Planning and designing sustainable paths for religious visits A proposed model for a sustainable path for the Arbaeen visitors

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Abstract

Zeyart AL-Arbaeen in Karbala is one of the most important events in Iraq to perform this religious ritual. Zeyart AL-Arbaeen in Karbala is an opportunity to strengthen the human ties between the masses participating in this visit.

Zeyart AL-Arbaeen in Karbala is characterized by the fact that it relies heavily on walking, as millions of visitors walk to Karbala for distances that reach several kilometers and take days, and the number of visitors exceeds millions, passing through many Iraqi cities and villages, through different regions, including the desert and urban areas. And within different climatic conditions due to the different seasons (such as cold and rain in winter and high temperatures in summer

Despite the importance of this visit, it faces many challenges. The research will focus on the most important challenges, which are providing the visitor's comfort requirements during his walk towards Karbala and hiking in Zeyart AL-Arbaeen.

Based on the foregoing, the research assumes that planning and designing the roads that the visitor takes with a sustainable perspective contributes to the comfort of the visitor, maintaining fitness and good health, and avoiding them fatigue and exhaustion, in order to achieve good preparation for that great religious event.

Accordingly, the research aims to propose a pedestrian road model for the visit with a sustainable perspective to improve the walking experience for visitors and ensure comfort and safety by adopting the

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concept and indicators of physical comfort. Achieving physical rest is important for maintaining general health, especially when doing strenuous physical activities such as hiking, and for improving physical and mental performance, concentration and endurance.

In order to achieve physical comfort during Zeyart AL-Arbaeen in Karbala, the following physical comfort indicators were adopted:

• Thermal comfort for the visitor: by providing shaded visit paths using afforestation, roofing and seating areas, which reduces the exposure of visitors to extreme heat in the summer. Environmental technology such as solar cooling systems and natural ventilation can be used to reduce the temperature.

• Physical comfort for the visitor: through the provision of sustainable rest stations, which include the most important services that the visitor needs with high quality and commensurate with the different groups of society and all age groups.

The analytical descriptive method was adopted in order to determine physical comfort indicators, and geographical information systems (GIS) were adopted to analyze the current situation. The results of the spatial data analysis of the current situation showed that the visitor paths achieve physical comfort indicators, and accordingly a proposal was presented for a sustainable pedestrian path model that meets the needs of visitors in terms of physical and thermal comfort, including determining the locations of afforestation as well as determining the locations of the signature of sustainable rest stations with their various spaces.

Keywords: religious visits, pedestrian road, Sustainable rest stations, Zeyart AL-Arbaeen visitors

1. Introduction

The event and the city are closely related, as cities are the sites that witness important and historical events, whether religious or non-religious, and cities bear a tangible impact of those events, including buildings, sites, statues, and souvenirs that convey those stories and events through time. And since cities are the sites of events, they play a vital role in reviving and preserving those events throughout history, and they become a destination for tourists who want to explore and learn more about those events.1)).

The nature of events varies according to their content, size, location, and the nature of their organization, and affects the nature of administrative and planning procedures at the city level, so these events are called huge events such as: religious events, international exhibitions, and major sporting events that have direct or indirect strategic effects on the host city, and the characteristics of events are (2)

1. An event that has a beginning and an end (a period of time)
1. It has a global reputation, and generates great economic effects
1. attract sustained media attention,

1. It is characterized by a large number of attendees and visitors ranging in the millions,
1. Attracts international visitors and international media coverage,
1. It is staged on a scale that justifies investment in new, purpose-built venues for the staging of the event,

which does not have a fixed site, sometimes referred to as free events or mobile events, and may be shared or competing among several cities to host or be closely associated with the site

2. Religious events

The events are related to the philosophical aspects through understanding the series of sequential and complex events that lead to the realization of its concept, the event is not considered an event unless it is related to the history of peoples and has a value transmitted through time (3). The important events that leave a material and moral impact are directly related to the place where the event took place, so many philosophers and writers point out the importance of studying events and the historical values they bear, and analyzing each event and its impact, leading to knowledge that determines its nature in which it occurred (4) ,Due to the association of religion with the beliefs of peoples, religious events, especially those immortalized in history, have become at the core of the religious and intellectual belief of those peoples, and this eternity leads to the emergence of the impact of that religious event in time and place by reviving it where it occurred, when it occurred, and how it happened, with its secondary sequential events Consecutively, this is what makes the religious event regular in well-known cities(5) .

Religious events require good planning and organization to achieve success and avoid any problems or challenges. Good planning and organization of religious events is important to improve the level of safety and public health, as plans are developed to deal with emergency incidents and provide medical services and first aid. In addition to achieving economic benefit, as religious events provide an opportunity to achieve economic benefit and attract tourists and visitors to the host city or town. Good planning and organization of religious events can provide a suitable environment for visitors, where logistics, accommodation, transportation, and public spaces for ceremonies and prayers are provided. Good planning and organization of religious events provides appropriate opportunities to participate in the religious occasion, by organizing various events and activities that suit all age and social groups.(6)

Religious events differ according to the type of event and the religion practiced, and this difference includes the religious, social, cultural and recreational goals that people seek to achieve through these events and also by the different ways of reaching the event site, some religious visits were reached to their sites by different means of transportation and some depend on walking that It gives a sense of challenge and achievement and is a unique and special experience that helps develop spirituality and closeness to God.(7)

In these visits, patience, endurance, and a good preparation for walking and physical exertion are required. It imposes physical and psychological endurance, and therefore the procedures and organization

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for these events differ. The research will focus on the religious event based on walking and the Arbaeen visit in the holy Karbala as a case study.

