 3. METHODS

**3.1. The Case Study** Heliopolis was one of Cairo's most outstanding impressive neighbourhoods since it was founded by the Belgian Designer Baron Emban in 1905 to end up about 8-10 kilometres. In Heliopolis, the entail design was prompted by the European urban and architectural style taken on the essence of quality of life and sustainable urban development [34]. Vast areas of green spaces attached the modes of public transit, including the upcoming electric tram lines that were planned to connect to the city centre [35].

Heliopolis incorporates western and eastern architectural and urban concepts, making it a unique neighbourhood [36, 29]. However, in the last quarter of the twentieth century, it faced a lot of encroachment, either by demolishing some of the distinctive historical buildings, or by changing its functions and land uses, or trespassing on many of its public, private spaces and green open areas [37]. These green areas were breath taking to residents and replaced by high-story residential towers, which increased by the increase of population and caused many problems that affected the image and culture of the city. Heliopolis consists of two major parts: Korba, the old city founded by Baron Empain, and the latest t supported [38]. Heliopolis consist of six districts: Al-Bustan, Almazah, Al-Muntazah, Al-Nozha, Al-Matar (the Airport), and Al-Sheraton. The total area of Heliopolis is 9.38 km2, with a 2.6 km2 [39]. Al Nozha District has a land area of 67.6 km2 and a population of 238,550 residents [40] (Figure 4).

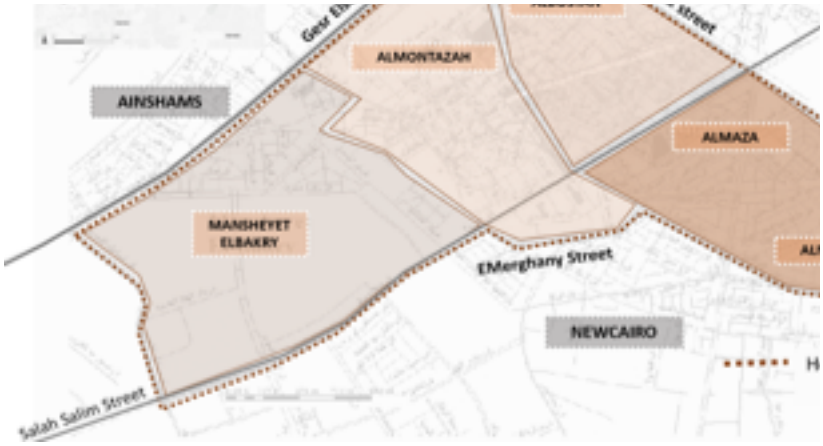


*Figure 4. The central districts in Heliopolis. Source: The authors of the present work.*

There was a significant change in the historical Heliopolis districts two years ago. Since September 2019, the construction process has begun slicing through Heliopolis's streets and urban fabric to achieve the national movement axis and road development plan, seeking to fix traffic problems [1]. Heliopolis development plans call for the creation of five bridges at intersections. Figure 5 represents the development of Heliopolis bridges. Besides, an extension planning scheme for street networks to reduce congestion, motion, and crossing. These new bridges cut through the residential neighbourhood to link the new cities east of Cairo e by cutting off the greenery alongside the sidewalks. The streets were expanded to five or six lanes after previously being just two lanes. Cairo Governorate and the Ministry of Transport placed a new reality on the citizens of Heliopolis almost immediately, with no consultation or community dialogue with the residents [41]. Building five new bridges over the sprawling and green squares sparked a substantial social uprising and public anger. According to data presented by the Heliopolis heritage project, the conversion of these avenues into psychopathic highways resulted in the removal of 375,065.36 m2 or a total of 95.3 feddans covered by trees and green areas [42] (Figure 6).

Following the criticism facing the cutting off of trees, another sustainable solution was implemented by the Egyptian Environmental Affairs Agency (EEAA) [43]. Green walls are to be built for the first time in Egypt inside the new bridges. The vegetation of the bridge columns may be a step in the fight against pollution. However, the cut trees on the roads cannot be replaced.


*Figure 5. The road development highlighted the new bridges in Heliopolis; source: The authors of the present work based on Google satellite map in January 2020.*

The government and authorities decided to take measures on the lost spaces under a flyover to construct elevated highways. The areas underneath the bridges have become bright sights, eliminating the once illegal means used to access these areas. Heliopolis neighbourhoods lack social facilities for their residents. The spaces can be used in small projects for young people ranging from cafes, shops, and restaurants. Designing space underneath an elevated highway; the biggest problem is getting people to go there. The use of these areas would also limit the number of offences/crimes committed there. Public spaces are not in people's language as they usually seek. People tend to use the area once they perceive it as an opportunity to explore it for themselves.

El Mahkama/Abu Baker Elsidiq elevated road was chosen as one of the case studies for three significant reasons. Firstly, it is the only case where discussions discuss planting the structure as a treatment of visual aesthetic value. Options to reconfigure the flow were already established because of that and to discuss how this affects space under the flyover. Secondly, its location in the context within different nature in a primary traffic movement in the centre links between the other areas. It brings users with different categories and characteristics because of the services and land use of the surrounding. Third, the first flyover finalised their construction works and open markets and activities in spaces under the flyover. This would aid in obtaining an actual first experience of the bridge so all prospective interviewees will have a fresh before-and-after vision of the city, so suggestions and impacts will be at the forefront of their minds. And open a discussion and prompt the concern of solutions that are applicable in certain situations.

