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## Strengthening Alexandria Urban Fabric by planning urbanism's walkable area

## Wzbogacanie tkanki miejskiej Aleksandrii poprzez planowanie terenów rekreacyjnych

**Słowa kluczowe:** Aleksandria, rozwój urbanistyczny, projekty, przestrzeń otwarta, parki

**Key words:** Alexandria, urban development, projects, open space, parks

### INTRODUCTION

Alexandria is the chief port of Egypt and is located in the north and occupies a T-shaped peninsula and strip of land separating the Mediterranean from Lake Maryout (fig. 1)<sup>1</sup>. The city was founded in 331 BC by Alexander the Great and was the capital of Egypt for over 1000 years.

Alexandria witnessed a continuous urban growth from the beginning of the Mohammed Ali era (1805) up to the present time. In 1905, Alexandria's 370 thousand inhabitants lived in an area of about 4 km<sup>2</sup> between the two harbors. Since that time the city has expanded rapidly, eastwards and westwards, beyond its medieval walls. It presently occupies an area of about



Fig. 1. Area of Study

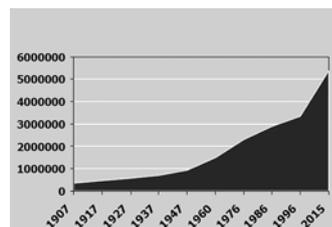


Fig. 2. Population growth in Alexandria 1907–2015

300 km<sup>2</sup> and has a ten-fold increase in population at 4 million, with a density exceeding 1,200 per km<sup>2</sup><sup>2</sup>. Population is projected to become 5.4 million by 2015

(fig. 2). Because of this, Alexandria is the second largest urban governorate in Egypt. At an international level, the city was ranked 62 in 1996 and it is predicted to become rank 54 by 2015<sup>3</sup>. This enormous urban growth requires precise detection with good management, prediction and planning to solve circulation and traffic problems especially in the city center.

### CHANGING ALEXANDRIA URBAN FABRIC

The rapid growth of towns and cities in the nineteenth century led to calls for parks to be provided for the health of factory workers and consequently it benefited society as well. This could be seen as an early precedent to highlight the role of open spaces in supporting what we now call sustainable development. This achieved a wide range of benefits to the economy (healthier, happier, and therefore more productive workers), social life (people relaxing and meeting in the parks) and the environment (as open spaces were created amongst streets, mines and factories)<sup>4</sup>.

One of the main urban problems in Alexandria is lack of Structured Public Squares. The primary public squares do not offer enough enclosure. Not only are

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the surrounding buildings too large (in plan), they are all separated by streets. Another problem with the public spaces is their large provision for traffic and parking.

Public open spaces can take the responsibility as key design elements for enhancing urban life quality and to reduce the negative effects of urbanization. For that sake, open spaces must meet the expectations of potential users and offer the suitable mix of environmental, economic, social, and even political conditions<sup>5</sup>.

Strategies for sustainable growth in Alexandria can be summarized in strengthening of the central parts of Alexandria, a particular focus on a strategic node such as Sidi Gaber terminal and the connection of city areas which until now have been separated and the creation of a vibrant urban environment.

Designing public spaces for pedestrians, is a challenging task for urban planners as it deals with the built environment which includes buildings, streets, plazas, trees and platforms, and also extends to people activities that play the important role in urban design as mentioned by previous researchers<sup>6</sup>.

Good urban design is not only the design of aesthetically acceptable places, but actually it depends on making places usable for people.

Redesign of urban places can always be the catalyst for change in cities. Alexandria city must increase the quantity and quality of well-planned beautiful public spaces that are human in scale, sustainable, healthy, safe, and lively. City streets, parks, and squares are important sites for social, economic, and political activity.

## THE CASE STUDY AREA (SIDI GABER TRAIN STATION)

### History of the station

The interior section of the Eastern District in Alexandria; Egypt, contains the Sidi Gaber railway station, the main rail entry point to Alexandria for most travelers. The station is one of the oldest in Egypt, having served the eastern regions of the city even before their transformation into major urban districts (they had previously been summering resorts for foreigners and wealthy and middle-class residents).

