Nabataean Architectural Identity and its Impact on Contemporary Architecture in Jordan

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ABSTRACT
This paper draws attention to the crucial problem of how to approach to design issues based on cultural identity within a global world, by referring to Petra and Nabataean architecture. This issue is related to the Nabataean architectural style and its impact as a cultural identity on the built environment in Jordan. The purpose of this article is to help architects and owners to identify the Nabataean architectural features or elements that give the modern buildings their visual character. These features should be considered in modern design in order to preserve them to the maximum extent possible. It aims to analyse the Nabataean architectural vocabulary and to create a system that would enable architects and owners to create future architecture from these deep solid roots. It also illustrates and presents some of the experiments by contemporary architects in Jordan who used some of the Nabataean architectural vocabulary in an attempt to revive this heritage. Pursuing this research will be through contextual analysis of texts, material, and visual culture from a wide range of settings. Consequently, after reviewing the link with the richness of the ancient past from a perceptual and analytical perspective, the research will conclude that the Nabataean architectural heritage is one of the prominent primordial roots from which the architects of Jordan can inspire its cultural codes in order to create an atmosphere with a culturally sensitive identity.

Keywords: Architectural Heritage; Contemporary Architecture; Architectural Vocabulary; Place-Identity; Petra; Jordan.

INTRODUCTION
This paper addresses the Nabataean architectural style and its impact on the identity of the built environment in Jordan. It identifies and classifies the different elements of the Nabataean architectural vocabulary. The topic is of great scientific and stylistic interest, not only for understanding Nabataean architectural features concerning their origin and development but also providing some indications for possible inclusion of these features as cultural codes in new buildings. These codes can create architecture that is rooted in culture, and has a distinguished identity.

The paper will present a framework of architectural vocabulary that regulates and organises the recent Jordanian architectural identity. This framework will contribute to the wider study of the necessity for linking the recent architectural identity with the sustainable development of the buildings’ surroundings. The paper comprises the following sections’ sequence: The first two sections mainly report the research problems, objectives and methodology. As for the third section, it deals mostly with identity and architectural heritage on general and architectural review of literature which are found suitable for the paper purpose. Section four tackles the contemporary architecture in Jordan, particularly the architectural identity as an issue of debate over the last three decades. Concerning section five, which is considered to be the major outcome of the paper, includes the study of the Nabataean architectural style. Indeed, section six, dealing with Jordanian trials using Nabataean architectural characteristics, includes detecting several different types of the Nabataean architectural vocabulary which are used in current architecture in Jordan. Finally, the analysis provided in section seven shows that the Nabataean architectural heritage is one of the important roots from which the Jordanian architects can draw their

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inspiration in order to produce buildings with identity.

1. RESEARCH PROBLEMS AND OBJECTIVES

It is believed that architecture is a powerful cultural indicator and that "in no art are the modes as clearly identifiable as in architecture" (Onians, 1979). Architecture is a visual indicator, reflecting what was thought at the time it was built. The desire of architects with global aspirations to create overbearing signature buildings that disregard their environment is the problem. How to achieve the cultural and urban architectural continuities, between the past, the present and the future is the task of the architect. Therefore, the role of the architect in developing cultural identity is vital. Except for a few trials that could be classified as unique, the modern Jordanian architectural scene is undergoing a severe dilemma that lacks identity due to the absence of a national expression.

Petra has hardly been considered as part of the Jordanian architectural heritage. It is hoped that this research will demonstrate the importance of this heritage in shaping modern buildings, and adding identity to them. It is hoped also that this research will present a framework of architectural vocabulary that regulates and organises the recent Jordanian architectural identity. This framework will contribute to the wider study of the necessity of linking the recent architectural identity with the sustainable development of the buildings' surroundings. The aims of carrying out this research are:

1. To investigate the significance of Nabataean architecture;
2. To shed light on the importance of the architectural form when it comes to studying Nabataean architecture as a traditional morphologic model in heritage;
3. To discuss how to properly regulate the needs for modernisation of our architecture, while at the same time safeguarding the irreplaceable heritage that Nabataean architecture constitutes;
4. To present some of the architectural experiments of contemporary architects who use some of the Nabataean vocabulary as a source of cultural identity in the built surroundings;
5. To show architects and the public understand and appreciate the idea of identity that can be found in Nabataean architecture;
6. To show the ways of accommodating the needs for modernisation and investment in architectural projects, without compromising Nabataean character and identity, and to clarify the limits of acceptable change and criteria to apply for evaluation and assessment;
7. To suggest an appropriate vocabulary for the Nabataean architecture that can be used in current architecture in Jordan.

The paper draws attention to the critical problem of cultural identity, which is a key issue of contemporary debate. This research is important because of the need to provide an awareness for both Jordanian architects and the public about the importance of the Nabataean cultural product, not only historically or archaeologically, but also as a cultural resource from which some architectural elements can be used to inspire our future architectural identity.

2. METHODOLOGY: AN APPROACH TO OUR GOAL

This research will be carried out using the following methods:

1. Preliminary research of an up-to-date literature review of some publications related to this research concerning identity and architectural heritage, and those on Nabataean architectural style;
2. A preliminary survey and documentation of the Nabataean sites, including evaluation and assessment of the significance of monuments and historic buildings of those sites;
3. A preliminary survey and documentation of the recent Jordanian monuments that includes the use of Nabataean architectural features;
4. Conclusions and recommendations will be made.

3. IDENTITY AND ARCHITECTURAL HERITAGE: REVIEW OF LITERATURE

The term 'identity', as defined in the Oxford English Dictionary (Crowther, 1995), as the state of being very like or the same as something or somebody, or the state of being closely involved with a part of something. The core meaning of any national identity is a sense of sameness over time and space. Today it seems that everyone claims a right to their own identity. Nations demand identity as if it were a necessity of life itself; a sacred object, because it brings power by sustaining certain subjective positions and social boundaries (Saliya,
1986). Identity is a huge part of who we are. Many factors combine to shape identity such as genetic, social, cultural factors, and the built environment.

Hayden (1995) expresses a strong relationship between identity, memory and place. He states that "Identity is intimately tied to memory: both our personal memories (where we have come from and where we have dwelt) and the collective or social memories interconnected with the histories of our families, neighbors, fellow workers, and ethnic communities ... Urban landscapes are storehouses for these social memories, because natural features such as hills or harbors, as well as streets, buildings, and patterns of settlement, frame the lives of many people and often outlast many lifetimes" (Hayden, 1995). Mellon (2008) also states that "Communities expect to see their identity expressed in their cities in such elements of urban form as architecture...". Therefore, we should find the proper sphere to enhance local memories and experiences that make it understood by inhabitants as well as other users.