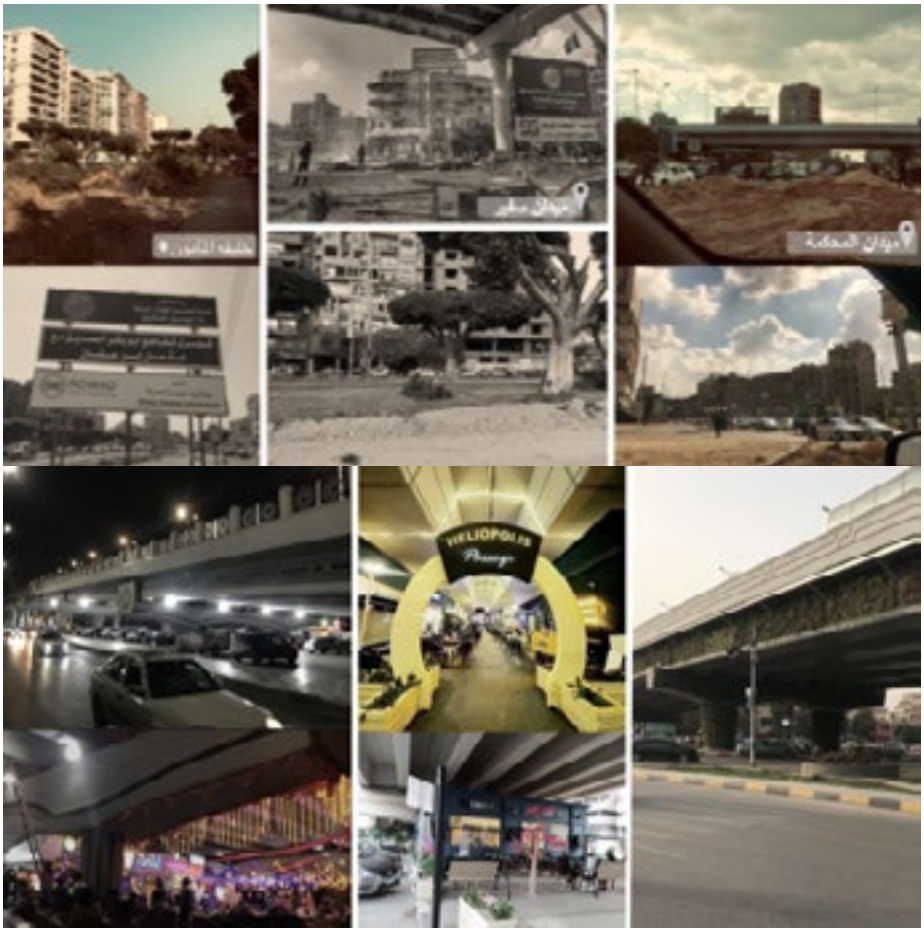


*Figure 6. The phases of creating new bridges and development in Heliopolis urban fabric. (Photographed by authors).*


*Figure 7. The aerial shots show the difference between the Abu Baker Elsidiiq axis before and after the elevated highway/flyover construction.*
*Source Google Earth satellite map, August 2019 and January 2020*

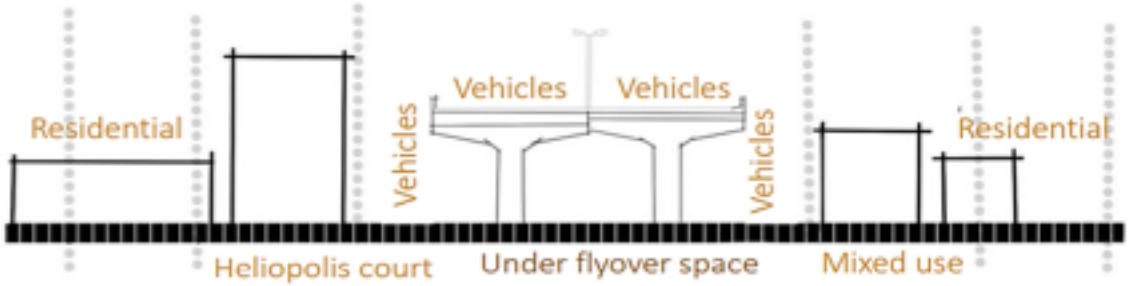


*Figure 8. The longitudinal section of Abu Baker Elsidiiq axis in the urban context after the elevated highway/flyover.*

Social services have been cut off for the people of Masr El-Gedida. Building a community hub that acts as a resource centre for people of all ages and socioeconomic backgrounds is the goal. People were generally in favour of making the bridge because it would help reduce traffic congestion. Still, there were also two significant criticisms: the loss of greenery due to its conversion to concrete and a loss of the neighbourhood's unique identity that draws people from all walks of life. Eventually, the ameliorating process should be oriented towards rebranding the community by accentuating the lost collective memory of the context. Besides, vegetation can vertically be on the bridge's pillars or the ground floor to simulate how it was before in different forms. In this regard, providing daily, weekly, or monthly activities for all ages can create convivial atmospheres in these places. Making public hearing sessions to listen to residents' voices can develop the neighbourhood into a more responsive environment. For such environments with active usage, residents can proactively initiate the interaction, and the area can be scaled up the pace on the level of enlivening the surroundings. This action can make the whole community socially entangled.

