RESTORING THE DEAD SPACES UNDERNEATH THE
ELEVATED HIGHWAYS TO THE PUBLIC REALM: A
CASE STUDY IN CAIRO, EGYPT

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Master’s thesis
Curriculum in Landscape Architecture

Supervisor
Prof: Simon Bell

Spring semester, 2020

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**Title:** Restoring the Dead Spaces Underneath the Elevated Highways to the Public Realm: A Case Study in Cairo, Egypt

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**Keywords:** Elevated highways, urban leftovers, urban voids, dead spaces, beneath highways, highway overpasses, Landscape Architecture,

**Abstract:**

Currently, more than half of the world is living in cities. Most countries are becoming increasingly urbanized; and for nearly a century, elevated highways have become vital element of urban development to cope with the rapid expansion of urban cores. Unfortunately, it has inadvertently caused severe problems in most cities. The massive infrastructures of those elevated highways have made cracks into the urban fabric, dispersed the neighborhoods by facilitating traffic yet isolating people, and created unwelcoming spaces. This research looks for answers how to rearrange priorities of the usage of the dead spaces beneath these structures, a method for understanding urban behavior while taming the negative impacts of these elevated highways to reach a common ground between the urge of urban growth and create a convenient space under such infrastructures. The research will be based on case studies and examples to develop a clear guideline to fill those urban voids and explore design principles to create an inviting environment in the least likely spaces, right beneath the elevated highways. The research has exposed the problem in a hierarchy of diverse scopes, from the international level in different locations globally. The fieldwork in Cairo is based on qualitative methods. In order to deduct citizen’s preferences, in depth interviews had been made with residents.
Acknowledgement

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<td>GOPP</td>
<td>General Organization of Physical Planning.</td>
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<td>GCR</td>
<td>Greater Cairo Region.</td>
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<td>CAPMS</td>
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<td>GARBLT</td>
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<td>NOUH</td>
<td>National Organization for Urban Harmony.</td>
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<td>AFEA</td>
<td>Armed Forces Engineering Authority.</td>
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<td>EEAA</td>
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Chapter 1: Introduction

Mainly, highways are one of the fundamental structures of mankind. It determines the growth of the cities; hence their existence inside our cities is inevitable. If the city is a building, highways would be its corridors. As a natural process, our cities are growing inorganically based on many aspects, and planning differences. Highways are an integral part of any city; they always follow urban expansion. “Elevated highways appear to have been constructed through four main areas of the city: around the perimeter of the city, along rivers, in industrial areas, and through low-income neighborhoods.” (Biesecker, 2015).

Therefore, it is crucial to urban expansion, supporting the economy, and connecting the cores of the cities. In general, Elevated highways and bridges are important to facilitate the vehicular flow inside the city in the crowded places to ease the movement between the urban and the rural areas.

1.1 Problem framing

Due to the rapid urban expansion, the viaducts and bridges are leaving vast areas of dead spaces underneath; they are part of the urban space but unintendedly disconnected and unused. The elevated highways have accidentally distorted the urban fabric of the city, disconnected communities, and divided neighborhoods deteriorating people’s lives and the connection between them. Since the essence of any city is its people being an integral part of how the city works, the elevated highways are negatively affecting it on that matter. It creates a functional space above but improperly empty and inefficient spaces underneath. “Revitalizing lost spaces is a workable way to decrease the negative effects, resulting from inefficient urban spaces and the problems associated with land shortage in large cities.” (Akbarpour & Tabibian, 2015).

“The spaces under the overpasses, bridges and any kind of urban infrastructure are regarded as perilous, negative, and overbearing. However, architects and urban designers consider that these spaces have potential to be transformed into distinguished space having visual pleasure.” (Chohan, 2014).

Referring to the possible locations of highways and in the context of the research, viaducts through low-income neighborhoods are the most harmful to the community in terms of social exclusion;
People perceive those structures as edges; they are barriers cutting through neighborhoods, causing significant segregation.

This research will discuss the questions of how we can fit public spaces beneath the elevated highways? Why is it necessary? And why now? Under the theories of public space design principles, to look for the reasons and solutions for the dispute between creating better communities and for the common good of the society, and the existing culture and characteristics of these spaces, based on international examples and precedent case studies focused on the similarities and the differences regarding time frames, place limitations, and policies considerations. Considering the nature of the place, although the negative impacts of the dead spaces beneath the elevated highways (at the field level) are almost the same, solutions cannot be the same.

1.2 Dead spaces defined

In 1986, Roger Trancik defined it in his book as ‘Lost Space’; according to him, “Lost space can be regarded as the leftover unstructured landscape at the base of high-rise towers to the unused sunken plaza away from the flow of pedestrian activity in the city. Lost spaces are also abandoned waterfronts train yards, vacated military sites, and industrial complexes” (Trancik, 1986)

Despite the term ‘Dead Spaces’ is commonly used, it means different things in different disciplines. This definition has also been explored in prior studies, by several authors, who emphasized and categorized those spaces. It was similarly described in a paper by Cravalho and Nainoa, as a ‘non-place space.’

Primarily, the term “dead spaces” implies, more specifically, the spaces beneath the highways A non-place space was referred to as “While they are still populated and frequented spaces, barely any social interaction occurs within non-places, thus rendering them dead spaces.” (Naiona & Caravalho 2015). “A problem of non-places, which produce an experience of loneliness, reducing social interactions in public spaces to a few scenarios” (Lavrinec, 2011).

Generally, dead spaces are a result of unplanned planning. Usually, it is undesired spaces without a positive impact on the community, unmeasurable urban leftovers without synchronization with people’s needs, lacking social interactions. However, they have extremely high potential as places for the public with many opportunities are hidden inside.
1.3 The causes

Elevated roads and highways are mostly a single-aim product from many aspects. The rising demand for increasing the transportation model inside our cities is blinding planners from considering and measuring other dimensions. “The planning and design of roads, like other modes of transport, tends to become the preserve of blinkered specialists infatuated with the dream of maximizing the transport mode for which they assume responsibility” (Turner, 1998). Highways are serving the automobile movement between rural and urban cities; nevertheless, they cut the dense fabric beneath, especially with the increased urbanization, highways have to cope with that expansion to reduce the traffic congestion, which in turn damaging the landscape. This research aims to restore the spaces beneath these structures (elevated highways and viaducts) again to the hands of the public realm. If highways started to be built approximately sixty years ago, so why are they such a dilemma in today’s cities? No specific answer can cover this question, the lifespan of the highways is almost approximately sixty years, which is the same age as them; they were designed not to last longer than that without significant redevelopment or major reconstruction. Many cities have encountered the problem and started to re-act. For example, San Francisco reconstructed the highways away from the dense fabric, in France and Netherlands, they transformed those spaces into boulevards and commercial spots, in New-Mexico, and it has been transformed into green spaces. In general, the solutions were different, but the purpose was a clear one ‘The public realm.’ Trancik mentioned the main causes of dead spaces as a common rule in his best-known book ‘Finding Lost Space.’ In the context of the research, only two main causes can be discussed: (1) the dependence on the automobile. (2) The gap between planners and architects.

1.3.1 The dependence on the automobile

Roads are a vital element in shaping our urban life, they are the arteries of every city, and they support the pillars of the economy. Since the industrial revolution, industries had become the main source of income for most people; hence, vehicular dependence has significantly increased to connect workers to their jobs, causing shrinking of public spaces, and directing towards mobility, communication, and most importantly, roads. Highways and roads are not just a way of getting people from one place to another, but also, they are a vital factor of transporting goods in and out of the city cores and induce the growth of the economy. “Gaining access to city centers would
mean that goods could more easily be shipped out and brought in, potentially boosting the economy.” (Biesecker, 2015). As the process of developing these highways, many open spaces have lost their cultural meaning, resulting in the isolation of societies, “Like urban renewal, the highway projects forced tons of thousands of people to relocate, creating profound traumas resulting from social disorientation” (Trancik, 1986).

Currently, most planners are concerned about limiting the automobile movement by creating sidewalks and anti-cars streets, in addition to, creating few plazas and public spaces; to impose more walkable zones for pedestrians free of vehicles. Surprisingly, that solution appeared to be a problem because it created isolated zones without efficient transportation services, especially for business. “Without automobile access the businesses on the car-less streets lost customers. Deliveries were difficult.” (Samuel, 2006). On the contrary, other policies’ priorities – especially in third world countries- are to enhance the streets network, giving the priority to the vehicles flow to induce the economic life; as a result, less environmentally-walkable, and more car-dominance cities.

That leads us to the importance of accessibility; it is fundamentally crucial for reviving a dead space. Paley Park in New York City is a great example of integrating a street with public space; the shift between the street and the park is appealing. Despite being a few meters from the noisy street, but the park works as an ergonomic escape to the public. Regardless of the repulsive image of the spaces beneath the bridges, access is an extra burden on the main problem.

### 1.3.2 The gap between Planners and Architects

Today, cities have many challenges than ever, one of the main causes is that the pace of the three-dimensional and two-dimensional development (Planning and Architecture) has highly increased; also, they suffer a rigid dichotomy. No doubt that planning has become a wider scope for planners, there are more variables and inputs to be considered in the process than ever. It continuously spreads in different directions due to the outbidding of many factors. This cause is a relevant concern for experts for several decades. As previously reported in the literature, Maki and Trancik mentioned it in their work; additionally, Wildavaky, back in the 1970s, mentioned that problem in his articles “Planning has become so large that the planner cannot encompass its dimensions. Planning has become so complex planners cannot keep up with it” (Wildavaky, 1973).
Architecture and planning have become more involved in their ambit, expanding the gap between each other. “One of the problems with planning and Architecture today is that the spaces between buildings are rarely designed” (Trancik, 1986). Since the beginning of the modern movement of Architecture in the middle of the twentieth century, Architecture has adopted functionalism and became internally involved in an approach different to Trancik’s theory of the modern movement of Architecture. Architecture is a reflex of the surroundings, and a response from the context to fit with the urban patterns and people’s behavior. The spatial process of the two disciplines is different, but the aim is one. Currently, as mentioned, Planning and Architecture appear to be indifferent routes; as a result, urban leftovers sprawled in our cities, especially viaducts, which are a significant addition to the urban formula, resulting in amenities beneath the elevated highways which are an extra burden on the city fabric.

