The Khedivial Cairo Revitalization Project

A case study from Kaser El-Nail Street

Heidi A. Shalaby: Ass. Professor of Architecture, Architecture Dep., Zagazig University, Egypt

Ali T. Omar: Supervisor for the Administration of Training and Human Development, Historic Cairo, Ministry of Tourism & Antiquities, Egypt.

Abstract:

The Khedivial Cairo is the central part of Downtown Cairo, it was planned and designed by prestigious French architects who were commissioned by Khedive Ismail, who stressed the importance of European style urban planning in Cairo, to include broad, linear gridded streets, geometric harmony, and modern European architectural style.

Since the 1860th tell now Khedivial Cairo has had significant importance as downtown and a heritage area. But after decades of neglecting the heritage buildings in downtown, without any maintenance and a lot of unprofessional additions to them, all the heritage buildings in this area need to be restored.

The revitalization project of the Khedivial Cairo started a few years ago, as cooperation between many governmental ministries, the privet sector, and the stakeholders. But the project still missed the comprehensive master plan for the whole area.

This paper will present overview of the revitalization of Khedivial Cairo project, in addition to discuss a case study of the restoration of a building in Kasr Elnil street and the work difficulties, attempts to find solutions and development of responses to these difficulties, these solutions should preserve the identity of the heritage building.

Key Words: Downtown Cairo, The revitalization of the Khedivial Cairo, Kasr Elnil street.

1. Historical Background:

The core of historic cities reveals the foundation of the image and structure of the urban realm, and represents the point of reference, determining the nature and direction of the city's future growth [1]. In that context, the Fatimid city, founded in 969 AD, was regarded as the center of all central activities until the nineteenth century. Looking back to the 1800s, this core was hit by poor living conditions, which resulted in a significant deterioration of the physical and social fabric. Its urban patterns had a random order and a random growth pattern. This was later considered to be stuck in a traditional non-modern time associated with chaos and disorder [2].

When Khedive Ismail assumed power in 1863, the borders of Cairo extended from the Citadel area in the east, to the Azbakeya cemeteries and Ataba Square in the west, dominated by urban deterioration in their neighborhoods, separated from the Nile by a number of ponds, swamps, hills, and cemeteries, with an area not exceeding 500 acres, with population that did not exceed 279 thousand people at that time[3].

The Khedive Ismail sought to transform the core of Cairo during his reign in the 1870s, he was inspired by his travels to Europe, especially when he met Haussmann, and realized that Cairo needs a modern identity, so he asked him to put the plan for the new core in the northwest of the historic Cairo [4]. The new core was not considered as an extension of Islamic Cairo and continuation of its natural patterns, but represented a shift in spatial order as Khedival Cairo was designated as the new downtown area [5]. This extension was a National Urban Project where the city was rapidly constructed for the event of the inauguration of Suez Canal and accomplishing Khedive Ismail’s vision of turning it into Paris of the east[6].

The modernization of the physical form of Cairo began by introducing many of the Haussmann planning ideals for Paris. Straight boulevards and open squares were introduced to the city’s indigenous urban fabric. The objectives were similar to those of Napoleon III [6]. The new network of boulevards was introduced to the city to bring light, ventilation and facilitate flow, in addition to establish pedestrian passages and social networking, we can notice in fig(1)[7] the changes in the planning concept between the historic Cairo and the extension of khedivial Cairo. Due to this efforts, architects from France, Italy, Greece and other European countries designed its buildings following the latest architectural styles. These buildings are still vibrant in the center of Cairo, but facing neglect, misuse and lack of maintenance[8]. Unfortunately, the lack of maintenance is one of the main causes of deterioration of a large part of the Egyptian architectural heritage.