## 3.2. Data Collection

Quantitatively, this paper designed a survey that consists of three phases. The first phase is the demographic structure determines the different ages and types of the community used or have an experience in spaces under the flyover and their characteristics. The second phase evaluated the experiences of used areas under the flyover based on the placemaking approach. The third phase was to get how people and residents cope with the places under flyover from their perceptions and determine their perspectives' positive and negative impacts. The set of these survey questions is represented in the supplementary materials. This survey was asked to random samples from local communities or visitors of different gender and ages. The questionnaire aimed to evaluate the experience inside the spaces under the new bridges in Heliopolis and how the uses are homogeneous with the unique neighbourhoods' special characters in terms of coordination of the site elements.

The data collection also passed through another data collection stream using a structured interview with an expert in knowledge and shop owners and workers. This interview aimed to investigate the relationships within the context and the surrounding neighbourhood. The discussion included three questions for shop owners and workers followed by other three questions asked to exert as follow:

- Upon rehabilitating spaces under the elevated urban highways, what kind of problems do you face?
- Why has this activity been chosen to participate under the elevated urban highway?
- Can you list the process you needed to develop the space under the elevated urban highway?
- What are the positives and the negatives of having a highway passing over any neighbourhood?
- Are the positives outnumbering the negatives or vice versa?
- What are the social, environmental, and economic impacts of building highways and utiutilising spaces in Heliopolis?

The interviews were held during the three months following the bridge's opening and development using spaces under the flyover. The district's significant transition recently had happened when conducting these conversations with residents that were considered sufficient to deduce thoughts from the authors' perspective. General questions were asked to collect random samples of various genders, ages, and available profiles of local shop owners, workers, and field experts. The expected results from their responses to the interview questions were to determine how people think about the placemaking and rehabilitation approach for the areas under bridges. This interview is also targeted to investigate how respondents' experiences differ from each other.

## 3.RESULTS AND DISCUSSION

This research determined the difficulties associated with structure areas underneath the residual highways in Heliopolis at the specified location. It chose the experiences of area users and their attempts to address the absence of immediate demands in the vicinity. Building upon the research methods, the results figured out how users feel about and perceive their environment.

The survey by observation method and spatial analysis of current conditions showed no direct relation between the types of activities and facilities mentioned in the space and the user/community's needs and their satisfaction with their experiences in the area. As a result, the design of places does not consider pedestrian life and needs as providing direct and clear paths for pedestrian circulation. More attractive landscapes, proper seats, benches for the public, and comfortable paving materials; as the user feels safe, comfortable,

and belonging to space, more time can be spent in the areas and attract more people. Although these spaces' development makes them not considered a lost cause, they still don't meet or achieve all users' needs yet. These spaces have more potential to increase their quality and provide a successful, sustainable public space and vital point of attraction in the context.

Based on the casual interview occurred to find the user's feedback about the spaces under a flyover. This feedback is divided into two teams with different ages average. The first team with an average age from 18-30 years old, and the second average to 55 years old, the younger group, agreed with the idea and activities on the space. They just had one concern about the type of activities and facilities. They need to have various uses and wealthy the space with more attractive elements to be much better and enjoy the experience, not just like it. The older team didn't agree on development at all as it affects the built environment. They listed the effect of destroying Heliopolis's aesthetic value, cutting through the urban fabric configuration, cutting and removing the historical trees, and green spaces with asphalt (grey structures). They also mentioned how this affected the environment and increased the temperature without any concern about the pedestrian. They also find it difficult in crossing the roads to reach the spaces due to its expansion development. Some answers showed annoyance because of the noise coming from traffic and spaces below bridges, but others didn't feel this noise inside the space as the sounds from shops cover the outside noise. As it is not the optimum solution to solve traffic issues, they suggest that to improve and maintain the tram line as a sustainable way of transportation in the heart of the city, so the pressure of vehicle number decrease and creating tunnels instead of bridges to save the visual continuity of Heliopolis image.

Understanding a place under a highway bridge is difficult; the real issue is getting people to use it. People's dictionaries don't include public spaces in such noisy settings because they often seek out more traditional locations. However, as we discovered from the literature, it all comes down to how individuals connect with their city, and once they see an opportunity to do so, they will take advantage of it.

## 4.1. Spatial Findings

The analysis focuses on the interventions and adjustments made to the places under flyover by users of varying ages and understanding the constraints that space faces in meeting their growing needs. To map the progress in the site, the case is divided into two phases: the original state, which was dealt with because of the project's construction, design, and the current stage of urban formation. Field observations exposed the design's limitations. The first researcher of the present work made numerous visits to the site over three months following the launch of the areas under the flyover to assess their current state.

