CHALLENGES FACING FACILITIES MAINTENANCE MANAGEMENT AT THE CITY OF EKURHULENI METROPOLITAN MUNICIPALITY

by

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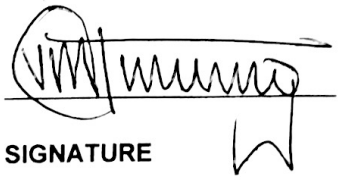

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ABSTRACT

The study explored challenges in facilities maintenance management at the City of Ekurhuleni Municipality and their effects on service delivery. It aimed to provide actionable recommendations for improvement through qualitative research. The City of Ekurhuleni Municipality is one of the three Metropolitan Municipalities in Gauteng Province, situated on the East of Johannesburg (previously known as East Rand). The city was formed in 2000, through the amalgamation of nine former municipal authorities, namely the Greater Germiston, Greater Benoni, Greater Boksburg, Greater Brakpan, Greater Springs, Kempton Park, Edenvale, Alberton and Nigel.

Adopting a qualitative research approach, the investigation addresses key questions: (1) What does the literature say about facilities maintenance management and service delivery within the discipline of Public Administration? (2) What are the challenges facing facilities maintenance management to enhance service delivery at the City of Ekurhuleni Municipality? (3) What are the effects of challenges facing facilities maintenance management on service delivery at the City of Ekurhuleni Municipality? (4) What recommendations can be made to the City of Ekurhuleni Municipality to minimise the challenges facing facilities maintenance management to enhance service delivery at the City of Ekurhuleni Municipality?

The findings reveal significant issues, including inadequate budget allocation, resource shortages, unfilled critical vacancies, and the absence of a guiding facilities management policy. Based on these findings, the study proposes actionable recommendations: the City of Ekurhuleni Municipality should increase budget allocation for maintenance, ensure adequate provision of resources and tools, fill critical vacancies in the Facilities Management Division, develop a comprehensive Facilities Management Policy, and secure top management support for maintenance strategies. These recommendations aim to address identified challenges and contribute to enhanced service delivery outcomes in the City of Ekurhuleni Municipality.

KEY CONCEPTS

City of Ekurhuleni Municipality, facilities maintenance management, service delivery, challenges, effects, municipal facilities, community, employees, resources, budget, policy, procedures.

LIST OF ABBREVIATIONS / ACRONYMS

ABBREVIATION	MEANING / DEFINITION
CoE	City of Ekurhuleni
RED	Real Estate Department
FMD	Facilities Management Division
PMD	Property Management Division
PDD	Property Development Division
EMPD	Ekurhuleni Metro Police Department
CCCs	Customer Care Centres
OHS	Occupational Health and Safety
SCM	Supply Chain Management
LED	Local Economic Development

TABLE OF CONTENTS

Contents *Page*

LIST OF TABLES

Contents *Page*

LIST OF FIGURES

Contents *Page*

CHAPTER 1: GENERAL INTRODUCTION

1.1 INTRODUCTION

This study investigated the challenges facing facilities maintenance management to enhance service delivery at the City of Ekurhuleni Municipality (CoE). Service delivery centres include, but not limited to clinics, libraries, Customer Care Centres (CCCs), community halls, indoor and outdoor sports facilities, fire stations, licensing stations, as well as Ekurhuleni Metro Police Department (EMPD) Precincts, administration buildings and offices occupied by employees of the city. This introductory chapter describes the general introduction of this research by discussing the research settings. It gives a full background to the study. The chapter also introduces the problem statement and the research questions. Further, the aim of the study and research objectives of the study are presented, followed by the significance of the study. An overview of the research design and methodology adopted in this study, as well as the process followed to obtain ethics clearance from all gatekeepers, is also provided. The chapter ends with a summary of mini-dissertation outline.

1.2 BACKGROUND INFORMATION

There is evidence to suggest that infrastructure development and management are critical components of the government's commitment to providing essential services to communities (Mazele & Amoah, 2021:1). Public infrastructure and property, including buildings and related facilities, are constructed to meet social and administrative support and requirements, as well as to fulfil economic responsibilities for the public (Amponsah-Kwatiah, Owusu & Afranie, 2021:686). However, among the challenges that municipal facility maintenance managers face, is determining how to improve the performance of municipal facility maintenance to provide communities with long-term service (Bikam & Chakwizira, 2021:2). These challenges are attributable to municipal facilities often not well-maintained and not regularly refurbished (Andile, Kahilu & Akintayo, 2018:437).

The CoE Municipality is a Category A municipality located in Gauteng Province, stretching from Germiston in the west to Nigel and Springs in the east. It was formed through the amalgamation of nine former East Rand towns, the Khayalami Metropolitan Council, and the Eastern Gauteng Services Council. As one of the most densely populated areas in both the province and the country, Ekurhuleni plays a vital role in South Africa's urban landscape. Its economy is robust and highly diversified, contributing nearly 25% to Gauteng's economy, which itself accounts for over a third of the national Gross Domestic Product (City of Ekurhuleni Metropolitan Municipality, 2025a).