Architecture can be best defined as the art and science of integrating the physical environment within a socio space-time organisation. It can be also seen as a gesture and its insertion within any context should be aesthetically relevant (Vale, 1997). Aesthetics, a Greek word meaning perceptions and feelings, are the feelings that this integration process and their arrangements prompt us to have. This argument raises the question of the morality of architecture: that is considering architectural heritage in modern designs. Heritage can be understood as a pure human instinct that comes from the knowledge and benefiting ways that nature revealed through trials and experiences. Heritage sites are considered as our tangible and intangible identity and collective memory. It is sustained by remembering; and what is remembered is defined by the assumed identity. Architectural heritage is important and worth preserving because it is the storehouse of memories; a link with the past, and because of its universal aesthetic and historic value. In Archibald’s (2004) words: “memory is a dynamic process of using the past to define and redefine who we are, what we believe, what we like and dislike, and the values we hold dear”. Therefore, the loss of heritage as storehouse of memories will lead to a loss of memory and then a loss of identity, because, as Gillis states, identity is "something that can be lost as well as found" (Gillis, 1994). However, Loewenberg (1996) argues for adopting psychoanalysis in historic studies in order to recognise and utilise the patterns of feelings, attitudes and behaviours that shape history. This argument is derived from the fact that “history is not the collective memory of mankind; rather, it is the reformation and reinterpretation of that memory by each historian according to his time, social circumstance, method, and subjective past” (Loewenberg, 1996).

Living in or close to historic sites, especially World Heritage sites requires emphasising the influence of the physical environment on identity and self-perception. In this process, the place-identity theory has provided important contributions to the field of architecture (Hauge, 2007). It proposes a new integrative model of place in both built and natural environments. The influence place has on identity is seen as a result of the interaction between people and their physical environment; people affect places, and places influence how people see themselves. Relph (1976) argues that “there is for virtually everyone a deep association with and consciousness of the places ...This association seems to constitute a vital source of both individual and cultural identity and security, a point of departure from which we orient ourselves in the world”. The physical features and settings of the place, together with activities and functions carried out in it, are acknowledged by Relph (1976) as a source of identity of place. Places are an integral part of human experience. For Relph (1976), the essential quality of place was its power to order and to focus human intentions, experience, and behaviour spatially. It is related to the place where people grew up, taking into account the emotional connections between human beings and their environment; their sense of place. When attachment to places grows, we start to identify ourselves with these places. Elkadi (2006) identified the term identity as stemming from the cultural dialogue between users of the place and their surrounding built environment. The places in which people have lived influence their environmental preferences and affect the kind of environment they may prefer to live.

The discussion of architectural heritage is now considered a popular phenomenon (Abel, 2000; Taylor, 1986). As Aylin Orbaşlı (2000) points out, "The interaction of human beings with the past and the present, with buildings, spaces and one another produces an urban dynamism and creates a spirit of place". Society passes on identity with a place from one generation to another, leaving a legacy in the physical environment. From this phenomenon, the present generation can gain an
awareness of the cultural and environmental values of the past on which to build for the oncoming generations (Çelik, 2003). They must realise that maintaining their architectural heritage means maintaining the continuity of a culture.

The question poses itself whether it is possible to maintain the continuity of a culture within a world where everything is changing so rapidly or not. The answer lies in understanding how cultural identity is formed, which is a key issue of the contemporary debate. Cultural identity which refers to local values is definitely a very important concept in architecture, balancing the dominance of globalization. However, it needs an awareness not to walk into a trap of material culture which uses the concept of “cultural identity” as a marketing strategy. Cultural identity cannot be created; it can only emerge spontaneously from the place-memory which exists in any geographical location. This place-memory materialises a true “cultural identity”; when it is created by the architects it becomes too easily a stereotype that can be used in marketing their buildings.

Architecture, as mentioned above, is a very distinct tool for shaping identity (Çelik, 2003; Abel, 2000). Architectural heritage can be the shadow behind today’s production. A nation's architectural heritage is an important part of its identity. Its components are architecture, identity and history (Lahoud, 2008). Architecture can regenerate the past, prefigure the future, and articulate the present. This is how one can bridge the gap between the past and the present. The integration will lead to the creation of new buildings which are faithful to the inspiration provided by the inherited cultural heritage. Contemporary architecture in this context is understood as a reference to all significant planned and designed interventions in the historic built environment, including open spaces, new constructions, additions to or extensions of historic buildings and sites, and conversions. The central challenge of contemporary architecture is to respond to developmental dynamics in order to facilitate socio-economic changes and growth on the one hand, while simultaneously respecting the inherited built environment on the other.

4. CONTEMPORARY ARCHITECTURE IN JORDAN

Jordan presents a remarkable diversity. It is a land of diversity and civilisations, surrounded by modern architecture and the clear remnant of a rich ancient history. This ancient land encompasses sea and mountains, waterfalls and desert. It abounds in archaeological riches, from the Paleolithic to the present. It has been home to the earliest settlements and villages, and has relics of many of the world's great civilizations. Because of its central location, it was included in the dominions of ancient Iraq, including the Sumerian, Babylonian, and Assyrian empires. From the west, Pharaonic Egypt extended its power and culture into Jordan. The Nabataeans, as an Arab people (Bowersock, 2003; Ball, 2000; Parr, 1990; Healey, 1989; Lawlor, 1974; Hammond, 1973), built their kingdom in Jordan after migrating probably from the north Arabian Peninsula (Rababeh, 2005). Finally, Jordan was influenced by Persia and the classical civilizations of Greece and Rome, the relics of which are scattered across the Jordanian landscape. Since the mid-seventh century AD, the land of Jordan has remained almost continuously in the hands of various Arab and Islamic dynasties. This diversity of land and the continuity of occupation have molded Jordan into a land with a high density of cultural resources, where different architectural styles are represented. Each style is sufficient as a type of its own to define Jordan.

