

# BUILDING THE SOUTH AFRICAN NATION THROUGH LEGAL DEPOSIT IN TIMES OF RAPID CLIMATE CHANGE: THE STRUCTURAL DESIGN OF THE MSUNDUZI MUNICIPAL LIBRARY

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## ABSTRACT

This article examines the structural design of a legal depository as the building is the cultural materials' main line of defence against drastic changes in climate. A conceptual framework using the International Organization for Standardization (ISO) International Standard (11799:2003) for 'Information and documentation – Document storage requirements for archive and library materials', and the Society of American Archivists (SAA 2008) 'Guidelines for archivists, librarians, architects, and engineers' were used to examine the different building facets of the Msunduzi Municipal Library, Pietermaritzburg, South Africa. Using a three-phased approach, quantitative and qualitative methods and tools were used to collect data over a period of time. As a way forward, the study recommends the adaption of various elements of the building in order to moderate and prevent further damage of the building and the documentary heritage.

**Keywords:** library buildings, legal depositories, climate change, Msunduzi Municipal Library, South Africa

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## 1. INTRODUCTION

Recent research has concentrated on the sustainable building and the internal design and environmental conditions that affect the lifespan of library collections around the world (Cassar 2011; Scherer 2004; Turpin 2011; Zhang and Wang 2015). Another concept that has been considered is that of the ‘library without walls’, also called the virtual library; however, physical libraries are still being built all over the world (Webb 2000, 9), and although some of them offer virtual services (hybrid) as they adopt technology, they are not paperless.

Cassar (2011, 6) emphasises that ‘it is widely recognized that cultural heritage is an environmental good that needs to be sustained for the future, curators ... have the responsibility to engage in the process of adaptation to climate change through energy reduction’. Adaptation and mitigation of climate change are two different processes but each has an effect on the other. Adaptation refers to change in processes, practices and structure in order to moderate potential damage caused by climate change; while mitigation is the reduction of greenhouse gas emissions in order to limit the extent of climate change (IPCC 2014). However, ‘the sustainability of archival institutions will be greatly affected by attempts to mitigate their carbon footprint to meet the challenges of global climate change’ (Wolfe 2012, 35). Various researchers (Cassar 2011; Kim 2008; Turpin 2011; Zhang and Wang 2015) have looked at energy efficiency and green building to create a sustainable archive in the process of adapting to climate change, as well as to help mitigate the carbon foot print. This article looks at the building as the collections’ primary shield of protection against the rapidly changing climate and its main focus is adaption to climate change. Therefore, the article looks at the exterior design of the building that is one of the stores of South Africa’s published heritage, namely, the Msunduzi Municipal Library, Pietermaritzburg, South Africa.

## 2. PROBLEM STATEMENT

The building is the collections’ main foundation of security; it is vital and affects preservation and access in various ways (Ngulube 2007, 55; Nsibirwa 2007, 33). According to Webb (2000, 7) and Dowling (2004, 21), the architectural design of the building is determined by the activities and functions that will be performed in the finished building. Although Webb (2000, 8) states that ‘library building projects seem especially to invite architects to grand design’, others feel that this may not be the case for future library designs which may be reduced to only architectural principles. The Msunduzi Municipal Library has the dual function of being a public library as well as a legal depository that requires a custom made building or an adapted one to accommodate its dual function. According to the International Federation of Library Associations and Institutions (IFLA 2001, 2), the main purpose of a public library is: ‘To provide resources and services in a variety of media to meet the needs

of individuals and groups for education, information and personal development including recreation and leisure.’

However, according to section 7(1) of the Legal Deposit Act (No. 54 of 1997), the duties of a legal depository are to receive, access, retain, preserve for posterity and provide access to documentary heritage. This requires prolonging the existence of such documentary heritage by keeping them in a controlled environment (stack rooms) to preserve them for present and future use.

