Assessment of Property Maintenance in Gombe State Legislative Quarters Using Geographic Information System (Gis) Approach.

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---**ABSRTACT:**--
This study assessed the maintenance of property using GIS-Based approach in Gombe, Nigeria. The study embarked on physical inspection of general condition of the residential quarters. The data for the study were collected using structured questionnaire administered to the occupant of the houses. The collected data were analyzed using Geographical Information System (GIS) and frequency distribution tables. The study revealed that (46%) of the houses are in excellent condition, (41%) are in good condition, while (3%) of the houses are in poor condition. The study highly recommend the use of GIS-Based property maintenance be put to use to enhance effective maintenance work management, easy storing and retrieval of data.
Keywords: Building Maintenance, Geographic Information System (GIS), Gombe State.

I.   INTRODUCTION

In Nigeria today, there has been a mass failure of building especially within government ineffective and efficiently maintain our human and material recourses as clearly reflected in most sectors of the economy with particular reference to public properties. Over the years, huge amount of money have been expended in construction of such public estates, but regrettable with no corresponding maintenance policy or arrangement to adequately keep such properties in sound conditions. Consequently, this had led to continuous deterioration of such building as well as its facilities.

1.1 Building Maintenance

BS 2811 (1984) as a "combination of all technical and associated administrative actions intended to retain an item or restore it to a state in which it can perform it's require function". Syagga (1988) Opine that maintenance entails repairs or replacements of worn out or damaged parts in order to keep the building in the state corresponding to its original technical characteristics and functions.

According to Oladipo (2006) as seen in Emmanuel et.al (2017). Buildings are to give a friendly environment for various human activities; thus the extent to which the buildings provide the required environment for the required activity is measure by the functionality of the building. Works carried out in anticipation of failure is referred to as preventive maintenance and those carried out for restoring after failure is referred to as corrective maintenance. Adejimi (2002) as seen in Shehu et.al state that it is a well known fact that the primary objective of building maintenance is to preserve buildings in their initial functional, structural and aesthetic states.

In addition, a concise definition is that "maintenance is synonymous with controlling the condition of a building so that its pattern lies within specific region" Fagbenle (1998).

However, routine infrastructural maintenance has been an Achilles in many Nigeria public building due to poor funding, misuse of facility by occupants, bribery and corruption etc Ugwu et.al (2018). In Nigeria maintenance programme has not received much attention in the past as the emphasis is on the development of new properties. Ahmed (2000),Odediran et.al (2012) and Shehu et.al (2013).

II.   FACTORS RESPONSIBLE FOR BUILDING MAINTENANCE

Previous research has shown that, so many factors are responsible for building maintenance to which Adejimi (2005) identified the following as the relevant factors affecting maintenance strength of building; design resolution, structural strength, specified material strength, maintenance manual, safety measures, skill maintenance personnel, maintenance plants, environmental factors, usage factors, quality control factors and post construction prevention strength. Olagunju (2012) identified drivers that influence the level of maintenance of residential building standard, in the study, about eight factors were identified. The variables are structural

components condition, roof component, toilets facilities discharge of waste water component, exterior wall condition, condition of walkway within the building premises, electrical wire and switches condition and interior wall surface condition.

However, many researchers opined that, the drivers of building maintenance could be looked at under three main categories: causes initiated at the design stage, causes initiated at construction stage and causes initiated at the usage stage (the I don't care attitude associated with users towards maintenance) Usman et.al (2012).

2.1 Concepts Of Geographic Information System (Gis) In Property Maintenance

Geographic Information System (GIS) has become effective tools for the administration of decentralized government and for the mobilization and management of resources all over the world. They provide the framework for all forms of spatial data storage, data retrieval and analysis, display, reporting and modelling. Jensen (2002).