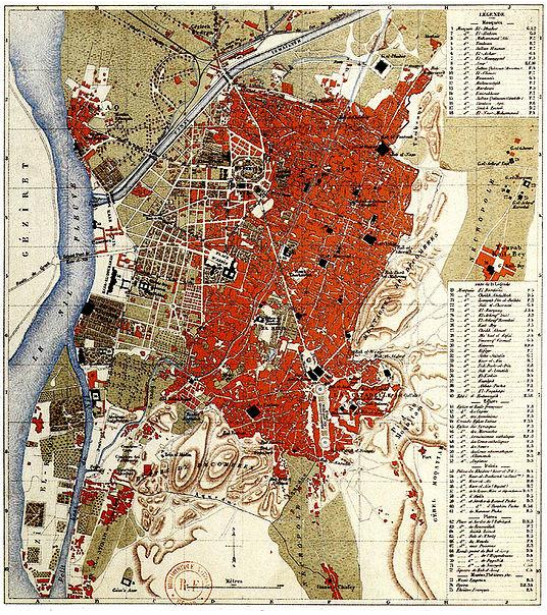


Fig 1: Historic map of Cairo, Egypt. Made by L. Thuillier in 1888.

Source:

https://commons.m.wikimedia.org/wiki/File:Cairo_map1888_Thuillier.jpg

After the 1952 revolution, the district started to lose its fine polished urban qualities as a result of policies that forced land reforms and intensive and unsympathetic construction. Historic buildings were subject to rent freezes, leaving little capital for maintenance and repair. This led to the rapid deterioration of several buildings[1]. Since 1992, downtown Cairo has been subject to many efforts aiming at heritage conservation and improvement of the urban environment. Most of the efforts whether governmental, or academic, were oriented towards documenting and listing[5].

A lot of political and economic factors hampered downtown development initiatives and efforts to improve the city's poor living conditions such as[5]:

1. Rent control laws were enacted in the early 1950s in order to stabilise social standards by freezing rents at a low rate. However, it resulted in deterioration of building conditions because maintenance costs exceeded rent payments. Other leased units were abandoned while their tenants relocated to the outskirts, keeping their city center apartments for convenience.

2. Many areas in Cairo's core have been designated as historical sites, resulting in an indefinite development freeze that restricts demolition or rehabilitation of existing buildings. As a result, a number of buildings are left vacant in depreciating conditions.

3. New housing units on the market are only for sale, making them out of reach for the general public. As a result, these units are converted into commercial spaces or used for municipal functions, transforming the area into a hub of administrative activity.

4. Finally, most urban areas lack basic services such as water, sanitation, electricity, waste management, and road construction. All of these factors and aspects of development contributed to Cairo's unsustainable status.

On 2010, the vision to the town down Cairo has been changed, even from the government and the decision-makers, or from the habitants and the visitors. The development strategy at that time focused initially on elements of Cairo becoming a Global, Green, and Connected City. After January 2011 the vision shifted towards Global, Inclusive and Sustainable, through multiple projects addressing various problems in Cairo's urban fabric[5]. Revitalizing the inner city is one of eight suggested moves to achieve the overall vision. Where Khedival Cairo will be profoundly upgraded, refurbishing the squares and creating underground parking.

Otherwise, the 2011 revolution had a passive effect on heritage buildings, particularly those from the 19th and early 20th centuries, as they are increasingly subjected to serious alteration or destruction without a proper discussion and assessment of the values embedded in them. Following that, rapid socioeconomic changes in society necessitate a shift in the functional use of heritage buildings, especially (modern heritage buildings)[9].

2. The revitalization of Khedival Cairo as a national project:

The revitalization of Khedive's Cairo is an important component of the Egyptian Government’s Strategic Urban Development Plan for the Greater Cairo Region. The achievement of this goal will be a significant step toward recognizing the government's vision for Greater Cairo, as well as bringing the world's attention back to the Central Zone's unique history, architecture, and urbanism [5].

