Analytical study of Pocket Parks (small Parks) guide new sustainable cities in the difficulty of providing large green spaces (Al-Ganain City as a model(

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ABSTRACT:
Rapid urban growth has led to significant changes in the city's shape during recent years. Urban sprawl is a common issue in fast-growing cities, contributing to issues such as The unfair usage of land, high density, car dependency, and pollution. Future cities should create various urban spaces that support city life and address prevalent urbanization challenges. While many research efforts have studied the benefits and design principles of pocket parks, there is a lack of systematic and quantitative understanding. This could impact decision-making for their optimal implementation. To address the knowledge vacuum, this study conducts a critical and practically analysis of pocket parks from three perspectives: benefits, spatial distribution, and design methodologies. The New Sustainable Al-Ganain City is one of the cities planned by the Iraqi state in Babylon Governorate, and it uses a small space system to distribute green spaces inside the city design. As a result, the study article attempted to create a suitable spatial distribution and Detailed designs for the repeated green spaces in the site plan and offer them as executable models.

Key words: Pocket Parks, sustainable cities, green spaces.

Introduction

Green infrastructure plays a crucial role in urban settings, delivering ecosystem services like moderating the urban heat island effect and enhancing air quality [2].Natural ecosystems provide many opportunities for outdoor enjoyment, physical activity, and socialization. They improve health by lowering blood pressure and heart rate, reducing stress and negative emotions, and enhancing perceived resilience. [10]. Small parks, such pocket parks, are essential for extending outdoor leisure spaces in highly populated metropolitan areas due to limited land resources and high real estate expenses[5.[

pocket parks an inventive method of increasing urban greenery in the metropolis. Typically, urban pocket parks are located in densely populated regions, it serve communities and are accessible to a range of individuals [1.[

Urban environments cannot function without green infrastructure, which offers crucial ecosystem services including lowering surface runoff, enhancing air quality [10], minimizing the urban heat island effect, and promoting biodiversity [12.[

Furthermore, natural settings provide a flexible backdrop for socializing, physical activity, and outdoor pleasure. By lowering heart rates and blood pressure, stress and negative emotions, perceived resilience, and the risk of death from all causes, they can improve health [8]. However, It can be difficult to offering extensive green with limited land resources and expensive real estate. In this regard, pocket parks and other tiny, reasonably priced micro-parks are becoming important components of green

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infrastructure and the main strategy for growing outdoor recreation places in crowded cities to sustainable cities [5 .[

Pocket parks are known as well-designed tiny urban places with or without green features to enhance urban quality, resilience, wellness, connectedness, variety, and usability. it is the approach used to distribute green areas in the city of Al-Ganain [3.[

The study problem : While several studies have looked into the advantages and design principles of pocket parks, there is a dearth of systematic and quantitative knowledge. This could influence decision-making for the optimal implementation.

The study objectives : Even yet, while there have been some studies on pocket garden in developing nations, most of them have focused mostly on benefits , placing less attention on the criteria of small green spaces, As a result, the study focused on applying the criteria for pocket gardens and creating two ideas in AutoCAD to serve as design models for future studies and small green spaces in Al-Ganain's city master plan.

Materials and methods

Study area:

The Iraqi Ministry of Construction and Housing has picked the new city of Al-Ganain to meet the current housing crisis with inexpensive dwellings and ecologically friendly architecture. It is located east of Babylon Province on the Al-Wardiyah-Hilla route towards southern Babylon. which totals 8,000 dunums and 27,000 dwelling units over the next few years. figure (1.(

The large green spaces were placed on the site plan based simply on their proximity to water, without regard for basic criteria, whilst the small green spaces were spread across the site plan. Table (1) figure (2.(

Table 1. depicts the extent and proportions of the terrain in the research locations. (The author's work) based on a site plan.

city area/ dunum	green spaces Area m2	Percentage of green spaces in the city %	Per capita share of green spaces /m2	Rate of family members/ member
8,000	2050100	10.8 %	14.16	6.5

The small gardens were repeated in the site plan of the Al-Ganain City at a high rate The areas of these spaces varied within the master plan., where both spaces (1600, 2100) m² were repeated 351 times. The small gardens occupy 32% with an area of 650,000 m² of the total green spaces in the site plan of the Al-Ganain City, which amounts to 2,050,100 m2.