However, architectural identity in Jordan has been an issue of debate over the last three decades. During this period, Jordanian culture underwent comprehensive changes, many of which had deep implications for the formation of modern Jordanian national identity. In the trend of modernisation, the Western mode started its encroachment on the territory of the greatest local cultural heritage (Kultermann, 1991). As a result Jordan, one of the world's richest storehouses of architectural heritage, has lost many of its historic styles; and the impact of modernisation has led to a break in continuity between the inherited morphology and the more recent urban structure. The role of architecture in this dynamic and extraordinarily complex process has never previously been systematically explored.

Several philosophical questions have been raised with no clear answers. What is Jordanian architecture? Are we looking for identity or acceptance? What is the local context for an architect working in Jordan? Are the colonnades of Gerasa of equal significance to the rock-cut monuments of Petra or the Islamic Desert Palaces? Would it be one with Nabataean influences? Nabataean monumental architecture was for more spiritual purposes,
like temples and tombs, not for daily life. However, the Nabataeans as all other cultures had simple housing, which but has perished. From most early cultures only the more solidly built monuments have survived, but that does not mean that they only built those. Would it be Islamic or vernacular, or could it be a style that combines them all? How does one establish ownership of heritage and the choice of models one employs to generate form in contemporary architecture? The need to answer these questions has been increased in the past few years to create an identity that confronts globalisation. Intellectuals, architects, and designers in Jordan find themselves dealing with a paradox needing to project a certain image of themselves through their built environment (Steele, 1991; 2005; Al-Faqih, 1989). This has led to some attempts which express the local identity. These trials approached the dilemma of cultural identity in different manners. Concentration is based heavily on the architectural heritage of Islamic buildings.

Taking a quick review over some examples, one can notice how critical the issue is. Rasem Badran’s practices, for example, ranged from engaging to local context’s physical environment to exploring Islamic cultural heritage and the culture of place (Steele, 2005; Mahadin, 1994; Abu Hamdan, 1987). Jafar Tukan, on the other hand, approached the issue of identity through vernacularism and experimentation in construction details (Mahadin, 1994). One noticeable case is his SOS village in Aqaba Jordan which received the Aga Khan Award (Correa, Frampton & Robson, 2001). Another example is Ayman Zuaiter whose experiments were attached to local and Islamic traditions, social dimensions and integrating nature into design (Al-Abbasi, 2003). Finally, Bilal Hammad celebrated the court yard house through his post modernist practices and integrating the outdoor spaces. His late practices are characterized by introducing the previous concepts using pure shapes (Al-Abbasi, 2003).

The clash of styles that exists in the built environment is a product of the tension between globalisation and localisation processes, and that the dichotomy between the cultural forces currently shaping the built environment, i.e. modern versus traditional, Islamic versus Western, and local versus international, is the result of this tension. While some architects attempt to integrate local architecture into global cultural trends, others try to revive the traditional architectural style to protect the local identity and heritage. An example of this trend can be found in the clear thought of Rasem Badran in making the best use of the cultural heritage of a society that meets the requirements of the contemporary life (Steele, 2005; Badran, 1988). To be more specific, the confrontation concerning the issue of globalization versus local identity throughout history always occurred with continuous attempts to develop a national identity in architecture, but the outcome in the end was a mixture. Much of the debate about this architecture remains bogged down in the dichotomy of "modernity versus tradition" (Kuban, 1983). The resulting built environment is chaotic and lacks identity and spirit of place.

The debate is not only about styles; it is also about meeting the needs, contextual constraints, and cultural aspirations. Architects do not need to turn their sights globally to architecture that will be unfaithful to their culture, nor is this necessary to demonstrate their passion or validate their modernity. All they need to pursue is a scholarship in architectural history (Badran, 1988), theory, and criticism. This should be based on conserving heritage architecture, such as that on which this paper is based.

Within the sphere of this clash Nabataean architecture has not previously been considered. The previous examples clearly demonstrate that none of the above mentioned Jordanian architects approached the Nabataean architecture as a possible source of inspiration for provoking contemporary identity. This could be due to the time distance and relevancy that separates us from the Nabataean heritage in comparison to the closer Islamic and local ones. Another reason may be attributed to the misconception of the Nabataean architecture as Roman site or as architecture of the dead (Negev, 1986).

The characteristics of historic buildings defined by Feilden (2003) for a historic site can obviously be seen in Nabataean buildings. These buildings, as will be discussed below, have both historic and architectural significance. They give us a sense of wonder. As cultural property, they have specific messages and values. The architectural continuity with the Nabataeans for the sake of our cultural identity will reflect our capability to select architectural forms to, or inspire modern architecture. If Nabataean architecture has a meaning for us, it should find a way to express itself in the present organisation of form and space. In making value-based decisions about what is worth preserving for future generations, Nabataeans architectural character should be part of the design process. Consequently, Petra should influence Jordanian environmental preferences and the resultant
architecture. For this reason, this article will help to solve many difficult problems in the integration process.

5. PETRA’S HISTORICAL VALUES

Petra, situated in modern day Jordan, recently achieved a world-wide fame by being recognised as one of the new Seven Wonders of the World by the New Open World Corporation. Lauded famously as the "rose-red city half as old as time" (Burghon in Lawlor, 1974), Petra was re-discovered by the Swiss explorer Burckhardt in 1812. It was placed on the list of UNESCO’s World Heritage Sites in 1985. It was selected on the bases of the UNESCO’s criteria c (i), (iii), and (iv); (http://whc.unesco.org/en/list/326) (i) to represent a masterpiece of human creative genius; (iii) to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared; (iv) to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history. Consequently, Petra is inscribed on the basis of the Statement of Outstanding Universal Value and that the preservation of this value should be at the centre of any conservation policy and management strategy for it.

Jordan has been blessed to be the land of Nabataean civilisation, one of the greatest civilisations in terms of its ongoing impact on human life. The entire world links Jordan to the Nabataean capital, Petra. Moreover, I see that most Jordanians refer to themselves abroad by anchoring themselves to Petra. After two thousand years, Petra still gives the place and the people their character and identity, expressing its strength and success as an ancient architectural testament. It clearly shows that our civilization is engraved in the subconscious mind of the human race in the form of its rock-cut monumental facades such as el-Khazneh (Fig.4).

Petra gives us a sense of wonder and encourages us to know more about the Nabataean culture that produced it. It has artistic and human messages. Architects, archaeologists, and historians spent much effort studying this civilisation as history but rarely analysed its architectural vocabulary to create a traditional morphologic model that would enable architects to develop architecture that express its own spiritual values.