1.4 Understanding Cairo’s urban challenges and policies

In the 1960s, Cairo suffered from saturation in its road networks, high population densities, overcharge sewage networks, all leading to the proposal of the 1970 Cairo strategic plan (Sutton & Fahmi, 2001) (Dessouky, 2016). As shown in the map (Figure 1.1), the movement of elevated highways in Cairo started on the local master plan in 1970 by constructing The 6th October Bridge, connecting both sides of the Nile, and approximately twenty kilometers long connecting the Metropolitan City. Also, a report from the General Organization of Physical Planning (GOPP) confirmed that the plan defined the ring road as the outer boundary for the urban agglomeration, and proposed new urban communities outside of the urban areas to accommodate the rapidly growing population (GOPP, 2012). The idea of planning the Outer Ring Road was to contain the urban sprawl and new bridges to connect the eastern and western parts of the city (Sutton & Fahmi, 2001) (Dessouky, 2016). According to the Central Agency for Public Mobilization and Statistics (CAPMAS), Egypt has 2267 bridges including elevated railways, pedestrian bridges, elevated highway (CAPMAS, 2015). A recent report showed that 1762 of them are vehicular bridges, and Cairo alone has 94 (CAMPS, 2019). These numbers reflect the pace of urban and road development in Egypt. Planners and policymakers know that the population problem will keep rising; accordingly, new satellite cities were proposed and connected with highways network to back up the socio-economic growth (Dessouky, 2016). Since the strategic plan of 1970, Cairo has changed drastically in all dimensions, and the following up process was slower than reality. While
the Masterplans continued to show the desired urban structure for GCR for the future, the mechanism for enforcement of controlling and stipulating the changes in the urban structure was generally insufficient (GOPP, 2012). Regarding elevated highways, stretching new bridges over the central core of GCR was the easiest tool for planners for traffic congestions and connecting neighborhoods. A recent report from the General Authority for Roads, Bridges, and Land Transport (GARBLT) showed that starting from the 1970s, on average, about 15 bridges were built each year. However, this varied widely from year to year—in two instances, more than 100 bridges were constructed in a single year, but in some years almost no bridges at all were constructed (GARBLT, 2015). As Sims mentioned in his book, Understanding Cairo: A city out of control, the complex network of elevated urban highways acted

![Master Plan of 1973](image)

*Figure 1.1. The Master plan of 1970 and was confirmed on 1973, it was formulated to follow the rapid expansion, new highways network and the outer main Ring Road were proposed for increasing the transportation mobility. (GOPP, 2012)*
as a blanket that was exclusively executed to serve car owners. Additionally, the network of urban highways was developed as a tool to allow access to the newly trendy developed satellite cities, where policymakers decided to ignore old cities and discard the surface and public transportation to invest in a network that aims to improve access to the new towns (Sims, 2012) (Dessouky, 2016). Above that, roughly 50% of all bridges in the country were constructed about 50 years ago (GARBLT, 2015).

With the continuous rising of population, the urban expansion became a must for policymakers. As shown in the map (Figure 1.2), the decentralization of GCR is still ongoing with the new satellite cities around the capital, but the mechanism of networking highways in and out is still insufficient; However, GOPP national vision for GCR has proposed the same mechanism. The strategic urban development plan proposes more 14 new highways linking the inside and outside of the Ring Road along 1000 km, in addition to three more minor ring roads added to the road network and corridors to be four ring roads (GOPP, 2012) as shown in maps (Figure 1.3, 1.4). Worth mentioning that, most of GCR roads and highways network are saturated with vehicles dominance; for example, GOPP reported that the 6th October bridge and the 15th of May bridge are carrying 1.5 of their maximum capacity, so the aim of the vision is to ameliorate the road network with elevated highways in the inner part of GCR for better connections and easy mobility, with the existing and the proposed new ring road, by adding new 170 km of new urban highways. (GOPP, 2012) (Dessouky, 2016).

![Figure 1.2. The planned decentralization of GCR (in red) to the new satellite cities. The direction of urban development is served with the Regional Ring Road. Source (GOOP, 2015)](image)
Figure 1.3. The yellow lines represent new 14 highway in the inner core of GCR by 2027 strategic vision stretching along 1000 km. (GOPP, 2012).

Figure 1.4. The red lines represent the new 3 proposed ring roads, besides the existing one, aiming for better accessibility in and out the outer cities around GCR by the year 2050. (GOPP, 2012).
Since the 1970’s master plan and the prosperity of constructing new elevated highways, many of these bridges reached or near to the end of their life spans, and their alternatives have to be considered, these highways were designed to last approximately 50-60 years, after which time they require major repairs or reconstruction. We are now in the period of time when these highways are reaching the end of their lifespan, and decisions have to be made for their future. (Biesecker, 2015).

According to Ahram Journal report, 700 bridges in Egypt exceeded their life spans, in other words they are close to collapse (El Sharnoubi, 2014). Adjacent to this fact, GARBLT in their Project Completion report stated the life spans of Egypt’s bridges as shown (in table 1.1). Approximately, 683 bridges had already reached their maximum life span, while 89 had exceeded it. Adding to that the bad condition of the pillars, the viaducts that cross the Ring Road are mostly made of concrete. Piles of garbage under these elevated viaducts often obstruct the passage of traffic. Shops and the like occupy the areas under viaducts so that bearings near abutments often cannot be inspected. (GARBLT, 2015).

<table>
<thead>
<tr>
<th>Bridge Age Group</th>
<th>Count</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 10 years old</td>
<td>5</td>
<td>2015</td>
</tr>
<tr>
<td>11 to 20</td>
<td>153</td>
<td>2005</td>
</tr>
<tr>
<td>21 to 30</td>
<td>204</td>
<td>1995</td>
</tr>
<tr>
<td>31 to 40</td>
<td>82</td>
<td>1985</td>
</tr>
<tr>
<td>41 to 50</td>
<td>272</td>
<td>1975</td>
</tr>
<tr>
<td>51 to 60</td>
<td>411</td>
<td>1965</td>
</tr>
<tr>
<td>61 to 70</td>
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<td>71 to 80</td>
<td>47</td>
<td>1945</td>
</tr>
<tr>
<td>81 to 90</td>
<td>2</td>
<td>1935</td>
</tr>
<tr>
<td>91 to 100</td>
<td>0</td>
<td>1925</td>
</tr>
<tr>
<td>101 or older</td>
<td>0</td>
<td>1915</td>
</tr>
<tr>
<td>Total</td>
<td>1216</td>
<td></td>
</tr>
</tbody>
</table>

Table 1.1. Shows the age of Egypt’s bridges, indicating the insufficient maintenance and the poor condition for many of them. Source (GARBLT, 2015)
Furthermore, due to the common dilemma of traffic congestions around GCR, policymakers are striving to construct even more viaducts to solve the problems of traffic congestions in the inner core of the capital. They are trying to decrease the road's intersections as possible by bridges and flyovers, which makes the neighborhoods divided by megastructures that shatter urban tissue.
Chapter 2: Literature Review

2.1 Introduction

Seminal contributions have discussed this topic in previous studies. The following paragraphs are the main findings of the research topic in several aspects. In this chapter, the main principles will be discussed; and some existed international examples regarding the spaces beneath the elevated highways will be analyzed. Due to the high volume of work, not all the findings will be brought up, only the more comprehensive and related to the research's main task's principles. The upcoming sources are demonstrating the stated problem.

2.2 Understanding urban spatiality and functionality

Urban spatiality and functionality are mainly about theoretical interpretations from well-known urbanists, the spatial relationship between solid and void, and how it affects the movement of the people. Additionally, it is about exposing the possible formal and informal functionality of these spaces, to make the restoration of it as effective as possible to understand the spatial urban layers in cities.

2.2.1 Roger Trancik, Finding Lost Space, 1986

Trancik in his best-known book ‘Finding Lost Space’ tackled the dilemma of urban challenges in today’s cities. He focused on the city’s cores, criticized the modern role of planning, the way it deals with spatial relations (between two and three-dimensional), and people’s uses. “The usual process of urban development treats buildings as isolated objects sited in the landscape” (Trancik, 1986, p. 1). He also mentioned that, currently, the problem of the modern movement in today’s cities is that it caused many improperly used vacant lands; hence, it left many dead spaces in the urban cores. Although the disharmony between planners and architects resulted in a lack of adequate design, dead spaces have a high potential for re-attracting people to deserted spaces. In almost every city in the world, there are many unused or misused vacant lands, and the spaces beneath the elevated highways seem to be a large section of them. Since those outdoor spaces represent great opportunities, today’s designers have to restore it. “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.” (Trancik, 1986, p. 2)

Trancik defined lost spaces in cities as unstructured patterns, “Lost space can be regarded as the leftover unstructured landscape at the base of high-rise towers to the unused sunken plaza away from the flow of pedestrian activity in the city. Lost spaces are also abandoned waterfronts train yards, vacated military sites, and industrial complexes.” (Trancik, 1986, p. 3). They are abandoned lands lack of social interaction, and repelling any sort of positive contribution to society, “They are ill-defined, without measurable boundaries, and fail to connect elements in a coherent way” (Trancik, 1986, p. 4).

He also mentioned five main causes of the stated problem; Firstly, “the increased dependence on the Auto-mobile”. Secondly, “the attitude of architects of the Modern Movement toward open space”, Thirdly, “zoning and land-use policies of the urban-renewal period that divided the city”, Fourthly, “unwillingness on the part of the contemporary institutions (public and private) to assume responsibility for the public urban environment”, Fifth and lastly, “an abandonment of industrial, military, or transportation sites in the inner core of the city.” (Trancik, 1986, p. 4).

Regarding the spaces beneath the elevated highways, Trancik's definition of lost spaces evolves from chapter to another; he reviewed three main urban elements focusing on the success of such spaces. First, the three-dimensional frame, which defines the edges of the space; for example, the flyover structure and the level of enclosure of flyover structures, and its scale to users, second, the two-dimensional pattern, which is about the textures, materials, and the composition of land patterns. Third, Hardscapes like; benches, light posts, sculptures, trees, and any object presents any sort of focal point on its own.

Turning to the three theories, he elaborated to understand the mechanism of spaces within the different cities. First, the Figure-ground theory that discusses the spatial relation between solids and voids; he supported it with few masterplans to explain how the dialogue between the buildings and land patterns could be successful, and how the poor relation can negatively affect the functionality of the outdoor space; Second, the linkage theory which is about linking between all the layers of the city, more specifically, the movement of users within the physical environment. He proposed three different formal types of the linkage theory, regarding the research scope, with only one relevant type, he stated it as ‘mega-form’, he explained, “Structures are connected to a
According to the famous Japanese Architect Maki definition, Trancik conceptualized Mega-forms or Megastructures as they tend to dominate the physical context without reference to the human scale. Hence, this definition can be assigned to flyovers structures as it is connected to a linear entity, creating a high potential space underneath it.

2.2.2 Charlotte Malterre-Barthes’ Functions Classifications, 2011.

More precisely, Charlotte Malterre-Barthes proposed five main points for a comprehensive understanding of the functions of the spaces under elevated highways in urbanized cities. This typology is helpful in the early phases of approaching these spaces because it is applicable in most of the cases.

2.2.3 Public Spaces
1. Access to pedestrians only.
2. Function is determined by surrounding businesses and people.
3. Designed and maintained by the city’s authorities.

2.2.4 Public spaces with service functions
1. Mainly used for parking although some benches and street furniture exist.
2. Used by another industry/business.