Geographic Information System is mainly interested in the locational identity of any object on, under and above the earth surface. It is an organised assemblage or collection of interrelated components in which facts can be deduced from processing of raw data that can be spatial and or/ spatial (attributes) in nature. Environmental Science Research Institute(1991) define GIS as the organised collection of computer hardware, software, geographic data and personnel designed to efficiently capture, store update, manipulate, analyse and display all forms of geographically referenced information. In the same vein, Burrough (1986) as in seen in Uluacha (2007) sees GIS as a "powerful set of tools for storing and retrieving at will, transforming and displaying spatial data from the real world for a particular set of goals.

2.3 Geographic Information System (Gis) As A Tool For Effective Property Maintenance

Geographic Information System (GIS) tools help planners analyse problems more quickly and thoroughly and formulate solutions to monitor progress for achieving long-term goals for the community development. Xinhong (1992). Geographic Information System has the capabilities to provide necessary physical input and intelligence for preparation of base-maps, formulation of planning proposals and to act as monitoring tool during implementation phase of any planning scheme. Guptal et. al (2001).

III. MATERIALS AND METHODS

On the course of this research, a structured interview was adopted. Haigh(2008) state that structured interview " involve the researcher asking the despondence all through a list of predetermined questions. This approach enhances the reliability of the results and the conclusion that will be reached due to the standardization of question asked.

The study population is primarily the Gombe State Legislative Quarters which consists up of 24 units of residential quarters. The data for the research was obtained through the use of structured questionnaires from the users of the residential quarters and maintenance unit of the State house Assembly Gombe, Attribute data and spatial data.

3.1 Hardware Declaration: The hardware used in this study includes HP 620 computer, HP DeskJet 2050 printer, HP LaserJet P1102w, sketching papers, pencils and scanner.
3.2 Software Declaration: The hardware used in this study includes Google earth software, Arc view 3.2a, ILWIS 3.1, CorelDraw 11 and Microsoft Word 2007.

3.3 Sample Size

The research sample size is 24 units of residential quarters for which 24 questionnaires was distributed among the residents of the legislative quarters and 22 questionnaires were returned for analysis, which represented a response rate of 92% of the total questionnaire administered.

IV. RESULTS AND DISCUSSION
Table 1. Illustrate the response to the questionnaire distributed.

		No. of Responses	Percentage (%)
1.	Received	22	92
2.	Not Received	02	08
	Total	**24**	**100**

From the information presented above, it shown that 22 out of 24 questionnaires distributed received which represented 92% of the sample size and 2 were not received which represents 8% of the sample population.

Table 2. Types of Maintenance carry out in the Estate?

	Types of Maintenance	No. of Responses	Percentage (%)
1.	Emergency	8	36.4
2.	Preventive	4	18.2
3.	Corrective	10	45.5
	Total	**22**	**100**

From the information above, it shown that 8 out of the 22 respondents indicated emergency maintenance, which represent 36% of the sample population, 4 respondents on the other hand indicated preventive maintenance, which represent 18% of the sample size while, 10 respondents indicated corrective maintenance which represents 46% of the sample size.

Table 3. General Condition of the Houses

	General Condition	No. of responses	Percentage (%)
1.	Excellent	10	46
2.	Good	9	41
4.	Poor	3	14
	Total	**22**	**100**

It can be shown from the above table that: 10 respondents goes for good condition which represent 46%, 9 respondents indicates that the houses are in average condition which represent 41% while 3 respondents chooses poor condition, which represented 14% of the sample size.

Table 4. Assessment of the Facilities

	General Condition	No. of responses	Percentage (%)
1.	Excellent	8	36.4
2.	Good	10	45.5
3.	Average	2	9.1
4.	Poor	2	9.1
	Total	**22**	**100**

It can be shown from the above table that: 10 respondents goes for excellent condition of facilities which represent 56.6%, 6 respondents indicates that the facilities are in good condition which represent 33.3% while 2 respondents chooses average condition of facilities, which represented 16.7% of the sample size.