2.1. Religious events based on walking:

Walking religious visits are an important part of the cultural and religious heritage of many peoples in the world. These visits are a unique spiritual and physical experience, as a visitor takes long walks through wild nature and rugged roads to reach a sacred religious destination. These visits carry deep religious, cultural and spiritual meanings, as they are an opportunity for visitors to get closer to their faith and strengthen their relationship with God, as well as an opportunity to enjoy nature and contemplate God's creation. As well as the experience of community integration, learning about new cultures, and exchanging expertise and experiences. It requires visitors to exert great physical effort, enduring the weather and difficult conditions, which makes it an arduous experience, but its spiritual reward makes it an unforgettable experience. (8(

On the other hand, visitors in religious visits that depend on long walks need to prepare well to meet their physiological, psychological and spiritual needs before starting the journey, so that they can continue the long walk, enjoy an unforgettable experience and strengthen their relationship with God. Accordingly, the research will address the challenges that the visitor may face during the walking trip.

2.2. Challenges of walking religious visits:

Religious visits on foot are a form of worship that requires visitors

to be well and properly prepared to face the challenges that can occur during the journey. These challenges include many weather and natural factors, in addition to health and fitness issues. The research will address the most important of these factors:

2.2.1 cardiovascular stress:

Walking religious visits are a strenuous exercise, as the visitor needs to walk for long hours over long distances. This intense physical activity can put a strain on their heart and blood vessels. (9)

Heart rate monitoring studies conducted in order to assess the walking intensity of visitors indicated that individuals tend to walk at approximately 56 percent of their maximum intensity, and this represents a relatively low pressure on the cardiovascular system in the visitor's body. (10)

Physical stress occurs when muscles need large amounts of oxygen and food to fully function and withstand physical exertion. The heart rate increases and blood vessels dilate to provide the muscles with the necessary oxygen and nutrients. And when the physical stress continues for a long time, it can lead to damage to blood vessels and the heart, in addition to that the visitors may be within a group of different ages and genders, and thus the speed varies, as the visitors walk at the speed of the slowest member in the group, such as children or the elderly, and thus the visitor works to increase or decrease The speed depends on how hard he feels, and this affects the heart rate. (11)

Therefore, it is important to prepare well for the trip and organize

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physical activity properly to avoid excessive physical stress. Visitors should take care of proper nutrition and adequate fluids, and avoid walking Severe or excessive physical exertion, and attention to necessary rest during the trip. Individuals with cardiovascular disease should also consult a physician before performing a walking religious visits.

2.2.2. metabolic stress

Metabolic stress is stress that occurs in the body as a result of intense and continuous motor activities, which deplete the energy stores in the body very quickly. This includes movement activities

It can lead to metabolic stress, intense and continuous sports activities such as running. (12)

Studies show that walking can lead to metabolic stress. The rate of metabolic stress can vary depending on the intensity of walking, the distance traveled, the time spent walking, the terrain intensity, and the body load. Visitors to religious events tend to walk long distances. This presents a significant physiological challenge, not only in the form of cardiovascular stress, but in metabolism or energy. However, it can be estimated that the visitor almost doubles his daily calorie expenditure during Average day of walking. To maintain this level of metabolic activity, visitors must significantly increase their daily caloric intake. Studies have indicated that the human brain is particularly vulnerable to changes in energy balance. As a result, feelings of hunger may elicit a specific physiological and psychological response that deepens the perceived spiritual experience by improving internal perception.

Therefore, feelings of hunger may require the visitor to be more aware of the body and its underlying limitations.

2.2.3.muscle stress

Walking can be a source of muscle strain if done excessively or irregularly. Studies show that muscular stress can lead to muscle tears, joint sprains, muscle pain, fatigue and exhaustion, and may increase the risk of sports injuries and arthritis. (13)

Perhaps the greatest stress on a visitor's body during a religious visit on foot is the constant and repetitive stress on the musculoskeletal system. Most people are not accustomed to walking for four to six hours a day, let alone doing it continuously for days. As a result, visiting on foot greatly stresses the musculoskeletal system, which triggers a physiological response followed by either adaptation or injury. Studies indicated the relationship between the weight carried by the visitor and muscle stress, as the extra load carried by the visitor on foot leads to injuries to the tendons, joints and skin, and represents the most likely reasons for the visitors to stop, either to rest and recover, or to end their journey. (14)

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2.2.4. environmental stress

Another factor to consider regarding the physical challenges associated with religious walks is the environmental conditions the visitor may encounter, including changes in temperature and increased exposure to sunlight. Heat and cold are physiological stressors in their own right. Heat is generated while muscles are working, and when outside temperatures are also high, this can put extra stress on the body. (15)

