Measuring urban decay in Baqubah city:

(AL- Sarray neighborhood as example)

Dr. Wasan Shihab Ahmed   Mr. Wisam Meteb Muhammed

Spatial Research Unit   Dept. of Geography

Diyala University   Diyala University

Abstract

The paper applies a technique that quantitatively measure building's physical decay. The technique depends entirely on field observation, inside and outside the building, using penalty points for each indicator, summing up the total points for the building in order to calculate the average for the enumeration district. Then classify E.D.s to groups according to their similarities and variation. The overall map of such groups could be used to designate housing policy in the study area.

The idea of measuring it depend on paper published by prof M.K. Omar Presented to crumbling urban indicators then put a formula to determine the value of that building decay.

Preface

Urban decay; blight; slums, shanty towns are studied deeply in areas of western societies, concentrating on causes (Housing Market particularly) and policies. But the situation in developing countries is quite differ, in terms of causes at least. This paper applied a proposed field method to measure decaying in urban areas of Iraqi towns and cities prior to delineating housing policies. The method was suggested by M.K. Omar[1], applied by D. K. Ali[2], and W. S. Ahmed & W. M. Meteb [3]. Research paper for W. S. Ahmed & W. M. Meteb applied survey method; recently they apply methods to measuring housing decay in Baqubah city, complementary fist research paper. The paper aims to highlight the method and comparing results of these applications to check the validity of the method.

Measuring Method

In order to apply the method , maps needed at different levels : regional , urban , sector , and even free hand sketch to project the events . The field work goes into three stages . But before that , the study area should be divided into enumeration districts (sectors) along with the land marks and building types in it .

The first stage of field work devoted to observe the following:-

- Construction ground level according to street level ,
- Variability in streets ground levels within the study area ,
- The overall appearance of house's front , in terms of crack , dampness , other deterioration features ,
- Demolished houses and slums ,
- Vacant houses (asking about) ,
- Additional and converted buildings ,
- Changes in land use ,
- The pattern of domain land use .

Questionnaire and interviews used in the second stage , to collect data on the history of the study area , in terms of :-

(1) The built up area :

a) changes took place physically and socially ,

b) Land crack and land folded down ,

c) Water leakage from ground and surface sources ,

d) Rain water ill drained for a long time , and its location ,

e) Reclamation of the residential area and the materials used ,

(2) Housing :-

a) Physical dimension , date of construction , material used , house type , number of rooms , dwelling construction area , number of floors , cracks and their locations , moister , water drain system , in need for maintenance , type of maintenance took place .

b) Household dimension , number of families in the dwelling , total number of persons in it , age composition , gender , education levels and employment types .

c) Maintenance dimension , tenant , number of times maintenance took place , date of last one , its type , occupancy nature , number of unused rooms , other uses beside residence.

The third stage require another type of field work , measuring decay level in each building recognized as deteriorating . A scheme of penalty points was designed . It consist of three folds :-

1- Assigning one point to each building with :-

a. Age of 50 years and over ,

b. Another uses beside residence ,

c. Another family living in the same dwelling ,

d. Unused part within the building ,

e. Ignorance of maintenance for the last five years ,

f. A crack on wall ,

2- Assigning two points to each building with:-

a. Ground level below the street level ,

b. Crack in ground ,

c. Damped foundations ,

d. Crack in foundations ,

e. Residential building used for non-residence purposes.

3- Assigning ten points to buildings:-

a. Decayed beyond recognition ,

b. Divided into two or more parts ,

c. Vacant plots within built up area.

After collecting the data, it is the time to calculate the parameters and indices to designate areas to policy implementation. It is worth mentioning that points for vacant and demolished buildings and derelict plots within the study area should be accounted as well. Here , three parameters can be calculated for each ED:-

A- Mean of penalty points for the enumeration district, which represent the level of decaying in it.

B- The percentage of decaying buildings within the ED, to indicate the ratio of deterioration in it.