2.2.5 Transit space hub
1. Used for public transit.
2. Trains/depots/bus stops.
3. Good for shelter.

2.2.6 Transit Space Circulation
1. Public transit.
2. Vehicular

2.2.7 Inaccessible Space
1. Where only private industries and city employees/industry have access.
2.2.3 Fumihiko Maki, *Investigation in Collective Form, 1964*

In like manner, this concern goes further back to 1964. The Architect Fumihiko Maki explained the problems of ‘Megastructure’ in-depth. According to Maki, “Megastructures is a large frame in which all the functions of a city or part of a city are housed” (Maki, 1964), which goes along with the function of today’s bridges. Maki concerned about the deviation of the conventional urban image due to massing buildings and highways in cities. He believed that cities should grow in a parallel with contemporary movements, socio-economic factors, to maintain the livability of societies. He stated that we lack an adequate visual language to cope with the superhuman scale of modern highway systems and with views from airplanes.

Back to Megastructures, Maki said that designers tend to be attracted to large-scale developments, as it offers more opportunities for diverse grouped functions. However, it is only a useful tool if it used in a way that coherently connects the city’s different layers; in other words, these structures should not be singled function.

2.3 **Understanding peoples’ behaviors**

This part of the literature discusses the problem from the human perspective. Several contributions had tackled the approach of people’s behaviors in urban spaces, explaining the general mechanism of using these spaces, and how people perceive and interact with it.


The urbanist William Whyte formed a research project on how urban spaces work from the perception of people. He observed different plazas and parks, to see which successfully work for users and which not. With such behavioral observation, he discovered some factors to understand the dynamics of peoples’ interactions, and why they prefer a space more than another. People tend to be attracted to certain activities such as music acts or art installations, as the author called it ‘triangulation’ which makes the strangers likely to have a conversation. “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.” (Whyte, The Social Life of Small Urban Spaces, 1980).

Whyte focused on the circulation of people inside the urban spaces, and how the two-way directions can make a difference for small conversations or slow down the pace of their movement.
Whyte also talked about movable chairs as a flexible element in the space that can make a difference. People can adjust it as they prefer, it gives them a sort of control. Definitely, People attract people; the bulk of people who are sitting, talking or eating are a key pull-factor; for example, a food cart can create sort of a junction in the space; accordingly, leading people into intersected paths. Crowds in certain open spaces add a sense of safety and assurance to it. Moreover, Whyte tackled natural elements such as trees; besides its ability to create shaded areas, it makes a pleasant barrier and a sense of protection. Trees, as well as, wind, sun, and water, all play a vital part in the liveliness of parks and public spaces. Usually, streets surround spaces beneath the elevated highways; therefore, the street is an essential element for the success of the public space; it must end in a coherent way where the plaza or the public space ends. The connection between what Whyte came across in his project and what mentioned in the research leads us to the crux that we can follow the behavior pattern of users in public spaces; thus, apply it under the viaducts. Simply, the planned composition of some of the mentioned elements can drastically change the environment of those dead spaces. Generally, it is about the ultimate planning and application to create a great, socially tangled city.

2.3.2 Francis & Marcus, Design Guidelines for Urban Open Space

Francis and Marcus contributed in the book ‘Design Guidelines for Urban Open Space’ and successfully classified the users of plazas and public spaces into two categories. First, the ‘passers-by’; the plaza for them is just on the way to their destination, the experience through their short journey should be appealing, space should offer to seat along the walking paths and waiting areas (Francis & Marcus, 1998) (Biesecker, 2015). Second, is the Lingerers, they have been classified into two sub-categories; A) The Overt, which is their presence, including socializing and participating in whatever the kind of activities. B) The Covert socializers who usually observe and watch without actual interaction with the event or the people. Both types need an ergonomic space, and because the seating area is an attractive element of its own; so, different compositions of seating are required to fit their natural behavior. Movable chairs are efficient for the users to give them the power of choice, for each activity should be served with seating to stimulate people, especially The Overt. (Francis & Marcus, 1998) (Biesecker, 2015).

Eventually, what damages social life in cities is that buildings and urban spaces are not equally treated, usually; they are not a cohesive product. “The usual process of urban development treats
buildings as isolated objects sited in the landscape, not as part of the larger fabric of streets, squares, and viable open space.” (Trancik, 1986).
Chapter 3: From Undesirable to Desirable!

As explained above in the introduction, we discussed the spaces beneath the viaducts, defined its meaning, and pointed out the causes of their existence. To analyze the potential solutions for the stated dilemma, first, we must comprehend the nature of these residual spaces, to understand the culture of the context, and to know the differences that create such urbanism conflict. Under the main problem, that elevated structures create an edge that cuts many layers of the urban fabric, land-uses, social life, open spaces, etc. In this chapter, we will discuss the ameliorating of these spaces and to constitute the negative impacts on the community to be fully aware of the causes of their repulsive image, to overcome this problem, in the context of what we demonstrated.

In every city of the world, what is more important than the buildings and roads are the open spaces between them, they are fundamentally about people in the first place, they play a vital role in people’s behavior, affect the quality of their life. They are an inevitable part of the city’s development process. On the other hand, Public spaces vary from urban pockets to big open spaces. “Public spaces range in form from informal street corners to grand civic set pieces. At a larger scale, formal public spaces have long had an important role as the perceived centers of settlements of all types and as the focus for public life, activities and events. At a smaller scale, they might simply be somewhere to rest, hang out, or play whilst providing a visual pause in the flow of streets through urban areas” (Carmona, 2018). The literature review showed that the negative effects have been discussed by many authors, Peter Samuel suggested six main categories for the impacts of these structures 1) increasing mobility and accessibility; 2) dominant structure in the urban fabric; 3) community segregation because of physical and psychological barriers and visual intrusion; 4) undefined spaces which are often misused; 5) low natural lighting and ventilation under the elevated structure; and 6) generation of negative or lost spaces. (Samuel, 2006)

In order to transform the spaces beneath the elevated highways to the public realm; first, we need to conceptualize the purpose of successful public space, if we can assign a single purpose to make a successful public space, it is where people go and meet, where people temporarily escape from the clamor of the city. In that context, public spaces cannot be superficial, they should be complex, yet flexible enough to accommodate people regardless of their preferences. Public spaces are a physical space that is unique and attractive in an urban area. Public space also allows all people from different backgrounds regardless of their personal, social, and cultural differences to use
public space. (Ramlee, 2015). Public spaces should accommodate change and people from all sorts of background should be accessible to public spaces with the right to variety and flexibility (Kurniawati, 2011)

According to Project for Public Space, there are four headings criteria for an efficient public space: (1) Comfort and Image, (2) Access and Linkages, (3) Uses and Activities, (4) Sociability. The contribution made here has wide similarities to the ultimate vision. In comparison with the knowledge from the literature to these criteria, we can tackle the stated problem from a different approach with a simplified pattern; to demonstrate, we will apply the criteria for successful public spaces specifically to the main problem of these spaces.

3.1 Access and Linkages

In the previous section, we discussed the treatment of the unattractive views of the elevated highways; in the meantime, accessing the spaces is also a great matter. Within dense cities, there is more need for free public gathering space, and when there is not accessible space specifically designed for social gatherings, people use what space is available. (Biesecker, 2015). Elevated highways and viaducts that stretch alongside neighborhoods are mostly located in highly dense zones with high traffic flow, centrally extending along the axial ground floor of the street dominated by vehicles, not pedestrians. Certainly, it makes it difficult to access. Even more, the relationship between these spaces and the main street is mostly rigid; users are less likely to use the space if it is hard to access. In the meantime, to attract a plentiful amount of people, there has to be a clear relationship between the space and the surroundings. It was highlighted in the literature review that the linkage between the street and the public space is a crucial factor in the efficiency of it. A good plaza starts at the street corner; if it is a busy corner, it has a brisk social life of its own (Whyte, 1980). For example, in Paley Park in New York, the street is an integral part of the park, the transition between them is practically coherent (figure, 3.1). The visual connection to nature by the presence of water from the artificial waterfall and the trees grabs the attention of the passing pedestrians; it works as a nexus to an efficient public space to visit. A local food cart can boost a two-way circulation for pedestrians; for instance, in Cairo, many kiosks are now located under the bridges. Moreover, these spaces are often used as public and private transportation stops, where people can wait in a shaded area.
Figure 3.1 The entrance of Paley Park shows the relation between the street and the park, the pavement blends in a coherent way with the Park itself. Image source, (https://shuhang.bitcron.com/post/case-base/paley-park)

For a more comprehensive description, Architect Fumihiko Maki proposed three paradigms for collective form, only one has been mentioned in the literature, ‘Megastructures.’ Maki explained it as “A large frame in which all the functions of a city or part are housed,” Trancik demonstrated it even further with his Linkage theory as an open-ended linear framework, ill-defined from its physical context (Trancik, 1986). Without mentioning the dominance of the structure which creates an isolating bubble, with no connection to the human scale. (figure, 3.2)
Undoubtedly, this seems to be a common problem. For a massive structure like an elevated highway, maintaining an ergonomic space and appealing image to accommodate people, appears to be unattainable. “Some researchers claim that such structures result in negative physical and psychological health conditions, increasing the noise and air pollution, especially in residential areas” (Appatova et al., 2008) (Lak, Ramezani & Aghamolaei, 2019). There are many negative attributes of the spaces beneath elevated highways, which induces the repulsive image of these spaces.

3.2.1 Senses relief

What makes people go to spend time in a plaza or a public space is that they want some relief from the atmosphere in the city, relax their sight, and their ears. Several studies had emphasized on mitigation of the negative health impacts of these structures, especially noise, which is one of the most significant urban noises is the traffic. Noise, defined as “unwanted sound,” is perceived as an environmental stressor and nuisance. Effects of noise can be defined as all those effects on health and well-being caused by exposure to noise (Stansfeld & Matheson, 2003). “Noise
emissions from various transportation modes have become a major concern to environmental and governmental agencies in recent years for the great annoyance they cause to surrounding communities.” (Baaj, 2001). Noise differs from one country to another depending on the density of urbanization, and the culture of societies. Recently, mitigation of traffic noises has broadened, in a study by Yildiz, he proposed Noise Insulation system; Generally, by implementing vacuumed double-glass, placed on both sides of the elevated highway to mitigate the traffic noises (as shown in the figure, 3.3). As a result, the noise level has decreased by 14%-17%; and so, it reached moderate levels. Traffic noises depend on diverse factors “traffic noise is affected by such factors as traffic volume, vehicle mix, pavement type, and vehicle conditions.” (Baaj, 2001). In the context of the research, the pavement texture is crucial in the assessment, concrete tiles are highly reflective surface otherwise, vegetated pavement, it can absorb noises additionally being visually appealing.

![Diagram](https://example.com/diagram.png)

*Figure 3.3 Shows vacuumed double glass, placed on both sides of the highway for noise reduction, source: Yıldız, (2016)*

### 3.2.2 Visual coherence

As we previously explained, the most significant impact of elevated structures is the visual intrusion, especially in urban areas. Simultaneously, Highways can act as physical and psychological barriers that create undesirable views, which make the pedestrian experience unpleasant. (Trancik, 1986). This approach has been successfully brought up by Gerda R. Wekerle and Carolyn Whitzman in their book, Safe Cities: Guidelines for Planning, Design, and
People started to get used to the eyesore view of the elevated highways. Since most of our information is acquired in a visual form, these structures can be a potential solution for a positive impact assessment.