Part of the revitalization process and linking urban space with identity is the preservation of the historical structures that make up the image of the city. The conservation of the familiar is of value in stabilizing individual and group identities particularly in times of stress[5]. Therefore, the revitalization of Khedival Cairo’s main idea focused on upgrading the urban spaces like: squares, sidewalks and pedestrian paths, in parallel with the fine conservation of the heritage buildings’ facades.

Duo to the richness of the heritage values of the Khedival Cairo, it had been registered as a heritage area from 2009, which give the area special ways to deal with it. The National organization for Urban Harmony put the special building regulations for this area to preserve the urban pattern. In addition, the Khedival Cairo had about 750 listed buildings as heritage buildings which have unique and significant features such as historical, symbolic, architectural, artistic and social values [10].

From 2014 tell now, the revitalization of Khedival Cairo conceded as a national project because of the number of the ministries and governmental bodies whose deal with the project everyone in his specialization, and also because of the variety of the funding sources. As mentioned, the project has two levels of intervention, the first level: on the urban level, and the second level: on the architecture level (the facades of the buildings). Many examples had been done in the booth levels, such as:

a. on the urban level: pedestrian streets like (the upgrading of the Al.Alfy st., Al.Shawarby st., Al.Sharefeen st. and Saraya Al.Azbakia street). And about the Squares: the upgrading of Al.Tahrer Sq, Oraby Sq, Talaat Harb Sq. and Mohamed Fared Sq.
b. on the heritage building's architecture level: more than 350 buildings had been renovated and restored in the Khedival Cairo tell the March 2022. The case study of this paper presents one of this buildings.

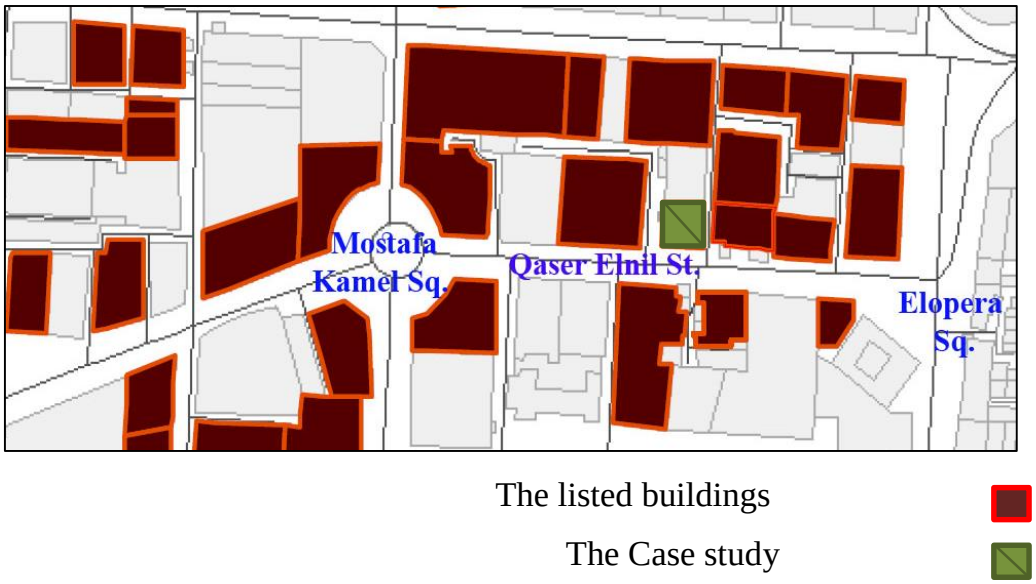
3. The case study:

Facade styles in buildings are phases of development that often classify architecture in the sense of historic periods, regions and cultural influences. Each facade style in Khedival Cairo defines design rules, certain forms, techniques and building materials for building construction [9].