The observation of the phase before and during the development of the spaces under the flyover made many changes in the area. As for replacing the greenery in such a historical district and neighbourhood like Heliopolis, 550 trees from Abu Bakr El-Siddiq and replacing them with asphalt will slightly increase the temperature. This impact is a likely result of the absence of any environmental pre-assessment plan. There was no mention of interference to form the EEAA, which has not come across an efficient ecological impact assessment process. Also, they removed the Abd elAziz Fahmy tram line, which passed through Abu Bakr El-Siddiq street. The tram network is not used a lot nowadays as it has become a fewer proper means of transformation, but there were still two trams. In this phase, removing old tram lines was transformed into expanding roads to solve the traffic issues and congestion problems in Abu Bakr El-Siddiq.

Environmental assessments are influenced by planting and greenery. Still, they also have a visual effect on the district's image, designed with people in mind, increasing its aesthetic value. Planters put on sidewalks, and street corners should not create congestion or block pedestrian circulation. A rain garden is a garden bed in which the storm water solutions are installed and then recycled into the drainage system or allowed to soak into the ground below, minimising the need for potable water to water the plants—establishing rain

gardens aided in the environment's sustainability. The most controversial effect is the loss of trees, with all participants expressing discontent with it. Residents opposed the initial stages of construction due to the tree cutting and uprooting; nevertheless, officials failed to present a suitable alternative. Numerous residents have stated that these projects have altered their perspective of the neighbourhood. This has impacted the community's collective memory; the district is nearly a century old, and these structures have obscured and distorted the area's unique history.

In Figure 9, street furniture includes lighting fixtures, waste receptacles, benches, signage, and bicycle racks. Public courts were located near the walkway during this time. Pedestrian sitting (benches) is meant to serve as a waiting and resting area and a place for people to sit and speak while taking in their environment. Courts were frequently found in bus stations. Lighting for pedestrian pathways should contribute to making them more accessible and safer for pedestrians. This was not the case before or during the development process. Sidewalks were essential to the social fabric of Heliopolis's neighbourhoods. Because the sidewalk was well-maintained and exciting to use, people could run, walk their pets, and bike on it. Sidewalk curbs operate as barriers to prevent vehicles from riding up onto the sidewalk where they meet the street. That makes pedestrians feel safe. Neighbours built their bicycle infrastructure. Due to the absence of these facilities, it is challenging to create a sustainable and pollution-free roadway. The lack of garbage bins along the street is observed. These are strewn about in an non organized, deteriorated, and useless. It is appalling that signs are placed around the region. Several of them may be found in dangerous areas for pedestrians and dilapidated due to lack of upkeep. Even if there are no pedestrian lanes to consider, there are pedestrian signs.

The observation of the current configuration of the places is designed to have better use from the viewpoint of the shop owners and users. (Figure 10) illustrates a street section sketched on a site visit to allocate activities and interventions in the space and how people interact to understand the area better. Figure 11 shows a flyover section to determine the relationship between the landscape of the spaces under the flyover and the urban landscape of the surrounding context. Figure 12 also mapped the site observation that took place by the first author of this research. Her statement focused on the current condition of areas under the flyover to better understand activities and their relationship with the surrounding land use. Understand the land use and activities under the flyover and how they are related to the surrounding area. It's surprisingly straightforward to see how the land use under the flyover affects the kind of activities carried out in the area. Part.1 was surrounded by various land uses, administrations, and governmental services with large capacity, so actions were transitional while waiting and relaxing.

Activities in Part 2 (restaurants) are impacted by the mix of entertainment and residential activities on the site. Similarly, Figure 13 illustrate the detailed sections of the places under the flyover to determine the current condition of landscape elements in the case study area and their quality to deal with the development

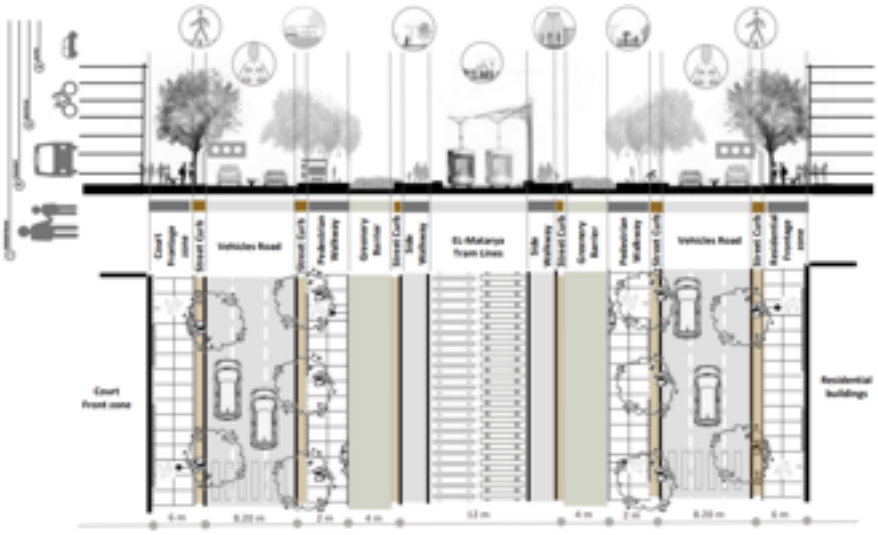

*Figure 9. Layout and section an analyser landscape and street elements before the development process along Abu Bakr Elsiddiq Street. Source: The authors of the present work*

The researchers of the present work observed that the area under the flyover is substantially loaded in the morning and that the parking zone is entire due to the proximity of the governmental building. From the observations of landscape features in the space beneath, it was found that they are overpassed. Trees and landscape strips faced a challenge in lack of greenery and trees, impacting environmental evaluations and influencing the weather. Although the bridge had a damaging effect on the district's overall image, planting its structure and columns improves its visual value. The absence of rain gardens will have a long-term adverse impact on rainwater and drainage processes.