In Chicago, specifically, in Wabash Avenue, two art enthusiasts came up with an idea to change the image of the elevated railway, they proposed to place 3000 LED lights panels on the lower deck of the structure (figure 3.4), as a sort of interactive connection with the residents. The visual language has transformed the undesired views of the old railway to abnormal expression, to create a positive approach and different experience to the users; additionally, the LED lights are programmable, it changes colors and intensity; the users can literally interact with the elevated railway. It is an innovative way to connect the divided neighborhood. Thus, the more senses people use in space, the more they become integrated and spontaneous with that space.

![Figure 3.4](http://www.thewabashlights.com/what)

Other approaches discussed the problem of the negative image of the elevated highways. In San Diego’s oldest Mexican-American neighborhood, almost 60 years old Coronado Bridge is splitting the neighborhood into two zones. The artist Torres proposed to transform the bridge’s concrete surfaces to an artistic expression of the Mexican history of the neighborhood’s background.
Currently, the columns of the bridge are sharing and reflecting the cultural environment of the place. Using vibrant colors and pleasant paintings made by locals and artists (figure, 3.5), the space became livable, visually more appealing for residents to visit, and spend time in; it became also a sort of museum on its own. There are some tours led by volunteers to guide tourists in the exhibition. This section presents a review of the recent literature on how art installations or sculptures can make a difference; it makes people stop and look, helps for a small conversation, and eye-catching from long distance.

![Figure, 3.5. As shown, the vibrant murals on the pillars of the bridge. These murals are reflecting the history of the middle-class Logan Heights neighborhood, the murals made the space a historic landmark to the residents. Image source: https://medium.californiasun.co/chicano-park-san-diego-5506a203c527](image)

The desired level of comfort for a random space underneath a busy highway or bridge seems to be absurd; however, people perceive this image as separated visual elements, and certainly, the distinctiveness of the placed elements in the view will spontaneously attract peoples’ attention. More importantly, the sense of safety, cleanliness, and availability of places to sit comfortably, will attract them.
3.3 Uses and Activities

One of the major attributes of successful public space is the activities that take place within it. They are the main reason for people to come back, a distinction between a place as a set of elements and a space as a dynamic field of every-day practices (Certeau 1988). In such spaces, forming a certain use or public activities seems elusive, but exploiting these leftovers appears to be highly underestimated. By initiating and participating in urban events, which set up an alternative model of behavior and reshape routine routes and dynamics, new solidarities are being developed, some of which are temporal, and some become long-term ones. (Lavrinec, 2011).

In Toronto, Canada, the Bentway is stretching for almost two kilometers isolating seven emerging neighborhoods. Urban designer Ken Greenberg noticed the lack of public spaces in the area and came up with the vision of developing a focal point for the seventy thousand residents of the community, as he mentioned: “It was introducing something new into the gene pool of public spaces.” The area was a formal industrial zone, and recently, factories moved out leaving an urban gap behind accommodated by residential units after. The spatial of the expressway structure was optimum for the idea of the linear park (figure, 3.6) with almost five stories high and 24 meters wide. The space was appropriate to accommodate many sorts of activities; skating trails, hiking trails, live performances, and events organized by the neighborhoods’ residents.

Figure 3.6. The master plan of the designed park. As shown the Bentway acts as physical barrier inside 7 neighborhoods in Toronto. The park stretches in a linear shape underneath the Bentway connecting the 7 neighborhoods back together. Source: https://medium.com/sidewalk-talk/the-future-of-public-space-is-now-arriving-beneath-a-busy-highway-35b1379d6fa (Image credits to Public Work)
The Bentway project is a great demonstration for reconnecting the city with its people. The negative view of the expressway has changed; locals have integrated deeper with their neighborhood. Ironically, the elevated highway became a new social node for the community and changed the image of the city. (figure, 3.7).

Figure 3.7. Ice Skating trails is one of the divers uses and activities that regularly take place under Toronto’s expressway. The Bentway project is providing gathering spaces for Toronto's residents from 7 neighborhoods. Photographer: Andrew Williamson. Source: https://urbannext.net/the-bentway/

Another intervention was carried out in Zaanstad, The Netherlands. The elevated highway A8 constructed in 1970, created a dichotomy between the North and the South sides of the Town, and River Zaan. A Visual blockage was created, especially, from the River, besides a physical blockage, concerning accessibility, and it was mostly functioned as parking. The Town’s design consultant NL Architects cooperated with the City Council and the residents to think about the potential needs and interests. After this successful participation, the project efficiently integrated with the community. For commercial and recreational purposes, retail shops and supermarkets, skateboarding parks, basketball courts, and many more activities were added. (Figure, 3.8).
project did not only connect the residents from both sides of the Highway; but also, connected them with the

Figure 3.8. An axonometric model shows the different uses of the project. The park in orange is the main gathering zone with commercial area in white surrounded by the Marina and the church square. Source: https://www.publicspace.org/works/-/project/d046-a8erna
river, by designing a small harbor where they can interact with the River differently (figure, 3.9). A8 is a successful model to how to adapt with an elevated structure by emerging the people more with their town and uncover new uses for the waste spaces beneath.

Similarly, in Boston under Zakim Bridge, the non-profit organization The Charles River Conservancy came up with an idea to transform the unused space beneath the viaduct into a skate park (figure, 3.10). In many places, skateboarding is overlooked at, by cities’ budgets. They are oriented to invest more in functional and conventional purposes. The designer noticed that there is a large community of skaters without a place to practice. The solution was not implemented overnight; there was participation from the community and public hearing sessions about the potential usage of the space. Currently, skateboarding enthusiasts come from all around the city to practice because they finally have a proper space.
In Cape Town, underneath the Mill Street Bridge, almost the same intervention has been implemented; a skate park in a derelict space is now hosting many skater enthusiasts around the city to practice, which is the first space to offer such an activity (figure 3.11). Interestingly, the park is hosting non-skating individuals, the space became well-maintained and well-lit especially in night times, which provides the sense of safety that was missing; in other terms, a specific activity does not exclude the non-participants, it can work as a passive interaction to attach the residents to space and more importantly to the neighborhood.


3.4 Sociability

The presence of people is what makes space work. As Z. Bauman mentioned: “the main feature of the ‘public, but not civic’ places are the redundancy of interaction, a space without people, only coordinates, just well-oriented to be static.” Public spaces can be formally public and/or private, fully, or partly; eventually, it has to be fully oriented towards people. The programming for the site should be geared to the user groups, most likely, to use the space and encourage use by different sub-groups of the likely user population. (Biesecker, 2015).

After going through the principles of making a vital space underneath a highway, it is time to go deeper into the interaction between people and how-to stimulate a conversation. The social interaction level between people is highly diverse and unpredictable; but as a Landscape architect, it is important to understand the pattern and the optimum environment for small talk. As mentioned before, William Whyte explained it as ‘Triangulation.’ That process by which some external stimulus provides a linkage between people and prompts strangers to talk to each other as though
they were not. (Whyte, 1980). In this chapter Whyte accentuated the importance of what we discussed above (Comfort and Image, Access and Linkages, and Uses and Activities) he unified them as stimulation for potential random conversation; for example, a food cart with two persons eating at the same time, while coinciding with the moment, they become less self-involved; they are more likely to start an interaction. Accordingly, the inducement for talking can be also physical object, like sculpture; it has the exposure to be seen closely and to be even touched, same with paintings or any art installations. Currently, art in plazas and public spaces is highly appreciated. The great rush to provide art is perceived and valued by the public (Francis & Marcus, 1998).
Chapter 4: Research Strategies and methods

4.1 Introduction

After we discussed the dilemma internationally, now we can take a closer look at Egypt; specifically, the Greater Cairo Region (GCR) elevated highways. Foundationally, and by implying what we discussed about the causes of dead spaces in the first chapter, Cairo’s rapid urban expansion in the last few decades has caused many planning errors. Rapid urbanization in Cairo during the last century caused a fragmented spatial structure forming of several small cities shaping the large metropolitan area. (Gauch 2000, Khalifa and Hamhaber, 2014). Therefore, the dependence on vehicular movement has highly increased, so that stretching roads and bridges were the main tool for planners to cope with that expansion. The literature review GCR currently has 1762 vehicular bridges in Egypt (CAPMS, 2015), and Cairo alone has 94 bridges (CAPMS, 2019). In the meantime, the research work regarding the spaces beneath the elevated highways in Cairo is still going on. Thus, the topic is not well-documented in general; however, in this chapter, we will then analyze the intervention area of Masr EL-Gedida, which is located on the east side of GCR.

4.2 Masr EL-Gedida background

Masr EL-Gedida District is one of the finest neighborhoods in Cairo; it was founded by the Belgian engineer and Entrepreneur Baron Emban in 1905 to become the Eastern gate of Cairo (figure, 4.1). The neighborhood was inspired by the European urban and architectural style; The unique neighbor, Masr EL-Gedida district, lies on the Eastern side of Cairo around 8-10 kilometers far. The historian Ilbert noticed that the planned urban expansion movement by Emban was as far as possible from violating the cultivated lands to the desert. Robert Ilbert dated in his book 'Héliopolis, Le Caire 1905-1922' ‘Genèse de Ville (Masr El-Gedida, Cairo, Genesis of the City), the history of Masr EL-Gedida mentioning that Emban bought a vast land from the English occupation to construct his new green city (Ilbert, 1981). The uniqueness of Masr El-Gedida is that both western and eastern architectural and urban ideologies were adopted (Al-Howaily, 2015), as shown in (figures 4.2 & 4.3). Emban wanted a unique image for the district, so he assigned architects and planners from Belgium and the French colony to design the new city. Eventually, the Neo-Classical Baroque Islamic style has led to sustaining Cairo's image, and to add to the cultural
sustainability of the town. (Al-Howaily, 2015). And because of that, the neighborhood was targeting foreigners and upper-class residents. The concept of the initial plan could be considered as a form of social segregation between the high and low-income classes; it also could be understood as an ethnic form of isolation between the Egyptian Muslims and the foreign (non-Muslims). (Al-Howaily, 2015).

![Figure 4.1. 10 km east of Metropolitan Cairo, the highlighted Masr El-Gedida district was the one of the first movements to build satellite city away from the capital center.](image)

The district is characterized by hosting highly distinguished and key Egyptian personnel on both levels, culturally and socially (Al-Howaily, 2015). The concept of the district was to extend the historical identity of Cairo; despite that, the targeted residents were mostly foreigners; the architectural design was inspired by the Islamic architecture (Al-Howaily, 2015).