2.2.4.1. Hyperthermia

Studies show that high temperatures can affect overall health and increase the risk of heat exhaustion, dehydration, skin infections, headaches, and dizziness. The primary mechanism of thermoregulation by the human body is sweating and the resulting evaporative heat loss. Sweating without adequate fluid intake leads to physiological stress in the form of dehydration. Thus the visitor can experience significant fluctuations in body temperature and body water levels. (16)

Exposure to such environmental stress may be another factor that alters the public perception and spiritual experience of visitors. Hyperthermia leads to a decrease in cognitive function. It is important to distinguish between passive (environmental) and active (exercise-induced) hyperthermia, although exposure to hyperthermia may present a potential risk, it is important to note that the visitor will likely experience an adaptive response to repeated heat stress and acclimation to the environments warm. This acclimatization usually leads to an improvement in thermoregulatory function through body water retention and improved perspiration. (17)

2.2.4.2. Natural light

The sun's brightness during walking religious visits can affect public health, as direct exposure to the sun increases the risk of sunburn, dehydration, exposure to heat stress and other health problems.(18)

One environmental factor to consider when visiting on foot is exposure to natural light. Studies show that the average time spent outdoors on weekdays is much less time than in the experience of visiting. Increasing the time you spend outdoors can be both harmful and beneficial. Scientific studies have indicated that exposure to ultraviolet rays can lead to skin damage. The beneficial effects of sun exposure are the production of vitamin D. Another benefit as a result of increased exposure to sunlight is improving mental health, as many studies have shown that natural light improves anxiety and depression. (19)

Based on the challenges that the visitor faces during the religious visit, there are requirements that must be balanced among them, some of which are related to the visitor himself, and this requires visitors to have good physical and health fitness. Including those related to other parties that work on appropriate planning and organization to ensure the safety of visitors and provide them with the necessary comfort and supplies. Therefore, the research concludes a group of factors that should be studied and taken into account when planning and organizing religious visits that depend on walking. The most important of these factors are:

1. Distance and duration: The distance traveled, the duration of

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the trip, and the time it takes to reach the religious site must be studied. This requires calculating matters related to weather conditions, natural obstacles, and geographical distances.

1. Culture and Traditions: The culture and traditions associated with walking religious visits should be studied, and ensure that these traditions are respected and appropriate religious norms are followed.

1. Health and physical fitness: The health and physical fitness of individuals who intend to perform religious visits that rely on walking must be studied, and to ensure that individuals are able to withstand the physical effort associated with these visits. Nutrition and health care experts can be sought to provide appropriate advice and guidance.

1. Security and Safety: Security and safety related to religious visits that rely on walking should be studied, and necessary measures taken to ensure the safety of visitors and protect them from potential risks

1. Spirituality and psychological impact: The psychological and spiritual impact of religious visits that rely on walking should be studied, and ensure that visitors have a positive and enjoyable experience and improve the experience of religious visitation.

1. Protection from challenges related to the environment: reducing heat and providing shade, as well as improving aesthetics and air quality.

Based on the above, the research proposes applying the concept of sustainable pedestrian streets as well as sustainable resting stations, achieving the factors that explain the importance of these religious visits, improving their organization and planning, and providing the

appropriate conditions for visitors to achieve a positive and satisfactory experience during these visits. There is evidence that the lack of proper planning for the management of religious visits can cause negative economic impacts affecting the general welfare of the local community (20). The World Tourism Organization noted in (in 2017) that sacred destinations urgently need to be carefully managed to preserve authenticity and integrity while making them accessible to all.

3. The indicators reached by the research to develop a sustainable pedestrian path

The research proposes applying the concept of sustainable pedestrian streets as well as sustainable resting stations as the research will explain in its subsequent paragraphs.

3.1.sustainable pedestrian streets

3.1.1. Walking and urban walkability:

Walking is the oldest form of urban transportation in the world, and until the advent of modern modes of transport in the nineteenth century, most cities relied on walking as a means of transportation and supported the possibility of walking in their plans. (21)

Walking is defined as a short-term movement from one place to another. Walkability is a concept defined as measuring the degree of suitability of walking in a given area. Walkability reflects the general conditions in an area, such as the quality of pedestrian facilities, road conditions, land use patterns, walking comfort, community support, and safety. (22)

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With the adoption of the concept of urban sustainability in city planning, walking again has become an important means of sustainable urban transportation. The reason for the renewed interest in urban walking is the fear that car-dependent cities will not be sustainable in the future, due to energy costs, fuel consumption, air pollution and other environmental impacts.

3.1.2. Sustainable pedestrian Streets:

Lynch defines movement paths in general as longitudinal channels through which a person can move, so the various elements of the city can be perceived and a visual image can be formed, and they are also means of movement and transition between parts of the city and linking its elements. Streets, roads, pedestrian paths or railways (23)

The world's greatest cities are fun and safe to walk in, resulting in less driving and better public health. It is the most option that any person from all classes of society can make to move from one place to another, and it does not require paying money for transportation or waiting in crowds for hours on a road crowded with cars. The importance of walking is highlighted in that it is a clean and easy process for the infrastructure, healthy for the individual, and an integral part of the community's life. (24).