The station Sidi Gaber is also one of the oldest Egyptian stations, is the first railway line outside Europe, and the second in the world, started to create between the cities of Alexandria and Cairo in 1851, following the start-up the rail line linking the cities of Manchester and Liverpool in Britain in 1830<sup>7</sup>.

The Khedive Abbas the first in 1851 had contracted with British Robert Stephenson, son of George Stephenson inventor of the ferrous tractor, and paid \$ 56 thousand pounds sterling for the establishment of a railway linking the Egyptian capital and Alexandria length of 209 km.

First locomotive on the line between Alexandria and the city of Kafr El Zayat in the Delta region was in 1854. The train cars was crossing the Nile water in



Fig. 3. the old and new facades of Sidi Gaber station

different cities by ferries prior to the establishment of iron bridges on the waterway.

The Sidi Gaber station witnessed many events such as in twenties of the last century reception Saad Zaghloul Pasha after his return from exile, as celebrated by Alexandrian people with Sayed Darwish song famous specially composed for the occasion “safety safety. We went and return safety”. Also the train offered by France in 1862 to Khedive Said, which was a locomotive containing a luxury salon, which remained used by the rulers of Egypt to move between El-Montaza and Ras El-Teen in Alexandria until 1898.

The famous train station building has a special architectural style and unique Dutch character building that was constructed instead of the traditional old wooden one, in 1948 and was built with yellow brick. The station is distinguished with a clock tower, and major map in front of it a showing the main streets of the city of Alexandria and the most important tourist attractions [8].

### New development project at the station

As of 2011, the station is undergoing expansion, with the intent to turn old parts of the station into a railway museum, and include space for commerce in the newer parts.

Development project has been implemented to use the top of the station to provide large halls for passengers either for commercial or recreational services. The cost of the project was estimated by 225 million Egyptian pounds. The station serves nearly 4 million passengers annually and now will provide more than 7,000 square meters of commercial spaces and cafeterias as well as places for 850 cars parking.



Fig. 4. Perspective of the new project as shown in advertising [7]

The two-storey mall over the station equipped with escalators, elevators, central air conditioning and alarm systems and fire-fighting up to date system, is considered an integrated service for station’s clients.

The ground floor will serve as train station with highly equipped ticketing tools and services.

## New development project design philosophy

The philosophy of the new design was based on the new design elements added to the internal train station with services and new activities to entertain passengers in the waiting times next to the events of economic boom. The building of the station is a sensitive quality in public building and brings a symbol of expression on the public spaces more than just a service relying on community service. This station is the welcoming gate of Alexandria for all passengers.

The philosophy of the project design idea begins with the influence first given in the design of the building and with the emphasize of the internal strength and depth with new technologies used either in materials finishing or in the construction methods to create a dominant building and a place to remember while arriving or leaving the city.

The design concept was inspired from Egyptian symbol of the Sun God as he was stripped of its wings and took and put them to send a date centric lighting resembling the new building embracing the old one. Industrial lighting next to natural adopted from sky light reflecting images from the juxtaposed buildings. Use of transparency and the blue color of the glass indicate the color of the Nile and life to the Egyptians. Despite the dominance of the design idea but the spirit of the age has been confirmed with the most recent technological manner (High tech) and through materials and transparent glass wall, where all are full of cylindrical columns of concrete coating aluminum metal ore, fig. 5<sup>8</sup>.



Fig. 5. The new development project of sidi gaber station photos showing the use of modern finishing materials

The designer tried to link between the old building with its unique character and modern style in architecture.

But the difference between the two buildings was clear and obvious even in the functions performance and quality of materials.

From another point of view, the new design had to encompass the old building and to cope with it in harmony, which was never accomplished in reality, fig. 6.



Fig. 6. The new facade with new finishing materials over the old train station building causing aesthetic pollution

## PROBLEM DEFINITION

With the new design of Sidi Gaber station project, the need for pedestrian walkable area becomes a must.

Pedestrians usually cross the street from extremely critical access that is in conflict with vehicles traffic. In order to eliminate such behavior, the local authority constructed a pedestrian bridge and escalators that in reality are not used by pedestrians according to previous studies, fig. 7 [7].



