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A critical survey and a design proposal for Al Balad, the Historic District of Jeddah, KSA

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Abstract — An agreement between the Al-Turath Foundation in Ryadh, KSA and Tecturae srl, Florence, Italy, in cooperation with the Municipality of Jeddah and the Department of Architecture of the Università degli Studi "G. d'Annunzio" of Chieti-Pescara, Italy, has made possible the urban and architectural survey, the construction of an interactive database and a final design proposal for a significant part of Al Balad, the historic district of Jeddah and for some of its most outstanding buildings, such as the celebrated Nasseef House. The survey has been executed using a Laser Scanner and a Total topographic Station, in strict scientific and technical cooperation with Dr. Osama bin Mohammed al Jawahri of Al-Turath, the Municipality of Jeddah with Eng. Sami Saleh Nawar, and the students of the King Abdulaziz University in Jeddah and of the Summer School of the IRCICA, Research Center for Islamic History, Art and Culture, in Istanbul. Though spoiled by recent constructions of debatable quality, this area is - still nowadays - an extremely interesting mix of different building types, illustrating a very significant stage in the city's history, when its merchants successfully conquered local and foreign markets and when Jeddah started to act as the main gateway from the Red Sea to the Holy Cities of Makkah and Medina. Our project aims at the preservation of its rich and fascinating built heritage and at the rediscovery of its lost relationship with the once nearby harbor on its west side and with the modern city all around; in addition to this, we also wish that the renovation of Al Balad may constitute a significant step toward KSA's green leap forward, demonstrating that properly upgraded historic districts can be not only more pleasant and appealing to visitors and pilgrims, but also smarter than most recently built suburbs.

Keywords: Digital survey; Heritage; Urban regeneration; Restoration.

Al Balad

The Historic District of Jeddah represents an interesting example of the Islamic urban and architectural creativity; it bears a significant testimony to a very specific cultural tradition and to a living civilization; it is also a very peculiar mix of different building types that contribute to an architectural ensemble which illustrates a significant stage in the city's history. Quite a few areas of the Historic District meet the

conditions of integrity and authenticity (authenticity is expressed through a variety of attributes including: form and design, materials and substance, use and function, traditions and techniques, location and setting). It is also very important to note that the entire area is very lively and densely if not as attractive, because of its present state, for tourists as well as for the inhabitants of "modern" Jeddah: the people that live and work in Al Balad form a very interesting anthropological mix of various immigrants coming from Africa, the Middle East and other Asian countries. Our project aims at the conservation of the entire Historic District, prolonging the life and the integrity of its architectural Survey of the historic trails characters, its built forms, its constituent materials, its original colors. A subtle cultural sensibility and a deep critical know-how are evidently requested in order to correctly read and interpret the built architectural and urban heritage. In the end, Al Balad should and will become a very interesting and lively area, highlighted by a variety of historic religious, commercial and residential buildings that form an extremely rich urban pattern, clearly different and easily recognizable from the modern parts of the city. A mix of religious, residential, educational and commercial buildings will also include showrooms, ateliers, galleries, exhibition halls, offices, boutiques, craftsmen shops, schools, little hotels etc.: the result will be an exciting and creative neighborhood, very attractive for the locals specially for young people) and their different activities, but also open to the international trends and influxes, in a very similar way to what can be found in many successful and tourist oriented Italian and European historic towns. Hopefully, many Saudi Arabians will start reconsidering their now quite scarce interest in Al Balad and will move back to Old Jeddah, where their ancestors were once based. But, most of all, we must not forget the importance of carefully keeping the precious, cultural identity of the place, of its architectural and functional characters, in a more general attitude aiming at showcasing the rich, traditional western Saudi Arabian culture of the Red Sea Coast. The chosen methodology will be the same that has been used in similar projects in Italy and elsewhere, aiming at the conservation of urban diversity (in terms of building types, materials and functions), an extremely difficult quality to achieve in new interventions; the strengthening of civic pride (people living there must feel that they are part of a deeply rooted community, that they are citizens and not city-users of Al Balad); the creation of a sustainable environment (the buildings should produce more energy than they request etc.); and - last, but not least - the transformation of Jeddah's Historic District into a very attractive and deeply rewarding area not only for its inhabitants, but also for millions of pilgrims and foreign scholars and tourists flocking to Jeddah every year from all over the Islamic world.