The Khedival Cairo have significant examples of the architecture styles that had been influenced by the European architecture styles, such as the Baroque and the Renascence, most of this beauties had been designed and constructed by famous Egyptian and foreign Architects such as Antonio Lasciac, De Rousseau and so many others. The planning of the Khedivial Cairo based on central round squares linked with straight bolivars. One of the most famous bolivar is Kaser El.Neil street, which is widely known as a commercial street, it linked between El.Tahreir square and El.Opera square throw Talat Harb square and Mostafa Kame square[11].

The case study of this paper (Fig 2) [10] is located in 52 Kaser El.Neil street near to the Opera square, and it was listed as a heritage building since 2008 according to the Egyptian law for the valuable buildings 144 / 2006.

Fig 2: the location of the case study in the Downtown Cairo



Source: The authors – from the archive of the National Organization for Urban Harmony –2021

The owner of the building was the famous Italian businessman Somoeil Sornaga –the owner of the Sornaga Bricks Factory- and he started to build the building from 1905, on an area about 355 m^2, with height 35 m, and the main building material was the Sournaga bricks which was famous by the rose color. Between 1912-1913 Mr.Sornaga moved the main branch of his company to this building to be in the heart of the new Downtown of Cairo[10]. The building was occupied with residential units, and the Sornaga company, in addition to the commercial shops in the ground floor. The (Fig 3) [10] shows the main façade on Kaser El-nile street.

Fig 3: The main façade of the building from Kasr Elnil Street

Source: The archive of the National Organization for Urban Harmony, Egypt

4. The condition before Restoration:

After decades of neglecting and the lack of maintenance, the building had a lot of damages and unprofessional additions. In this paper we will focus on the exterior damage for the facades. But the damage of the building can be divided to:

4.1. From the exterior: Most of the apartments of the building are used as clothing stores or as a warehouse for these stores, for that the owner of this shops didn't take care of the building as a heritage building, as they put the air conditions, satellite dishes, advertising banners, and wires on the external facades, also many layers of different types of paining were found, as a result, the exterior façades were distorted and lost their heritage architectural value, The residents of the building also did not care about making gutters to drain rain water and didn't care about Sewer pipes which led to damage to the decorations and plaster cornices, as well as damage to the concrete of the external balconies floors.

Fig 4 : photos that show the damaged for the facades.

4.2. From the interior:

Due to the changing of the use for many units from the residential to clothing stores or as a warehouse, many units had been changed from the original design, like to remove some walls to have a bigger, or to remove the solid walls and to make as a shop window. Also an elevator has been added to the building in the main stairs void. In addition to, the lack of maintenance to the hand paintings, and the Gibson windows that had been done by the traditional ways.

Fig 5: the lack of maintenance for the main entrance.

In order to avoid damaging the composition and other complimentary protective systems, material surfaces at building facades should be treated with appropriate cleaning solutions. These might include lasers, light detergents, poultices with chemical peels, low pressure water misting and high-pressure water systems. The International Masonry Institute references many types of cleaning methodologies that can be employed. Periodically cleaning surfaces can help preserve the finishes and reduce the cost of much more substantial cleaning after longer periods of deferred maintenance. Certain staining may be

a symptom of a poorly designed façade system that requires replacement, or repairs beyond superficial cleaning methods[12].

5. The restoration project:

in 2021 a restoration project has been started to that building by the owner, the restoration project aims to restore the facades of the heritage building to its origins as possible as we can, maintaining the same spirit of the architect who designed the building. And also to make the fine restoration to the entrance and the handmade paintings. To achieve this goals, many steps have been taken:

Figures 6: the façades before restoration

5.1. First step: the cleaning:

First step was to eliminate all the addition to the original old façade, so all the air conditions, satellite dishes, advertising banners, wires and modern metal windows were eliminated to restore the figure of the original façade.

Also the small windows in the balconies which were closed by bricks were open as it was, also elimination the metal and the wooden ceiling which were put on the top of the façade.