Fig. 7. the pedestrian bridge that in reality is not used by people

The new design of the station either accepted by people or rejected is a reality that must be dealt with as soon as we can. The change of the train station and the new designed building have caused change in population densities to increase and require spatial development as soon as possible. Pedestrian flow coming to the station besides the flow of the people visiting the mall will create Chaos.

It is important that urban design achieves continuity of the urban fabric and streets to facilitate flows. Wherever movement occurs, there is vitality and flow creating the need of street surveillance. From the field observations on the selected space there are a number of pedestrian that have been noticed as pedestrian movement destinations. Within these paths, pedestrians need to cross "Al – Horreya Avenue" in order to arrive to their targets [7].



Fig. 8. Pedestrians crossing Horreya street to arrive at Sidi Gaber with higher flow

There are interference between private and public activities either inside or outside the train station, giving the feeling of confusion to the users of the train station. The organization of this area will allow people to find their way clearly. There also a need to minimize the impact of the new invasive mall building in the surrounding public space. There must be a system to manipulate the flow of people either entering the station or visiting the mall.

In urban spaces, people must be the decision makers, and they are free to choose their next steps. Where spaces are supposed to be designed to meet pedestrians' needs and support their activities. Most of our urban spaces are not giving pedestrian movements the enough priority and that cause a mis-use problem.

Norman Foster design in Santa Giulia provides a very safe pedestrian condition, thanks to the addition of clear walking paths and the public surveillance from the presence of stores<sup>9</sup>.

### SUGGESTED PROPOSED PROJECT

Open spaces in neighborhoods are defined as "any unbuilt land within the boundary or designated envelope of a neighborhood which provides or has the potential to provide environmental social and/or economic benefits to communities, whether direct or indirect"<sup>10</sup>.

The proposed project composed of either greenspaces represented in vegetated land or water elements



Fig. 9. Different circulation flow of people going to and from station with an obvious disorder



Fig. 10. The proposed plaza in front of the train station to solve the problems resulted from the new development project of Sidi Gaber

and greyspaces represented in paved or hard landscaped areas with civic function can be an enhancement to the urban structure of this central crowded part of Alexandria, Egypt, fig. 9.

The new design of a plaza in front of the station relating it with the tram line on the other side and creating an urban public space offer the urban quality to the place as well as solving the chaos problem in this district. The Ground floor will be the entrance for users both coming from the front street of the station or from the plaza or from the back street, fig. 10.

In general, in the previous solution as shown in fig. 10, Landing cars level in the way of Horreya street under the ground, and raise the level of the tram as a monorail, leads to organize cars circulation and separate between them and the pedestrian as an important improvement that must be considered. Creating a plaza outside the train station until the tram side will allow people to walk or sit with maximum safety. It organizes the people flow either coming to the station or visiting the new mall and other public spaces in harmony and logical way.

In such a central terminal, walkable paved greyspaces is required to develop the quality of the urban space outside the train station. Using patterns and new materials in pavements can facilitate the direction of people path.

The new planning of the site will organize the pedestrian places and separate the cars allowing the pedestrian to cross street safely. Although, greenspaces

especially trees, palms and flowers led to the shading of some parts in the space. The presence of fountain in the middle give psychological effect of satisfaction, beauty and climate mitigation that could send joy in the space. Provision of greenspaces in this crowded area is a source of recreation to the residents specially Sidi Gaber Towers, which overlooks it directly. So comfort and pleasure is provided for train station users and residents in the same time. Fire fighting alarm and Extinguisher must be distributed according to the new building design and people flow. Also guidance signs must be provided in prominent and clear places for the eye.

The huge height of the existing towers in the background has always led to distort the fine harmonious impressive image of the station. The new building juxtaposed to the old train station can give good impression to the viewer now especially with the disposing of visual obstacles in the old situation.

We note that the provision of green areas will restore the sense of scale of the station and the surrounding space.

### EVALUATING SUSTAINABILITY PERFORMANCE OF THE PROPOSED PROJECT

Urban quality is the overall key word for the understanding of how the relationship between cities and people works. When urban quality is low the

number of pleasure visits and activities are low. The activity is limited to the most necessary visits and walks which people do because they are compelled to carry them out.

A number of issues affect the public spaces and the way we act when we are in the city. These issues are presented in a keyword list for urban quality, which is used when identifying problems, potentials or possible solutions to issues of different character as shown in the next table<sup>11</sup>.