The western city is characterized by a free and safe pedestrian zone in the downtown area, where the main center of the city is and the meeting point for pedestrians, whether local or foreign. We find that the urban planner and designer deposited the pedestrian areas in these areas with all the elements: "beautification", "coordination",

"pleasure", and "creativity».The implementation of the planning theories for the pedestrian movement network has met with success in many cities of the world. It is noted that all large cities, which are rushing towards regaining their status, are equipped with a special system for pedestrians, so pedestrian zones have become the main base in Western countries. Therefore, the theoretical distance to the center is determined by the duration of the pedestrian's transition from one point to another, within the limits of not more than ten minutes. (25)

3.1.3. Principles of sustainable planning for pedestrian streets:

For a pedestrian network to be comfortable it must make the walking experience pleasant and appropriate, comfort is related to the emotional reactions of the pedestrians, and this dimension is mostly influenced by the features of the pedestrian infrastructure. This includes variables such as the characteristics and condition of sidewalks and remaining pedestrian infrastructure, presence of obstructions on sidewalks, street trees, street furniture, slopes, lighting and other elements of pedestrian street planning. (26)

When planning pedestrian streets, the following principles are observed: (27)

- Connectivity
- (Legibility)
- Sustainability
- Safety
- Accessibility
- Permeability

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These principles benefit the built environment and the natural environment and work to achieve a balance between them

3.1.4. Sustainable planning and design principles for pedestrian streets:

When planning and designing pedestrian streets, and in order to overcome and solve the climatic challenges faced by the participants on foot in Zeyart AL-Arbaeen, which were previously explained, the following design principles must be followed: (28)

First: providing shade and reducing the air temperature

The pedestrian's thermal comfort is a major factor in choosing walking as a mode of transportation. The streets and pedestrian paths in traditional Arab architecture were narrow and shaded by buildings, and when the need for additional or temporary shade arose somewhere, the solution was to create umbrellas of wood or cloth to extend over areas of the street adjacent to the buildings, especially in those areas where it was concentrated Pedestrian activity, which creates a comfortable environment for them. In modern cities sustainable solutions offered by urban designers include roofing, use of awnings, sunshades and tree-lined walkways.

Second: Reducing the effect of heat islands:

Thermal comfort in densely populated areas is not only affected by the local climate, but also by the effects of additional heat resulting from the urban effect of heat gained due to sunlight or what is called urban heat land, which is simply the storage of roofs and streets in the city for the heat generated from the sun and its release in the evening. An effective reduction in the urban footprint of heat gain can be achieved through:

-Architectural or floor elements constructed with materials that retain and radiate less heat.

- Negative shading measures that reduce the exposure of pavement and wall surfaces to the sun and increase air circulation see figure (1)

-Trees adapted to the environment and green spaces to reduce ambient temperatures, such green spaces can cause a psychological sense of cooling . see figure (2)

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Unused ground surface areas should not be paved and their components of exposed gravel, crushed granite, stabilized sand or stabilized soil should be left.

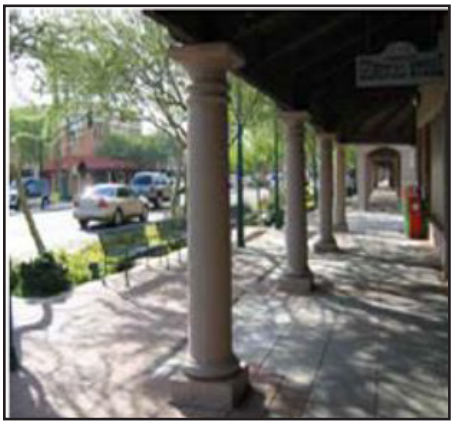

figure (1) Negative shading

figure (2) Trees and green spaces

Third: shadow paths and shadow spots

The design of street spaces should enhance the degree of thermal comfort by establishing a network of safe, comfortable and constantly shaded paths, and accordingly, pedestrian walkways must be shaded by buildings, trees, or other acceptable means.

Shade paths and main shade spots should include not only shade, but green spaces, pedestrian resting furniture, and other elements in an organized manner.

Fourth: Lighting

Adequate lighting helps reduce the threat of harassment and criminal activity, thus encouraging trekking. The standards for street lighting and the distance between poles differ from one country to

another, and depend on many factors, such as: (29)

1. Road type and surrounding uses: The road type and surrounding uses can affect the lighting requirements and the distance between the pillars. For example, highways can need more powerful and more frequent lighting than internal roads.
1. Environmental and health standards: Street lighting must meet health, safety and environmental protection standards, by providing lighting in a way that reduces carbon emissions and light pollution.
1. Technical Standards: Street lighting must meet technical design and installation standards, including quality, durability, safety and easy maintenance.

The distance between the columns in street lighting is usually determined based on the level of lighting that is provided, and this is done by determining the number of columns that the road needs to provide the required lighting. Usually, a distance of 25 to 50 meters is provided between each lighting pole in the main streets, and less than that in the less crowded roads. The exact distance is usually determined based on local needs and technical and environmental requirements.