Table 5. Mode of Lodging Complaints

	Mode of Lodging complain	No. of responses	Percentage (%)
1.	Direct Contact	14	66.7
2.	Through Phone call	4	11.1
3.	Through Official letter	4	22.2
4.	Other	-	-
	Total	**22**	**100**

It can be shown from the above that 14 respondents goes for direct contact of mode of lodging complain which represented 64%, 4 went for through phone call which represented 18%, while 4 went for through official letter which represented 18% too.

Table 6. Analysis of Services and Facilities provided in the Estate assessed by the Researcher.

	No. of Houses Affected	Building services and components	Defects	Causes
1.	7	Roof	Leakages	Heavy rainfall, decay of roof trusses and use substandard materials
2.	7	Ceiling	Leakage/Sagging	Same as above
3.	10	Wall	Cracks	Environmental impact and lack proper ratio mixture of cement
4.	12	Wall openings	Broken doors and window glasses	Use of substandard materials and human factor.
5.	13	Plumbing works	Damaged septic tanks and broken pipes	Wear and tears, environmental impact and human factor
6.	15	Electrical fittings	Expose wires, un-replaced bulbs.	Use of inferior materials and poor electrification.
7.	14	Floor	Tiles peeling off and tears	Environmental impact, use substandard materials and poor workmanship.

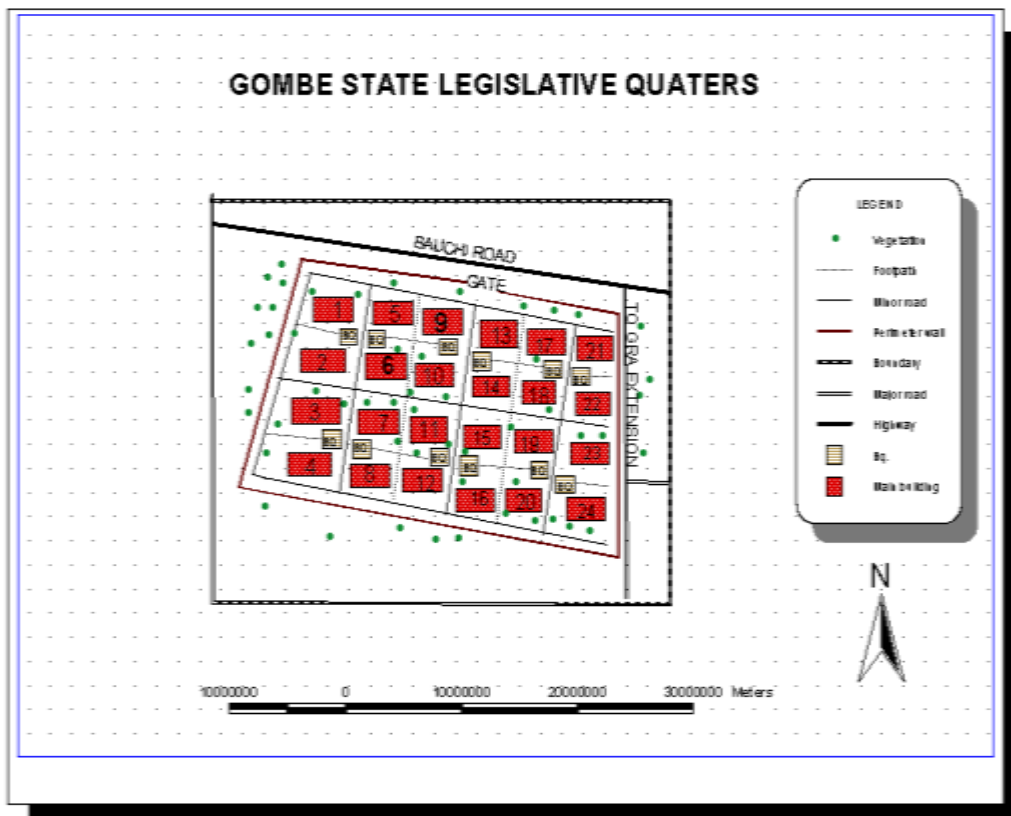**Figure 1: Google Earth Image of Gombe State Legislative Quarters**