Figures 7: Reopening of the closed old openings

5.1.1. Why is important to clean an historic building façade?

The primary concern is to prevent dirt build-up, principally from airborne particulates which may contain a range of potentially problematic materials – these can react with stonework and reduce its lifespan. Damp areas are particularly likely to attract dirt – especially in a wet climate – and, if not already apparent, can be identified as the result of a clean. Thick layers of grime can retain water against or within masonry, resulting in increased salt cycling and accelerated deterioration of the stonework[13].

Regular cleaning will help to identify areas where there is an above-average build-up of dirt and salts. These may be indicative of more far-reaching problems which, if rectified at an early stage, could give rise to considerable cost savings in the longer term.

All buildings will eventually age and deteriorate. However, what we do to them can affect the rate of that deterioration. Using the wrong materials and applying the wrong principles to cleaning, repairs, alterations, etc. might accelerate the rate of decay and deterioration. Using appropriate materials and a sympathetic approach to the building can result in a much slower rate of decay and deterioration [13].

It is important to care and remember that older buildings, not just those that are listed, are technically different from modern buildings. From a technical point of view, certain works might be incompatible and could result in damage or at least future problems.

5.1.2. Water Cleaning methods:

In general, the gentlest possible methods are water cleaning methods. They can safely be used to remove dirt from all kinds of historic masonry. Essentially there are four types of water-based methods: hot-pressurized water or steam cleaning; water washing with a non-ionic detergent supplement; pressure water washing; and soaking. After water cleaning is complete, it is frequently necessary to follow up by rinsing with water to wash the loosened soiling material off of the masonry.

*It might not be appropriate to use water cleaning methods on some masonry that is badly deteriorated since the water might exacerbate the deterioration, or on alabaster or gypsum, which in water are very soluble.

5.1.3. Steam cleaning:

Of the methods mentioned above perhaps the most accessible and most widely used is steam cleaning. Steam cleaners have been in use since the early part of the 20th century. Shaffer refers to the use of steam cleaners to clean a ‘blackened frontage’ and goes on to say ' …the steam process is unlikely to cause any more damage than washing with water or scrubbing with stiff

brushes'. In truth, it is now recognised that steam cleaners cause much less damage than those methods.

There are, however, many different types of steam cleaner available and they should be distinguished from hot water washers. Hot water has a lower surface tension than cold and thus is more likely to clean more deeply and quickly.

This principle is at the heart of hot water washers which have diesel fueled boilers and a pump that delivers water at temperatures up to 90°C through a restrictive nozzle which increases the velocity of the water. This results in pressures of between 60 and 150 bar and water-use of between 5 and 20 liters per minute. These can be used in conjunction with detergents or other chemicals but in reality, this is rare for historic buildings. More often than not, hot water washers are the method of choice for rinsing after chemical cleaning and for removing algae and other materials from paving[14].

Some of the machines used in hot water washing can result in quite aggressive cleaning because of the high water pressure and volume they can deliver. Apart from these, other parameters which can provide some control include the design of the nozzle, the angle of spray to the surface being treated, distance of the spray to the surface and the duration of contact. All of these can be manipulated by the operator so it is possible to carry out careful cleaning using lower pressures, keeping the nozzle at a greater distance from the substrate and ensuring the nozzle spray angle is above 35°[14].

Steam cleaners can broadly be divided into small industrial/domestic units and the larger machines (such as Doff and ThermaTech) that are commonly encountered in building conservation. Steam cleaning system was used for cleaning the façade, one of the best benefits of steam cleaning is that it eliminates these nasty elements from facades, and when steam penetrates surface pores, it removes dirt, debris, bacteria, and other tiny elements with hot vapor molecules, adding that steam remove the layers of over paintings easily.

The Steam cleaning system is non-obtrusive and non-damaging to surfaces and substrates. It can clean rapidly and leaves the surface looking restored and fresh.