Ideally, depositories should be custom made in accordance with the proper architectural properties and standards that will help to prolong the life of materials (Ngulube 2003, 102). However, due to economic and cultural reasons, there has always been a debate about whether to erect a new building or to adapt an existing one. Nonetheless, whether a building is custom made or adapted, efforts need to be put into defending the building against external environmental elements. A study of the Msunduzi Municipal Library concerning the preservation and access of legal deposit materials by Nsibirwa (2007, 98) revealed that the building was custom designed and built in 1975 for its present use. However, according to Nsibirwa (2007, 98), the building:

Was built during the time when many institutions all over the world had just identified mass embrittlement of books and were starting to understand that preservation does not entail conservation only. The building was not designed for preventative preservation of materials.

The current effects of the outdoor climate are affecting the external components of the building as well as the internal climate of the building, especially with regard to temperature and relative humidity. In addition, the Department of Environmental Affairs (2013) states that without any climate change mitigation:

Climate change projections for South Africa up to 2050 and beyond project warming as high as 5–8 °C over the South African interior, and somewhat less over coastal regions ... A general pattern of a risk of drier conditions to the west and south of the country and a risk of wetter conditions over the east of the country has been projected.

Climate change has a serious impact on buildings and this is a vicious circle as existing buildings also contribute to the carbon foot print in circumstances where there is no mitigation or adaptation of the buildings. Therefore, ‘building proper storage facilities must be considered as a crucial point in functioning of archives all over the world’ (Hanus and Hanusova’ 2012, 62). South Africa is currently facing extreme El Nino events which include very high temperatures in a number of areas as well as drought conditions with below normal rainfall (South African Weather Service 2016). In 2010–2011, South Africa experienced heavy rainfall causing flooding as a result of La Nina. Although there are natural causes of climate change, scientists argue that the carbon foot print has led to the acceleration of these changes. Cai et al. (2014, 111) state that the increased frequency of the reorganisation of atmospheric convection which is defined as El Nino, is as a result of global warming.

They argue that ‘potential future changes in such extreme El Nino occurrences could have socio-economic consequences’ (Cai et al. 2014, 111). The problem in South Africa is that officials in local municipalities do not understand climate change and all its implications (Faling, Tempelhoff and Van Niekerk 2012, 246), yet they are responsible for the maintenance of government buildings within their jurisdiction.

### 3. OBJECTIVE OF THE STUDY

The main objective of the study was to establish whether the structure of the depository (i.e. the Msunduzi Municipal Library building) is able to withstand the changes in climate as the initial shield of the legal deposit materials. Zhang and Wang (2015, 71) state that ‘architectural design and construction have a significant impact on interior temperature and humidity’.

The following research questions were posed arising from the objectives, rationale and motivation for the study:

1. What are the climatic conditions of the area where the depository building is located?
2. What is the structural design of the building housing the legal deposit collection?
3. What are the problems faced by the depository as a result of the structural design, location and current climatic conditions?

#### 3.1. Guiding conceptual framework

The study hinged on a conceptual framework using the International Organization for Standardization (ISO) International Standard (11799:2003) for ‘Information and documentation – Document storage requirements for archive and library materials’ (hereafter ISO 11799:2003), and the Society of American Archivists (SAA 2008) ‘Guidelines for archivists, librarians, architects, and engineers’ (hereafter SAA guidelines). The choice of this framework was based on the fact that building libraries and archives is a complex task with various facets and one size does not fit all. The ISO 11799:2003 and SAA guidelines give general rules and facts that are internationally accepted, and these were used as the criteria for the study. The following concepts regarding the exterior structural design were drawn from the ISO 11799:2003 and SAA guidelines and are discussed in detail in the literature review:

- Building site – location and security assessment of the location.
- Structure of the building – materials used for construction of the walls including:
  - the size and number of windows;
  - the type of roof;

- the load-bearing capacity of the foundation and floor; and
- the system of drainage.

The researcher acknowledges that different geographical regions have varying building standards as a result of many facets including the varying climate conditions of the area and availability of construction material. However, Hanus and Hanusova' (2012, 63) state that 'despite the diversity of archival buildings there exist common principles and rules which should be kept in their construction'.