Fifth: Afforestation:

Afforestation on both sides of walking paths is a design necessity to provide shade, reduce air temperature, and provide comfortable walking paths for pedestrians, in addition to other environmental

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benefits such as providing oxygen, absorbing carbon dioxide, and providing shelter for birds and other living creatures.

The following standards must be adhered to when planting pedestrian walkways (30)

1. The distance between one tree and another should not be less than (48-) m in internal streets and not less than (1012-) m in highways.
1. Adaptation of plants to local environmental conditions.
1. Plants planted in the streets should be of a species that bears the environmental conditions of the region and is resistant to diseases, insect pests and environmental pollution factors.
1. Cultivation of the inner streets of cities is carried out according to what the specialists see for each case separately, and it is better that the sidewalk width is not less than 3 m. Regular established trees must be selected for afforestation.
1. That the nature and size of plants grow in proportion to the size and nature of the street and the conditions of the site in which it is grown and the fixed facilities surrounding it, so that the branches of trees are not subject to entanglement with wires and other things, and therefore standing or tent trees that are spread are chosen according to the conditions of the street.

When selecting these trees, whether they are local or imported species introduced years ago, they must have the following characteristics:

1. To be a perennial species that has a high ability to withstand the local environmental conditions of the area in which it is grown

in terms of high and low temperatures, drought, winds, salinity, and others.

1. To have a high resistance to insect and disease pests or snake worms.
1. To be fast, densely growing and abundantly branching.
1. It should have a strong root system that is in-depth and not spread horizontally so that it does not impede the growth of other plants and does not affect neighboring facilities and does not block sewage or drinking water pipes.

Sixth: physical rest

In order to achieve the physical comfort of pedestrians, the following indicators must be achieved: Designing paths for pedestrian movement, with special mention of the activities of value engineering (31)

1. Adequate walking space, no obstacles in the path
1. Good surfaces
1. Attractive places to stand or sit

3.2.Sustainable rest stations:

A rest station is defined as a place intended to provide rest and relaxation for people who are on a long journey or doing a strenuous activity. Rest stops are often available on highways, main roads and in places where travel is common. Rest stations usually contain a set of facilities and services that help provide rest and relaxation for people. (32)

Rest stops are very important to public health and safety, as they help reduce tiredness and stress caused by a long journey, and help provide a safe and comfortable place before continuing the journey. The characteristics of rest stations differ according to the different countries, regions and the purposes for which they are provided, but in general, rest stations are characterized by a number of common characteristics, among which are:

1. Providing comfort and relaxation: Rest stations include a group of facilities that help provide comfort and relaxation for people
1. Availability of sanitary facilities: Rest stations provide sanitary facilities such as bathrooms, toilets and other hygiene facilities.
1. Availability of food and beverages: rest stations include restaurants, canteens, supermarkets, drinks and snacks.
1. Availability of fuel stations: Fuel stations are available at rest stations, and fuel stations provide services related to cars and trucks
1. Availability of stores and entertainment services: Some rest stations provide stores and entertainment services such as gaming halls, electronic games and children's parks.
1. Provide spaces for green rest: Green spaces are available in some rest stations to provide spaces for rest, relaxation and enjoyment of nature.
1. Availability of safety and security: rest stations provide safety and security for visitors, as they are characterized by the presence of surveillance, guarding, good lighting, and first aid facilities.
1. Availability of tourist information: Some rest stations provide tourist information about the area, nearby attractions, and places to visit.

3.2.1. rest station for religious visitation pedestrian routes

Resting areas are important places for religious visitors, where they can rest and relax after worshiping and energize. And since the characteristics of the rest stations differ according to the region and the purpose of establishing the station, therefore, the visitors rest station can extract its characteristics and activities from the challenges facing the visitor, which were previously extracted

Characteristics and events of the station	The challenge the visitor faces
Characteristics and events of the station The presence of public bathrooms designed in a way that suits all genders, age groups and people with disabilities	Health and fitness
Provide a healthy food and drink space to avoid dehydration and heat exhaustion	
Providing space for first aid	
Providing space for awareness lectures on the importance of fitness and health	
A space to rest and sleep	
A space to provide the basic needs of the visitor, such as strollers for the elderly and other equipment that eases the load	
Surveillance, guarding and good lighting space	Safety and Security

An educational and awareness space about the religious event and tourist information about the area, nearby attractions and places to visit	Culture and traditions
It includes spaces that are linked between the inside of the station and the outside reality, such as gardens and enjoying nature.	Spirituality and psychological influence
A place of prayer	

3.2.2. Standards for distances between resting stations for religious visits

There is no set standard for the distances that should be between resting stations for religious visits, as these distances vary according to the location, circumstances, and the needs of visitors. It is important to consider the following factors when planning and designing rest stations

1. The distance between the religious monuments: there should be resting stations near the main religious monuments and at an appropriate distance between them, to provide a place for visitors who need to rest between the monuments.
1. Population density: The number of rest stations must be commensurate with the population density, and it must be available in places frequently frequented by visitors.
1. Type of visitors: The type of visitors and their special needs, such as people with disabilities or people suffering from heat exhaustion, must be considered, and appropriate resting stations should be provided for them.
1. Weather conditions: Possible weather conditions in the area,

such as high temperatures or heavy rain, must be considered, and appropriate facilities should be provided for those conditions.