5.1 Nabataean Architectural Style: Origins

Petra was under Nabataean control, for which we have written records, from approximately 312 BC to AD 106. The Nabataeans also possessed another city with similar rock-cut tomb facades, Medain Saleh, now located in northern Saudi Arabia (Fig.1). Archaeological evidence for Nabataean architecture has not survived from before the end of the second or beginning of the first century BC (Schmid, 2001). Relying on the architectural details of the facades (McKenzie, 2001; 1990) and archaeological excavations, we are able to establish at least some basic concepts of the architectural styles of Nabataean buildings.

Earlier studies which offer an analysis of the architectural styles at Petra have been broadly based on the features of the tomb facades, and they have used two main tools of analysis: determining stylistic developments and detecting stylistic influences. The study of the stylistic choices reveals the affect of cultural influences. Additionally, as has been suggested, this was the essential element in a typological development of the rock-cut monumental facades, based on the details of their architectural decoration. During the last hundred years a number of attempts have been made to divide the rock-cut facades into typological groups. Brünnow and von Domaszewski (1904) divided them into seven groups. The first type, the Pylon Tombs, have one or two rows of crowsteps, and are followed by the Step, Proto-Hegr, and Hegr type tombs (Figs.2, 3). The crowstep was the most widespread geometrical form on the tomb facades. In addition to Petra, the capital, Medain Saleh (Hegra) is the richest Nabataean site of these elements (Anderson, 2003; Healey, 1989). Kennedy (1925) and Browning (1989) established typologies similar to the system of Brünnow and von Domaszewski, while Browning divided facades into five groups. Although he only named the first type Assyrian because only it has crowsteps, the other four types have single or band of multiple crowsteps in addition to a cornice (Rababeh, 2005). McKenzie (1990) established a new system of chronology for the main classical monuments of Petra, both tombs and public buildings, based on the details of the architectural decoration. Ball (2000) divided the rock-cut facades into two categories, the first of which forms the bulk of the rock-cut monuments in Petra and Medain Saleh, and is labelled as the Assyrian style. The second is classical, but also includes crowsteps. Schmid (2001) divided the facades roughly into two groups “more Oriental” and “more Hellenistic”. Netzer (2003) followed the basic divisions of the facades established by von
Domaszewski. The results of such analyses show that the basic styles seen in the rock-cut façades have some features of Hellenistic appearance, but in other cases the Nabataeans tried to orientalise the style, as on the crowstep tombs (Fig.2, 3) and ed-Deir (Fig.5) (Stewart, 2003; Lyttelton, 1974). Besides these features, there are some details which are Egyptian, Syrio-Phoenician, Assyrian, Parthian, as well as Roman (Schmid, 2001).

It is possible to suggest that the introduction of the crowstep element into the Nabataean rock-cut façades may have been a two dimensional symbol for the Assyrian and Babylonian ziggurat, and that its intensive use by the Nabataeans may have been a gesture of tribal solidarity (Rababeh, 2005), like the stylistic choice of the classical orders in Greek architecture during the fifth and the fourth centuries BC (Onians, 1979). The crowstep motifs (Fig.2, 3) were probably the earliest architectural feature of the Nabataeans (Wenning, 2003; Schmid, 2001), and that the Nabataeans probably inherited this basic idea from Mesopotamia. The sculptors carved the crowstep in relief as modeled form which projects out of a flat background, and giving a three-dimensional effect. This work may be described as a bas relief or low relief with an inclined background, and gives a three-dimensional effect. Some scholars note that the number of steps differs from this found on the original Assyrian version of this motif with only three steps, whereas the number of steps in Petra and Medain Saleh varies between 4 and 6 (Browning, 1989).

Along with a motif of two half crowstep, some façades, the Proto-Hegr and Hegr types, have a large cavetto cornice (Fig.3). This is a feature of Egyptian architecture (Wenning, 2003; Browning, 1989). The same feature, however, can also be found in Persian architecture, assumed to be a result of Egyptian influence (Rababeh, 2005). It is possible, therefore, that the concept also came from that direction.

Another example of Egyptian influence is the obelisks, as on the Obelisk Tomb (Fig.6) which has a plain lower part and is decorated with four obelisks in its upper part; cut free from the rock behind. There is also a pair of rock-cut obelisks at the High Place.

The larger, and more richly decorated, facades are more complicated and show stronger classical influences (Fig.4). Several scholars (e.g. Lyttelton, 1974; Wright, 1962; Robertson, 1943) have noted that the architectural images of some of Petra’s monuments are shared with other Hellenistic and Roman buildings or monuments. McKenzie (1990) concluded that the 'baroque' architecture of Ptolemaic Alexandria, as also depicted in Second Style Pompeian wall-paintings (phase 1), is reflected in the classical architecture of Petra. The decorative stuccos and wall paintings in temples, rock-cut façades, and private houses were very rich (Kolb, 2003). Some scholars (Wenning, 2003; Schmid, 2001; McKenzie, 1990; Lyttelton, 1974) have connected the architectural composition of el-Khazneh (Fig.4) with that of Palazzo delle Colonne in Ptolemais, Cyrenaica, the Northern Palace of Masada (30-29 BC), the description of the famous river boat of Ptolemy IV, and Qasr al-Abd (182-173 BC) (Will and Larché, 1991). Since there is no support for direct cultural influence between Pompeii and Petra, scholars have tended to accept Alexandria as the source of these influences. Alexandria was the source of inspiration for all these examples.