## 4. LITERATURE REVIEW

The literature examined included the background of the Msunduzi Municipal Library, depository (library/archival) buildings structural elements and designs, geographical locations of libraries/archives and climate change.

### 4.1. The background of the Msunduzi Municipal Library

The Msunduzi Municipal Library was originally the Natal Society Library established by the Natal Society and started off as a Book Society with a small library as a result of prominent members' donations in 1846 (Natal Society Foundation 2009). Initially the nucleus library was kept in a small rented room as there was hardly any public interest and subscriptions could barely cover the rent of the room hired (Natal Society Foundation 2009). The Memorandum on the Natal Society (1967) states that 'after leading a peripatetic existence for 25 years, the Natal Society was established in premises in Longmarket Street which had been purchased with funds raised from a week-long Grand Bazaar in 1874' (see Figure 1).



**Figure 1:** Natal Society Library 1878 – Longmarket Street

*Source: Natal Society Foundation (2009)*



**Figure 2:** Natal Society Public Library 1929 – Longmarket Street  
*Source: Natal Society Foundation (2009)*



**Figure 3:** Msunduzi Municipal Library 1975 with the extension built in 2006  
*Source: Natal Society Foundation (2009)*

After the Union of South Africa in 1910, the Natal Society Library became the principal library of the capital city of Natal and with the first Copyright Act of 1916 the library became a legal depository (Natal Society 1967; Natal Society Foundation 2009). With its legal deposit status, the library required more space to accommodate the growing collection and a two-storey building was built in front of the Longmarket Street premises (see Figure 2) in 1929 and used as such until 1975 when the library moved to Church Street behind the City Hall (Natal Society Foundation 2009). As part of the grant-in-aid agreement of 1967, the City Council undertook to provide a new library building (see Figure 3) in its Civic Centre Complex which would suitably house the various collections of the Natal Society Library (Natal Society 1967).

## 4.2. The building

Scherer (2004, 163) states that: ‘A library or any other major public building is more than the sum of its material parts. It is not simply a structure – it is a visible symbol and an expression of a community’s values.’

The library building is a civic landmark for the area it serves and varies in design, shape and size. However, the main reason for having building designs is for the building to serve a specific purpose and solve a specific problem. In this case, to provide a secure, strong, stable and durable environment to preserve South Africa’s documentary heritage and information access, with the dual function of a public library and legal depository. The building is the collections’ most important source of security; it is fundamental and affects preservation and access in various ways. Higginbotham and Wild (2001, 19) state that ‘for this reason, its mechanical systems, maintenance, and other protective qualities are key to the preservation mission’. Depositories are similar to archives and Membe (2002, 19) states that ‘the archive has neither status nor power without an architectural dimension, which encompasses the physical space of the site of the building’. The dual function identifies the requirement to look at the different needs and therefore the designs of both a public library and an archival building. The plan of a public library is usually created for users to have easy access (open plan) to most of the collections on the shelves. However, an archive is designed for the long-term preservation of materials which are only accessible to users through the staff of the archive (closed access).

## 4.3. The location of the building

The location of the building has an impact on the building. Banks (2000, 121) stresses that although there are building standards, these standards vary due to the fact that different geographic locations have different climatic conditions that affect the building. As mentioned earlier, the Msunduzi Municipal Library building was not designed for the preventative preservation of materials, but the interior has since been renovated to improve the interior environmental conditions, and there has been an extension to the building in the form of a new children’s wing in 2006 (Msunduzi 2015).

The influence of the environment on the materials and records is very complicated, including controlling that environment (Banks 2000, 114). The ISO 11799:2003 states that ‘if these requirements cannot be met, special provision shall be made in the construction of the building to defend against these threats’. Therefore, whether a building is purpose built or adapted, effort needs to be put into defending the building against environmental elements to reduce weathering of the building structure.

The ISO 11799:2003 and SAA guidelines (2008, 7) state that the site for an archive and/or library repository building should not be:

- liable to subsidence or flooding; whether from a natural source, such as an underground river, or from a man-made source, such as water mains;
- especially at risk from earthquakes, tidal waves or landslides;
- at risk from fire or explosions in adjacent sites;
- near a place or a building which attracts rodents, insects and other pests;
- near a plant or installation emitting harmful gases, smoke, dust, and so on;
- in an especially polluted area; nor
- near a strategic installation or symbolic site which could be a target in an armed conflict.