1. Transportation: The means of transportation available to visitors must also be considered, and the provision of rest stops on the main roads and sites that can be easily reached. In general, rest stops should be evenly provided along the route, and optimal distances can be determined based on these factors and the needs of visitor.

3.2.3. Sustainability of the visitor rest station

Designing a sustainable resting station for visitors who make religious visits requires consideration of many important factors that contribute to improving and preserving the environment, and providing a comfortable environment for visitors. Renewable energy, environmentally related designs, recycling, community awareness), the factors are:

1. The use of sustainable materials: the use of sustainable materials in the construction of the rest station, such as materials that have a certificate of good environmental performance, and recyclable materials, which reduce the environmental impact.

1. Renewable Energy: The use of renewable energy, such as solar and wind energy, to generate electricity and operate the necessary facilities at the station.

1. Environmental design: The resting station must be designed in an environmental way, such as using natural lighting and natural ventilation, and designing green gardens and outdoor areas to reduce temperatures in the summer.

1. Water and sanitation: Providing a system for recycling the water

used in the resting station, and providing a sustainable sewage system to collect organic waste and convert it into organic fertilizer.

1. Education and awareness: educating visitors about the importance of preserving the environment, rationalizing the use of natural resources, and maintaining cleanliness at the rest station.

1. The environmental and social impact: The environmental and social impact of the rest station must be studied, and the necessary measures should be taken to reduce it, such as reducing noise and environmental pollution.

Designing a sustainable resting station for religious visitors helps preserve the environment and provide a comfortable environment for visitors. This can be achieved by taking the necessary measures to improve and preserve the environment, and by providing comfortable and high-quality facilities for visitors

Zeyart AL-Arbaeen is one of the largest annual religious events in the world. It is held over several days in Karbala, Iraq, with nearly 20 million visitors from Iraq and other countries. This visit has brought about unique reflections on the human spirit and psyche in all respects, because this sacred ritual inspires spiritual attraction to the memory of Imam Hussein, peace be upon him, in particular, and to his companions. Notables are general. Accordingly, the indicators will be implemented within the practical framework that will be discussed.

4. Study area:

Zeyart AL-Arbaeen Street of Karbala visitors that extending from

Baghdad city to Karbala city has been selected as a study area, its length is 85 km, and its width is 10 m. The street passes through three governorates represented by (Baghdad, Babylon, and Karbala) through many cities represented by (Al-Rasheed - Al-Mahmudiyah - Al-Latifiya - Alexandria - Al-Musayyib - Al-Hussainiya) to reach Karbala city. Map (1) shows Arbaeen street location from Iraq and its governorates, with an indication of the cities it passes through.

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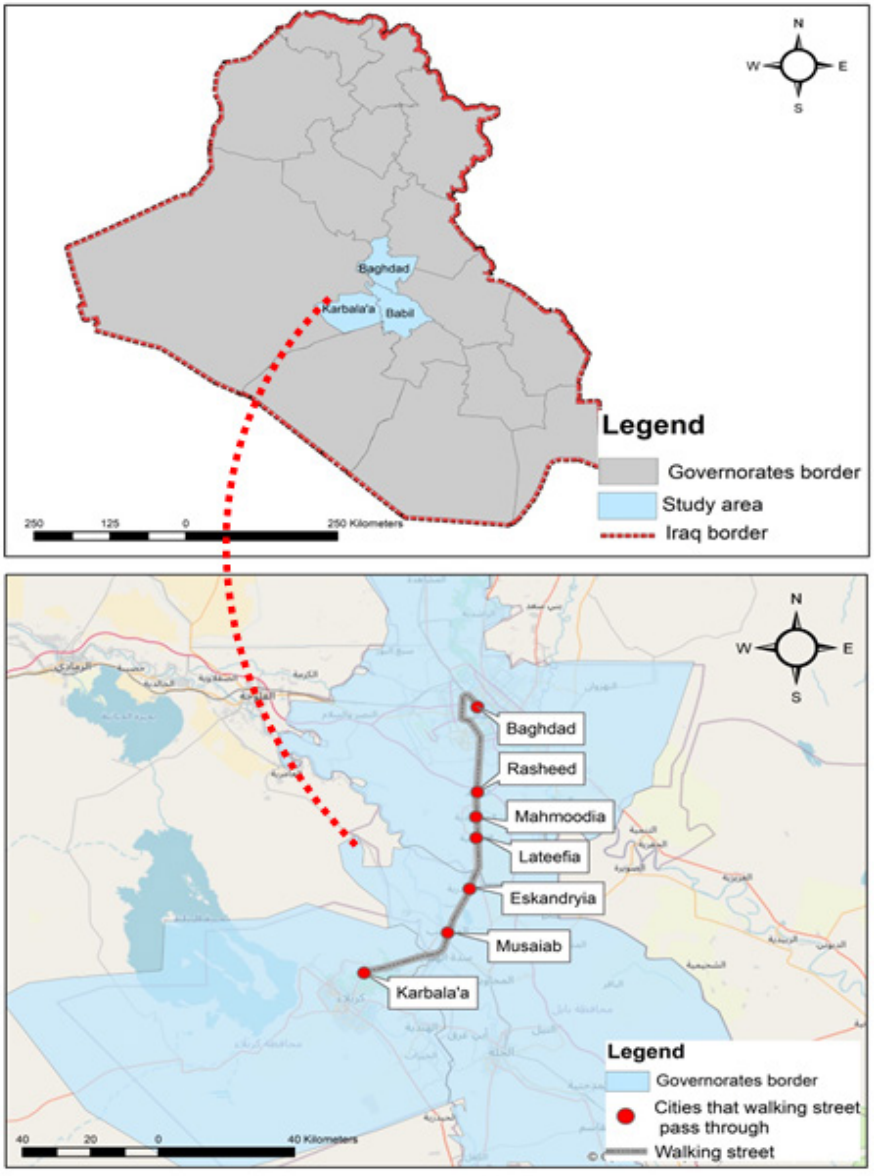
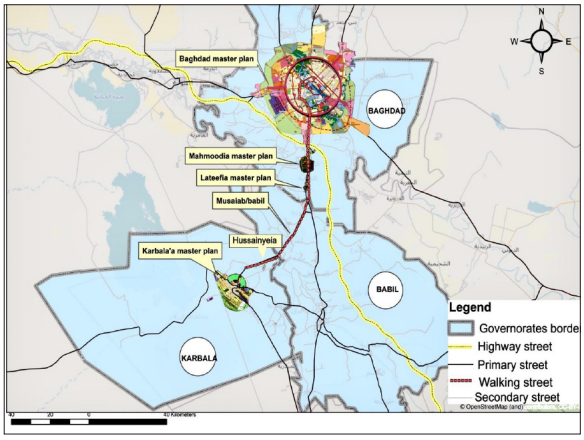