C- Then, the degree of deterioration (DD) can be calculated by multiplying the penalty points mean by the percentage of decaying building in the ED.

$$C = A * B$$

After calculating the degree of deterioration (DD) for each ED, one can abstract the overall decaying mean and ratio, and DD for the study area.   These parameters can be used as a domain to abstract the indices:-

Index of decaying in ED = A_{ED} / A_{SA} (study area)

Index of deterioration in ED = C_{ED} / C_{SA}

These indices can be adopted to shade light on the spatial variation in deterioration and decaying in the study area by projecting the results on a map. Such maps considered as a corner stone in policy designation and implementation.

Case study

Baqubah is the capital city of Diyala Province . It consist of (17) neighborhood , Al-Sarray is one of the oldest . It lies on the right side of Saria river and the left bank of Diyala river . It boarded from the north by Al-Wathba junction and , from the south by Al-Balda junction and the Female farmer square . Most of the houses there built during the period before 1920 to 1950 [4]. Figure (1) shows the Area of study .

In year 1987 [5], about (2.9%) of Baquba's population lived in the area of study (3978) , grow up to (4220) in 1997 , then (4594) in 2004[6] . Even though , it share only (0.18%) of City population , due to loss attraction.

Figure (1)

Sectors of AL-Sarray neighborhood 2010.
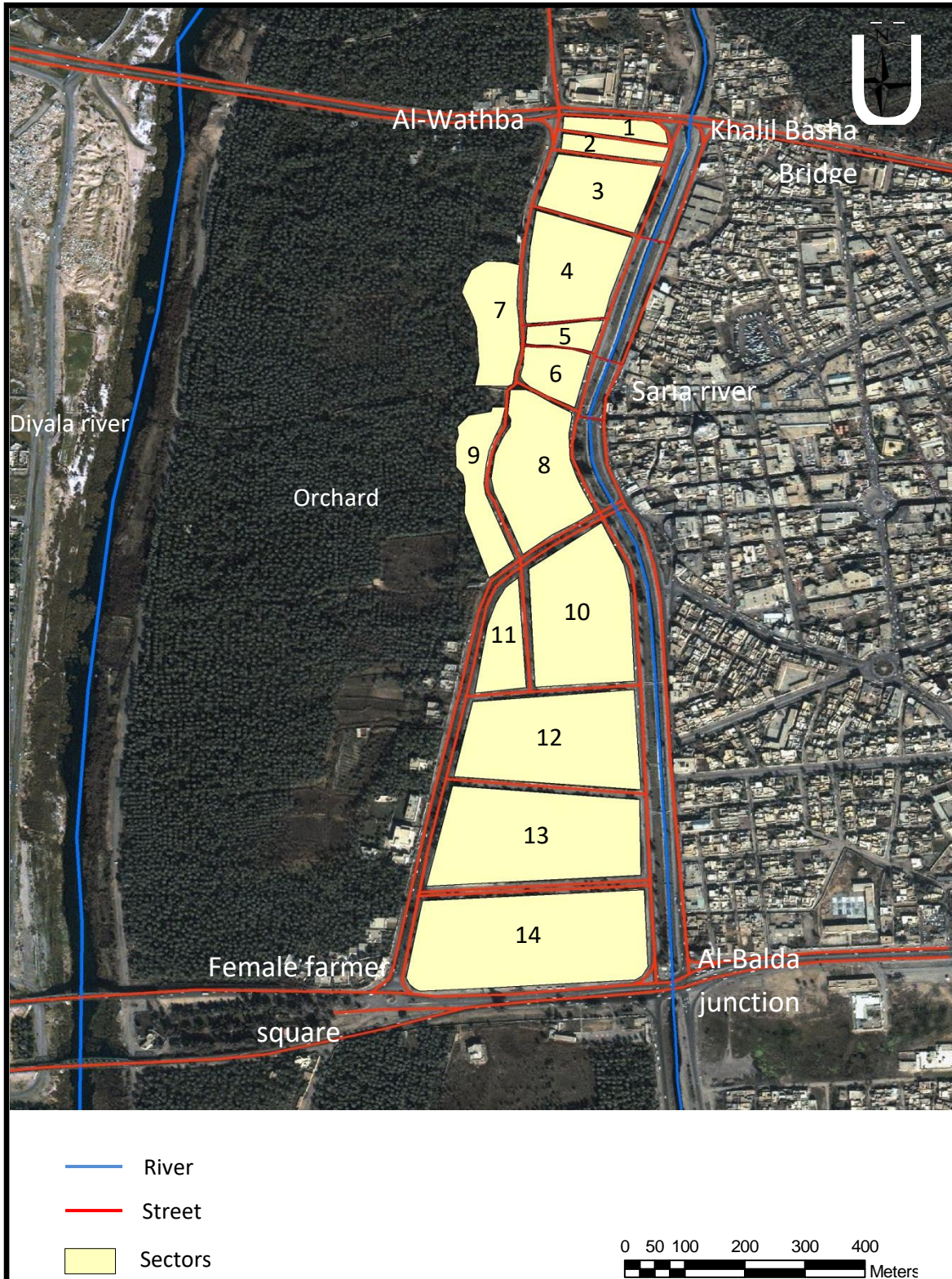
Reference: researchers work depended on satellite image EQNOS 1m resolution 2002.