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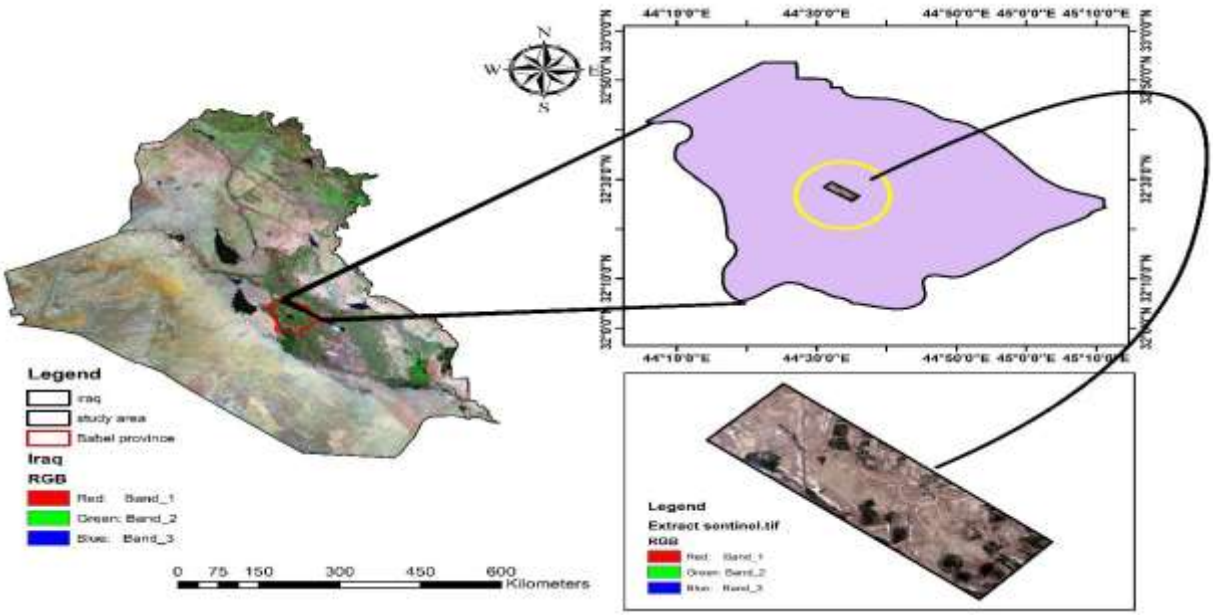

Figure (1) location of study area Source: (Author with GIS)

Figure 2. cite plan of study area Source: (Babylon Investment Commission)

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Spatial distribution of the pocket park

Before beginning garden construction, it's crucial to complete the garden Spatial distribution phase, which is an extension of the site design process. Many gardens fail due to improvised designs, which are costly and do not serve the intended purpose.

The process begins with legal constraints and historical background, followed by an analysis of site owner, space users, and building uses. A comprehensive needs program is then developed using social and economic surveys and standards. Analysis of the factors associated with the location itself, which include natural characteristics such as topography. The site, natural water drainage, soil and its constituents, water bodies, and groundwater. Groundwater And its level, which determines plant types and features (growth pattern, size, shape, and color). their texture, and its ornamental value (environmental influences). temperatures, orientation, and movement of the sun in relation,[2.[

The site's sensory qualities include prevailing winds, rain and snow levels, relative humidity, and man-made structures such as buildings, paths, roads, utility lines, and communications. The design plan should take into account the site's unique characteristics, such as perspectives, smells, noises, colors, and scale. It is critical to consider spatial distribution and the compatibility of nearby activities, whether they are energetic or quiet,[6.[

The advantages of pocket parks

Pocket parks have the ability to significantly impact community members' health and social cohesion since they offer chances for communication, education, and opinion sharing. These parks are valued for their contribution to the general ecosystem of the surrounding area as well.

-1Advantages of Social Life and Health

According to the National Parks and Recreation Association, a well-planned pocket park can:

Decreased crime rates and a sense of security

Encourage physical activity

Reduced incidence of medical problems

Improve consumers' mental well-being

Give locals the authority to decide on matters that impact their community.

By bringing neighbors together, communities may become more social.

Strengthen linkages with communities and local government

-2Advantages for the Environment

Cut down on traffic, pollution, and the use of resources like oil. People who live in neighborhoods with parks that are conveniently close by are less inclined to go outside of the city to enjoy nature, which lowers traffic and pollution. [4 [

Restore dilapidated areas

Expand the number of permeable surfaces in the city [8 .[

serve as patches for certain creatures, especially birds [13 .[

Although pocket parks may assist the community in many ways, their restricted size may cause issues such as conflicting activities and producing distracting noises. Additionally, undesirable persons like gangsters or homeless people may be drawn to tiny parks [14.[

Design Standards for Pocket Parks

.1Place and Area

No more than 5000m²

There should be between 500 and 1000 people living close the parks .