Sahoo (2007, 110–111) states that the building should not be built in the centre of cities and towns and should be built away from the traffic to avoid dust and dirt. However, most archives and libraries are built in the city centre in order to be easily accessible to people.

The SAA guidelines (2008, 7) state that ‘many of the dangers that threaten an archival facility can be avoided by careful site selection’. James Reilly (A.M.G 2009, 37) agrees with the SAA and emphasises that data needs to be collected on variables, such as local climate and building structures. The degrees of vulnerability of the buildings according to the strength of the winds need to be considered especially in areas prone to hurricanes, tornadoes and tsunamis. However, Banks (2000, 125) states that there are a number of strategies that can be employed to reduce the effects of outdoor temperature on the internal temperature and humidity including:

- a mass of older buildings that envelop the depository or archive provides a measure of thermal inertia although in approximate inverse ratio to the number of windows in a building (fenestration);
- creating a double wall structure around the building;
- storing collections in internal spaces with staff and other functions around the perimeter of the building; and
- storing collections underground if ground water can be effectively controlled.

Duchain (1988, 106) states that there are simple ways of ensuring a building is watertight, such as ensuring that gutters are clean as well as ensuring that windows and doors are properly sealed. There are also various complex techniques used to protect buildings against damp rising from the foundation, soil or ground. Sahoo (2007, 110) agrees with Duchain (1988) and states that even the soil on which the building is constructed has an impact on the environmental condition inside the library building. Architects, librarians and archivists should bear in mind that design measures are required to mitigate site hazards that can add additional costs to the institution (SAA 2008, 8).



#### 4.4. Climate of the building location

Apart from the buildings in which legal deposit collections are stored, as climate change and global warming have become a major environmental problem, there is an urgent need to consider the geographical area and the external environment of the building. Since 1950 there has been extraordinary warming in the climate systems over a number of years (IPC 2013). This includes an increase in temperatures which may be linked to global warming. The South African Weather Service (2011) and IPCC (2013) state that it is natural for climate to change or vary from one decade to another, but human industry and development have led to changes over and above the natural variations.

If nothing is done about climate change, the Conference of the Parties 17 (COP17 2011) predicts the following for South Africa:

1. coastal regions will warm by around 1–2 °C by about 2050 and around 3–4 °C by about 2100; and
2. interior regions will warm by around 3–4 °C by about 2050 and around 6–7 °C by about 2100.

#### 4.5. Structure of the building

There are a great many considerations to be made in achieving a sound library building for preservation according to Banks (2000, 126–127) and the ISO 11799:2003, including:

- An attractive building that can be visually recognised at a distance to draw people into it that is durable with a long life expectancy.
- Climatic inertia – in order to protect archive and library materials from exposure to harmful light, the storage areas should have no windows or skylights. If there are windows, they should be fitted in such a way as to exclude direct daylight.
- The repository should be designed to provide an accurate and stable internal environment, with minimum dependence on mechanical systems. This can be partially achieved by constructing the external walls, roof and floor of the building from materials that, as far as possible, insulate the interior from external climatic changes. Exterior walls and frames should be made of steel, masonry and concrete for strength and durability.
- Walls, floors and ceilings inside the repository should be made of materials that have a high thermal capacity. In areas of the world where the relative humidity does not exceed the recommended values for prolonged periods of time, building materials with a high hygroscopic capacity are also recommended. For example,

brick is a material with both high thermal (heats up very slowly and releases the heat gradually) and high hygroscopic capacity.

- The foundation and floor load bearing should make provision for the weight of documentary material as well as shelving (stationary or compact/mobile).
- The roof should be watertight and slope for proper draining as flat roofs are often problematic and leaks easily occur. The roof also needs to have good thermal insulation for heat resistance.