Further architectural influences can be found in the results of the archaeological surveys and excavations of temples and houses at Petra and other Nabataean sites. Some scholars have divided Nabataean temples into typological groups according to the form of their architectural plans (Netzer, 2003; Wright, 1961). Netzer prefers to concentrate on the main features of the design rather than on typology. He defines some of the characteristics of Nabataean temples as: a plan in the form of a square within a square, an ambulatory, a broad naos and a tripartite adyton, a temenos with an external altar, and a forecourt with benches (McKenzie, 2004; Netzer, 2003; Wright, 1961). Other characteristics such as the roof terrace, an ascent to the roof, and a naos open to the sky cannot be confirmed without careful study of the roof structure. Moreover, Nabataean temples are typically more square shaped than rectangular in plan. The huge courtyards with porticoes in front of the temples, like the “Great Temple”, the Qasr el-Bint, and the Temple of the Winged Lions are a typically considered a Roman feature, but could also reflect Egyptian and Mesopotamian influences. This feature can be seen in every Egyptian temple from the Ptolemaic period. The tripartite adyton, the additional shrine, the inner courtyard and the square plan also possibly show South Arabian influences. Other scholars have attributed the source of the square form to Parthian architecture, such as the temples at Kuh-i Khwaja, Hatra and Ai Khanum (c. 300-250 BC) (Colledge, 1986). The square plan and the tripartite adyton can also be seen in the temple of Jebel Khalid on the Euphrates (Clarke, 2003;
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In the private houses at Petra there are clear features indicating that the Nabataeans were inspired by late Hellenistic houses and palaces in the Near East. One of the most characteristic features in this context is the courtyards seen in the two storied houses at az-Zantur (Kolb, 2003), and even in the rock-cut houses, such as the house opposite to the Main Theatre. Moreover, the houses of al-Katute have a further aspect of this feature with the cistern under the main courtyard. It should be mentioned that a peristyle courtyard can be seen also in the Nabataean rock-cut monuments, such as the Urn Tomb and the structure between the Roman Soldier Tomb and the triclinium opposite (Schmid, 2001).

Therefore, the Nabataeans developed their architecture in a milieu containing Hellenistic and later Roman cultures in addition to Eastern ones. The major interest is in how the dialogue between different cultural traditions shapes the construction of ideologies and identities. It can be said that the simpler rock-cut facades show stronger Oriental influences, while the more complicated ones show more Western influences. It is probable that the shift from crowstepped facades to classical ones, as seen by the Khazneh replacing the Hegr tombs below it, represents the shift of the Nabataean cultural orientation from East to West (Rababeh, 2005). Beside these influences, some architectural features which are characteristically Nabataean can be found, such as the Nabataean capital (Fig.7) (McKenzie, 2001). Moreover, the combination of the elements together in the Nabataean monuments gives them their own character, as seen in the simplicity of el-Deir compared to the complexity of al-Khazneh (Fig.4, 5).

Nabataean buildings can be studied as examples of function and form. Some of these qualities are feelings conveyed by the sense of time and place. Relph (1976) defines terms like ‘spirit of place’, ‘sense of place’, and ‘genius of place’ that are used to express the intangible dimension as much as the uniqueness and mystery that can enclose a place, and that are derived from people’s emotional and mental attachment to place. Consequently, Nabataean buildings can also be considered as examples of a historical period, which is often related to a specific architectural style. It is their tangible elements that embody its significance for association with specific events or persons, and it is those tangible elements both on the exterior and interior facades that should be clarified. Nabataean architecture incorporated geometric forms, lively colors, materials and construction techniques that contribute to its historic qualities or significance as well as its aesthetic considerations.

5.2 Nabataean Architectural Vocabulary

The most important point is that Nabataean architecture and construction techniques show amazing exploitation of the possibilities of the Nabataeans foreign contacts and the available materials from which different characters can be shaped (McKenzie, 1990; Rababeh, 2005). Examination of Petra should include the physical determinism, where the environment, dimensions, colours, texture, and stylistic form are seen as having direct effects on architectural identity. Nabataean monuments, based on the structural techniques used in preparing them, can be divided into three groups, namely: freestanding buildings, rock-cut monuments, and mixed monuments which were built in some parts and carved in others. The freestanding buildings are not well preserved, except for the Qasr el-Bent, but the archaeological corpus of excavation is full of architectural details from which the holistic image can be reconstructed. However, most of the rock-cut monuments are to some extent well preserved, and can be considered as a rich source for some architectural elements.

5.2.1 The Visual Aspects of the Main Characteristic of the Nabataean Architecture

Our appreciation of the visual aspects of the main characteristics of the Nabataean monuments or parts of them can be assisted by an understanding of the character values within each monument. It is important that a distinction is made between heritage significance on the one hand and the aesthetic value on the other. In order to determine the visual aspects of the main characteristic of the historic monuments at Petra the three steps recommended by Lee H. Nelson (2008) are used to identify them: the overall visual aspects (shape), the visual character at close range (materials, colours and craft details), and the visual character of interior spaces (surface materials and finishes). The following sections will examine each of these steps.

5.2.1.1 Overall Visual Character: Shape

The shape of a building is an important aspect of its overall visual character. The Nabataeans, in constructing their tombs, added many symbols and signs of geometrical forms, plants and animals. The symbols of
crowstep as a geometrical form were the most common among these symbols. Obviously, most of the Nabataean rock-cut monuments in both Petra and Medain Saleh contain crowsteps carved in relief (Figs.2, 3). As mentioned above, the crenellations of the crowstep create a shape possibly an abstraction of a ziggurat. It is done by the creation of bas relief or low relief carving. The shape is squeezed onto a nearly flat two-dimensional surface while maintaining as much as possible the perception of the full three-dimensional form. The thickness of the relief can be expressed as the range between two-dimension crowstep and full three-dimension of the ziggurat.

Other monuments show mixed geometric forms; western and eastern styles. The best and the most famous example of these monuments is the Khazneh (Fig.4) which is the best preserved and the most elaborately carved facade. The facade is approximately 30 m wide and 42 m high (McKenzie, 1990). It consists of two storeys; the lower has six Corinthianising columns and a frieze. The centre four columns are surmounted by a pediment, and forms the entrance to the rock-cut tomb chambers. The upper storey has tholos in the centre placed between two projecting bays, which are crowned by the two halves of a broken pediment. The tholos is topped by an urn, which is 3.5 m high (Figs.4, 8).

Other examples with a similar overall shape are al-Deir (Fig.5) and the Corinthian Tomb. They have horizontal and vertical elements with the middle portion of the tholos surmounted by the urn flanked by two masses of broken pediment. The monuments have other visual aspects that help define their overall character, including the pattern of vertical columns, the decorative horizontal entablature which separates the lower floor of the building from the upper one, the red-rose color of the rock, the large openings including the entrance way, and the urn surmount the tholos as a crown (Figs.4, 5, 8). The Obelisk Tomb, named after the four obelisks that decorate the top of the tomb, has two stories. The upper storey is distinguished by its visual character of the four vertical obelisks (Fig. 6). The lower storey, known as the Bab el-Siq Triclinium, which contains a traditional dining hall for Nabataean funerary rites, is decorated in a more classical style than that of the upper storey.