<b>Protection</b>	<b>Traffic</b> – protection against traffic accidents – pollution, fumes and noise – visibility	<b>Security</b> – lived in / used – street life – street watchers – overlapping functions on spaces and time – overlapping functions in space and time
	<b>Seeing, talking, hearing</b> – reasonable seeing distance – free vistas – interesting views – good lighting (evening / night) – low noise level – bench arrangement – talks capes	<b>Activities and interaction</b> – invitation to physical activities, play and entertainment day and night and summer and winter
	<b>Climate</b> Protection against – wind / draft – rain / snow – cold / heat Possibilities for – sun / shade – warmth / coolness – breeze / ventilation	<b>Aesthetic quality</b> – good design and good detailing – views / vistas – trees, plants, water – clear streets and squares – good lighting quality – good materials – building scale dimensioned to the human scale

Fig. 11. Key words list for urban quality criteria

Applying the previous list of urban quality criteria on the research proposal indicated that besides the new plaza fulfill most of the list, it also it creates a well public functioning domain offering a wide range of attractive public activities for people.

Sustainable design takes the circulation of people on foot and bike and the effectiveness of public transport as starting points. However, creating neighborhoods where walking is the natural and pleasurable means of access between activities achieves much of sustainability goals and objectives (quality of life-health economics of communities and community participation)<sup>12</sup>.

The role of open spaces to play within the neighborhood structure, to achieve sustainability goals and objectives, is formulated in three key issues; space management, space function (circulation of people and permeability), and the role of objects within space (sustainable landscape) [11].

The detailed study of these issues can be the set of sustainability checklist applied to open spaces. Applying the matrix of sustainability parameters used in previous research<sup>13</sup> on the proposed project (table 1), can reveal many conclusions. The project, as shown in the table below, achieved 66.5% of the first sustainability parameter in the space management issue, 80 % of the second space function issue and 85% of the last issue

concerning the role of objects within space, respectively. The space function in our case is the key issue to be discussed as it is the solving procedure of the pedestrian's dilemma in order to reach the station or to enter the mall. Presence of accessible, active spaces can socially support children, young people and people with disabilities. Also, it can improve visual appeal, enhance social cohesion opportunities for active socialization and generate a more sustainable healthy system.

Table 1. Sustainability parameters achievement of the proposed project

Sustainability Parameters		Proposed project Achievements
<b>Space Management</b>	<i>Encouraging sustainable lifestyles</i>	×
	<i>Making maximum use of existing features assets.</i>	×
	<i>Strengthening the sense of place</i>	×
	<i>Incorporating local or recycled materials</i>	
	<i>Encouraging community participation and involvement</i>	×
	<i>Reducing inputs of non-renewable resources during construction and subsequent maintenance</i>	
	<i>Eliminating or reducing the use of herbicides and resources that affect other ecosystems</i>	
	<i>Encouraging habitat creation and native planting</i>	×
	<i>Managing resources carefully</i>	
	<b>Space Function</b>	<i>Reduce the level of car reliance</i>
<i>Effectiveness of public transport</i>		×
<i>Reduce the need to travel</i>		×
<i>Social benefits of increasing transport choice for all groups in the population</i>		×
<i>Enhancing local security and community</i>		×
<b>Role of objects in Space</b>	<i>Return to original sources of inspiration, whether nature or culture</i>	×
	<b>Respond to the site:</b>	
	<i>Creating connections and themes (functional and perceptual as well as spatial) within and across sites while defining and delineating boundaries</i>	×
	<i>Transforming site constraints into environmental opportunities;</i>	×
	<i>Minimizing negative environmental impacts (including sensory as well as physical pollution)</i>	×
	<i>Maximizing positive impacts, off-site as well as internally</i>	×
	<i>Minimize inputs of materials and energy and maximize outputs of renewable and reusable resources</i>	
	<b>Maximize resilience and dynamic stability in the:</b>	
	<i>Maximizing the diversity of landscape elements and the diversity of relationships between elements</i>	×
	<i>Creating opportunities for the emergence of self – sustaining and self-regulating systems in the landscape</i>	×
	<i>Create 'place' as distinct from merely manipulating space, in such a way that the design maximizes the potential for user Interaction with the environment</i>	×
	<i>Make systems visible, which means making environmental processes apparent and celebrating them</i>	×
	<i>Minimize maintenance</i>	
	<i>Meet the varied recreation and leisure needs of users</i>	×
	<i>Involve local communities</i>	×