According to Singh and Bartholomew (2014, 9), 'Adaptation ensures an increased ability to cope with a changing climate, and climate change related issues including its variability and extreme events.' However, Faling et al. (2012, 252) state that the threat of climate change is mentioned in some local strategies although no measures for adapting are offered. This includes the Msunduzi Municipal climate change policy that also discusses adaptation but does not provide any measures. The Local Government: Municipal Structures Act (No. 117 of 1998) does, however, mandate municipalities to undertake development planning. The White Paper on National Climate Change Response (Department of Environmental Affairs 2011) set out proposals for future legislation. The adaptation strategy in the white paper does not include the built environment but focuses primarily on water, agriculture, health, biodiversity and human settlements. The overall approach includes disaster risk reduction by forecasting and predicting future climatic conditions.

In a study about South African municipal buildings and the potential impact of climate change, Chinowsky, Schweikert and Hayles (2014, 459) state that the typical flat roofed public buildings have a specific drainage design based on projected amounts of rainfall. They argue that the failure to properly size the roofing drainage results in water accumulating on the roof, thus damaging the roof sealant and causing leaks.

According to Schlipf (2011, 227), library architecture has disappointing design concepts that stem from architects, librarians, library consultants, engineers and government agencies. Some of the common dysfunctional architectural design concepts include skylights, atriums, fountains and courtyards (Schlipf 2011, 228–235). These features bring the external climatic environment into the internal spaces of the library and depository. Cristina Sabbioni, Research Director at Consiglio Nazionale delle Ricerche (CNR) Institute of Atmospheric Sciences and Climate of Italy, stated that 'it is very important to identify climatic factors that affect buildings on a longer time scale' (A.M.G. 2009, 37). Some libraries are currently undergoing transformation by considering green building to adapt and mitigate climate change. Librarians/archivists need to look at the potential positive and negative aspects of green techniques as some of these are not suitable for libraries/archives, for example having a green roof can result in leaks.

## 5. RESEARCH METHODOLOGY

Buildings need to withstand changing climatic conditions for stability and durability, and examining these multiple and complex facets require different approaches. Using a conceptual framework and a three phased approach that was mainly qualitative in nature, data were collected on Msunduzi Municipal Library over a period of time. According to Wagner, Kawulich and Garner (2012, 138) in qualitative research ‘it is generally accepted that employing multiple methods of data collection to increase trustworthiness and credibility’. The data was collected using a semi-structured interview schedule and an observation guide. In addition, secondary data (rainfall and temperature figures) were used and photographs were also taken and collected. Crystallisation was used instead of triangulation to analyse and bring data together from various data collection methods and emerging patterns were used in order to get a more accurate result. To crystallise is to ‘bring together and formulate the reality that emerges from the various data-gathering techniques and data analyses’ (Wagner et al. 2012, 269). According to Wagner et al. (2012, 138), ‘in qualitative research, what we are dealing with is not an exact measurable finding, but emerging reality that we are describing and analyzing’. Non-probability sampling in the form of purposive sampling was used to select the Head of Msunduzi Municipal Library who was interviewed. The head of library was purposively selected based on the researcher’s knowledge of the population and the fact that issues pertaining to the structure of the building are dealt with by management. Table 1 shows the methods used to collect data from the multiple sources.

**Table 1:** Phases, methods and tools

Phase	Methods and tools
1	Review of literature and secondary data
2	Interview
3	Observation using a building worksheet, taking and collecting graphic data

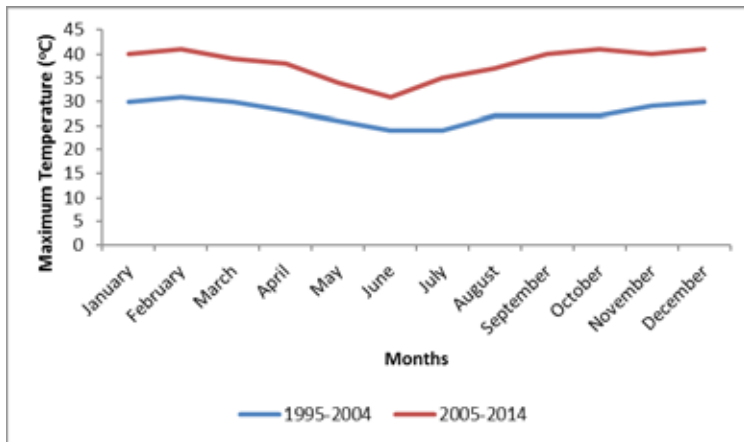
On request a copy of the interview schedule and observation guide (building worksheet) will be made available.