5.2.1.2 Visual Character at Close Range

This step involves looking at the building at close range; where it is possible to identify the visual aspects of the exterior by moving up very close to see all the surface qualities of the materials, such as their color and texture, or surface evidence of craftsmanship or age.

5.2.1.2.1 Materials and Colours

At close range, the visual character is most often determined by the surface qualities of the materials and craftsmanship. And while these aspects are often inextricably related, the original choice of materials often plays the dominant role in establishing the character at close range because of the colour, texture, and/or shape of the materials. The variety and arrangement of the materials and craftsmanship are very important in defining the visual character.

Building materials play a definite role in the architecture and the style of Nabataean buildings. Sandstone was the most readily available construction material to hand for the Nabataean masons. The sandstone, which is encompasses most parts of the Petra area, led to its early description as mentioned above as “a rose red city, half as old as time” (Burgon in Lawlor, 1974). The Nabataean architects used the benefits of the availability of sandstone. They obtained whatever they needed of stone for architectural purposes and for monumental work (Rababeh, 2005). This was especially applicable to residential buildings. However, in public buildings, a variety of imported materials can be seen occasionally in use such as wood, granite, and marble. These were brought to Petra by means of the Nabataeans’ extensive trade network. Nonetheless, by far the largest volume of building material used was of sandstone. The rock-cut monuments were carved in different sandstone layers, and these layers were also used to provide blocks for freestanding buildings. It is worth noting that the softness of sandstone allows for very easy carving. Rockwell (1993) states that tools normally associated with wood carving, such as gouges, are very frequently used in carving sandstone.

5.2.1.2.2 Details of Craftsmanship

There are many instances in Petra where details of craftsmanship dominate the close visual character. These are especially noticeable because the stones are individually of a uniform colour, but their surfaces were worked with different tools and techniques to create a great variety of textures. This texture is very important at close range. It was a deliberately contrived surface that is an important contributor to the visual character of the
monuments. The traces of chiselled lines tilted at 35 to 55 degrees to the horizontal are the most common feature resulting from the Nabataean sandstone dressing (Fig.9). In fact two types of these lines can be observed: coarse and fine lines.

Rababeh (2005) analysed the coarse lines, he assumed that either a point or a claw chisel “gradine” with a mallet has been used for the coarse type. However, he distinguished a single point or pick from a toothed chisel by the regular spacing, as well as the fineness of the lines (Rababeh, 2005). This is suggested by the width of the grooves and the number of them per cm, as the distance between the grooves depends on the distance between the teeth of the claw chisel. As today, it is likely the three or four-toothed chisel was used in Petra by the Nabataeans. For the regularly spaced coarse lines, Rababeh (2005) argues that a claw chisel with pointed teeth was used rather than a rectilinear teeth or a pointed chisel. He observes the craftsmen using both claw chisels with four teeth to produce both of these types of lines, but preferring the use of a claw chisel with four sharp teeth in the restoration work in the “Great Temple”. Rababeh (2005) tried to produce lines like these by using a claw chisel with four rectilinear teeth and a metal mallet. The same pattern of lines was produced, although he did it on limestone.

Fine line types of dressings are similar to the coarse line types, but the density of lines per cm is greater and the lines are finer. It seems probable that a sharp-toothed claw chisel was used for this type. However, the regularity of the carved lines in all of the rock-cut monuments led Rababeh (2005) to argue for the existence of a further tool. A rasping tool, made of metal, like a hairbrush or a comb might have been used. This alternative tool could be driven by hand or with a wooden mallet. The reason for suggesting this is the difficulty of obtaining regular fine lines in sandstone despite its softness. In principle, it would be difficult to distinguish the marks of tool from sharp-toothed chisel marks or marks from the so-called chemin-de-fer (Bessac, 1986; Rockwell, 1993). The chemin-de-fer exists today, and it is probable if it was used in antiquity (Ginouves and Martin, 1985). But traces of it at Petra can be distinguished from those of a sharp-toothed chisel, for example in the façade of Tomb 813, in which the fine lines are slightly curved, as if a tool like a hand plane or hairbrush was used. The curved lines show the use of a tool like a chemin-de-fer rather than a sharp-toothed chisel. The chief difference between them is that the sharp-toothed chisel involves more skilled labourers working over a longer time, while the chemin-de-fer involves less skilled labourers working and producing a higher output over a shorter time. As the sandstone in Petra is fairly soft, this would enable the stone masons to achieve both regularity and fineness in their work.

5.2.1.3 Visual Character of Interior Spaces: Surface Materials and Finishes

The surfaces of facades may have evidence of either handmade or machine made products that are important contributors to the visual character. When identifying the visual character of Nabataean interior spaces one should emphasise the importance of the materials and finishes of the surfaces of walls, floors and ceilings. As discussed above, most of the interior rocky surfaces were worked with different tools and techniques to create a great variety of textures; including fine line and coarse line dressings (Fig.9).

To conclude, the survey above leads us to locate the main characteristics that can define the Nabataean architecture which are unique to the Nabataean style (Table 1). The other elements such as the use of courtyard, classical orders, full pediment, marble cladding and flooring, and the use of stucco and paintings on walls and columns were frequently in Greco-Roman and Islamic architecture. The most significant basic vocabulary that symbolises the Nabataean architecture contains the following characteristics or codes (these characteristics are clarified in Table 1):

1. Crowstep motifs symbol (Figs.2, 3).
2. Broken pediment (Figs.5, 6).
3. Circular structure, Tholos (Figs. 2, 3, 8).
4. Urns (Fig.8).
5. Obelisks (Fig.6).
6. The Nabataean Order (Fig.7).
7. Tilted line dressing (Fig.9).
8. Rose red sandstone colour (Fig.4).

How does the Nabataean architectural vocabulary shown in Table 1 contribute to heritage revival? Surely using this vocabulary based on visual configurations which belong to earlier Nabataean civilisation is not adequate in itself to revive a sense of cultural heritage when designing modern buildings. The transformation of cultural codes into contemporary design is the main problem in maintaining a sense of collective memory. In particular, regeneration projects require an understanding of the deep
meaning of these cultural codes, which have many parameters and ambiguous aspects, not only in terms of formal / visual aspects. If the continuity of any culture is based on only formal / visual aspects; if, in other words, it would be maintained by borrowing the visual images from the past for modern architecture, then it raises many problems for the material culture, in which architecture may be manipulated as an objectified kind of image. Although the Nabataean architectural vocabulary refers to the stylistic forms and represents the visual character of buildings which are the result of fairly limited types of technology from about 2000 years ago, it is acceptable to use this vocabulary in contemporary architecture, given that the latter can be recreated by the technological possibilities and resources of the twenty-first century.