Street furniture includes lighting fixtures, waste receptacles, benches, signage, and bicycle racks (Figure 14). Lighting: The spaces under the flyover are well lit, but lighting elements cannot be considered sustainable because they are not energy efficient. The areas under flyover are well lit, but lighting elements cannot be regarded as sustainable because they are not energy efficient. The pavement in this part is not suitable for disabled people or older adults' movement. That is due to the lack of a ramp. Curb height is not operating as a barrier to prevent vehicles from running over the spaces. That risks the user's life and makes them feel uncomfortable and unsafe. The difficulty of crossing the street is due to the over-speeding cars; almost all of them highlight the danger of space because of the speed. Sidewalks are indirect and unclear for pedestrians, leading users to interrupt the activities that occur under the flyover, as interactions occur under the flyover, as sidewalks are essential to the social fabric. It also makes the participants lose their privacy and the sense of the place and their hierarchy. Users use concrete tree surroundings as shaded benches for relaxing, sitting, and waiting for public transportation. They began to meet their requirements in the area beneath the flyover. For the safety of both automobiles and pedestrians, signage is an essential visual guiding and orienting tool. As a result of the wayfinding signs being clear and visible from all directions, it contributes to a pleasant urban atmosphere.

The findings showed that individuals intervene in the area for several reasons, including functional, aesthetic, and regional considerations. To meet users' immediate needs for accessibility, shop owners and users can work together to create accessible environments around businesses and restaurants. In terms of aesthetics, consumers desire to have an attractive, beautiful area that reflects a positive image of the space. Many public events and interventions are local, allowing users to expand their scope and sense of control over the place represented.

Based on the flow of people to these spaces, the results showed what draws more users to the area. Several maps of users on different days took place within a specific time range (Figure 15). Collecting a map of people's flow on the study field figured whether those uses are parts of the space or not and fully occupied. Based on the mapping of periods from 8:00 am-12:00 pm, 3:00 pm-5:00 pm, and 7:00 pm-9:00 pm, the focusing observation showed the number of people, their flow, and their location related to the spaces they used. The finding confirmed that the capacity of users is affected directly by the land use of the surrounding.

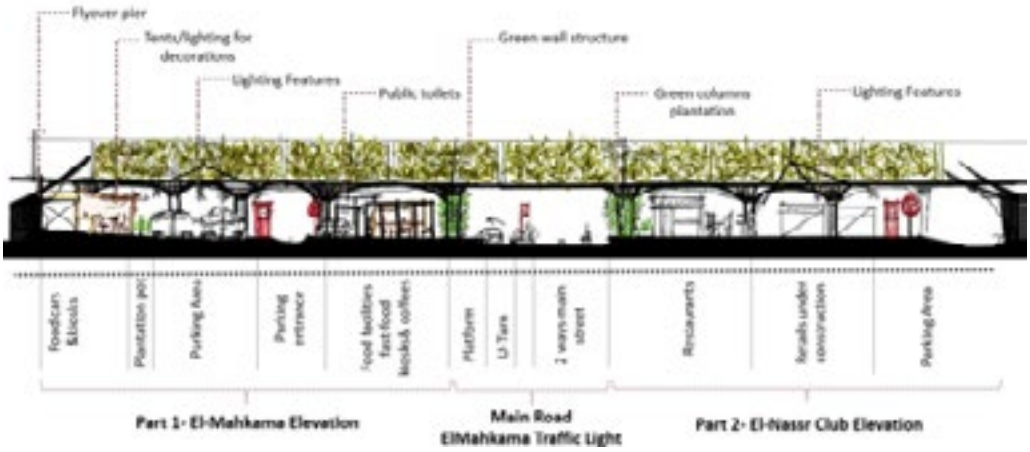


*Figure 10. Elevation & sketch from observation of a field visit; shows the current situation of used parts of spaces under a flyover—source: the authors.*

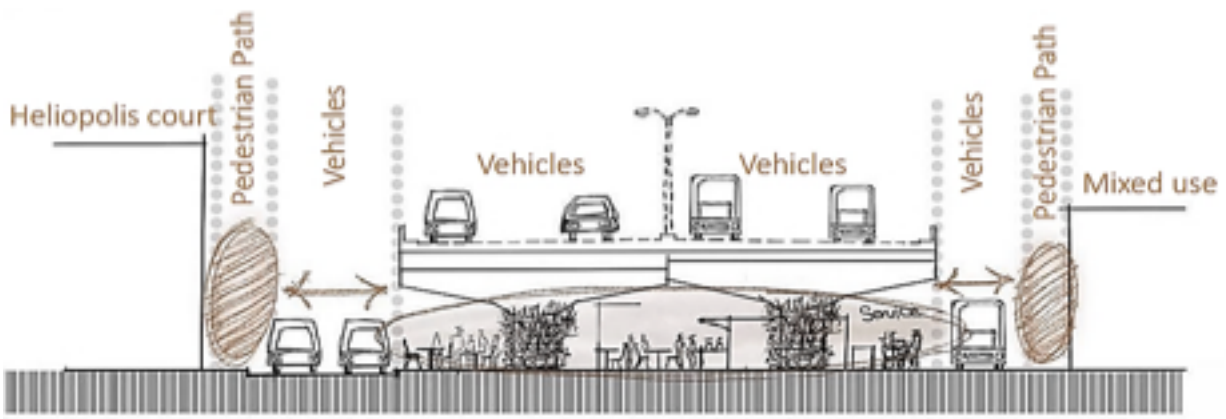


*Figure 11. The longitudinal section of the relation between an urban landscape of the surrounding and geography of the spaces under the flyover. Source: Illustrated by the authors of the present work.*