The district was flourished with green and open spaces; the maximum distance between the residential units and public parks was 300 meters. The main streets vary from 30 – 40 meters wide, with green traffic islands in the middle, smaller streets depend on their length but vary from 11.5 - 19 meters (Ain Shams University, 2016).
Figure 4.2. The picture shows the architectural style of the context, also the proportions of the streets’ widths compared to the buildings’ heights. Source, (Ain Shams University, 2016).

Figure 4.3. An aerial photo shows the iconic Basilica and the green open spaces between the buildings. Photo courtesy: Masr El-Gedida Heritage Initiative. Source, https://linesmag.com/Masr-El-Gedida-the-land-of-history-and-architecture/
4.3 Masr El-Gedida’s urban shift

As a result of the rapid increase of population, everywhere in Egypt, the district of Masr El-Gedida has come across a series of significant transformations. The heights of the buildings started to rise disproportionately with the streets’ widths, and the commercial activity started to be dominant in most of the main axis of each neighborhood of the district. Al-Howailly showed the difference in two pictures (figure, 4.4), the debacle of the identity, and the lost image of the district.

Throughout the whole century, the district was exposed to many major transformations starting from the urban fabric. As we mentioned, Masr El-Gedida is a mixed district of networking and radial grid, as shown (figure 4.5). (Ain Shams University, 2016). One of the main transformations was the urban expansion vertically and horizontally. On the vertical dimension, the issued regulations in 1905 were that the maximum height for residential buildings should not exceed five floors (Ain Shams University, 2016). However, many formal and informal buildings had exceeded the regulations due to the absence of firm and proper control. On the horizontal dimension, the informal outbidding mechanism expanded while congregating through clusters in the whole district, at the expense of green spaces, as shown in the charts (figure, 4.6). The residential use increased since 1915, while the entertainment had significantly decreased from 25% to only 7% (Entertainment in 1915 was mainly about green spaces) as a sign of environmental quality deterioration. Meanwhile, commercial use has jumped to 18%; thus, it secured more flow of vehicles to deliver goods in and out of the district. In the same token, the maps of land uses are showing the mechanism of the expansion (figures 4.7 & 4.8).
Figure 4.5. This map shows the solid and void structure of the district in the 1950’s, the urban fabric is a mixed of networking and radial grid. Source (Ain Shams University, 2016).

Figure 4.6. The left chart indicates the land uses in 1905, while the right one is from current time. The commercial increase, transportation besides the major decrease in greenspaces are the significant transformation of the District, worth to mention the increase of population as well. Source (Ain Shams University, 2016).
Figure 4.7. This map shows the land uses in the Monarchy Era (1905-1952), almost a total residential use. Source. (Ain Shams University, 2016).

Figure 4.8. This map shows the land uses in the current time, with an obvious commercial spread through the main axis. Source. (Ain Shams University, 2016).
The National Organization for Urban Harmony (NOUH) declared in 2012 that the whole district is architecturally preserved due to its special value; the declaration included several regulations regarding preserving architecture, urban fabric, and landscape. The preservation includes dealing with ameliorating, maintaining, or demolition according to the condition (Al-Howaily, 2015).

4.4 Masr El-Gedida’s new bridges

This paper begins with a review regarding the causes of lost spaces, as mentioned; the main reason is the increased dependence on the vehicular movement. In a dense city like GCR, vehicular concentration, and highways became the regular image of the city’s life. Parking lots are an integral part of every street corner, leaving a staggering percentage of urban land in major modern cities devoted to the storage and movement of automobiles. (Trancik, 1986, p. 5). The predominance of vehicles and the vast grey blanket of asphalt seems to be logical for a city (GCR) that accommodates more than 20 million residents, including Cairo which accommodates almost 9.5 million residents, approximately 46,349 per kilometer square (according to CAPMAS). Surprisingly, according to a recent report, only 2.3 million vehicles are registered in Cairo, 1.6 million of them are privately owned. (CAPMAS, 2016). Despite the major difference between residents and car owners, the urban development in Cairo is almost fully poured to the service of automobiles and traffic congestions, making less and fewer spaces for the overlooked pedestrians.

If we look at figure 4.6, we will notice the major spread of commercial use in the district, which required gaining more access to the neighborhoods. As it was successfully established in the literature review by Biesecker, “Gaining access to city centers would mean that goods could more easily be shipped out and brought in, potentially boosting the economy, besides, allow for jobs and people to move out of the city”. (Biesecker, 2015).

In August 2019, the immediate construction of five elevated highways in the district of Masr El-Gedida -as a first phase- was carried on to solve the traffic congestions; the development plan for the upcoming phases includes 5 to 7 additional bridges in the same area for the same purpose. On one hand, this development plan would primarily induce the accessibility to the district, solving major traffic congestions, besides it obtains a moderate hierarchy and a better connection to the new satellite cities like Fifth settlement and the New Administrative Capital further East. On the other hand, in such rich context like Masr El-Gedida, Five megastructures as elevated roadways are a massive burden on the urban fabric. As shown in (figure 4.9), the bridges are
extending along the main axis of the district, cutting through the neighborhoods, acting as walls causing dichotomy between communities.

As recent as January 2020, the construction of the 5 Bridges was finished as fast as possible with the implementation period that lasted for only 4 months. As discussed above, the width of the main axes varies from 30 to 40 Meters, yet, currently, it reached almost 50 meters to increase the absorptive capacity of the roads. The streets have been stretched to 5 or 6 lanes after it was only 2; so, it increased the flow of vehicles in the neighborhoods, which was an extra factor that hindered the pedestrians’ freedom. In other words, without a proper pedestrian path crossing the 50 meters wide street, there was a major difficulty in accessing different neighborhoods due to the significant reduction in walkable paths compared to before. Additionally, the green traffic island and the old tram where located in the center of the street had to be removed to construct the viaducts. According to Egypt Independent, more than 550 trees had been uprooted and replaced by concrete pillars. (Mounir, 2019), few of these trees were aged over 100 years.
## 4.5 Cause of selection

As we mentioned in the last chapter, the excavation of the foundations of the five bridges started on August 2019, the work started immediately with no pauses, the construction continued around the clock. After less than five months, vehicles were already moving back and forth on Abu Bakr el-Siddiq Bridge. There are few reasons for choosing this bridge specifically: firstly, the sudden change for such a massive structure (figure 4.10) that will help to get a genuine first impression of the bridge, simply because all the potential interviewees already have a fresh before-and-after image of the neighborhood; so feedbacks and impacts will be on the top of their thoughts; Secondly, the vulnerability of the neighborhood, as we mentioned, the whole district has an iconic image, unique history, and special architecture and urban style. This approach has not been discussed anywhere in the literature. These facts tackling the impacts on that dimension are another reason for selecting this bridge specifically.

![Figure 4.10. The images show the dominance of the bridge inside the residential fabric of the neighborhood. Source: Author.](image)

## 4.7 The vision

Masr El-Gedida community is deprived of support services for residents. The vision is to create a multi-purpose community hub, which can work as a resource center to provide the community with different services for all residents, regardless of their ages and social differences. On one hand, on the first wave of the survey people pointed at the beneficial side of the bridge regarding easing the traffic congestions of the vehicles; On the other hand, there were two main complaints: firstly, the loss of greenery and its transformation into the concrete form, secondly, the loss of the identity of the neighborhood. On account of these reasons, the foundation of the proposal is established. Eventually, the ameliorating process should be oriented towards rebranding the neighborhood, by accentuating the lost collective memory of the context; in addition to adding
vegetation vertically on the pillars of the bridge or the ground floor, to genuinely simulate how it was before in different forms; besides, providing daily / weekly / monthly activities for all ages; as well as, making public hearing sessions to listen to residents’ voice, and develop the neighborhood. For such environments with active usage, residents will proactively initiate the interaction, and the neighborhood will scale up the pace on the level of enlivening the surroundings, most importantly, making the whole community socially entangled.

4.8 Design concept

Designing a space underneath an elevated highway is challenging; the main challenge is to get people to go there. Public spaces in such noisy environments are not in people’s dictionary as they usually seek conventional places. However, as we learned from the literature and the examples; it is all about interacting with their city, people tend to use the space once they perceive it as an opportunity to explore it themselves.

The design concept is to create a neutral space for people to explore it from their preferred approach, and then reshape it with their own perception; the proposed design is to complement the neighborhood to what it has lost, the extracted greenery, and the unique identity of it. Masr El-Gedida is a multi-functional complex area on both levels, residential and commercial. Since the elevated structure is relatively new, the impacts are not fully discovered; undoubtedly, it will not be far from what we discussed previously. Accordingly, the spatial aspect of the structure is offering a wide range of high potential interventions, the columns are structurally well-imposed, and the deck of the bridge is spatially working in balance, creating repetitive rooms to accommodate different functions.

4.9 Research Objective

As we discussed in chapter 2, the literature review has successfully shown a comprehensive understanding of the history of the problem, internationally, by analyzing the theoretical data that discussed the characteristics and the nature of these spaces, besides prior examples that tackled the negative impacts of the elevated highways. So, the research aims to develop a criterion that can be adaptive to these spaces to make successful public spaces in the selected area of Masr El-Gedida. Eventually, combining these three headings as shown (figure 4.10), leads us to our objective which is how to reclaim the dead spaces underneath the elevated highways to the public realm, and make
these vacant lands can be reused adaptively as successful public spaces, especially, in Cairo which suffers from lack of plazas and public spaces, the plenty of elevated highways can be the future of public spaces.

4.10 Research Question

Asserting on the objective, the research question is about exploring a method to restore the dead spaces under the elevated highways by providing global evidences and guidelines to be tested as a case study in Masr el-Gedida, Cairo.

4.11 Research Methodology

The research objective is a combination of three; first, the literature review. In the second chapter, we brought up a large number of existing urban theories in which the broader literature has examined. The authors clarified information about the background of the problem; specifically, the urban and the spatial dimension of the dead spaces and elevated highways, and the human and perception dimension, which discussed how people use these spaces, stating some factors that can/not, attract the public. Second, the examples of prior studies and projects that successfully handled the dilemma internationally from different angles based on multi inputs; Third, the feedback from the qualitative interviews, which had been made in the selected area of Masr El-Gedida.

After analyzing the literature, and understanding the problem, from the theoretical and the practical aspect, we elaborated an approach from Project for Public Spaces (PPS) criteria (in chapter 3), which is, a) Access and Linkages, b) Comfort and Image, c) Uses and Activities, d) Sociability. The idea is directed to a qualitative method that consists of two phases, the first phase is to get an initial thought of the bridge according to peoples’ perceptions, and determine the positive and negative impacts from their point of views, set of questions (table, 4.1) had been asked to random locals samples gender, age, and general profile. This phase helped to realize how locals had perceived the structure. Since it is a recent construction; so, all the interviewees already had a general before and after idea in general.

Based on the responses of the first phase and the studied examples from chapter 3, the second phase came up with different alternatives on the shape of future activities and pictures of the space,
and how it will be (table, 6.1). The alternatives had been shown to a batch of different locals than the first phase, with the most diversity as possible. On a satisfaction scale, locals will choose the preferred choice of the potentiality of the space.