Decay Causes

As Tobler said , everything is related to everything else, but near things are more related than distant things[7] . Thus no single factor could cause it . Many interacted factors , interwoven to produce decaying phenomenon . And due to adjustment to two rivers , dampness presumed to be the most affected factor , beside the natural building age .

A questionnaire was distributed to the residents , exploring their opinions about the causes of decay . Eleven reasons with the highest frequencies were selected and ranked .Table (1) presents these reasons in rank order , indicating that the nearness to the river as the most

	Near river	Competition	Water drink leak	Time	Incoherent ground	moisture	cracking	Change landuse	Building retrials	Landuse invasion	Derelict Land nearby
Sector 1	3	1	3	2	3	5	4	1	2	3	3
Sector 2	2	2	5	5	5	2	5	3	5	3	4
Sector 3	2	4	3	3	3	3	3	5	6	6	5
Sector 4	3	4	5	5	5	4	5	4	7	6	7
Sector 5	3	3	4	4	4	3	4	4	7	6	6
Sector 6	3	4	3	5	5	4	5	5	7	6	6
Sector 7	2	2	2	2	2	4	5	4	4	3	2

affecting factor .

Table (1)
Decay causes for AL-Sarry neighborhood.

Sector 8	3	2	5	4	4	3	4	3	4	3	5
Sector 9	2	4	3	3	3	3	3	5	3	5	5
Sector 10	1	1	1	2	2	2	2	2	2	2	3
Sector 11	1	2	3	2	2	4	3	3	2	1	4
Sector 12	2	4	3	1	1	1	1	5	1	4	1
Sector 13	3	5	3	4	4	6	4	5	4	7	7
Sector 14	3	4	3	5	5	7	5	5	5	6	6
SUM	33	42	46	47	48	51	53	54	59	61	64
Rank	1	2	3	4	5	6	7	8	9	10	11

Reference: researchers work depended questionnaire.

Time factor comes in the fourth rank , pipe water leakage considered the third order , competition on land looked as the second factor . land use change comes to the eighth rank , land use invasion take tenth order , dampness as a sixth rank , cracks on walls comes seventh rank , building material considered ninth rank .

Between Diyala river and the built up area lay a buffer zone of orchards . Houses were built in these orchards and adjacent to them . It means that houses built on sedimentary soil , almost clay . Water table in the area drained to the river , leaving some cracks on ground platform.

Question comes are there spatial different for decay causes between the fourteen sectors of Al-sarray , to give detailed answer will be through flowing discussing:

The factor near the river, has specified the highest amount of occurrences of the survey which appearing sectors 10 , 11 at a rate of 9.836%, followed by sectors, 5 , 12 , 7, 9 , 3 , 2 in rate of 8.197%, while the lowest percentage in the sector 6 amounted to 3.279%, competition factor has the highest percentage appeared in the sectors of 11 , 10 by 14.286%, due to the closeness of the junctions of main roads, which has encouraged the competing uses of land to be appeared on those sectors of the nearby intersections, Followed by the sectors 8 , 7, 2 , 11 by 10.714%, which is neighboring to the first group of sectors, while the lowest occurrences appeared in sector 13 by 0.0% showed no signs of any competition in terms of using the ground due to the newly established sector and its distance from the central area of trade.