*Figure 12. The uses and Activities mapping of the current condition of spaces under Abu Bakr El Sidiq (ElMahkama) Flyover (visual survey (observation). Source: The authors of the present work.*

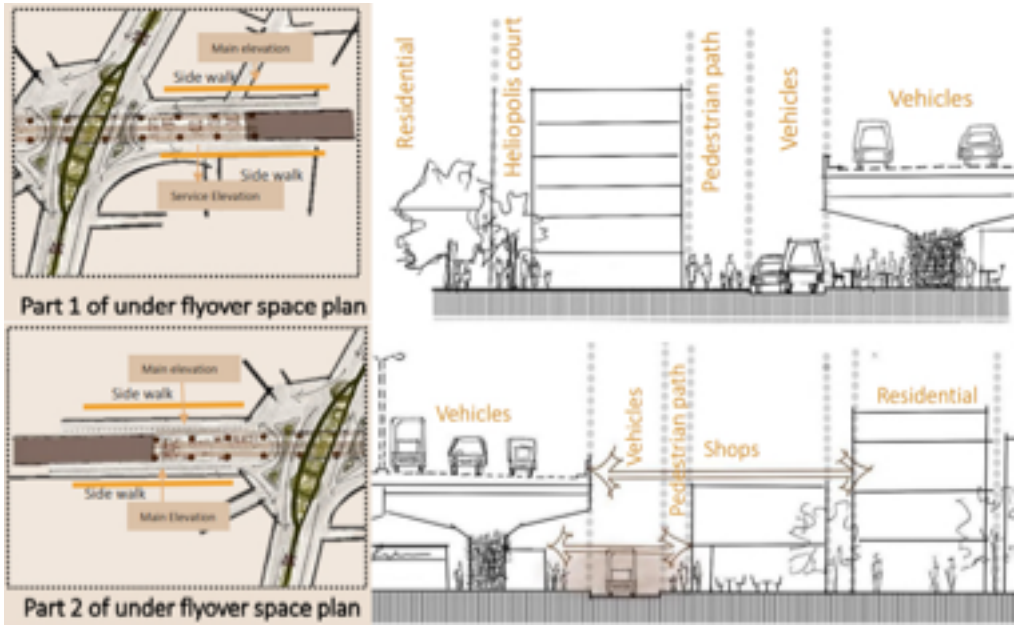


*Figure 13. Detailed plans and sections show the relation between spaces under a flyover and the surrounding context of parts 1 & 2 of a landscape under the flyover (Illustrated by the authors of the present work)*

*Figure 14. The functional and visual analysis of landscape elements on the spaces of the focus area (the authors of the present work)*


*Figure 15. The pedestrian flow to space under a flyover at different timing of the day (based on Google Satellite Maps captured in 2021 by the authors of the present work)*

## 4.2. Survey Results

This part of the research evaluates the experiences of the different users in places under flyovers and how the uses have a homogenised context. The purpose was to investigate the characteristics in the study area to understand how changes in physical traits influence users' perceptions. The questionnaire was launched to users and residents online in the methods applied with the focal points.

The first section of the site shows the demographic structure that collected the data about the space users. The results show that 82 respondents (35%) were males and 65% females who used these spaces. Six responses showed the ages of 35 to 55 years old, while the age range of responses from 18 years to 25 years old was 42 respondents. Thirty respondents' ages ranged from 26 years old to 34 years old. Understanding

the type of the survey participants and users who use these spaces and their characteristics helped interpret their needs. The results showed that 30 respondents from the space users, 22%, didn't use these spaces as they are residents in the area. However, a percentage of workers (6 %) who do jobs in the surrounding regions of surrounding offices use the parking areas in these spaces.

Furthermore, 35% of respondents show that they use that space for entertainment activities with friends and using the food facilities. In response to the actions provided in the area, 23% of residents pass through these spaces for daily activities. A small percentage of 6% of respondents selected using the surrounding activities and services around the places. These results explain why people are primarily drawn to open areas for eating and drinking.

The second, the survey analysed a thriving space that achieved its goals based on PPS's four primary core qualities of placemaking. This research illustrated the type of attribute to measure and how it was converted into indicators reflecting how much these attributes are achieved in the space to accommodate the users' needs in the current landscape environment and socioeconomic settings.