2. The Nasseef House

The construction of the Beyt Nasseef House on old Jeddah's main street, Suq al-Alawi, began in 1872 and was finished by 1881. This grand residence - built for Omar Nasseef Efendi, governor of Jeddah at the time and a distinguished member of one of Jeddah's oldest, wealthiest and most respected merchant families - housed for decades all the members of the clan and their staff. Commerce has traditionally been Jeddah's principal activity and, over the centuries, has brought wealth to its inhabitants. This prosperity was reflected in some outstanding homes, large structures lavishly decorated. The four-storey high building (at the front, seven at the back), was the tallest in Jeddah until the 1970s. From the upper terraces visitors can enjoy the most beautiful and comprehensive view of the Old City. People used to call the Nasseef House "The House with the Tree" because it was the only house in Al Balad that had one - a neem tree (Azadirachta indica) - on the little square on the north of the house. Jeddah entered a new era in 1925, when King Abdul Aziz Ibn Saud, after a siege, extended his rule to the city, bringing security and growth. Within a decade, the city spilled over the restrictive walls, expanding in every direction. In the same 1925, the King requisitioned the historic building while his palace was being constructed - hence the name of its location, King Abdul Historical Square. The house was used as a royal residence and received many illustrious guests. John R. Bradley, author of Saudi Arabia Exposed: Inside a Kingdom in Crisis, in the 1920s described it as a "kind of social salon", as consuls and merchants gathered there. The King also modified some of the interiors and transformed the stairways into ramps that were said to be used by camels. In 1975, the Saudi government bought the house and designated it as

a historic landmark. It was first transformed into a library with 16,000 books; since its renovation, it has been used as a cultural center for lectures and exhibitions, also housing an interesting cultural and heritage exhibition. The books were finally given to the Central Library of King Abdulaziz University. Nasseef House has over a hundred rooms, some of them containing remarkable art works. Besides works on wood, others on tiles can be seen as well as Arabic calligraphy. The design style, influenced by the Ottoman taste, is clearly related to stylistic elements found along the Red Sea, in Egypt and other East African countries. The house has an irregular plan of rectangular rooms arranged around a central hall. The main entrance is from the north, while there is a second entrance from the west, traditionally used by women. After climbing a flight of stairs onto a small platform in front of the house, one enters into a large entry hall (dihliz), that opens to the central hall. To the left and right of the entrance hall there are some smaller rooms that occupy the northern corners of the house.

The west entrance opens straight into the central hall, while several smaller rooms are arranged around a small corridor that connects to the central hall on the east. A similar group of rooms occupies the southwest corner of the building. Directly opposite the main entrance hall is a large and interesting stairway system. Both the entrance hall in the north and the stairway in the south jut out from the façade. Two large rawashin occupy the front facade above each other. Point clouds from laser scanning connecting the two levels above the main door with their large and beautifully crafted wooden structure. A second smaller stairway in the southeast corner of the house may have had more of a service function as, further up, the kitchen lies in this part of the house.

The layout of the main rooms such as the entry hall in the north with the two smaller corner rooms to its east and west, the central hall and the large stairway are all traced to the floors above. On the fourth floor there is a large terrace on the outlines of the entry hall, while the rooms to the left and right are built as lofty structures with large windows covered with wood lattice from the outside. The terrace itself is screened from external view by a wall with many windows.

The fourth floor rooms, except in the southeastern part, are covered by flat roofs at different levels, some usable as terraces. On the fifth floor the kitchen resides above the main stairway in the middle of the southern part of the building. A light pavilion-like wooden structure (kushk) rises above the building on the middle eastern part, thus giving the Nasseef House seven floors (depending on how you count some of the intermediate or offset floors). This was used for resting and sleeping in, making the most of cooling breezes at this height. Although larger and more important than most other structures on the preservation list of Al Balad, Nasseef House is similar in design and construction techniques. The foundation and walls are built entirely with coral taken from the seashore or from the surrounding hills, which were below sea level millions of years ago. The coral blocks were held together with mortar made by mixing sand and lime, which was produced by firing coral in large vats. The floors of each level were constructed by laying unhewn wooden poles side-by-side and covering them with palm matting and mortar. Structures built with these materials were not only cheaper than those built with stone, but also surprisingly durable. Department Director Sami Saleh Nawar, a civil engineer by training, noted that after more than a century of hard use, with hundreds of people occupying the house at one time, the building is still structurally sound, a testament to the durability of traditional building techniques and materials. As an example, he cites the wood used in building the house. In a hot and humid climate such as that of Jeddah, wood usually does not last long before succumbing to the ravages of moisture and insects. To protect it, the wood was coated with a liquid extracted from the Al- Bisham plant found in the mountains. Shark oil was also used for the same purpose. The resulting brown stain was an effective preservative.