The fieldwork had been done by a friend who lives nearby the selected neighborhood; he made face-to-face on-site interviews. The participants were selected with different genders and ages as possible, likewise, between residents and workers (employees and shop owners). The questions were directly asked, and the pictures were shown on printed sheets, while the answers were voice recorded. Few of the residing participants (interviewer’s friends) received the questions and the pictures electronically and voice-recorded their answers as well. All the recorded feedback had been sent by the interviewer to be written down and analyzed.

### 4.12  First questionnaire survey

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<tbody>
<tr>
<td>1-</td>
<td>How long have you been living/working here?</td>
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<tr>
<td>2-</td>
<td>In your opinion, what have been the main changes to the neighborhood resulting from the bridge construction?</td>
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<tr>
<td>3-</td>
<td>Apart from the change to traffic, has the bridge had a personal direct impact on you?</td>
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<td></td>
<td>If yes, what kind of positive impact, if any?</td>
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<tr>
<td></td>
<td>If yes, what kind of negative impact, if any?</td>
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<tr>
<td>4-</td>
<td>What type of activities are taking place under the bridge? Negative or positive? Formal or informal?</td>
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<tr>
<td>5-</td>
<td>What services are missing from the neighborhood? Can they take place under the bridge?</td>
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*Table 4.1. The asked questions in the first round of survey*

### 4.13  Second questionnaire survey

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<table>
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<tbody>
<tr>
<td>1-</td>
<td>Do you consider that the space beneath the bridge should remain as public spaces?</td>
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<tr>
<td>2-</td>
<td>Do you think some or all the space could be privatized? If yes, why and what for?</td>
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<tr>
<td>3-</td>
<td>On a scale from 1 to 5, how are you satisfied with the bridge?</td>
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*Table 4.2. The asked questions in the second interview before seeing the proposals.*

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<tbody>
<tr>
<td>1-</td>
<td>On a scale from 1 to 5, rate Access and Linkages.</td>
</tr>
<tr>
<td>2-</td>
<td>On a scale from 1 to 5, rate Comfort and Image.</td>
</tr>
<tr>
<td>3-</td>
<td>On a scale from 1 to 5, rate Uses and Activities.</td>
</tr>
</tbody>
</table>
Table 4.3. The proposed criteria had been asked twice, before and after seeing the proposals.

<table>
<thead>
<tr>
<th>Table 4.3. The proposed criteria had been asked twice, before and after seeing the proposals.</th>
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</thead>
<tbody>
<tr>
<td><strong>1-</strong> Why did you choose this as your preferred proposal?</td>
<td></td>
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<tr>
<td><strong>2-</strong> If this design is implemented, would you use the space? How often? With whom (friends - family - alone - all)?</td>
<td></td>
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<tr>
<td><strong>3-</strong> If you visited it alone, would you participate in the activities or you just watch? (passive or active participant)</td>
<td></td>
</tr>
<tr>
<td><strong>4-</strong> Who do you think should maintain and be responsible for the space? Should residents help to maintain the space?</td>
<td></td>
</tr>
<tr>
<td><strong>5-</strong> On a scale from 1 to 5, how are you satisfied with bridge?</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.4. The asked questions in the second interview after seeing the proposals.

![Diagram showing the structure of the research work](figure 7.1)

Figure 4.11. The diagram shows the structure of the research work. Source. Author.
Chapter 5: Findings & Results

In this chapter, and from the short review above, we will discuss the reason behind selecting this bridge particularly in Cairo, and the key findings that were extracted from the two separate interviews; so, we can analyze them together. The first interview was about the first impression of the elevated highway. The second interview was about presenting the alternatives to a group of locals to deduct their level of satisfaction.

5.1 First interview of the elevated highway

The interviews had been done 3 months after the construction of the bridge; so, the significant change of the district was fresh enough to deduct the first impressions. The impressions were classified into two parts, positive and negative, based on general questions (see table 4.1).

5.1.1 Positive impressions

All the participants flattered the traffic flow; they all agreed that there is no traffic congestion as before, all the non-resident participants (who work in the district) pointed out the improvement of the transportation and the ease of going back and forth. A1 is a shop owner, he claimed that he was spending daily an hour and a half in the traffic because of the serious congestions, but currently, he takes less than half an hour.

A2 who has been working in the area for 40 years, commented positively on the traffic flow, he pointed out that the neighborhood is much quieter than before; he also said that the horns of the overcrowded vehicles, especially on rush hours, were making too much noise. A6 who is a housewife resident mentioned that now there is no more traffic congestion; she is enjoying the quietness much more than ever. A4 who is a 22 years old resident, also flattered the new level of quietness, he said: “before, at some point of the day it was unbearable noise because of the old mini-buses and micro-buses, but now no need to horn anymore.”

Surprisingly, the noise was significantly reduced. In contrast with the literature, one of the bridge’s impacts is reducing noise, or in other words, the neighborhood now is exposed to less noise than before.
5.1.2 Negative impressions

As we filtered the impressions, the participants shared their negative thoughts about the bridge as well. Regarding traffic improvement, some of the responses were indicating that the vehicles now are too fast. A2 mentioned that on the lowest points of the bridge, cars are too fast because the road has become wider and less crowded. A1 confirmed that he witnessed two different car accidents after activating the bridge; he said that “Now it is not like before, the road became appropriate for cars to speed up.” A4 also commented on the same issue; he mentioned that crossing the street has become much harder, and with no proper pedestrian paths, it is much more dangerous. A6 mentioned the difficulty of crossing the street as well.

The most common complaint was the loss of greenery. In chapter 4, it is pointed out that, trees had been uprooted to construct the bridge. As a result, all the participants mentioned that they are unsatisfied with the green-less neighborhood (figure 5.1, 5.2). Since the beginning of the construction, residents were complaining about cutting the trees. A5, A6, and A9 said: “It is a massacre to the neighborhood’s trees, how can we compensate this?” A3 mentioned that these trees were the only source of greenery in the neighborhood, but now, it is just concrete and asphalt. Armed Forces Engineering Authority (AFEA) claimed that they will restore the green lost image of the neighborhood by placing natural vegetation on the sides of the bridge as well as the pillars. All the nine participants emphasized that impact; particularly, residents A8 and A9 said that Cairo suffers a major lack of green areas. At least, it is necessary to preserve what we already have.

As an illustration, figure 6.2 shows the crucial transformation implemented in a few months. As all the participants emphasized, regardless of the structure of the bridge itself, the loss of the historical tram, trees, and the greenery on sidewalks is the most severe impact.
Figure 5.1. This aerial shot has been taken on August 2019, which shows the trees and the patches of green areas that were placed in the central island, this also the railway of the historical tram of the district. Source Google Earth.

Figure 5.2. This is a current map of the area after the construction showing the loss the tram line and most importantly, all the trees. Source, Google Earth.
The time span between the two maps (figures, 5.1 & 5.2) is less than 5 months; however, the change is drastic. Officials of the project and AFEA stated to the residents that these trees will be replanted elsewhere, and according to the Egyptian Environmental Affairs Agency (EEAA), the minister of environment Yasmin Fouad stated that at least double of the uprooted trees will be replanted; but, A8 who is a member of the neighborhood committee said: “It does not make sense to replant it elsewhere; we need them to be here in the neighborhood.” he also mentioned that there is no space to plant any trees anymore; moreover, some of these trees were more than 50 years old and this is an environmental disaster on the long run. In addition to that, this matter is a part of EEAA’s job; they should consider other aspects of the project than just the traffic.

A4 who lives next to the bridge added that these trees were a source of birds’ sounds around sunrise and sunset times, he said: “I used to open my window and enjoy bird’s sounds in the early mornings, but I rarely hear it now.” A5, A7, and A9 mentioned that the trees were providing shading areas for pedestrians, also there were benches on which some people used to rest and sometimes to eat, A7 said “The street has few restaurants, people used to buy their food and eat it on the benches, and to cover from the sun in hot times,” he also added: “This activity was a sort of outing and gathering for some people.” A9 who is a resident mentioned that replacing that number of trees with asphalt is unhealthy to the residents, she added that trees were slightly alleviating the high temperatures in the summertime; unfortunately, it is no longer the case.

The second most common complaint was the impact on the neighborhood’s identity. Almost all the participants noticed that the bridge has a great visual effect on the authenticity of the neighborhood. A3 said that the area is not the same anymore; he stated it as “barely recognized.” A2 said: “I have been working here for 40 years, but I feel like I am in a different neighborhood,” he also said that the tram was an integral part of Masr El-Gedida’s image. A8 also said that although the tram was inefficient and slow; however, it was a symbolic figure. He also pointed out that considering the history of the place; Masr El-Gedida is too vulnerable to handle that amount of bridges. A8 said that residents enjoyed the image of the old tram, despite being off service; he added: “It is part of Masr El-Gedida’s spirit.”

Mostly all the participants expressed that the neighborhood has transformed; it became visually unpleasant; the collective memory of the street has significantly shrunk. The literature did not bring up any contributions on this issue; as we discussed, the bridges have social and physical
effects, but regarding the memory of the place, it was a new and different perception that was interestingly perceived by residents and non-residents.

Some of the residents also commented on the level of safety of the space under the bridge. A1 said that at night times the space is too dark; no proper lights are installed, he also said that the quality level of the finishing of this space is less than the rest of the bridge, which makes it uncomfortable especially at night times. A6 said: “I have become worried about my daughter walking beneath the bridge when she comes home late at night,” she also mentioned that the space has to be lit, to prevent any undesired or ill-legal activities. A1 even thinks that they should provide a control point under the bridge for safety reasons; he said: “So far, nothing is going on there, but I believe that without the existence of police unit and proper lighting, this space will attract undesired activities.” A7 also mentioned the over speeding cars; so, he suggested almost the same as A1, which is to place a traffic control point to prevent cars from over speeding, he said that few accidents have already happened because of the speeding vehicles. Regarding the difficulty of crossing the street, A3 mentioned that it is necessary to make pedestrian paths, to obligate drivers to obey speed limits, he said: “I know an old man who once got a taxi to just drop him on the other side of the road.”

![Figure 5.3. Images show the current situation of Abu Bakr el-Siddiq bridge. Source: Author.](image)

Another point was brought up by two participants who live there, which is the level of privacy; A4 whose flat is looking over the bridge said that the level of the elevated road is almost as the same level as his flat; he said: “My front windows are totally exposed to vehicles, the bridge has violated the privacy of the flat; it will affect the market value of it.” A6 also commented on the same issue; she said that she does not feel comfortable anymore near the openings over the bridge; so, they are not using it as before. It seems that the lack of privacy was a concern for the residents who look directly into the bridge. Likewise, it was another point that was not part of the literature.
The questions of the first interview aimed to know how locals perceive the bridge and what their feedbacks are. Some individual feedback was pointed out by few participants; for example, A9 mentioned that the neighborhood is less walkable than before; she said: “I used to jog occasionally with my dog, but now, I cannot do it anymore.”