Drinking water leaks showed the highest rate in the sector 10 by 13.953%, according to results of a questionnaire of the population, followed by Sector 7 in ratio of 11.628%, due to the high percentage of both sectors to the long-lasting drinking water network, , While sectors 4 , 8 , 2 showed ratio amounted to 2.326%, whereas the factor of time , came the sector 12 the highest turnout of 14.706%, despite recent

newly established but it showed the impact of the time factor more than other sectors, Was followed by sectors 10 , 11 , 7 , 1 by 8.824%, while the lowest ratio found in the sectors of 4 , 2 , 6 , 14. Notes that the sector 12 gave the highest percentage in the earth's fragile factor was 12.308%, then sectors 10 , 11 , 7 in ratio of 9.231% while the sectors 14,2,4,6 shown the lowest ratio amounted at 4.615%.

Dampness gave the lowest in the sector 14 amounted to 0.0% did not show any effect of humidity factor in this sector despite its proximity to the river, but the newly established and different building materials helped to resist dampness, The highest percentage of the effect of moisture appeared in the sector 12 amounted to 16.327%, followed by the sectors of 2 , 10 by 10.204%, while the lowest were found in sector 2 by 0.0%, which means there is no cracks in the walls of buildings of this sector, the reason is that for the renovation and reconstruction that took place in the sector, either cracks factor have emerged to have the highest percentage in the sector 12 amounted to 16.949%, then after the sector 10 by 10.169%,likewise in terms of land use change factor, Sector 1 , appeared the highest turnout of 16.667%, followed by the sector 10 by 10.333%, and the lowest percentage were in sectors 6 , 14 , 13 , 9 , 3 , 12 by 3.333%.

Factor of building materials is the highest rate in the sector 12 by 17.647%, followed by sectors 11 , 10 , 1 by 11.765%, while it has been the lowest in sectors 4 , 5 , 6 by 0.0%, the factor of invasion of land use has emerged the highest rate in the sector 11 by 16.216% then sector 10 by 13.514%, Security conditions that have plagued the city of Baqubah that led to the invasion of land use for certain parts of the city and for many reasons like the close to the business district and overlooking main streets and in the sectors 10 , 11 In Sarray neighborhood which is under study, while the sector 4,13 gave less ratio for almost 0.0%, and finally the land abandoned factor , given the highest percentage in the sector 12 by 20.0%, came after Sector 7 by 14.286%, The review above shows that the reasons for crumbling urban in the district Sarray have overlapped and diverged at the same time the percentage of those factors between Sarray & other sectors , which gives an explanation of the physical realities in the neighborhood.

Measuring the physical Decay of the Sarray

After addressing the reasons of the crumbling urban Sarray for discussion, it raises the following question how do you measure the physical collapse? , To answer this question, the equation, which were

presented in paragraph C will be used, and through the application of data on sectors of AL- Sarray neighborhood, the results have shown in table (2) and exposure in Figure (2), where the emergence of four levels of physical decay of buildings and housing been noted , namely:

The first level (0.0 - 1.0)

This level has shown the lowest percentage of urban collapse, has included sectors (1 , 2 , 5), although these sectors are the oldness , but made it with a low collapse of urban . due to the demolition and reconstruction and restoration as well as the invasion of land uses, it is also included sectors (9 , 10 , 11 , 13 , 14) This is a newly emerging sectors, reflecting on the value of the physical collapse.

Table (2)

Measuring building decay for AL-Sarray neighborhood.