As do most traditional homes in old Jeddah, the Nasseef House has exquisite exterior woodwork. Instead of ordinary windows, all openings are covered with wooden grills known as mashrabiyah and projecting bay windows with internal seating known as roshan. Most also have a special sitting area on the roof known as kharajah. The elaborate latticework that covered all three allowed an unhindered circulation of air without compromising privacy. It also served as the principal exterior decorative element for most buildings and, as such, incorporated complex and beautiful patterns. Although the most common color for exterior wood in these old buildings is the brown stain left by the preservative, many are painted turquoise or green. One of the doors is painted an unusualgreen color - almost certainly an

aniline dye. As most old buildings in Jeddah, the house served not only as the home of the owner, but also as a place of work. Walking along the souqs and alleyways of old Jeddah, one sees many such structures with a shop, workshop or storage area on the street level and living space above. The Naseef House had storage rooms on the street level as well as on the fourth floor.
The urban and architectural survey of a significant part of the Historic District of Al Balad has been made using a scientifically coherent methodology and a strict working program. The survey made use of a Laser Scanner and a Total Topographic Station - it has become more and more frequent to use the Laser Scanner in conjunction with the Total Station: the two methods (though showing big differences: the laser automatically surveys something like 2000 dots per second; the total station requests more attention by the operator and takes a longer time for each point) can successfully integrate. The targets necessary for the 3D laser scanning, were positioned in order to achieve the point clouds, basically locating them at the main crossings, in squares, streets and other public areas. The general survey of the historic district started with an exhaustive photographic documentation and with sketches that refer to the present state of the architectural and urban fabric. The photographic documentation, fully showing all the buildings in the case study area, has been carefully analyzed and compared with the metrical survey and the existing cartography. Laser scanning associates high resolution pictures (10 Mpixel) to the points representing the 3D geometry of the buildings and the public spaces around them. To each laser impulse has been associated the RGB value of the digital image, allowing thus the recognition of the geometries of the scanned objects and a reliable mapping of cracks and other pathologies. The purpose of a 3D scanner in the architectural and urban survey is to create "point clouds" to describe the buildings' geometric shapes. These points can then be used for the 2D or 3D modeling of the object (a process called reconstruction). In fact, 3D scanners share several traits with cameras. Like cameras, they have a cone-like field of view, and like cameras, they can only collect information about surfaces that are not obscured. While a camera collects color information about surfaces within its field of view, a 3D scanner collects distance information. Therefore, the "picture" produced by a 3D scanner describes the distance to a surface at each point in the picture, allowing the identification of the 3D position of each point. For most situations, a single scan will not produce a complete model of the subject. Multiple scans, even hundreds, from many different directions, are usually required to obtain information about all sides of the subject. These scans have to be brought in a common reference system, a process that is usually called alignment or registration, and then merged to create a complete model. The scanner can thus collect a very huge amount of data, allowing the survey of any architectural example, even very complex and decorated ones, as is the case in Old Jeddah, within a square grid that can guarantee a resolution to 6 x 6 mm, through which it is possible to draw the exact geometry of the surveyed object. This technique offers the possibility of getting a 3D data bank (usually quite heavy, requesting thus equally sophisticated and advanced computers) which may eventually work as an excellent basis for developing any further project. In a post-production phase, it is possible to get the 3D point clouds; to get the textured mesh; to rotate the point clouds to obtain 2D ortho-photos, very useful for mapping the drawings of the elevations and for evaluating cracks and pathologies of the facades; the make the 3D model (that can be used, with standard CAD software, for the documentation and calculation of surfaces, volumes, sections, elevations, for monitoring future changes in the urban fabric etc.