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The intended users may walk to Pocket Park in five to ten minutes.
Position the park in front of the nearby buildings' active rooms.
Utilize underutilized space, neglected areas, and tiny, uneven plots of land .
Use unconventional spaces, such as building facades, foyers, or roof tops.
.2Links and Accesses
There are several entry points and no obstacles separating the park from the street, providing convenient and fair access .
Easy, secure pedestrian access that is protected from driving cars
Place the park in an area with a high density of houses and connect it to the greenway network .
accessible by foot and by bicycle, and a car shouldn't be necessary Connection to further communal, cultural, and recreational facilities
.3Design of Space
A focal point and well-defined edges
Make sure there are unobstructed sightlines throughout the location .
opened on two or four sides to the street.
A welcoming and inviting design that provides variety and choice for a wide range of users
Clearly defined identity and community representation
Spaces that are pleasant and adaptable
Vertical lawns may be created using space barriers.
-4Activities and Uses
Provide areas for physical fitness, such as climbing frames, basketball courts, and tot lots .
Make room for relaxation and mental well-being .
Recreate with wide grassy spaces, playgrounds, and seating spots .
Include events that will keep the park lively at all times.
Include areas for socializing, meeting friends, having lunch breaks, and hosting small events .
Include educational areas so that kids may learn more about and develop a greater respect for environment .
-5Environmental Use solar-powered facilities, bio-filter landscaping beds, LED lighting, and previous surfaces
Install a tree canopy on the ceiling .
Provide swales, a rain garden, and weather protection.
There should be enough sunshine and ventilation in the spaces .
Adding green roof technology and green wall technology to reduce the effect of UHI.
-6Features of the Landscape
Avoid having blank walls at the edge of the room.
Include things like drinking fountains, bicycle racks, garbage cans, heat lamps, seats, gazebos, water features, and individual sitting .
Make the most of the natural shadows .
Make sure there is enough illumination at night .
Give people the chance to create beautiful hardscapes and public art .
The potential addition of edible gardens
-7Maintenance
Engage the community in the design process for both aesthetic and structural reasons .
Obtain the local government's backing to enable the project .
Maintain a favorable reputation
Minimize the need for maintenance, [1] [11] [14.[
Techniques for designing microscopic landscapes
The most common design approaches for pocket parks at the moment are conventional techniques like the case study method and the expert experience method.

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In order to summarize broad design concepts for pocket parks, the case study technique often identifies particular design features, such as location, function, size, and arrangement, by examining and evaluating data from images, documents, and interviews. established health-related design components, including flowerbeds, seats, historical features, and paths, to serve as a foundation for pocket park design that is focused on health [7]. The design guidelines for pocket parks were developed based on an Italian research that compiled the features and spatial arrangements of 13 different kinds of pocket parks across Europe [3]. The expert experience approach is a knowledge-based empirical judgment technique.

the expertise of professionals to assess and choose design concepts. For example, experts evaluated pocket park quality based on perceptions of safety, accessibility of features, park attractiveness, and feature functionality, which encapsulates the design standards for excellent pocket parks [9.[

Result and Discussion

Spatial distribution of Al-Ganain pocket park

The initial stage of design is the space distribution phase of the plan, which differs depending on the study's area, nature, and location. Children's play facilities, as well as recreational places, draw visitors to small gardens in residential neighborhoods. As a result, landscape designers emphasize the importance of activities that complement one another, such as placing picnic areas near children's play areas to facilitate parental supervision, and active spaces such as open play areas away from picnic and relaxation areas to achieve tranquility and seclusion .

bathrooms and kiosks were scattered around the park, particularly in the children's areas, while other service facilities, such as the waiting room and reception, were positioned at the entrances.

The spaces should be designed to be functionally efficient, with recreational sections located near children's play areas for convenient parental monitoring. It is critical to separate them with a visible iron fence to keep youngsters from leaving the play areas, while still offering individual and communal seating for families .

The concept of safety is critical when distributing and surrounding places, particularly children's gardens, which should be located away from water bodies, vehicle routes, and busy locations.