Figures 8: Cleaning the facades with steam cleaning system

5.1.4. Mechanical cleaning:

Mechanical cleaning systems are used to remove contaminants of work surface by propelling abrasive materials through any of these three principal methods: airless centrifugal blast blade- or vane-type wheels; compressed air, direct-pressure dry blast nozzle systems; or compressed-air, indirect-suction (induction) wet or dry blast nozzle systems. This article focuses on the abrasive media, equipment, applications, and limitations of dry and wet blast cleaning. It discusses the health and safety precautions to be taken during mechanical cleaning [13].

After steam cleaning, some solid dust and cement calcifications on the surface couldn’t be removed by steam, so metal tools were used to remove these calcifications by mechanical cleaning without any liquids.

Figures 9: Mechanical cleaning to the hard cleaning surfaces

5.2. Second step: The Restoration of Balconies floor concrete:

Firstly, eliminating all the rickety concrete, then exposing the iron and sanding it, then all the corroded iron poles were replaced with new iron poles have the same diameters, followed by painting the concrete surfaces with (***Sika Ferro Gard 903)*** in order to delay corrosion and rust and increase the life span of the concrete.

Then painting the concrete and iron surfaces with ***(Sika Top Aromatic 110 Eposem)*** for protection against rust and to connect the new concrete with the existing concrete,

Then the rebar was covered with a mixture consisting of 80m^3 fine gravel : 40m^3 sand : 400Kgms cement with the addition of ***(Sika Fly-Ash)*** in the mixture to improve the final surface and reduce shrinkage, after that putting the final layer of cement plaster with the addition of ***(Sika 1)*** to the cement mortar.

Figures 10: Restoration of Balconies floor concrete

5.3. Third step: The Integration and consolidating:

The lost and damaged parts of the bricks were replaced by the same kind of the bricks, which have the same sizes and same color of the original bricks.

The cornices and plasters were highly damaged, and many parts were missed, so the missed parts were integrated by a mortar contains[15]:

1 white cement : 3 gypsum : 10% ***Addibond 65*** from CMB, and before putting the mortars, the walls were cleaned so well by water to eliminate any dust, after

were painted by a solution of 10% Addibond 65 to improve the connection between the new mortars and old mortars

The big cracks in plasters were injected by a mortar consisting of white cement 1 : lime 1: 20% acrylic ***Acril 33*** for the Italian company CTS, and this was after injection with water and alcohol to clean the dust inside the cracks.

The small cracks were injected by Acril 33 20%.

As for the stucco cornices, they were integrated by a mortar consisting of white cement 1 : gypsum 3 : 20% Addibond 65.

The cracks were injected by Acril 33 20%.

After that all the plasters and stucco cornices were painted by a solution 20% of Acril 33 for consolidation.

Fig 11: injection by Acril 33 20%

Fig 12: integration of missing parts

5.4. Fourth step: Metal handrail of the balconies:

The handrail had many layers of paintings, so heaters were used to eliminate these layers, after heaters, chemical removers were used to clean the rest of the paintings.

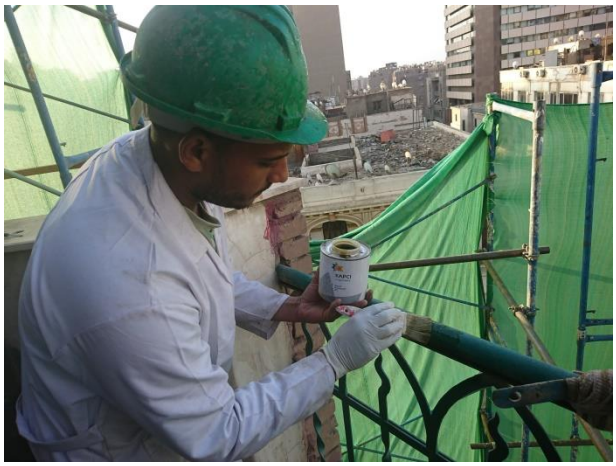


Fig 13: removing over paintings from metal handrail

5.5. Final paintings:

After steam cleaning, specially the higher parts where people can not arrive, we could get the original colors of the painting, and after many trails we could arrive to the colors degrees.