2. The regeneration of Al Balad

As we have anticipated, our project aims at the conservation of the entire Historic District, prolonging the life and the integrity of its architectural characters, its built forms, its constituent materials, its original colors. A subtle cultural sensibility and a deep critical know-how are evidently requested in order to correctly read and interpret the built architectural and urban heritage. As it is the case for Saudi Arabia and other different areas in the Middle East and in the Mediterranean basin, Italy has been continuously inhabited since very ancient times; its historic cities are universally recognized among the most valuable urban models of humankind; the quality of life that the historic, central districts of some of our cities can boast is rated at the highest ranks in the world urban competition. Italian experts, though sometimes

overcome by the huge quantity and the great artistic quality of their extraordinary built heritage, have usually been quite successful in preserving and restoring historic towns as a whole. The result of all this is that, though post-war Italian suburbs share the same problems (and ugliness) of many other contemporary cultures around the world, the Italian historic urban legacy is still nowadays very successful among its citizens and extremely appreciated and looked after by tourists coming from all over the world. It's understood that the built heritage is not and should not be considered a heavy burden on the municipal finances, but an exciting opportunity to exploit – not without a quite high degree of cultural sensibility - for the future of the entire local community. As we anticipated, the Historic District in central Jeddah should also be a significant part of Saudi Arabia's green leap forward. Our current way of life, in Saudi Arabia as anywhere else, is clearly unsustainable, and that which is not sustainable does not continue. Our cities have to rely on renewable resources, they must be dramatically more ecologically sustainable and we have the challenging task to redesign them in order to achieve an entirely different kind of civilization. A green city can have a great, positive impact on the planet's future. The idea of a green city can coexist perfectly well within a historic district. A well redesigned historic district won't just help comfortable people become prosperous, it will also meet its inhabitants' most basic needs – from clean water and adequate housing to education, healthcare and other social services – way better than spread out, car dependant suburbs do. Designers (architects, engineers, urban planners, technicians etc.) have to know the place well in order to make it better, because a given urban-planning tool never works for every city, and because the more we know and love a place, the more we want to participate in determining its evolution. This is the reason why the Italian architects and planners involved in this design proposal must strictly keep cooperating with their Saudi Arabian colleagues in order to share an exciting, common vision for the future of Al Balad. Central Jeddah will thus experiment a great variety of challenging and entirely new issues, like, for example, new forms of urban farming: people will be able to produce a significant percentage of their food using their small gardens, their terraces and green roofs and the little public, green areas. These areas, with their abundance of shade trees, will act as passive means of cooling, blocking hot sun rays from the houses.

A high density - which is very much part of the Saudi Arabian as much as Italian urban tradition - is extremely important for achieving a more general urban efficiency: though contradictory, a dense compact neighborhood like Al Balad uses less energy and spews less pollution. People can walk or bike, and everything gets cheaper and easier to provide: electricity, sewage and other basic services. And when more people share these services, they all have far less of an impact on the city and on the planet. We all know that we have to build in existing communities - it's the so-called infill housing - in order to have comparatively minimal impact on surrounding ecosystems, since the most damage has already been done there. Jeddah, as any other contemporary metropolis, has to fight hard in order to limit the urban sprawl and increase the quality of its urban life: improving air and water quality, creating safe, vibrant and friendly neighborhoods and becoming a walkable city, at least in its central areas. The new houses that will be built here and the old existing houses that will be competently and creatively renovated, will adopt solar panels to bring clean energy and refrigeration and will make good use of the rainwater that occasionally floods the city; passive solar energy will also make use of existing conditions and natural methods like conduction and radiation to heat the water; discarded hardwood coming from existing buildings that have to be demolished can be reused in new constructions; a Re-Building Center will hopefully be opened in order to provide a vast selection of readily available material coming from these previously discarded buildings. The renovated houses, properly designed ad hoc, will be more flexible, adaptable and interactive than the old ones; smart home technologies, for example, can easily be proposed in a renovated historic district; geothermal pumps may also be adopted in order to achieve a natural cooling of the indoor temperatures: these and other similar design strategies, will produce homes that act not only as a passive shelter, but as an efficient, active service system, keeping up with its inhabitants' demands for a comfortable and convenient space; in the end they will prove eco-friendly but also wallet- friendly. Housing must be dedicated to a range of incomes and mixed with offices, shops and a wealth of beautifully designed, low maintenance green spaces: community gardens and playgrounds. Everything will be on a human scale to make pedestrians, aged, disabled and children feel