Eventually, the participants were asked about the potential usage of the space underneath the bridge, and the activities can be suitable there. Mostly, they suggested allowing some commercial connection; A2 said that allowing businesses here will attract people to use the space; he said that as long as the space is providing a service, people will use it. On the other hand, A8 suggested that the city should offer few plots for only small and startup businesses to provide more opportunities to unemployed citizens. He also stated that the process of choosing these businesses should be legitimate and well-controlled to avoid any informal activities. In the like manner, A3 believes that commercial purposes should be under the city’s selective surveillance to avoid undesirable or illegal activities. A6 and A4 said that any commercial activity is much better than leaving the space useless. On the other hand, A1 (a shop owner) was concerned about the potential commercial use, he agreed on the idea in general, but he said that it depends on the activity itself. He stated: “If these businesses provide the same service I provide, it will negatively affect mine.” he added, generally, the more existed people, the better for his business flow.

Finally, after all the participants gave their feedback, one last issue was brought up and indirectly mentioned, which is the public participation in the development plan. Only A8 has mentioned, as a member of the district committee, that he is not satisfied with not involving the residents in the project. He said, certainly, the bridges will help to facilitate the traffic in the district. However, residents should be taken into consideration, especially with the massive scale of the development. This issue was deduced from all the participants. Many of them said that they knew about the project only from the banners placed in the construction sites, which confirms the absence of public participation.

**5.2 Second interview**

After collecting the segments of the first phase of the qualitative process and putting our hands on the key points of the interviews, moving to the second interview, the idea is to integrate what we tackled in the findings with the literature and the international examples. As a beginning, proposing
a set of different alternatives deducted from a new batch of participants to get the potential uses of
the space based on a satisfaction scale from 1 to 5 (see table 6.1.) Also, asking a small
questionnaire before and after the proposed alternatives to scale the impact of the design solutions.
The responses of the second interview are classified into two parts, before and after the design
intervention.

5.2.1 Before seeing the proposals

The second sample of participants was firstly asked to scale their overall satisfaction of the bridge,
and the possible uses for the space (see tables 4.2, 4.3), the 12 participants acknowledged that the
bridge has significantly facilitated the traffic; however, the average of their satisfaction level was
3.16/5. Mostly all the participants justified their score by mentioning the same common complaints
from the first interview. B2, a 27 years old resident gave it 1.5/5, she justified that a tunnel would
be much more efficient, and wouldn’t result in such undesirable major impacts caused by the
bridge.

Since the recreational use of the spaces underneath the bridges is generally odd to exist in Egypt,
few questions were asked to check the initial impressions of the intervention. These questions aim
to measure the participants’ feedback about the idea of developing the space underneath Abu Bakr
el-Siddiq Bridge; they are concentrating on the potential uses of the space.

The most highlighted concern of all the participants was not to privatize all the space and keep it
to the public. Mostly, all of them did not mind the possibility of allowing small businesses; yet,
controlled by the City. B5, who is a 38 years old resident, suggested dividing the area to plots
allowed to be rented as usufruct from the city’s government. He also added that these businesses
have to be small because there is already enough commercial activity in the neighborhood. On the
other hand, few believe that it should be partly privatized. B4 preferred the privatization as she
believes that the quality of the private service is much better than the public one.

In the third chapter, we discussed the proposed criteria from PPS. As mentioned before, it was
based on 4 Main headings: (1) Access and Linkages, (2) Comfort and Image, (3) Uses and
Activities, (4) Sociability. Similarly, participants were asked twice, before and after seeing the
proposals, to rate each point on a scale from 1 to 5, to measure the difference, and to put the theory
to test. As shown (figure 5.4), participants gave the lowest rate to the sociability factor (0.42/5) as
they believed that the space is not attractive for any social interaction. The highest given score is the uses and activities (2.37/5), most of them claimed that the U-turns under the bridge are often used for informal microbuses stop, B9 said that he uses it for his transportation routine.

![Chart showing average scores](image)

**Figure 5.4.** Based on the ranked questionnaire (1 to 5, as 5 is the highest), this Chart shows the results of the average score given by the 12 participants. Source, Author

Comfort and Image score was relatively low (0.91/5). Basically, they mentioned again that the bridge had negatively affected the whole image of the district, B6 said: “the structure is too dominate which makes it hard to feel comfortable beneath it,” few mentioned that they are not satisfied with the design of the columns. B8 stated: “the design of the columns looks odd and does not go along with the style of the neighborhood.”

Lastly, Access and linkages had the second-lowest score (0.53/5). The participants repeated one of the complaints of the first survey which is the difficulty of crossing the street due to the over speeding cars; almost all of them highlighted the danger of the space because of the speed.
5.2.2 After seeing the proposals

The proposals were presented in the form of images, as we discussed in the third chapter, then participants were giving their feedback on each idea; additionally, few activities were inspired by the previous examples and impressions of the first interview (see table 6.1.). The Majority of the participants complained about the lack of lighting under the bridge; accordingly, two options were proposed as shown (figure, 5.4); option A, the Underpass Art Park project in Washington D.C; it is polycarbonate rods suspended from the elevated railway which is called “Rain”. Option B is in Wabash Avenue, Chicago. It is 3000 colored LED light panels placed on the elevated highway. Option B scored 4.32/5, while option A was 3.88/5; some justified that the polycarbonate rods from option A might not be suitable for the bridge is not very high.

The next options were concerning sports usage; surprisingly, most of the participants preferred a well-equipped outdoor gym over a football court. B6 and B11 mentioned that they are concerned about the potential noise of the football court since it is a residential area, while some claimed that there are already football courts nearby, and there is no necessity for more. For that reason, option A (football court), scored at 1.27/5 while option B (outdoor gym) scored 3.92.

Turning to the seating in the space; according to the literature, movable chairs were recommended from some studies. However, when participants were offered the choice between movable and fixed seats, they preferred fixed seats with score 4.37/5, while they gave the movable chairs 2.34/5. Mostly, they said that it could be stolen or easily broken.

As the pillars of the bridges were a common design tool in the examples, two options were proposed for the treatment. Option A was a painting that stimulates the history of the district, and option B was vegetation cover. All of the participants commented positively on option B rating 4.75/5, in the same way, option A scored 3.5/5. Also, most of them showed interest in option A; they said that this could be a separate activity that takes place there.

Turning to the mentioned point of privatization of the space, Option A was establishing startup businesses by youth like drink and food vendors. All the participants were satisfied and rated it at 5/5, and all the residents said that these projects already exist, mostly, in parking lots of the neighborhood; allowing them to sell there would be a successful move. Additionally, many of
them said that people will use the space if it offered food. Option B, bigger and more diverse private investments, was refused; they rated it 0.74/5.

One of the potential activities given in the questionnaire was assembling public sessions discussing the main problems of the neighborhood, as it was a common complaint. Surprisingly, participants rated it 2.31/5, and mostly mentioned that it is not a suitable place for such activity. In the meantime, they welcomed the idea of organizing art sessions, including painting, photography, and sculpting rating it 4.62/5.

Lastly, kids playing areas were not welcomed, most were concerned about the over speeding cars, because it is not safe for the kids, rating it 2.25/5.

Turning to the criteria questionnaire, Again, the questionnaire (see table 4.3) were asked to the new participants to measure the difference, figure 5.5 shows the results of the questionnaire compared to the previous one (before and after seeing the proposals).

![Figure 5.5](image)

*Figure 5.5. Comparison between the answers of the same individuals before and after seeing the proposals that were inspired by the international examples and the previous survey, as shown the significant increase of the rates of the mentioned criteria. Source, Author.*

Furthermore, few questions were asked to test the potential interaction of the participants in case of implementing the selected design elements (see table 4.4). First, they were asked about the level
of their interaction with the selected activities. Most confirmed that they will visit the space regularly after the proposed implications, they mentioned that they would visit it once or twice a week and they would participate in the activities that would take place. Additionally, the majority prefer to visit it with their friends and families over being alone. Moreover, the participants believed that maintaining the space should not be limited to the City; residents also should participate in that matter. Eventually, they rated the bridge generally (in case of implementing the project) at 4.33/5.
Chapter 6: Discussion

To conclude, the residents perceived Abu Bakr el-Siddiq Bridge as a successful project to facilitate the traffic congestions in the neighborhood; however, the surveys showed that they are not fully satisfied with its impacts. Some of the residents showed passive criticism about it; they accepted the new distorted image of the neighborhood, justifying that constructing the bridge is the only way to solve the severe congestions problems. While others showed the total opposite, they refused to waive the special character of the neighborhood in return for better traffic flow. Interestingly, there was a significant age difference between the two groups; the first group’s average age was 59.5 years old (7 participants), while the second group’s average age was 30.1 years old (6 participants). Some of the younger group suggested a tunnel instead, mentioning that the impacts would be much less. Others are concerned about the disappearance of greens. Generally, they believe that this is not the optimum solution, while the older group believes that this inevitable solution. The age difference was noticed when participants rated the bridge overall. The average rate was 3.16/5, more specifically, the same group whose average age is 59.5 years old averagely-rated the bridge 3.71/5, while the same younger group rating was 2.5/5, which means that elderly residents are more satisfied with the bridge than younger residents. On the other hand, the findings from the second survey (after seeing the proposals) were similar, no age difference was noticed, and the participants' ratings were almost similar. In the case of implementing the proposed project, their average final rate was significantly higher 4.33/5 compared to 3.16/5 before (figure, 5.5).

![Figure 6.1. Comparison between the average rates of the general satisfaction on the bridge before and after implementing the selected proposals. Source, Author.](image-url)
As we found and as shown in figure (5.6), the most controversial impact is the loss of the trees, all 
the participants form both interviews had expressed their discontent from it. The residents 
complained about cutting and uprooting the trees at the early stages of the construction; however, 
the authorities did not give a sufficient alternative. Many residents and community associations 
demanded to stop the construction, but it was already too late (Bakry, 2019). Afterward, the 
responsible authority of the project AFEA had announced that these trees had been removed in a 
way that will allow them to be replanted elsewhere, which is not a solution for the damaged 
neighborhood. Additionally, after the rising discontent of most residents, the minister of EEAA 
has announced that the district will be flourished with green covers and trees (Bakry, 2019), but 
the streets and bridges are too dominant to accommodate any of her claims.

With such a major development of replacing the greenery in a historical district like Masr EL-
Gedida with 5 Bridges (as a first phase), there was no mention of interference to form the EEAA, 
which means that this major development has not come across an efficient environmental impact 
assessment process. Turning to individual feedback about the impact on weather, removing 550 
trees from Abu Bakr el-Siddiq Street, and replacing it with asphalt will slightly increase the 
temperature; this impact is a reasonable result of the absence of any environmental pre-assessment 
plan.