Architects absolutely do need to understand and interpret the deeper meaning of the cultural identity of a given architectural heritage in relation to its spatial configuration, and then transform these spatial relations into contemporary circumstances. Cultural identity can be redesigned as an archetype, but not as a stereotype, as seems to be the case in some contemporary architectural examples from Jordan.

6. JORDANIAN TRIALS USING NABATAEAN ARCHITECTURAL CHARACTERISTICS

Some architects practising in Jordan have understood the importance of the Nabataean architectural characteristics. Different types of the Nabataean architectural vocabulary which are used in current architecture in Jordan can be detected. The examples themselves can be considered as recommendation to the types of future architectural projects that may contain some of the Nabataean vocabulary (Shown in Table 1). By understanding the vocabulary in depth we can achieve an architectural alternative that is capable of enhancing the Jordanian cities identity. The following sections examine some of these examples.

6.1 Al-Hussein Bin Talal University, near Ma’an

Al-Hussein Bin Talal University, established in 1999, is located in the southern part of Jordan, where almost all educational disciplines are taught there, including Tourism, Hotel Management, Science, Computer Engineering, Education, and Mining Engineering. The University’s main campus is located 7 Km to the west of the city of Ma’an and 30 km east of Petra. It was designed by Consolidated Consultants (CC), Amman.

While desiring to create spaces and places that facilitate learning, the designers extended the university’s mission with the potentials of the natural and built environments. They created an atmosphere suitable for promoting local thoughts. A mixture of both traditional and contemporary styles were used in designing the buildings; keeping modern elements such as, prefabrication and modern references and materials, while using traditional elements such as orders, urban and architectural typologies and symmetry without accepting them as integral parts. This was important for giving the University users an enjoyable urban fabric filled with a traditional atmosphere of the region. The architectural image is derived from the unique nature of Ma’an as a desert settlement in southern Jordan. Benefiting from its historic heritage context and traditional origins, the designers used the crowstep crenellations, the Urn, and the rose colour to give a distinctive identity to the University. The designers applied the crowstep motif, split into two halves in all the facades of the buildings (Fig. 10). A successful experiment in using the three elements, the crowstep, the rose red colour, and the broken pediment images can be seen in the main gate of the University (Fig.11). In addition, the designers also placed a grey granite Nabataean capital supporting an urn as a land mark of Nabataean heritage in the middle of the roundabout, 40 metres inside the main gate (Fig.12). It is the capital which makes it Nabataean not the urn.

The whole result can be appreciated for its innovative approach, which integrates Nabataean architectural style, planning environmental dimensions to preserve the treasures of the past and simultaneously to realise the promise of the future as a response to the need for cultural continuity and identity. It goes much beyond that, and provides a powerful statement about contemporary architecture within the context of a developing country such as Jordan. This design transcends debate to create its own modernity and plant the seeds for a new tradition in the construction industry. Al-Hussein Bin Talal University is sufficient as an example to show that many buildings are suitable to adopt aspects of the Nabataean architectural style.

6.2 Crown Plaza Resort, Wadi Musa

The Crown Plaza Resort is located in Wadi Musa, very close to the visiting centre of the ancient city of
Petra. The main entrance of the hotel includes the orders with a steel structure. The colour of the stone used in the building is rose red, while the dressing of the blocks has tilted Nabataean lines. The interior of the restaurant has crowstep symbols used as shelves for artefacts, behind the main counter (Fig. 13). It is worth mentioning the Mövenpick Hotel in Wadi Musa, very close to the main gate of Petra, designed by Rasem Badran (2009). The designer did not use any of the Nabataean vocabulary, although he incorporated the crowstep motifs in the exterior view of the façade including the parapets of King Abdul Aziz Foundation for Research and Archives project, Riyadh, Saudi Arabia. This use could possibly be attributed to formal manipulations to indicate the main entrance by showing integration of mud brick into concrete frame of the left side of the main entrance façade (Fig. 17). Another possibility of using the crowsteps could be attributed to the influence of the local context language.

6.3 Al-Jamal Student Accommodation, Irbid

Al-Jamal accommodation is located in Irbid, north Jordan, about 300 km north Petra. The project was designed by the author in 1993 to accommodate the undergraduate female students of Yarmouk University and the Jordan University for Science and Technology. The building is of ten storeys high, the first contains the reception, and the basement contains the sports centre, a library, laundry, and a restaurant. The other storeys house the bedrooms; each storey contains 28 rooms. The designer used a tholos to help shape the main facade, and crowned the tholos with a row of crowsteps (Fig.14). The use of different textures of limestone is another characteristic feature. The inner area of the crowstep has a fine dressing, while the outer part was dressed roughly by a point chisel. This creates a contrast between the two surfaces and makes the visual appearance for the crowstep lines strong.

6.4 Abu-Alrob Residential Building, Irbid

The Abu-Alrob residential building which is located in Irbid, was designed by the author in 1995. It consists of 12 flats. The main facade is crowned by a shape, with sloping lines separated by a semicircle. This shape alludes to a broken pediment. The mass in the centre with a triangular cross-section reflects the image of a tholos (Fig.15). The articulation of masses and the elements of the elevation are purely responses to functional requirements. The overall relative simplicity of the elevation and the uncomplicated articulation of the façade elements create an effect of monumentality.

6.5 Antiquated Examples

There are examples of villas that demonstrate the antiquated use of the Nabataean architectural vocabulary in modern buildings showing a passion for that heritage. These facades strive for monumentality (Fig. 16). The articulation of volumes, masses and elements of the elevation are all dictated by the requirements of the form. The central part of the composition was designed as stereotype because the facade is copied completely from el-Khazneh, while the framing of the windows is reminiscent of el-Deir. Although examples of this type are opportunities for establishing a dialogue with the Nabataean traditions and contemporary architecture in Jordan, their detailing is costly and is time consuming. This makes this approach uneconomic for larger scale projects.