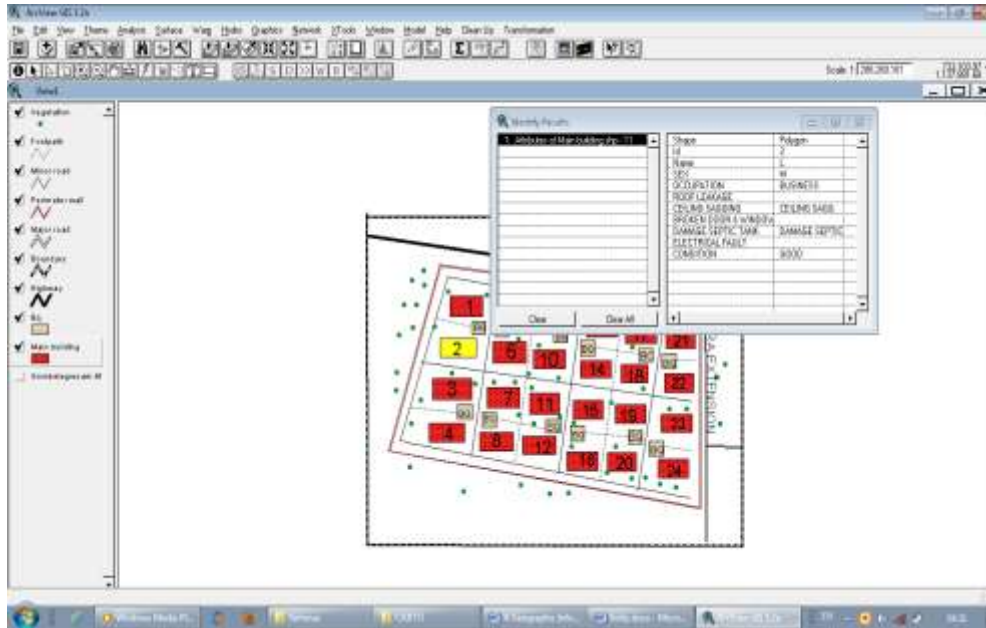**Figure 2: Gombe Legislative Quarters**

Figure 3: Query showing details information about a house NO. 2
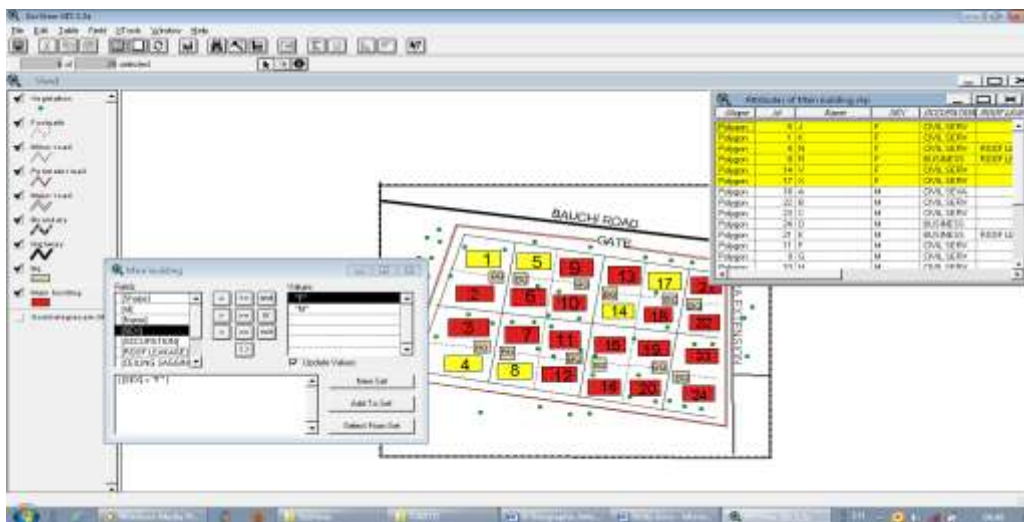