Figure 6.2. The lower images show the green cover in the neighborhood before the construction of the bridge while the upper images show the significant degradation of green areas after the construction. Source: rassd.com
Due to its history and urban value, Masr el-Gedida is registered in NOUH as a heritage district; however, the organization was not involved in the project. As a result, most of the participants expressed that the neighborhood has visually changed because of these structures. Consequently, the collective memory had been damaged; as mentioned, the district is more than 100 years old; unfortunately, these structures have hidden a major part of its history and distorted its special image. Unexpectedly, as far as we know, no previous research has investigated this impact, in particular, the prior researches had not covered the impacts of elevated highways on the collective memory of neighborhoods, but, it was a common concern in this case.

Regarding the literature review, it was common that noise is one of the main impacts of elevated highways. Unexpectedly, it was the total opposite in our case; some participants mentioned that currently, the street is quieter than before, previously, the congestions of vehicles were causing much noise, especially in rush hours, and since the bridge facilitated the traffic, the noise was significantly reduced. In fact, the interviewer mentioned that certainly, the moving cars over the bridge are creating noise; however, it seems that the noise currently is much less than before.

The level of safety was a concern for some residents. As shown previously, safety is one of the crucial factors that determine the attraction of space. The safer space is, the more likely to be visited. Undesired spaces attract undesired people (Whyte, 1980), which is a common problem, particularly in such spaces as we saw in several examples; yet, the solution was as common as the problem, which is proper lighting. Some participants stressed on lighting the space; lighting will give passers better sight on the space, and much fewer chances for undesired activities.

Another impact tackled for the first time is the privacy violation. It was not mentioned in the literature; yet, the only two participants that complained about it are living almost on the same level of the bridge, which means that all the residents surrounding the bridge on the same level are most likely to have the same complaint.

Regarding the potential activities for the space, most of the participants suggested commercial use, which is similar to most of the examples and the literature; however, they asserted to keep it to the minimum, only small businesses due to the existing dominance of commercial use.

Many of the participants indirectly mentioned that the constructions started all of a sudden; no one had prior knowledge about it, which is the usual situation in Egypt anyway. Almost all the
developments in Egypt do not include the public in the process, as we found out that even the community associations did not take part in the mentioned project. That mainly explains the lack of public spaces and parks all over the country. Recently, the regime is executing a great amount of national infrastructural projects for the common good, which is reasonable for a developing country; however, none of these projects include the public. That dysfunctional process is deprived of the most important element, public participation.

Turning to the proposals’ questionnaire, in the table (6.1), these are the pictures that had been shown to the participants. The selected interventions are inspired by worldwide examples. The selected ideas and activities depend on the first interview and the general relevance of each activity to the citizens. Each option in the table was rated individually, and all the ratings were averagely calculated. Regarding the lighting, participants preferred option A over B with rate 4.32 to 3.88; respectively, they were concerned about the length of the polycarbonate rods because the underside of Abu Bakr el-Siddiq Bridge is not high enough (roughly 10 M).

Despite the popularity of Football in Egypt, they mostly expressed their concern about the possible noise of the field users considering it is a residential neighborhood. Meanwhile, they agreed on the idea of the outdoor public gymnastics; they rated it at 3.92/5. In the literature, we came across the movable chairs as more preferred elements over fixed; however, they rated the fixed benches 4.23, while they were concerned about that the movable chairs might be stolen or vandalized. Expectedly, regarding the treatment of the columns, all the participants recommended the vegetation cover, while the most suggested that the drawings could be done separately on occasional events. Eventually, they liked the possibility of musical and artistic events, especially if the art reflects the history of the district. Unexpectedly, they rated the public sessions for the neighborhood’s problems at 2.31/5; they did not believe that it is the right place for such activity.
<table>
<thead>
<tr>
<th>Intervention</th>
<th>Option A</th>
<th>Score/5</th>
<th>Option B</th>
<th>Score/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sport activities</td>
<td>Football field under beneath the Westway in London. Photographer: Gisela Erlacher</td>
<td>1.27</td>
<td>An outdoor gymnastics in Shanghai. Photographer: Gisela Erlacher</td>
<td>3.92</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Type of public events</td>
<td>Public sessions for residents to discuss the neighborhood problems (under the Bentway, Canada). Source: <a href="https://www.thebentway.ca/event/sunday-social-july-14/">https://www.thebentway.ca/event/sunday-social-july-14/</a></td>
<td>2.31</td>
<td>Art activities reflects the history of the district like drawing, sculpting, photography, etc. Source: San Diego, USA. <a href="https://medium.californiasun.co/chicano-park-san-diego-5506a203c527">https://medium.californiasun.co/chicano-park-san-diego-5506a203c527</a></td>
<td>4.62</td>
</tr>
</tbody>
</table>

Table 6.1. The table shows the inspired selected interventions form examples worldwide. The selected ideas and activities are based on the first interview and the relevance of each activity to the citizens in general. Each option in the table has been rated individually, and all the ratings had been averagely calculated. Source: Author.
As shown in figure 6.3, the comparison of each element of the proposals, the comparison is in an average score form the participants.

Figure 6.3. The comparison between final scores of each element, while options A and B are referred form table 6.1. Source: Author.
Chapter 7: Conclusions & Recommendations

In summary, this research put our hands on the impacts of elevated highways and argued for the way to transform the spaces beneath it into better ones. As explained, this research proposed criteria for creating a successful public space on these spaces, to transform it from its poor conditions into future potential use. “These spaces become a burden upon the urban landscape because they occupy real estate and can be costly and time-consuming to get rid of.” (Naiona & Caravalho 2015).

Considering that dead spaces underneath the elevated highways are a globally common dilemma, the framework of the research has been directed to the case study in Cairo, Egypt. In the literature chapter, we understood Cairo’s urban challenges and regulations, also provided the current vision of the road network development in Egypt to give an overall image of the stated problem and its multiple activities. Abu Bakr el-Siddiq Bridge in Masr El-Gedida was selected as a case to test the process. The aim of the Project for Public Spaces (PPS) is similar to the research purpose proposed to create successful public spaces. It lies on four main pillars: (1) Access and Linkages, (2) Comfort and Image, (3) Uses and Activities, (4) Sociability. To test the efficiency of the method, the collected data have been analyzed, and the theory has been tested on the selected bridge. (See figure, 4.10).

As mentioned, Cairo alone has more than 94 vehicular bridges (CAMPS, 2019), which cover vast areas underneath it, mostly misused. Currently, Egypt is urbanely expanding faster than ever, and because of the rapid pace of developing, the process does not acquire enough scrutiny. The 5 Recent Bridges in Masr El-Gedida cover approximately more than 60,000 M2, and according to the AFEA, additional 7 Bridges will be constructed. It means that more than double of this area will be dead spaces; this vast area will be cut out from the urban fabric and overlaid with such megastructures. As we saw from the surveys, this will lead to more severe impacts on the district and residents. “Decision-makers prefer to build new bridges to be added to the list of their accomplishments instead of maintaining the current ones.” (Dessouky, 2016). It seems to be that policymakers care about the quantity of the projects more than the quality.
“The development of this kind infrastructure would primarily increase the accessibility and mobility of urban dwellers but at the same time become barriers that separate district or neighborhood.” (Saouma, 2008).

This landscape has been bifurcated by these elevated highways, creating purely functional spaces above and largely ignored spaces below. They have driven industries and jobs away from the urban center and have isolated neighborhoods and divided communities. (Biesecker, 2015)

“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” (Roushan, 2013).

In figure 7.1, the final proposed design for the space underneath Abu Bakr el-Siddiq bridge. Based on the participants’ preferences, the interpretation is to provide the residents a possible alternative to re-raise the value of their neighborhood.

Figure 7.1. The final design intervention based on the participants contribution and the discussions. Source: Author
7.1 Recommendations

Undoubtedly, it appears that Egypt is outdated in terms of planning; after reaching the end in the long process of researching, carrying out the fieldwork and surveys, a significant amount of shortages came across. Firstly, regarding the policymakers, there are crucial gaps in the planning process in Cairo, the public should be engaged since they are the first line of beneficiaries. Secondly, it was clear that the project did not go through environmental impact assessment, as it appears that pre-environmental assessment analysis in Egypt is usually overlooked.

7.2 Future research

In a qualitative method, the research tried to cover the impacts of the bridge; however, quantitative research in larger samples should be done. Moreover, environmental analysis should be implemented on bridges; a significant amount of discussions with the participants stressed on that issue. Also, one of the participants mentioned that the value of his property has decreased because the bridge violated its privacy. Accordingly, socio-economic research should cover this matter.

7.3 Limitations

There are few obstacles to the completion of the empirical work. First, due to the international situation of COVID-19, there were not many pedestrians to interview; they were not even welcoming the idea of being interviewed. Additionally, the authorities applied curfew situation across the country, coinciding with the time of the empirical work, which made it harder to cover a bigger batch of locals. Second, part of the interviewees is supposed to be policymakers, stakeholders, and urban activists; yet unfortunately, that was not applicable in time because of time limitation and being abroad. Eventually, since the construction of the selected bridge has ended on January 2020, there were no reliable materials or studies found about it.
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### Appendix 1: First round, Interviewees’ profiles:

<table>
<thead>
<tr>
<th>Code</th>
<th>Gender</th>
<th>Age</th>
<th>Activity</th>
<th>Period of presence in the area</th>
<th>Date</th>
</tr>
</thead>
<tbody>
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<td>A1</td>
<td>Male</td>
<td>29</td>
<td>Shop owner</td>
<td>7 years</td>
<td>30/03/2020</td>
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<tr>
<td>A2</td>
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<td>64</td>
<td>Working</td>
<td>40 years</td>
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<td>A3</td>
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<td>Resident</td>
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<tr>
<td>A4</td>
<td>Male</td>
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<td>Resident</td>
<td>16 years</td>
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<td>Resident</td>
<td>4 years</td>
<td>30/03/2020</td>
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<td>A6</td>
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<td>Resident</td>
<td>25 years</td>
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### Appendix 2: Second round, Interviewees’ profiles:

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<th>Activity</th>
<th>Period of presence in the area</th>
<th>Date</th>
</tr>
</thead>
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<td>Resident</td>
<td>20 years</td>
<td>09/05/2020</td>
</tr>
<tr>
<td>B2</td>
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<td>Resident</td>
<td>Born in the neighborhood</td>
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</tr>
<tr>
<td>B3</td>
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<tr>
<td>B4</td>
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<tr>
<td>B5</td>
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<td>38</td>
<td>Resident</td>
<td>15 years</td>
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</tr>
<tr>
<td>B6</td>
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<td>59</td>
<td>Resident</td>
<td>23 years</td>
<td>09/05/2020</td>
</tr>
<tr>
<td>B7</td>
<td>Male</td>
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<td>Resident</td>
<td>32 years</td>
<td>09/05/2020</td>
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<tr>
<td>B8</td>
<td>Male</td>
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<td>Shop owner</td>
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<tr>
<td>B9</td>
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<td>60</td>
<td>Resident</td>
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<td>B10</td>
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<tr>
<td>B11</td>
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<td>Male</td>
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<td>Working</td>
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</table>
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