Map (1) shows Arbaeen street location from Iraq and its governorates, with an indication of the cities it passes through.

Source: Researcher depending on satellite visible images and GIS software

Arbaeen Street of Karbala visitors take a parallel location to the railway line and the primary street, Map (2) shows the location of Arbaeen street from cities master plan and from the other kinds of streets.

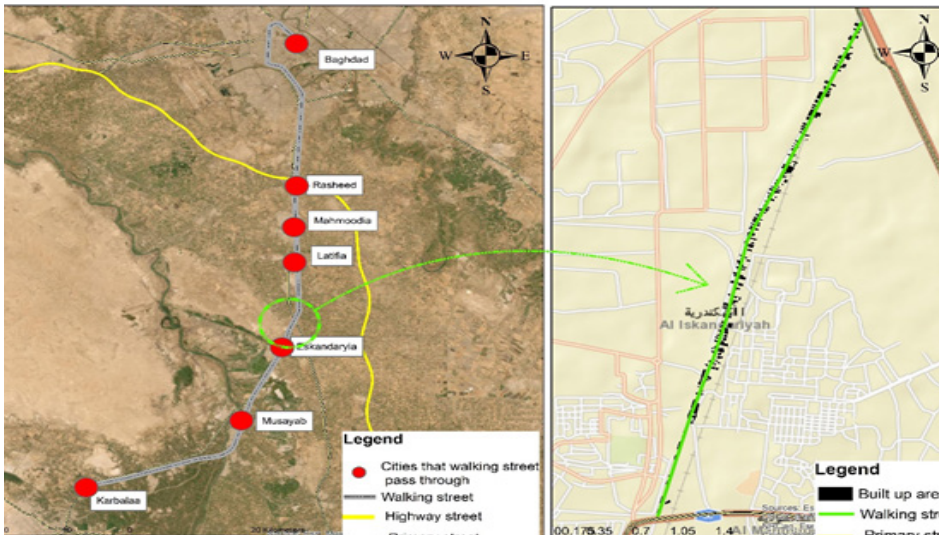


Map (2) shows Arbaeen street location from cities master plans and the other kinds of streets.

Source: Researcher depending on satellite visible images and GIS software.

4.1. existing status of street

The part of Arbaeen Street, which will be the scope of the study, is located within Alexandria district, The study of current status for this part is based on visible satellite image and GIS software. The street extends for a distance of 5 km, with a width of 10 m. It is specified for pedestrians only, with no cars passing through it. It is 30 meters away from the railway and 1 km from the primary street. On both sides of the street there are a number of buildings that represent small mosques, places to serve food and public bathrooms in random buildings that lack planning and design and at a level that does not achieve adequate service and comfort for visitors.



Map (3) shows the location of the part to be developed, while Fig (1) shows its existing state.

Source: Researcher depending on satellite visible images and GIS software

Fig (1) shows the existing state of the part to be developed.

Source: Researcher depending on satellite visible images and GIS software

4.2. The development proposal for Arbaeen Street

After studying the existing state of the street and its services, it was found that it does not meet the comfort of visitors in terms of environmental comfort, security, and safety, in addition to the lack of planning and design of its facilities. Therefore, several proposals were presented to re-plan and design the street, as follows:

1. Removing the current service buildings and replacing them with sustainable rest stations that extend along the street and are 600 km away from each other, consisting of basic services needed by Arbaeen visitors with a unified design that is in harmony with the religious occasion to provide visual and psychological comfort.
1. Adding shading roof and seating, which contributes to alleviating the physical burden on the visitors of Arbaeen, while providing several garbage bins at a close distance from each other in order to maintain the cleanliness of the street.
1. Afforestation of the sides of Arbaeen Street and the sides of the railway, with the planting of vacant spaces and increase green spaces area, to reduce temperatures, which contributes to psychological comfort for visitors. Fig. (2) shows the development proposal for Arbaeen street.