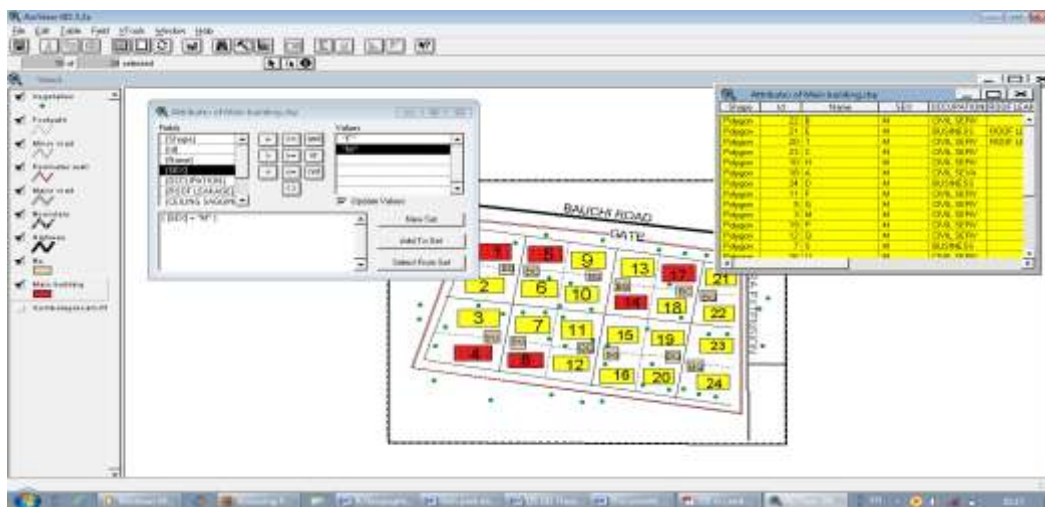**Figure 4: Query showing NO. Of female occupant in the Estate**

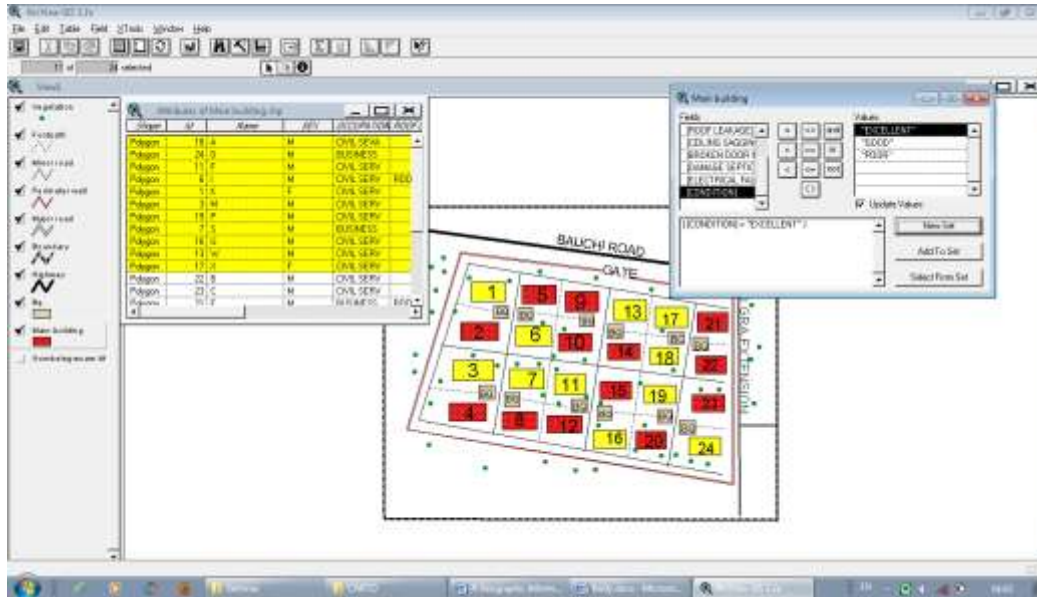**Figure 5: Query showing NO. Of male occupant in the Estate**