7. CONCLUSIONS

Nabataean architecture has its own aesthetic, historic, and symbolic values. The richness of Petra is situated in specific time–space contexts that call for consideration of not only the opinion of architects and scholars but also the awareness of lay people such as residents and user groups when making their construction projects. It could be a symbol of cultural identity and continuity. Consequently, the Nabataean architectural heritage is one of the important roots from which the Jordanian architects can draw their inspiration in order to achieve buildings with identity.

The paper has identified and classified the different elements of the Nabataean architectural vocabulary. This subject has international interest and there is every reason to offer an architectural vocabulary that could be modified into new designs. The paper addresses the crucial problem of how to continue this architectural heritage in the 21st century, and how to create an effect that can represent or allude to cultural identity without copying its cultural codes as architectural stereotypes. It is suggested that using a vocabulary based on these visual configurations which belong to earlier Nabataean civilisation is adequate in itself to revive a sense of cultural heritage when designing modern buildings.
The most significant elements that make up the vocabulary of Nabataean architecture consist of: rows of crowsteps, the half crowstep motif, broken pediment, tholos, the Nabataean capital supporting the urn which makes it Nabataean, Nabataean capitals order, obelisks, tilted line dressing, and rose red sandstone colour (Table 1). The use of some of these characteristics as images of the past within a model of nonverbal communication of the meaning in the built environment is examined. These examples show the use of the Nabataean architectural vocabulary in current architecture in Jordan in different types of projects such as, residential and office buildings, and gateways. They demonstrate how Jordan’s most successful modern architectural designs should harmonise with their rich architectural heritage. However, the awareness of these characteristics by the Jordanians has received limited consideration. Jordanian government could widen and encourage the use of the Nabataean architectural vocabulary in the future construction projects to preserve the community identity. The types of future projects that can incorporate elements of the Nabataean architectural vocabulary mentioned in this article include hotels, hospitals, trade centres, palaces, and embassies, and both public and private projects, both locally or internationally. They can use the inspiration of one element or more in an abstracted manner.

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Fig.1. Nabataean Kingdom, its extent, ancient trade routes and major centres, Petra and Medain Saleh (After Rababeh, 2005: Fig.1.13).
Fig.2. Crowstep motifs; the most widespread geometrical form noted on the tomb facades. With rows of crowsteps on the left and half crowsteps in the right.

Fig.3. Crowstep (as two halves) and the cavetto cornice motifs.
Fig. 4. The large and richly decorated facade of El-Khazneh, complicated and showing stronger classical influences, Petra.

Fig. 5. The large and richly decorated facade of ed-Deir shows a combination of classical and oriental styles, Petra.
Fig. 6. The Obelisk tomb with the upper storey distinguished by its visual character of the four obelisks.

Fig. 7. A Nabataean capital, the Blue Church.
Fig.8. The Tholos topped by an urn on el-Khazneh, Petra.
Fig. 9. The traces of chiselled lines tilted at 35 to 55 degrees to the horizontal are the most common feature resulting from Nabataean sandstone dressing.

Fig. 10. The crowstep split into two halves on the facade of Al-Hussein Bin Talal University.
Fig. 11. The main gate of Al-Hussein Bin Talal University using the split crowstep, rose red colour, and the broken pediment images.

Fig. 12. A grey granite urn supported by a Nabataean capital as a land mark of Nabataean heritage in the middle of the circle of Al-Hussein Bin Talal University.
Fig. 13. Half Crowsteps used as shelves for artefacts behind the main counter of the restaurant, Crown Plaza Resort in Wadi Musa.

Fig. 14. Al-Jamal student accommodation, Irbid, designed by the author, used the row of crowsteps, and the tholos on the main façade.
Fig. 15. Abu-Alrob residential building in Irbid, designed by the author, shows the use of a sloping broken mass, which portrays the broken pediment, and the mass in the centre with triangular cross-section reflects the image of the tholos.

Fig. 16. Villa in Mafraq, north Jordan, the whole of the centre part of the composition is copied from el-Khazneh.
Fig. 17 Exterior view of façade The crowstep motif was functioned to indicate the main entrance by showing integration of mud brick into concrete frame of the left side of the main entrance façade showing integration of mud brick into concrete frame, King Abdul Aziz Foundation for Research and Archives, Riyadh, Saudi Arabia (Badran, 2008).
Table 1 The most significant basic vocabulary that symbolises the Nabataean architecture contains the following characteristics or codes.

<table>
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<th>SYMBOL</th>
<th>DESCRIPTION</th>
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<td>1</td>
<td>Crowstep motifs. The most widespread geometrical form noted on the tomb facades.</td>
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<tr>
<td>2</td>
<td>Broken Pediment. Based on a pediment consisting of two sloping halves, without a centre part.</td>
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<tr>
<td>3</td>
<td>Tholos. A cylindrical mass on elevation usually topped by an urn. In modern examples simplified to a triangular or cylindrical mass framed by a broken pediment.</td>
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<tr>
<td>4</td>
<td>Ums. A massive shape crowned a tholos. In modern examples, it marked the apex of a building, or is even used as a landmark in a traffic circle.</td>
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<tr>
<td>5</td>
<td>Obelisks. A shape with four flat sides which all taper inwards towards the top. In modern examples they lead visual planes to the highest point, also used as landmarks.</td>
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<td>6</td>
<td>Nabataean Order. This simple order is uniquely nabataean, and characterised by the plain form of the capitals.</td>
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<td>7</td>
<td>Tilted Line Dressing. A chiseled Nabataean sandstone dressing, created of parallel lines tilted at 35 to 55 degrees to the horizontal. Still used nowadays as a developed chiseled called &quot;Msamsam&quot;.</td>
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<td>8</td>
<td>RED ROSE SANDSTONE COLOUR. A unique natural color of the Nabataean city sandstone. Still affects the local architecture as an influence in strengthen a massive characteristics.</td>
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REFERENCES


النبتية المعمارية الأردنية في العصر المعماري فيها رباحة محمد شاهر

البحث الذي نناقشه يتعلّق انطلاقاً من المباني التي يمكنها أن تمكن الفروع الصحية، والأقسام، والصالة الرياضية التي يمكنها أن تروج للحفاظ عليه من حيث بصرية خاصة في العصر الحاضر.

الشروط التي تضمن إنجاز مشروع المبنى، العناصر، والأدلة الأساسية الأدبية والطبيعة المنزلية، بالإضافة إلى الشروط المحددة للembre، والمتطلبات التي تؤثر في صياغة المشروع.

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