## CONCLUSION

In Alexandria, residents are in real need of having walkable areas especially in the center of the city and in crowded places. In the new sustainable design of the city, the quality of the urban space is equally important with the efficiency of the space. The previous research project is an attempt to solve a major aesthetic and functional problem that Sidi Gaber, a major terminal in Alexandria, is facing and will be elaborated with the new extension.

The research discussed the prompt and accurate solution, especially with the high increase of population in the city. Once the mall at the train station will be opened a real traffic jam will occur in the center of the city.

Also, the proposed solution creates green and open sustainable spaces and provide walkable areas which are

the most important issues to be considered in Alexandria new planning to enhance the city urban pattern or the residents behaviour and safety. Our urban design sustainable solutions of Public Urban spaces should prioritize life quality, health, safety and an inclusive environment for all. We regard the public realm as a place for all people, regardless of ethnic background, age, socio-economic class, disability, religion, or the like. Residents, visitors, students, workers, children, and the elderly are all invited to meet in the public realm.

A city public spaces must be available and open to invite and include all people, having different activities and possibilities and thereby ensuring multiplicity and diversity. Well-designed cities inspire the people who live in them, whilst poorly designed ones brutalize their citizens.

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## Abstract

Nowadays city of Alexandria has a very wide range of urban development projects, some of them has a major influence to the physical being of the city meanwhile others just have a small interpretation to its characteristics. The rapid growth of Alexandria city in the nineteenth century led to calls for parks to be provided for the health of all categories in the society. This could be seen as an early precedent to highlight the role of open spaces in supporting what we now call sustainable development.

This paper proposes an urban development project which make a replacement of an urban crawl in Alexandria city into unique open space through presenting a comprehensive approach for assessing this suggested project to create a walkability area based on a combination of its conceptual and applicable aspects. Discussion of the sustainability modules to this new urban development project in Alexandria will be accomplished, by the aim of investigating its ability to stand against the future challenges.

It is concluded that a significant attribute of urban design achieves continuity of the urban fabric and streets, because this facilitates flows. Wherever movements occur, there is vitality and flow creates eyes on the street producing spontaneous surveillance. Also, Comparison of contextual and neighbourhood before and after the project revealed the positive impact of the suggested project either on the built (physical) environment's or health and social well-being.

## Streszczenie

Obecnie w Aleksandrii realizuje się wiele projektów urbanistycznych, z których część ma ogromny wpływ na strukturę miasta, zaś inne są jedynie niewielką interpretacją jego cech charakterystycznych. W wyniku gwałtownego rozwoju Aleksandrii w wieku XIX ważnym elementem urbanistycznym stały się tereny rekreacyjne, które miały zapewnić możliwość prowadzenia zdrowego trybu życia przedstawicielom wszystkich warstw społecznych. Można to postrzegać jako jeden z pierwszych precedensów podkreślających rolę otwartych przestrzeni w utrzymywaniu zrównoważonego rozwoju miasta.

Niniejszy artykuł przedstawia projekt urbanistyczny, który pozwoli zamienić zatłoczone ulice i place Aleksandrii w wyjątkowe, otwarte przestrzenie. Prezentuje on także sposób oceny przedmiotowego projektu, który oparto na połączeniu jego conceptualnych i dających się zastosować w praktyce aspektów. W artykule przybliżono także analizę zrównoważonych modułów opisywanego projektu, w celu określenia jego wydolności w obliczu przyszłych wyzwań.

W podsumowaniu stwierdzono, że znaczna część projektów urbanistycznych z sukcesem kontynuuje istniejący układ urbanistyczny, co m.in. pozytywnie wpływa na usprawnienie komunikacji. Podobnie, w wyniku porównania analizowanych terenów, przed i po projekcie, odnotowano jego pozytywny wpływ zarówno na zurbanizowane otoczenie, jak i zdrowie oraz zadowolenie mieszkańców.