welcome. We have to make walking not only easy but pleasurable. Shopping areas and public transit must be within a five-minute walk of every home. Public transit and walking, under the right circumstances and with appropriate long-term public policies, can serve as viable alternatives to reliance on the automobile. We have to discourage car ownership and invest in making public transportation safe, cheap and reliable. We have to protect key views of the many historic buildings that abundantly dot the area and introduce green roofs, rain gardens and green facades in order to reduce the heat-island effect, decrease ground-level ozone and limit the understandably very high demand for AC. At the urban scale, for example, permeable pavements can be used in order to preserve all the functionality of regular pavement eliminating the downsides: they will allow the rare rainwater to filter through into the ground, preventing street flooding and keeping urban greenery healthier, with less work and less water. Effective water technologies must obviously become a very important part of our design proposal: the homes of this neighborhood will be part of a new, natural urban system. In the end, Al Balad should and will become a very interesting and lively area, highlighted by a variety of historic religious, commercial and residential buildings that form an extremely rich urban pattern, clearly different and easily recognizable from the modern parts of the city. A mix of religious, residential, educational and commercial buildings will also include showrooms, ateliers, galleries, exhibition halls, offices, boutiques, craftsmen shops, schools, little hotels etc.: the result will be an exciting and creative neighborhood, very attractive for the locals (especially for young people) and their different activities, but also open to the international trends and influxes, in a very similar way to what can be found in many successful and tourist oriented Italian and European historic towns. Hopefully, many Saudi Arabians will start reconsidering their now quite scarce interest in Al Balad and will move back to Old Jeddah as their ancestors once did. But, most of all, we must not forget the importance of carefully keeping the precious, cultural identity of the place, of its architectural and functional characters, in a more general attitude aiming at showcasing the rich, traditional western Saudi Arabian culture of the Red Sea Coast. The chosen methodology will be the same that has been used in similar projects in Italy and elsewhere, aiming at the conservation of urban diversity (in terms of building types, materials and functions), an extremely difficult quality to achieve in new interventions; the strengthening of civic pride (people living there must feel that they are part of a deeply rooted community, that they are citizens of Al Balad and not city- users); the creation of a sustainable environment (the buildings should produce more energy than they request etc.); and - last, but not least - the transformation of Jeddah's Historic District into a very attractive and deeply rewarding area not only for its inhabitants, but also for millions of pilgrims and foreign scholars and tourists flocking to Jeddah every year from all over the Islamic world.

3. The silent witness of history

The Saudi Arabian built heritage is among the priceless and irreplaceable assets, not only for the Saudis, but for humanity as a whole. The loss, through deterioration or disappearance, of any of these most prized assets constitute an impoverishment of the heritage of all the peoples of Africa and of the world. Since the adoption of the UNESCO Convention in 1972, the protection and conservation of cultural heritage also constitute a significant contribution to a sustainable, future development. Based on the principles of the

1964 International Charter on Conservation and Restoration of Monuments and Sites (the Venice Charter), it is our specific duty to identify, study, protect, conserve, present and transmit to the future generations of a built heritage of outstanding universal value, promoting the application of the most advanced theories, methodologies and scientific techniques. This valued architectural heritage is also of seminal importance for the collective psychological life of Saudi Arabia: a Nation needs deep and meaningful cultural roots. The built heritage works as the Nation's soul, it physically represent its cultural spirit. No country is able to confidently look at the future without respecting the past.

Our design proposal, which includes a scientific survey and a restoration project, aims at the most accurate conservation of this urban complex, prolonging the life and integrity of its architectural

characters, its built forms, its constituent materials. It also includes the guidelines for the future life of his historic area, in the belief that architectural ensembles of the past request a contemporary role in order to fulfill new functions that respect the original design and, at the same time, guarantee their survival to the advantage of future generations. The transformation of Al Balad into the active focus of the religious, cultural, political and touristic life of the city of Jeddah, showing in the newly restored buildings' interiors the lavish collections of the Saudi memorabilia, will provide the noblest future for this magnificent buildings, silent witnesses of the Saudi Arabian history.