## 6. FINDINGS AND DISCUSSION

A phased approach was used to collect data regarding the structural design of the legal depository; the climatic conditions of its location; and the problems faced as a result of these climatic conditions. A semi-structured interview was used to collect data regarding the structural design and problems experienced as a result of climate. The researcher observed the structural aspects of the building using a building worksheet, and also took and collected photographs in order to verify and confirm

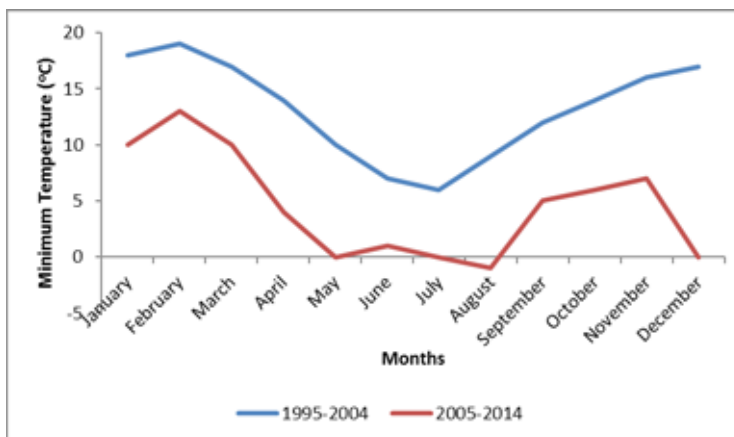
the results of the interview. Secondary data was used to analyse the temperature and rainfall patterns of Pietermaritzburg from 2005–2014. Literature was reviewed to inform the context and conceptual framework.

The first research question looked at the climatic conditions of the location of the library. Secondary data collected by Weather2 (a global weather service) was used to create the maximum and minimum temperature graphs below. The average temperature collected in Figure 4 shows that there is already quite a substantive difference in average monthly maximum temperatures from the past decade (1995–2004) to the present one (2005–2014). The maximum temperatures have increased on average by 10 °C and the minimum temperatures (Figure 5) have decreased on average by approximately 8 °C.



**Figure 4:** Average maximum monthly temperature of Pietermaritzburg

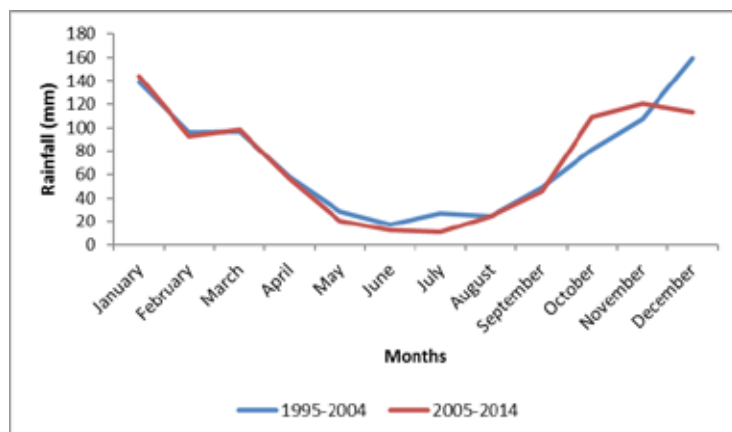
Source: Weather2 (2015)



**Figure 5:** Average minimum monthly temperature of Pietermaritzburg

Source: Weather2 (2015)

The average monthly rainfall data used to create Figure 6 was secondary data collected by Cedara Weather Station (Department of Water Affairs 2015). It shows that there has been a decrease in rainfall over the present decade (2005–2014) during the winter months from May to August (an average of approximately 7.52 mm) and an increase in rainfall in summer.



