

# **An Examination of Optimizing the Sustainability in Urban Level: Case Study of Al Waha Community in the UAE**

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## **ABSTRACT**

City, community or neighborhood could be considered as a system of depending components. The major variables or components that affect the design of any development are; urban form, transport, landscape, buildings design, waste management, energy and water supply. The best sustainable design is about equilibrium between these components. In order to make cities more suitable for people, all aspects of viable city required to be involved and operates smoothly within design or system equation. Cities and urban environment polluted for different reasons; density and moving about the cities, human activities , construction and buildings effect on nature and landscape, atmospheric pollution by CO<sub>2</sub> emissions, noise, building orientation effects on solar gain, sunlight access and ventilation system. All these reasons influence the human health and well-being and turn cities to an uneasy place to live. Cities should be designed to make its people secure and happy, for this aim cities must become greener, robust with a stable ecosystem. Our built environment at the present suffers enough and an urgent integrated approach is needed. The success solutions depend on understanding the relation between the involved sustainability elements; Environmental, historical, social, economic, the solutions should start from the individual building to block, neighborhood, city, region towards the globe.

Sustainability had defined by the United State Environmental Protection Agency (EPA) [1] as; what we need for our survival from surrounding natural environment, either directly or indirectly. It creates a kind of harmony and maintains between humans and nature.

Changes with its context, Sustainability itself has different definitions, [2]stated that the sustainable system or process can be continued indefinitely, without depleting any of the materials or energy resources required to keep it running.

Simply, it is living our present and taking the future in to consideration. [3] it was pointed out that the World Commission on Environment and Development (WCED) which is a group formed by the United Nations defined Sustainability as “meeting the needs of the present generation while promoting a high quality of life without compromising the ability of future generations to meet their own needs” [4].

Urban Design is the process required to shape the developments, neighborhoods, communities districts and cities , through integrating all the elements required for the built environment starting from planning and dealing with the large scale of the built environment.

The urban design is a matter of creating the relation between human and spaces; initially it is a management of public functions and spaces. Urban design required a wide knowledge in most of sciences, planning, engineering, social, and economy, management and computer programs.

The key elements of urban planning are; open areas and landscape, transportation, buildings design, solar potential and waste management, each one is of significant effect on sustainability of urban design. The biggest challenge for the urban planner is to improve and optimize the relation between the three major factors in urban design concept; density, movement and recourses. The appropriate, passive design is one of the solutions to solve the equation, the environmental and economic factors have their effect on the equation as well.

The strong urban structure aims to provide the less use or requirement for transportation use and path. The different types of transportation plays the significant role in changing the traditional urban structure. The vehicle flow and transportation Parking areas, street width, public transportation stations, and many of which related to transit system are the element should be well designed to obtain the strong structure. Thus, the road planning affect the other urban factors like gardens and open areas, playground, the cycling transportation in the most preferred plan.

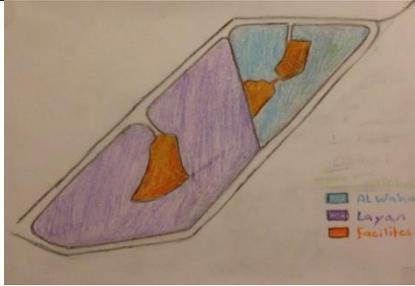
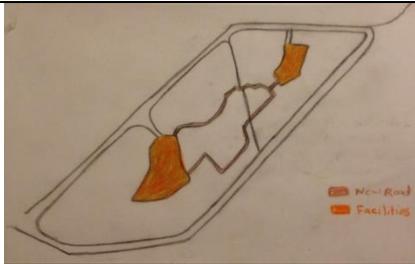
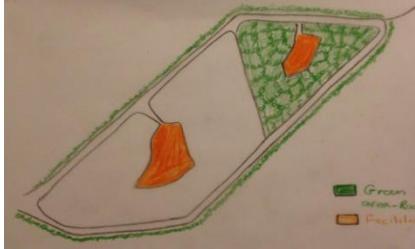
This research aims to explore the sustainable urban design in past, present and future , for this aim a literature review will be conducted to study the sustainability according the timeline concept. Furthermore, a case study research method is selected to explore and analyze one of Dubai' communities using City Cad, IES VE software and LEED Neighborhood and Development checklist (ND), in order to result with some suggestions and recommendations for enhancing and optimizing the sustainability level of the community and other similar future developments.

To achieve the research aims and objectives, a literature review was conducted to explore the sustainability on urban level in past, present and future.

Furthermore, a case study as a method of research was adopted to explore the urban sustainability, and a community in Dubai was selected to be analyzed and evaluated using the City Cad and IES VE software.

In additional to the City Cad and IES VE software , the community sustainability will be evaluated using the LEED rating system , the version will be used in this study is LEED for Neighborhood and Developments (ND), V4. The strategy of the modifications will adopt the passive urban design solutions to the community master plan, the strategy was followed is; thinking of the applicable modifications to the existing community. Four of the urban design parameters will be modified according to four scenarios to enhance the community livability and thermal performance. The modification scenarios will cover; Land use, open and green areas, movement or accessibility and building design. Three main scenarios or parameters were developed to improve the sustainability status of the community, table 1 illustrates these scenarios.

Table1: The three Scenarios of the Suggested Modifications(Source: Auther 2015)

Scenario No.	Details	Figure
Scenario 1	Changing the land use and the height of some units, adding supermarket, pharmacy, laundry and other required services.	
Scenario 2	Opening new access to the adjacent community, to share more services and facilities and enhance the community accessibility.	
Scenario 3	Improving landscape and increasing the green areas and number of trees, adding water features and green belt along the community boundary wall.	

In summary, nowadays, and a part of the future vision, there is a strong return of passive design trend, this was a result of real consciousness in limited resources, global warning and pollution problems, and sustainability was the only solution for keeping live on our globe. Finally and in lane with this context, the case study will be explored in this project to enhance and optimize sustainability on urban level. The results will be benefitted to many construction stakeholders including architects and end-users.

## References

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