Figure (3&4.(

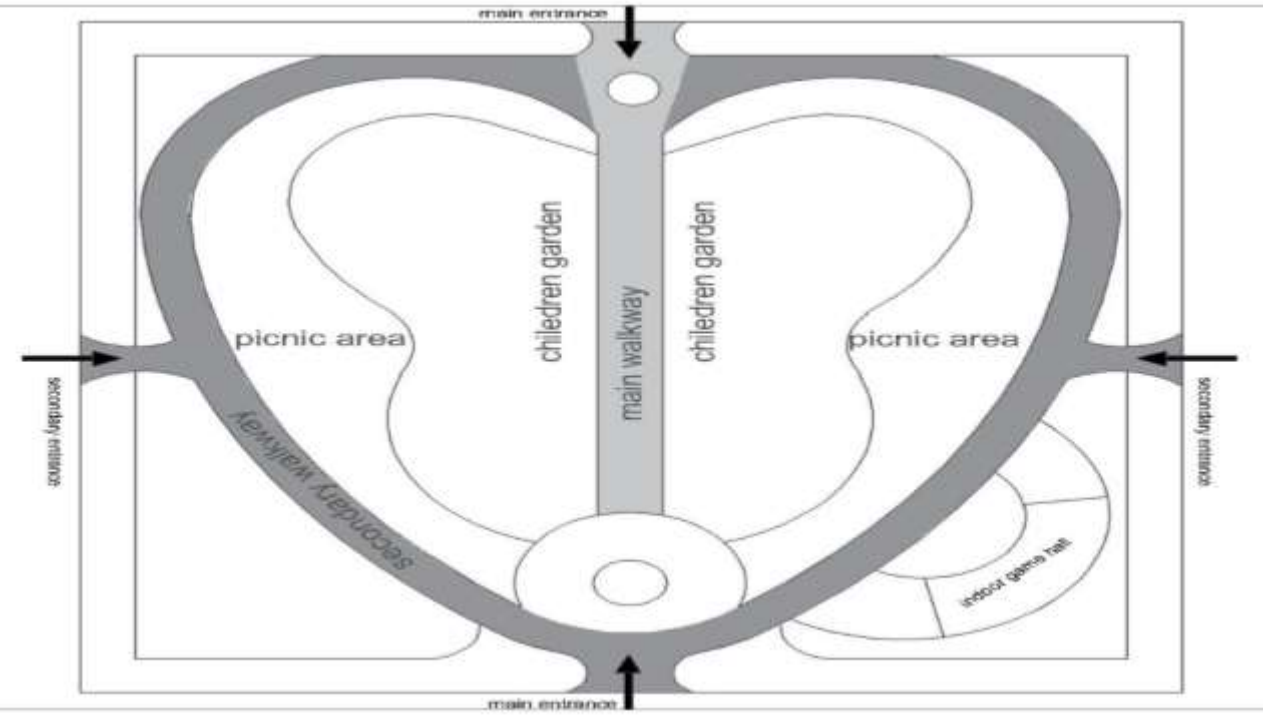

Figure 3. Spatial distribution map of the pocket park (1600 m²) within site plan of Al-Ganain City Source: (Author with AutoCAD.)