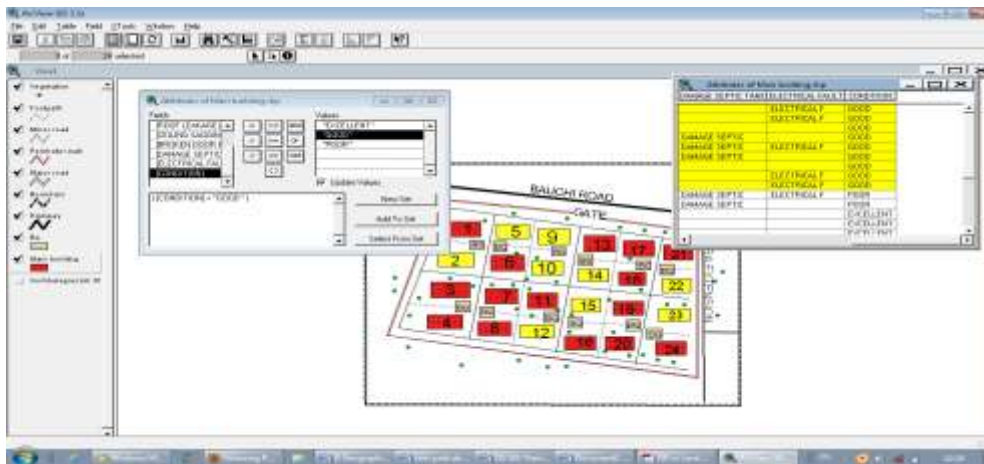**Figure 6: Query showing No. of Houses that are in Excellent condition**

Figure 7: Query showing No. of Houses that are in Good condition
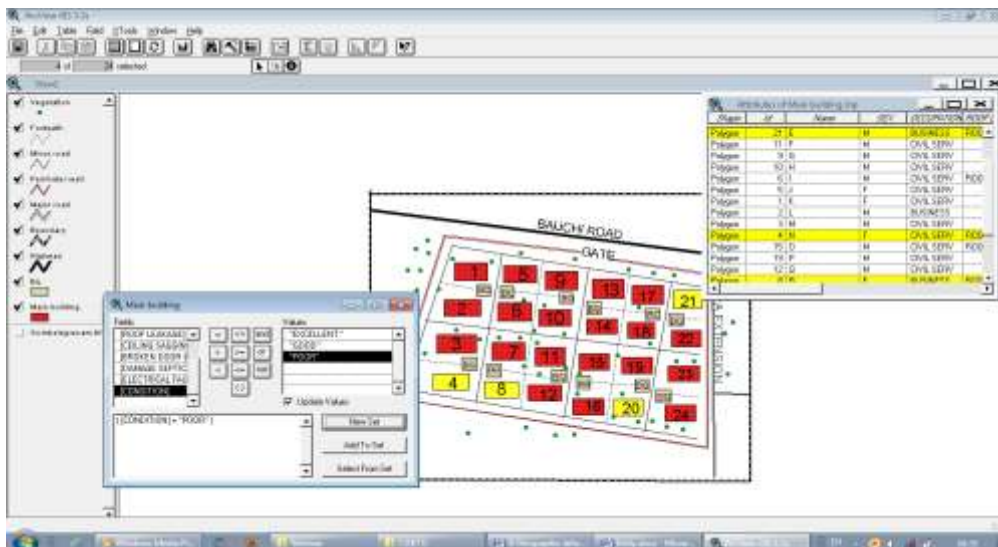