Fig 14: the result of the balconies and arches before and after restoration

Fig 15: the final result before and after restoration

6. The Conclusion:

The Heritage building must be restored and maintained continuously to avoid the irreversible damages that could be happen. At the case of the restoration project of 52 Kasr Elnil Street, the main problem of the deterioration of the building was first of all by the ignorance of the value of it, and Improper use of building facilities, then the air pollution had effected the surface of the facades.

Communication with Community helped a lot firstly to Spread awareness of interest in heritage buildings among the population, This, in turn, made the residents help by themselves in removing the encroachments and distortion from the facade of the building.

It was the first time the steam cleaning system was used for cleaning the facades in Cairo down town, and it gave a great result for cleaning the facades also for removing the over paintings easily without making any bad effect on the surfaces.

Finally, the vendors must move their stores from the apartments which was done to people just to live and use them as families' homes and they were not done to be stores that closed all time, and by closing these apartments for long time affected the paintings and plasters because there was no ventilation.

Modern Heritage in Khedival Cairo, which comprises the architecture, town planning and landscape design of the 19th and 20th centuries, must have the identification and documentation of its architectural and decorative elements.

7. REFERENCES:

[1] J. Amedi, H. Nagler, and W. Christoph, *The Importance of Urban Renewal in the Historic District for the Development of Great Cairo*. Schwerpunk, Berlin: Department of Urban Development and Design, Brandenburg University of Technology Cottbus, 2009.

[2] D. Singerman and E. Al, *Cairo contested: Governance, urban space, and global modernity*. Cairo, Egypt: Oxford University Press, 2011.

[3] H. Shalaby and A. Taha, "The Revitalization of the Khedivial Cairo," in *5th Biennial of Architectural and Urban Restoration. BRAU5*, 2021, pp. 942–948.

[4] A. Raymond, *Cairo: City of History*. Cairo, Egypt: American University in Cairo Press, 2001.

[5] S. Attia, "Revitalization of Downtown as center for social democracy and sustainable growth," 2013.

[6] R. Shafik and H. Salama, "Modernization of Downtown Cairo," *IJERT*, vol. 9, no. 01, 2020.

[7] Thuillier, "Cairo map." Original: "Le Caire, Itinerare de l'Orient, Egypt, Dresse par L. Thuillier, Paris Hachette, 1888.," 1888, [Online]. Available: https://commons.m.wikimedia.org/wiki/File:Cairo_map1888_Thuillier.jpg.

[8] A. Elyamani and E. Al, "A Study on the Surroundings of Sednaoui El-Khazendar Historical Building in Khedival Cairo and Proposals for Improvement and Development," *Int. J. Herit. Museum Stud.*, vol. 1, no. 1, 2019.

[9] M. M. M. Abdelmegeed, "Documentation of construction systems, type of damages and modification processes in façades of unregistered heritage-buildings in Khedival Cairo, Egypt," *HBRC J.*, vol. 16, no. 1, pp. 77–112, 2020, doi: 10.1080/16874048.2020.1779474.

[10] "The Archive of the National Organizatian for Urban Harmony," 2011, [Online]. Available: www.NOUH.org.eg.

[11] S. Hawas, *Khedivian Cairo- Identificatian and Documentatian of Urban Architecture in downtown Cairo*. The Arab Contractors Press, 2002.

[12] Heritage Building Conservation Ltd, "Thomann-Hanry restoring Excellance." https://thomann-hanry.co.uk (accessed Feb. 01, 2022).

[13] ASM HANDBOOK, *Surface Engineering*. 1994.

[14] Cathedral Limited, “Building Conservatian.” www.Buildingconservation.com (accessed Dec. 20, 2021).

[15] S. Vadstrup, “Conservation of plaster architecture on facades -Working Techniques and Repair Methods,” 2008.