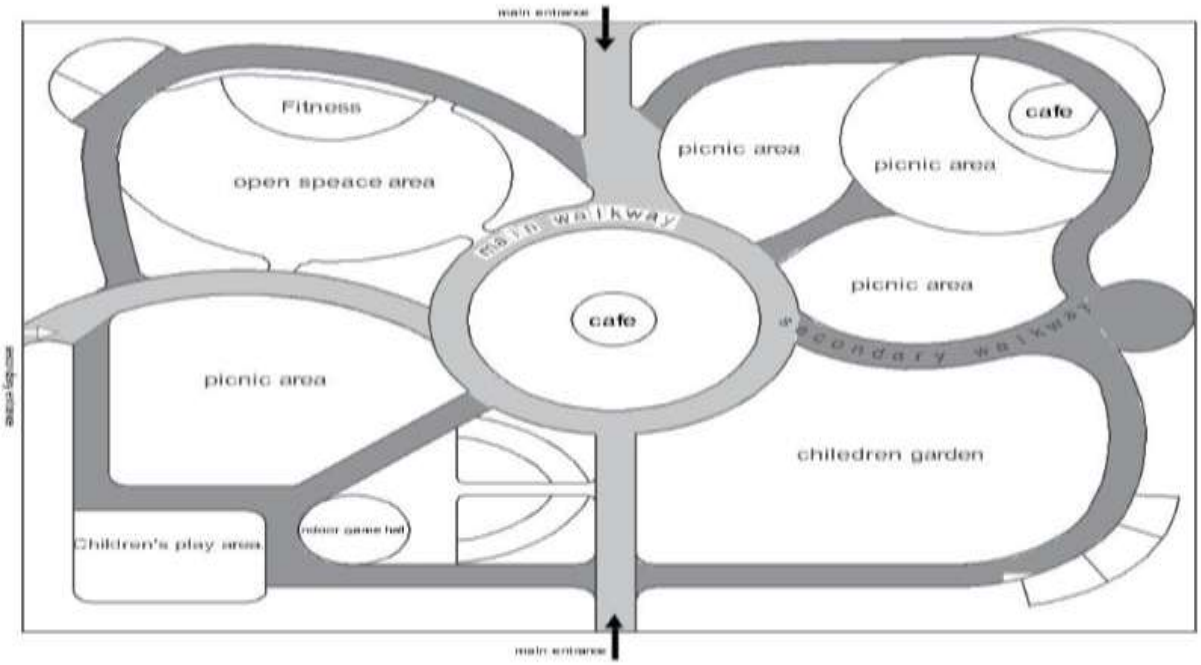

Figure 4. Spatial distribution map of the pocket park (2100 m²) within site plan of Al-Ganain City Source: (Author with AutoCAD.)

Final design of the pocket park

The design phase follows the spatial distribution phase, which comprises the movement axis from the park's gates, as well

as the main and secondary roadways that support the park's recreational activities and services. The games, furniture, and other amenities are then custom-designed for each space based on the type of activity and target age range. It is ideal to have an artificial grass surface that can handle foot traffic in the play areas. Three different-sized children's play activities have been picked, as well as bathrooms and water drinking spots for the children. The space is enclosed by an iron fence and a plant fence to prevent children from wandering into the adjacent family picnic grounds, which are provided with various sizes of seats, BBQ places, sustainable and deciduous trees, and a green area with natural grass. Service amenities like as kiosks and restrooms were spread around the complex, while others, such as information desks and waiting areas, were focused near the entrances. As shown in both designs, plants were used to provide sustainable shading over the wooden supports surrounding the doors and hallways. Figure (5&6(

The garden (1600 m²) was created with a café, shaded community seats, flower beds, and water fountains to enhance its beauty and enjoyment. The ground surface alternated between green areas and natural stone as a sustainable flooring, surrounded by local plants, with a small enclosed playroom added on the other side for children under four years old. Figure (5(

The preceding recreational activities were repeated in the 2100 m² park, taking into account the varying sizes of the repeated events due to the park's huge area. A new recreational activity was created, which is the open play area with football, tennis, and volleyball, , but in a disorganized way, which means there are no designated fields. In this activity, the area is opened in the center with no facilities or landscaping and is restricted to the boundaries. A sports area for agility and fitness games with a built-in floor has also been added, and the space's floor is composed of natural green turf. Both gardens were developed with AutoCAD software. Figure (6.(

Planting design.

To establish a sustainable plant design, both gardens employed local flora. The ground was covered with local natural grass, and the children's gardens were surrounded by permanent boundary plants including Myrtus Communis and Dodonaea Vescosa. The Albizia Lebbeck tree was utilized as a deciduous plant to provide shade in the summer while also allowing sunshine to enter, providing light for guests. Climbing Bougainvillea plants were placed on trellises to give shade at the entrances and walks.

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Figure 5. final design map of the pocket park (1600 m²) within site plan of Al-Ganain City Source: (Author with AutoCAD.)

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Figure 6. final design map of the pocket park (2100 m²) within site plan of Al-Ganain City Source: (Author with AutoCAD.)

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conclusion

Small parks are a sustainable and cost-effective way to alleviate the scarcity of open space in densely populated metropolitan areas. There must be more to small urban parks than just places to play or unwind. They should also be sights that we might be able to see from a distance, such when we are walking down a street, looking out a window, or just getting a glance. Therefore, little urban areas may increase the interest, diversity, and appeal of communities. It can help urban planners, policymakers, and government officials allocate more green spaces in cities. When constructing small spaces in the Sustainable Al-Ganain City, local materials were used, as well as planting native plants that can resist the circumstances and shade with plants to reduce energy usage.

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