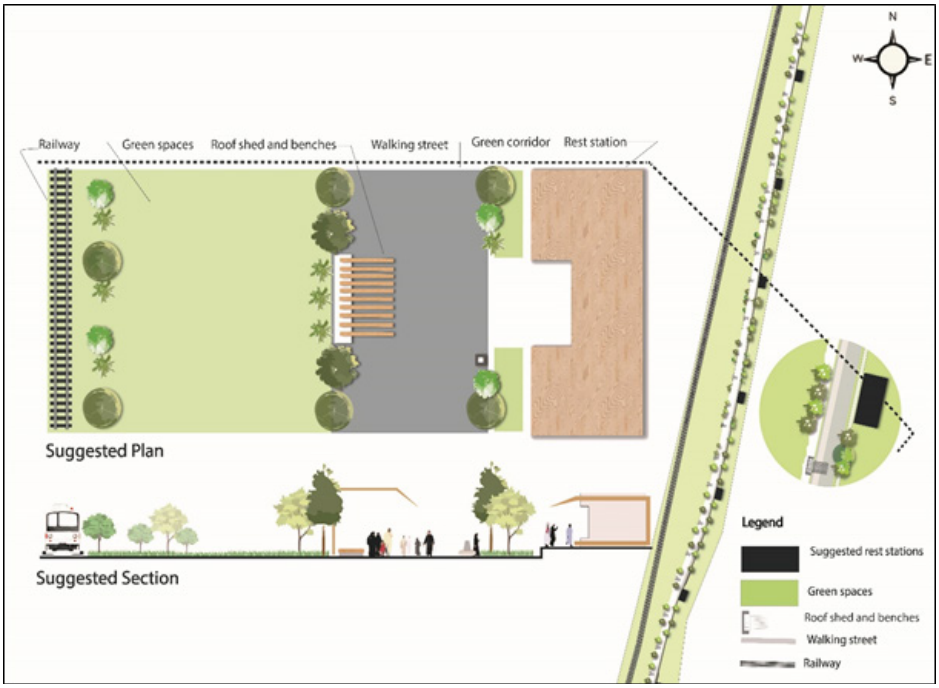


Fig. (2) shows the development proposal for Al-Arbaeen street.

Source: Researcher depending on satellite visible images and GIS software

5. Conclusions and recommendations

Conclusions:

The research reached several conclusions, the most important of which are:

1. The Arbaeen visit to Karbala is characterized by the dependence of the visitors on a very large percentage of their access to Karbala on foot, a journey that lasts for days, and most of the roads that the visitors take lack the planning and design requirements that meet their needs and provide them with physical comfort and protection from climatic factors.

1. As a result of the huge number of pedestrian visitors and the long distance, there is a need for suitable places to rest.
1. Hiking can cause serious health effects and problems in the absence of preventive measures and logistical services for visitors.
1. The pedestrian visitors of Arbaeen suffer from the harsh climatic factors in summer and winter as a result of the lack of climatic treatments necessary to mitigate the severity of the impact of these factors.
1. The service processions of the Arbaeen pedestrians spread along the pedestrian roads randomly and are not based on planning rules and standards, which causes wastage and waste of efforts due to their lack of the necessary infrastructure to meet the needs of visitors in terms of services, places of rest, sleep and logistical services because they depend on the efforts and initiatives of people.

Recommendations:

1. Because the Arbaeen visit and other large visits take place on various religious occasions and continue during the year and in several cities, it needs a comprehensive planning view to organize the current walking paths and rehabilitate them and create new paths to accommodate the increasing numbers of visitors and secure their movement within safe paths designated for walking and isolated from Vehicle tracks.
1. Creating a formation that includes a team of specialists in urban and regional planning, urban design, and other necessary

disciplines, to undertake the task of planning and designing walking paths according to the principles of sustainability.

1. Paying attention to planting the internal and external roads in the Iraqi cities in general, and the roads that connect the city of Karbala with the rest of the Iraqi cities, in order to provide shade and mitigate the effect of the high summer heat.

1. With regard to the proposed sustainable rest stations, the research suggests that they be of two types, permanent and temporary. The permanent ones can be used throughout the year as rest stations for travelers on these routes. The temporary ones are mobile stations that can be used in different places at the time of religious and social occasions and events.

1. The need to establish special organizations working on and educating the users of the pedestrian roads on the principles of preserving the environment and material assets within the road and respecting the environment and preserving it from all kinds of pollution and tampering.

1. Develop future plans to develop the Arbaeen pedestrian paths according to the research proposals and the needs of the pedestrians, and provide these paths with the requirements of comfort and safety for visitors, and provide feedback to assess the stages of implementation of these plans and the extent of their success.

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