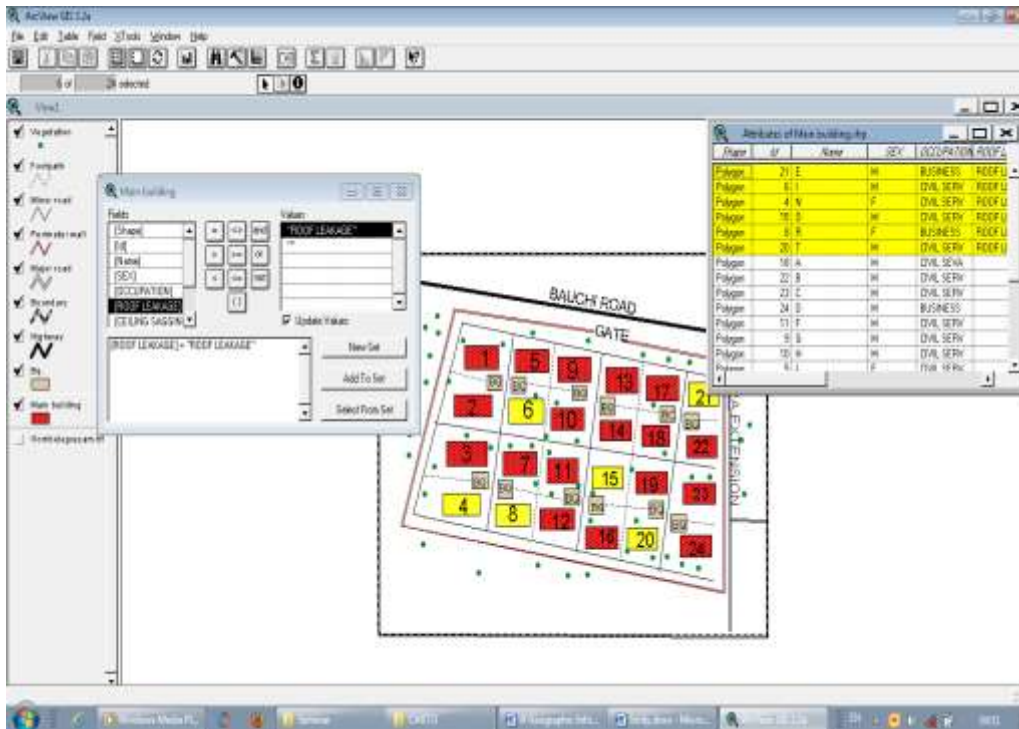**Figure 8: Query showing No. of Houses that are in Poor condition**

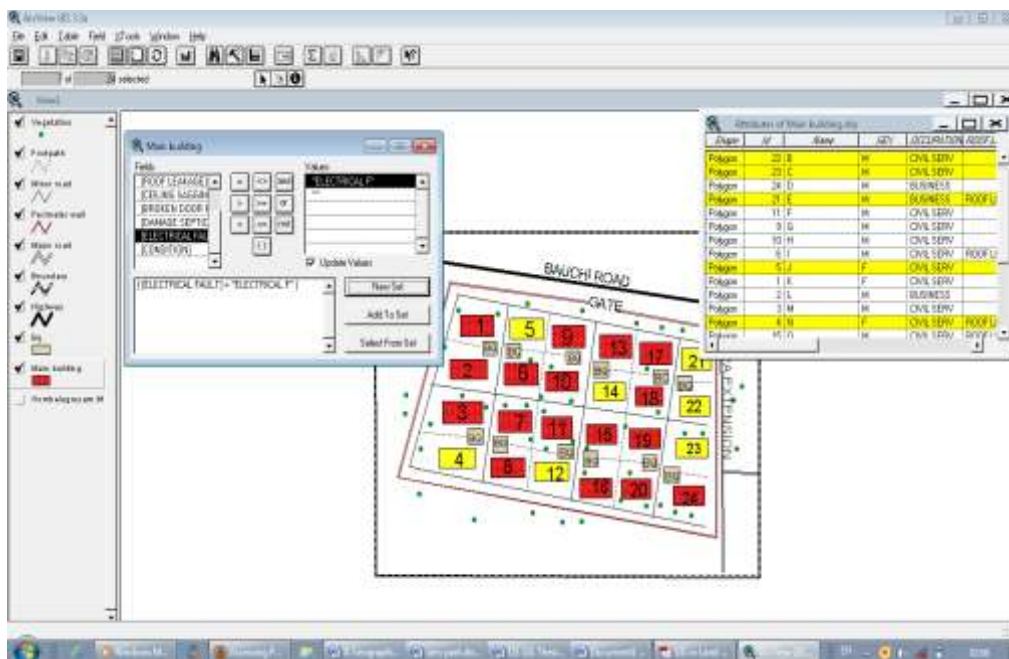**Figure 9: Query showing No. of Houses which roof are leaking**