The access and linking indicators showed that private cars were the most common way to reach the space. In this regard, 62% of respondents use their cars as parking facilities in the area. Besides, the 2nd rank of 20% of respondents reaches the places on foot as it's easily accessible by walk. 15% use public transportation. This percentage is low as there are no stops near the space to make public transit accessible from the area. The safety and security rates were highly rated; the site was not safe while crossing even though it's easily accessible from all directions. In investigating the comfort and image, comfort in the spaces was at an average rate the aesthetic value of the areas under flyovers, but its needs to be cleaner. This research also shows that most respondents were not fully satisfied with bridge impacts on the city context (Figure 16).

The results of interviews and the survey users' satisfaction found that the rate of the young users who liked the experiences was much more than the order's experience evaluation. It depends on the type of users and the factor of design for pedestrians.

## 4.3. Interview Results

The results from interviews held responses to the given questions to both shop owners and workers on the one hand and mailing experts to schedule a consultation with them in the field of urban planning and design on the other. In the responses from shop owners and workers, an interviewee of a 36-year-old as a shop owner mentioned that:

"I used to spend an hour and a half in traffic every day due to heavy traffic, but now I take less than half an hour". He agrees with the concept of renting out kiosks and shops under flyovers to youth to provide them with work opportunities. However, he disagrees with using the places under flyover with similar marketing issues and affects their profits.

This previous response compared the status of activities under flyover with other activities on the shopping streets, focusing on the traditional cafes because of their loud atmosphere, and young people are used to sitting in noisy environments, despite traffic noise. The various ways to access these spaces aid in enticing users to participate in the activities. In a different way of thinking, an interviewee as a 32 years-old worker mentioned that

"It is a place I go to when I go through the city centres on my busy days. But it won't be my first option, mostly, if I go out. "


*Figure 16. Results from the survey*

In this respect, he thought that the space was not safe; a few accidents were still happening because of the high speed of traffic. Another respondent mentioned that:

(This isn't my first time here,) said another interviewee, (but space needs to be better reorganized. The area should be visible for each café; they're all related, and conflicts frequently occur between them.)

There can even be some security on the site since young people sometimes battle one another. It also requires cleaning and regular maintenance immediately adjacent to the street, making it dusty and polluted with car exhaust. The place is also boisterous. In the interview with experts in the field, one of our interviewees mentioned that

"The community in Saft El Laban opened coffee shops under the road. They are, however, continuously in danger of demolition when they are seen as unsafe and casual. There's a cleaning issue; I've seen a truck washing the green walls many times. I think that keeping them unused makes them dark, mysterious places for stunning waste so that it makes effective use of energy, but rather than commercialising might have been an exciting public space."

One of the interviewees, Egyptian architect, and urban planner, has scrutinised what he called the destruction of Egypt's urban fabric. He argues that elevated highways cut the urban fabric without regard for pedestrians, and their travel within the community creates plenty of issues. Is it more relevant for most traffic solutions to deemphasise health solutions? People who participated in the interviews revealed various strong use. They were unconcerned with granting permission for small businesses so long as they were under the supervision of the city government. They claim that there is a shortage of variety in business operations in the space under the flyover. In the same vein, another expert in urban planning and design explained the implication of public spaces under flyovers by saying:

"If experts want to improve traffic, they must follow the hierarchy in traffic roads before reaching the city centre if you want to link the areas". He adds: "Using it as intersecting lines cuts the urban fabric without regard for the residents of the neighbourhoods or pedestrians, and their travel within the community creates plenty of issues." There are several alternatives and solutions, he says. Even if the creation of uses and activities under lost spaces appeared because of the elevated highways, they do not consider the pedestrian life in the area.

To sum up, this paper figured out the importance of considering the places under flyover roads. Much attention should be paid to the context these bridges are passing by. The profound results from Abu Bakr El-Siddiq Bridge were tested as a case and confirmed our findings. In line with the PPS, the findings here prove the essential need to create suitable public spaces similar to the research purposes. The results also confirmed that Egyptian planning policies had faced challenges in solving the traffic issues concerning the whole image of cities. Besides, the results figured out a considerable number of shortages have come across since the end of research, fieldwork, and surveys. Finally, the results also proved the importance of focusing on the designers' views, the users' sense of space and their needs, and the right to act as their vital places. Based on findings from observations, questionnaires, analysis, and interviews, all of which aim to develop successful public spaces. It is founded on four foundational principles of the PPS used in this research as design values. The context and surrounding neighbourhood influence the activities that occur underneath the flyover areas. Table 1 summarises the concluded factors used to determine the design value through the tram line and the area under overpasses. This table also provides recommendations based on the current condition of the space under flyovers at each spot to transform it into an adequate public space that reflects community interests.

*Table 1. Design implications of public spaces under the flyover. Source: authors*