**Figure 6:** Average monthly rainfall of Pietermaritzburg

Source: Department of Water Affairs (2015)

COP17 (2011) also emphasises that: ‘There will be an increase in the frequency and severity of extreme weather events. Damage costs due to extreme weather-related events (flooding, fire, storms and drought) have already been conservatively estimated at being roughly 1 billion rand per year.’

The current climate change and effects of global warming affect the buildings and the materials stored in the buildings and have increased the level of risks to disasters. Thus climate change and global warming make preservation of materials even more important because they also affect the building in which materials are stored. The government of South Africa is tasked with protecting infrastructure from the impact of disasters through legislation in the National Disaster Management Act (No. 57 of 2002). However, a study conducted by Nsibirwa (2007, 109) found that Msunduzi Municipal Library did not have a disaster plan even though the library had been affected by water disasters in the past (see Figure 7).



**Figure 7:** Roof leaking fourth floor stack room 2012

*Source: Msunduzi Municipal Library (2012)*

Secondly, the study examined the structural design of the building housing the legal deposit collection including construction materials, windows, roof, the foundation and drainage system using a semi-structured interview, a building worksheet and graphic materials. These results will be discussed together with the third question regarding the problems faced by the depository as a result of the structural design, location and current climatic conditions.

The building is the outer protective, strong and durable shell of the collections which it stores. Therefore, the way it was constructed and the materials used as well as how it is maintained are key to preservation. According to Fletcher (1975), the Msunduzi Municipal Library building is a revival style colonial civic building. The library is a four-storey rectangular building with two basement levels and a semi-circular extension added to the main building in 2006 (see Figure 3). Brick, concrete and steel are the predominant materials used to build the walls of the original rectangular building structure. Brick and concrete are good at maintaining favourable and stable internal environment as they have a high thermal capacity. Glass panels and steel are the main materials used to build the semi-circular extension structure. Schlipf (2011, 252) states that ‘glass is hard to insulate as effectively as solid walls’. The glass panels lead to solar heat gain and are easily damaged in heavy storms. According to Naidoo (Pers. comm., March 22, 2016), the glass panels were damaged during a severe hail storm in February 2014 and had to be replaced.

The exterior of the main building is generally in a good condition. The centre of the building was designed with an open courtyard/atrium on the second floor and has large windows (flat and sliding L1.3 m x W1.1m, fan-lights L1.3 m x 0.48 m) all around the inner walls (see Figure 8). This courtyard leaves a void in the centre of the building on the second, third and fourth floors. According to Schlipf (2011, 235), ‘courtyards can introduce daylight to otherwise dark interiors’. The central courtyard allows daylight into the second, third and fourth floor stack rooms and other climatic

elements as it is open and not covered. However, the proper preservation of cultural materials is crucial, especially in the context of climate change, and the materials require a high level of protection against light, temperature, relative humidity and water.



**Figure 8:** Windows closed, sliding windows and fan-lights

*Source: Msunduzi Municipal Library (2016)*

The roof of the main building is flat with a parapet and is made of bitumen sheets. The respondent stated that ‘bitumen sheets have just been removed and the roof was recovered with new sheeting (silvery stuff)’. These bitumen sheets were replaced in 2013 according to the respondent because the roof was accumulating water and leaking (see Figure 5). The researcher observed that the bitumen sheets were replaced with a new bitumen membrane and were painted with aluminium paint that is weather resistant, deflects heat and has anti-corrosive properties. The new extension’s roof is dome shaped with skylights. The researcher observed that the leaking of the main building’s roof could also be a result of poor drainage. As mentioned above, Chinowsky, Schweikert and Hayles (2014, 459) state that the typical flat roofed public buildings have a specific drainage design based on projected amounts of rainfall. With extreme storms as a result of the change in climate, the drainage capacity of a roof built in 1975 will be insufficient and thus result in rain water accumulating on the roof.