	1 point	2 point	10 point	SUM	Decay weight
Sector 9	5	6	10	21	0.456522
Sector 11	13	6	10	29	0.630435
Sector 13	4	6	20	30	0.652174
Sector 14	6	4	20	30	0.652174
Sector 2	29	2	0	31	0.673913
Sector 5	18	8	10	36	0.782609
Sector 10	24	16	0	40	0.869565
Sector 1	23	0	20	43	0.934783
Sector 12	17	14	20	51	1.108696
Sector 8	22	14	20	56	1.217391
Sector 4	21	18	50	89	1.934783
Sector 6	31	6	60	97	2.108696
Sector 7	47	32	60	139	3.021739
Sector 3	44	80	40	164	3.565217

Reference: Applying equation of decay measuring.

The 2nd level (1.1 - 2.0)

Covered sectors (4 , 8 , 12) overlooking those sectors on major streets, which contributed to the promotion of a repair and change land-use, on the facades overlooking the street, while the buildings overlooking the internal streets to these sectors, it has not affected to the distance from the impact of the main streets.

The 3rd level (2.1-3.0)

this level came out in the sector (6) only, since its origin made have affected the high rate of collapse of buildings and houses where the distance from the main streets has reducing its influence in bringing about change in uses, as well as low-level economic of the inhabitant population which reduced the chances of a restoration and rehabilitation.

Figure (2)
Measuring building decay for AL-Sarray neighborhood
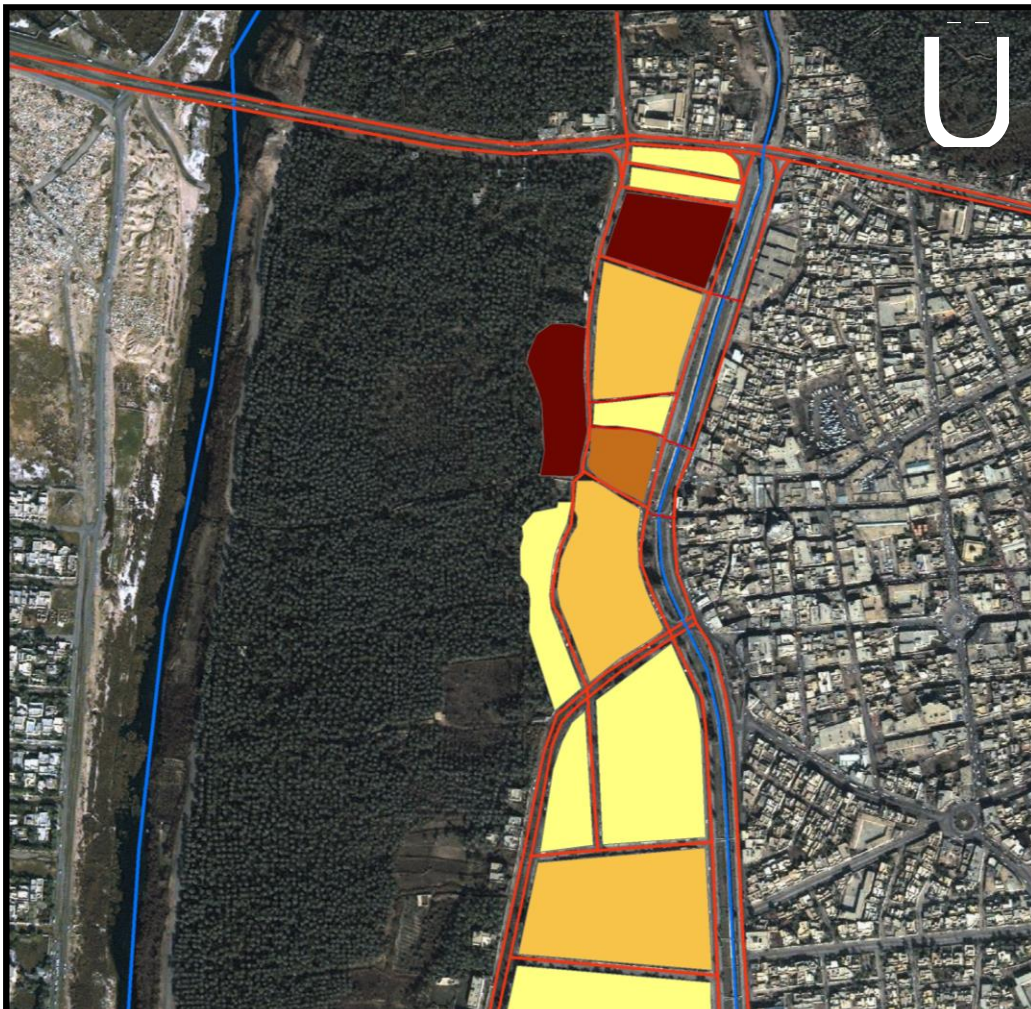
Reference: researchers depended on table 2.