| Values<br>Before activities under flyovers | | Inferences | | Recommendations |
|---|---|---|---|---|
| | | After activities under the flyover | Recommendation for a current condition | |
| Functional Values | Land use | • Street for Pedestrians and Tramlines network | • Motorized for parking and retails activities | • Mixed-use development<br>• Streetscape-landscape must be appealing and practical. |
| Social Values | On-street activities | Relaxation activities | Recreational activities | Interactive activities Street furniture Input. |
| | Inclusiveness - | • Highly visited by youth age, but other periods with significant assets.<br>• Children in every time especially school hrs.<br>• High Footfall 2:00 – 4:00 pm | • Highly visited by middle-aged, but other ages with significant assets.<br>• More minor children in every time.<br>• High footfall | • Introduction of age centric infrastructure.<br>• Redistribute traffic signals neat under the flyover.<br>• Vehicle speed reduction in the entire focus streets near the flyover.<br>• Peak hours traffic management. |
| | Services for community | Not applicable | • Shops<br>• Toilets<br>• Ramps | • Infrastructure for differently abled.<br>• Variety in Vending types. |
| | Public security | Unsafe | The security comes from:<br>• Shop Front<br>• Street curb<br>• Lighting<br>• Sidewalk | • Barrier-free streetscape<br>• Integrate curbs with gutters to control water runoff.<br>• Shopfront zone.<br>• Clear Sidewalks. |
| Economic Values | Dedicated spaces | Little Encroached Footways and street spaces. | Dedicated spaces are there but not managed well. | • Providing fixed stands for street<br>• Providing public seating spaces. |
| | Storage | There were no shop kiosks, just vendors | A balance between total shops private storage and shared storage. | • Providing a designed service zone from the street. |
| | Water waste | N.A. | Private water but no Sanitation nor water disposal. | • Water & Sanitation facilities. |
| | Seating time frame | N.A. | During business hours, the shop permanently as active. | • Seating facilities for the public at any time. |

| | | | | |
|---|---|---|---|---|
| Environmental Values | Trees and planting | Greenery and plantations bet tam lines and walkway<br>Trees along the walkway | Removing trees and adding little artificial pots and tree surroundings at the entrance<br>Planting bridge structure | • Planting shrubs and grass along with the unused spaces.<br>• Along the sides barrier. |
| | Curbside green strip | No grass strips | No grass strips | •Providing to add a grass strip at the edges as a hedge for safety & privacy |
| | Rain gardens | Stripped rain gardens along with the green areas | No rain gardens | •Stripped rain gardens |
| | Management and maintenances | Lack of Maintenance | Maintenance of the green walls on the structure | • Provide maintaining the clean |
| | Permeable paving | Semi-Permeable paving | Semi-Permeable paving | • Use absorbent material & maintenance |
| Physical Values | Ramps | No ramps for disables | No ramps for disables | • Add ramps/ facilities for disables. |
| | Human scale | connections to their physical surroundings built environment. | Relation with the structure and street furniture. | • Consider human scale in the design process. |
| | shades | Natural shade pedestrianrians' walkway | structure shading along with the spaces under the flyover. | • N.A. |
| | Garbage bins | Little bins Along the sidewalk on trees | Through the street with irregular interval | • Frequenting Garbage's bins |
| | Crossing roads | Very little, only at nodes | Faded and unclear marking | • Support signals and stop controls.<br>• Refuge island in some spots for clear crossing |
| Traffic Value | Travel mode | Lack of traffic control affecting the walkability | high pedestrian footfall but without infrastructure. shot trip distance and connectivity | • Controlling system for pedestrian flow and vehicles to prevent accidents - bus stops |
| | Parking | Carriageway markings are causing a street blockage. | Parking areas under the flyover | • Designing its approach with street |
| | Cycle lanes | No dedicated cycle lane to cater cycle flow on neighbourhoods | No cycle flow and lanes | •Dedicated spaces and ramps for bicycle parking |

## 5. CONCLUSION

This research showed the impacts of bridges in the urban context of Cairo and argued for a way to turn the places under bridges into better positions. Since the lost areas below the highways are grounded global dilemma, this research has focused on the Heliopolis districts in Cairo, Egypt, as a case study. The surrounding context is segregated by constructing bridges passing through the urban fabric of Cairo. The impact of having the flyovers was recognised the segregation between city districts and neighbourhoods. However, our results from residents' and visitors' perspectives showed applicable opportunities in turning places under leftover streets into public places. The argument in the literature confirms that these places are lost spaces leftover lands of high economic value. Building upon the qualitative data, the selected cases assessed the implications of constructing bridges and the impact on the local context of Heliopolis. The results highlight the flyover's implications for everyday life, routes, and forms of transit.

Building on the research results, this research suggests creating a thriving public space in public space under flyovers is essential to turn these places from their unused areas into future potential usage. Integrated people's needs with streetscape/landscape components should be considered when creating a public space under a flyover.

Here we review some of the contributions which are related to this topic. The difficulty of investigating the effects of newly constructed flyovers has contributed to the lack of studies in this domain. This research has made substantial contributions to urban planning and design research. The lessons learned from investigating residents' and visitors' satisfaction showed the importance of turning the challenges of having flyovers passing through the city districts into opportunities. Besides, the critical contribution of this work is the solution it provides for reusing the lost spaces under flyovers.

One of the research limitations is collecting data about people's perceptions of constructing flyovers in different places in Egypt. This research highlights a future research direction of investigating the other cases in Egypt and comparing users' responses to the usage of the areas under flyovers. In future research, it is suggested based on the essential need to investigate digitally how to integrate the vision of the development scheme with surrounding neighbourhood preferences and interact with the context to add aesthetic value to the city's image.

## 6. ACKNOWLEDGEMENT

This research did not receive specific grants from funding agencies in the public, commercial, or not-for-profit sectors. The researcher of the present work wishes to thank the respondents who paid attention to helping us fill out the survey. The authors also acknowledge interviewees for accepting our invitation to run an interview with them.

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