The respondent revealed that there are no regular inspections of the building and maintenance is done ‘only when the need arises’. The respondent also stated that an on-going log of building problems is not kept yet the building has had ‘roof leaks, pipe leaks, flooding plus toilet problems, rising damp in the new wing, malfunctioning air-conditioning and a lift that needs replacing and non-functioning book lift’. The researcher observed that the roof had leaks as there were water marks on the ceiling and walls. According to the Library and Information Services (LIS) Transformation

Charter (Department of Arts and Culture (DAC) and the National Council for Library and Information Services (NCLIS 2014, 54): ‘The challenges facing public libraries stem in many respects from the legacy of apartheid and a period of funding neglect in the first decade of democracy. They relate to infrastructural deficits, human resource demands and operational difficulties.’

Apart from the building being affected by a leaking roof, extreme weather has led to rain water penetrating the building through the windows. In addition, it has also led to the rise of the stream over which the building was built due to the inability of the pump to control the amount of stream water. Naidoo (Pers. comm., September 12, 2015) stated that the Fire Department had to be called in the past to help recovery from the flooding of the periodicals stack room in the basement. A larger pump had to be installed in recent years to control stream water as a result of an increase in extreme rainfall.

The 1970s purpose-built library has had mainly parts of the interior redesigned. The respondent stated that this includes ‘the installation of the circulation and periodicals issue desks, refurbishment of auditorium, new shelving, and extension of the internet café, new carpets, fittings and equipment’. The only structural change since the building of the children’s library in 2006 was the construction of a mezzanine floor in 2008 in the periodicals stack room in the basement of the building to increase storage space (Naidoo, pers. comm., March 22, 2016). Nsibirwa (2007, 87) found that the periodicals stack room in the basement lacked adequate storage space. The researcher was unable to establish why the other stack rooms were not given priority during the renovation. The researcher can only speculate that other departments and functions of the library were seen as a priority. This may be because these functions are included in the mission statement and the preservation of legal deposit materials that is not included in the declaration. This was confirmed by the LIS Transformation Charter (DAC and NCLIS 2014, 88) which states that the Legal Deposit Mandate of the Msunduzi Municipal Library is not funded and as a result of this, it struggles to accommodate and manage the publications.

## 7. CONCLUSION AND RECOMMENDATIONS

The key aim of the current study was to establish whether the structure of the Msunduzi Municipal Library building is able to withstand the changes in climate as the primary shield of the legal deposit materials. The findings show that some of the features of the 1970s building, namely the roof, court yard, windows and drainage, are not shielding the library materials properly. This is as a result of the architectural design of the building and abnormal changes in temperature and rainfall patterns.

Thus, the study concludes and recommends that the Msunduzi Municipal Library building needs to be adapted since it was built 40 years ago. Due to lack of funding, only a few alterations have been done to the building’s exterior structure that is



directly affected by climatic conditions. According to the recommendations made by the LIS Transformation Charter (DAC and NCLIS 2014, 89), ‘the Department of Arts and Culture should fund the Legal Deposit mandate of Msunduzi Municipal Library so that they can provide accommodation for the resources and employ skilled staff to manage them’. The areas that need urgent adaptation include:

1. The roof drainage needs to be improved as its design was based on projected rainfall in the 1970s. The study found that the South African climate has changed and that although in 2016 the climactic challenge is that of El Nino, there is a high likelihood of experiencing La Nina with extreme summer rainfall.
2. The open court yard creating a void in the centre of the building should be roofed in order to protect the centre of the building from the environmental elements especially rainfall, high temperatures and sunlight.
3. The windows in the centre of the main building and the glass panel walls of the extension should be covered with solar window film that filters and protects from ultra-violet (UV) rays and the heat and glare created by solar rays. The windows and glass panels should be covered with safety film to protect the glass from shattering in case of hail storms or strong winds that carry debris.
4. Although a larger pump has been installed to control the stream running underneath the building, a storm water drainage system needs to be improved to draw the stream water away from the building. This will help to avoid flooding of the stream and building during heavy rains.

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