The 4th level(3.1 and more)

this level shown the highest rate of erosion has included urban sectors (3,7) the last-long buildings of these sectors, and low economic level of the occupants of the buildings, as well as construction materials, which are used to palm trunks and mud, Made the buildings of these sectors crumbling larger than other sectors.

It notice that the percentage of collapse has affected with many of the factors and the time factor is not the decisive factor in that, when the competition factor between land use sector affected by the location of the main streets and proximity to central business district of the city of Baquba became essential , As well as an economic level of the population of buildings which reflected on the possibility of repair or rebuilding of the house, all this calls for taking in consideration the specificity of the Sarray district in any urban planning .

Conclusions:

There is a range of factors that lead to a decay of the urban buildings and old houses such as time factor, the invasion of land use , change of land use, Building materials, humidity, deposition of drinking water, lack

of renovation of the building for various reasons, particularly the economic factor ...... etc, that the process of measuring the collapse contributes to the emergence of urban planning ideas suitable for the district, , as well as the privacy of the old part of the town's special character distinguishes it from other neighborhoods. Sarray district contains a range of buildings of architectural heritage character of the old bath-tube, and the palace building itself that should be preserved, collapse appears in the older sectors growing up in the district, also shows a change in the interface and not be separate of its buildings in land use, the old shops that do not possess the physical nature only, but also social in nature, Where that distinguish the occupants are a social class of lower- economic in general.

AL- Saray neighborhood present one of oldest parts, to Barqubah city, it contain many heritage buildings, for that choicest to be case study, so it divided to fourteen sectors for comparison, whereas sectors distinguished by different age of building , therefore these sectors presents an interesting results.

قياس التداعي الحضري في مدينة بعقوبة: (محلة السراي كمثال)

د.وسن شهاب احمد   م.م وسام متعب محمد

وحدة الابحاث المكانية   قسم الجغرافية

جامعة ديالى   جامعة ديالى

ملخص

تقدم هذه الاوراق استخدام لتقنية قياس التداعي العمراني للبناء الحضري. هذه التقنية تعتمد على مجموعة من الملاحظات التي قان بها الباحثان بالاعتماد على

استمارة استبيان ، شملت كل جوانب البناء من مواد انشاء والمرحلة العمرية والسكان ونوع الاستخدام للبناء ، تاتي هذه الدراسة على مسار دراسات سابقة للتداعي الحضري منها بحث الدكتور مضر خليل العمر الذي قدم مقترح طريقة لقياس التداعي والتي تم استخدامها هنا لتحديد اي القطاعات في محلة السراي تداعيا.

قسمت محلة السراي الى ١٤ قطاع اعتمادا على شبكة الطرق التي تقسمها لتسهيل عملية المقارنة ولتحديد اي هذه القطاعات اكثر تداعيا من غيرها ، كون محلة السراي من اقدم المحلات في مدينة بعقوبة ، وقد تمت عملية القياس بعد ان تم جمع نقاط وفق استمارات الاستبيان ومن ثم تطبيق قانون القياس.

من ابرز نتائج الدراسة يظهر ان هناك اجزاء كثيرة والتي تعد من اقدم اجزاء مدينة بعقوبة محيت وتم اعادة بنائها وفق شكل البناء الحديث مما ادي الى فقدان الكثير من الابنية ذات البناء المعماري التقليدي القديم والذي يعتبر جزاء من تاريخ المدينة وهويتها.

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