Figure 10: Query showing No. of Houses that has Electrical faults

Figure 11: Query showing No. of Houses which has sagging ceiling

Figure 12: Query showing No. of Houses that has Broken Doors &Windows
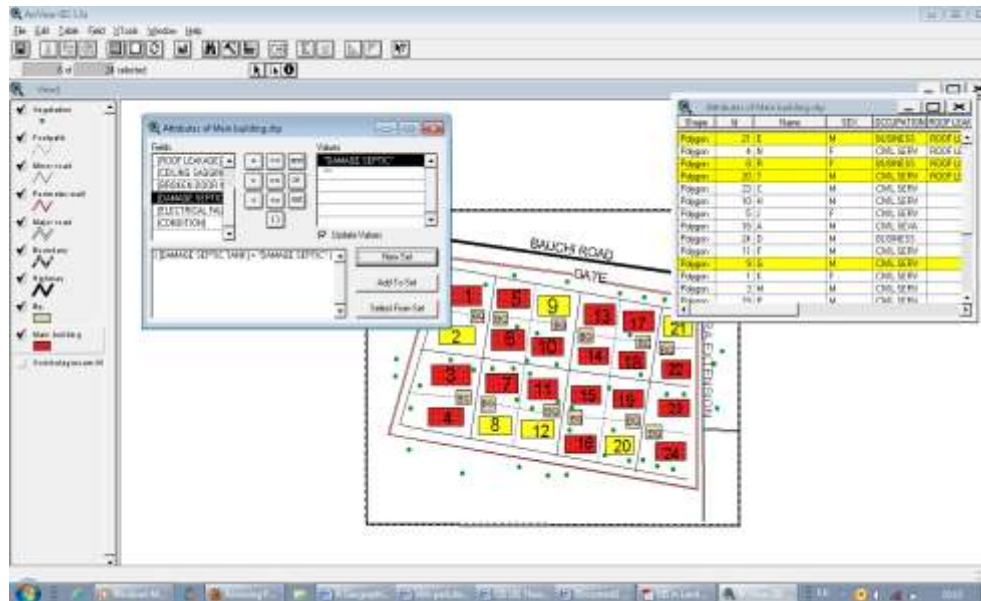
Figure 12: Query showing No. of Houses that has Damaged septic Tank

V.   CONCLUSION

GIS acts as an excellent tool for automating the process of a real estate development and maintenance. GIS can assist in site selection and assessment, strategic planning, demographic analysis, marketing and sales, property maintenance and can act as an integral part of all the other information systems put in place.

GIS is a very powerful in aggregating data and presenting data, especially its ability to present data in map (image) format. Image format is the most efficient way of presenting information that mankind can understand. GIS not only possesses the power in presenting data in very efficient way, but also the ability to process data (vector, raster, TINS and image data).

RECOMMENDATIONS

The following recommendations are proposed:
1. GIS courses should be included in the curriculum of Estate Management programmes in our tertiary institutions.
2. Estate Surveyors and Valuers should get acquainted with the use of GIS software's as its
make work very fast and easier in terms of storing, retrieval, managing, manipulating as well as recording of attribute and spatial data used in the course of delivering their job.
3. Awareness and enlightenment should also be created through media, national dailies, seminar presentation e.t.c to Local Government authorities, works department unit, Ministry of works and Land and survey as regard to GIS capabilities to their works.
4. The use of tested and quality materials be used during the construction stage
5. A GIS-Based maintenance management should be put in place for effective maintenance and storage of data for maintenance record.

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