Ekurhuleni is also a national transport and logistics hub, with world-class infrastructure that rivals that of many developed countries. It hosts OR Tambo International Airport, the largest in South Africa, and is central to a dense network of roads, railways, and telecommunications. Major strategic projects include the Maputo Corridor, direct connections to Durban, the Gautrain rapid rail system, and the OR Tambo Industrial Development Zone. Covering 1,976 km², Ekurhuleni includes towns such as Boksburg, Kempton Park, Benoni, Tembisa and Alberton. Its economic output is driven by various sectors: finance (26%), community services (24%), manufacturing (21%), trade (13%), transport (8%) and others such as electricity, construction and mining. These statistics reflect its significance as an economic engine within Gauteng and South Africa as a whole.

A map delineating the boundary and towns encompassed within the CoE is depicted in Figure 1.1.

Figure 1.1: Map of City of Ekurhuleni Municipality

Source: City of Ekurhuleni Metropolitan Municipality (2025b).

In November 2010, the CoE Municipality established a new department called Real Estate Department (RED). The establishment was justified by the desire to consolidate all real estate-related functions that were dispersed throughout the city to improve efficiency. The RED was established with three divisions namely Property Management division (PMD), Property Development division (PDD) and Facilities Management Division (FMD). The PMD is responsible for the acquisition of land, disposal of land, leasing of land, zoning and management of all municipal owned land (Gungubele & Ngema, 2014:161).

PDD is responsible for the construction of new municipal buildings or facilities, while the FMD is responsible for continuous maintenance of existing buildings or facilities to improve and enhance their useful lifespan, prevent deterioration and failure, restore their physical condition to a specified standard, as well as to recover from structural defect. This includes the development of maintenance planning of existing building infrastructure and the management of maintenance projects (Chidi & Mashego, 2018:9).

Administration buildings, CCCs, clinics, libraries, licensing centres, fire stations, Ekurhuleni Metro Police Precincts, Municipal Courts, taxi ranks, residential flats/units and hostels, are among the categories of facilities owned by the CoE Municipality. Facilities of the CoE Municipality also include community halls, sports facilities and stadiums, cemeteries, municipal arts centres, museums, municipal workshops and depots. The maintenance of all these facilities is the responsibility of FMD of the RED (Chidi & Mashego, 2018:9-10).

The CoE Municipality capital and operational budget set aside for the maintenance of buildings is decentralised and scattered to different departments (Deloitte, 2018:14). In essence, the function of building maintenance and repairs belongs to FMD of RED, but the management of financial resources to carry out the function is with different departments. Essentially, this allows departments to prioritise other projects, some departments disregard the approved maintenance plan, others repurposing maintenance budget to fund other projects. Other departments duplicate projects and that results in fruitless expenditure. Basically, all these factors result in poor municipal facilities maintenance, under-budgeting and under-spending on municipal facilities maintenance, which has an impact on service delivery (Bikam & Chakwizira, 2021:2). It also leads to an increasing maintenance backlog worrying budget constraints (Andile, *et al*., 2018:437).

The level of expenditure on infrastructure maintenance in South African municipalities has been excessively low, resulting in the deterioration of infrastructure (Miya & Grobbelaar, 2015:931). Given this scenario, it is important to comprehend the challenges that facilities maintenance management faces to improve service delivery, as well as the impact of those challenges on service delivery, specifically within the CoE Municipality.

1.3 PROBLEM STATEMENT

The goal of facilities maintenance management is to provide end-users with a user-friendly, functional, and safe work environment, while using as minimum resources as possible, to improve organisational effectiveness (Xaba, 2012:216). Public facilities should therefore be well managed, particularly when it comes to the required maintenance works to ensure facility functionality, minimal repairing costs, and providing a safe environment for users (Amponsah-Kwatiah, *et al*., 2021:686). In the CoE Municipality, the FMD chose preventative maintenance as its preferred strategy for improving service delivery in the city (Grobler, 2019:21). On the other hand, buildings in the city are deteriorating due to neglect and poor maintenance (Deloitte, 2018:13). There is also little preventative maintenance system on the Real Estate portfolio (Deloitte, 2018:14). As a result of FMD's reactive approach to facilities maintenance, most maintenance problems exacerbate to OHS problems, resulting in inflated costs with legal ramifications (Grobler, 2019:21). Furthermore, the backlog of facilities maintenance is increasing year after year, as the city constructs and/or buys more new facilities that must be maintained (Grobler, 2019:16). Additionally, the division of Facilities Management is underutilised because departments manage their own budget for maintenance buildings (Deloitte, 2018:58).

The current practice of municipal facilities maintenance poses numerous risks, including inadequate provision of basic services to communities (Bikam & Chakwizira, 2021:14). Maintenance has not been prioritised in the city, resulting in a severe backlog of work and dilapidating buildings (Andile, *et al*., 2018:431). Hence, if facility maintenance issues are not addressed adequately, the CoE Municipality will face risks, including non-compliance with building regulations and Occupational Health and Safety (OHS) standards (Grobler, 2019:22).

Therefore, a critical need has been identified to investigate the challenges of facility maintenance management to improve service delivery at the CoE Municipality.

1.4 RESEARCH QUESTIONS

The following research questions are addressed in the research:

- What does the literature say about facilities maintenance management and service delivery within the discipline of Public Administration?
- What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?
- What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?
- What recommendations can be made to the CoE Municipality to minimise the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

1.5 AIM AND OBJECTIVES

The aim of the study is to investigate the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality.

To achieve the aim, the following objectives were pursued:

- To conduct a literature review on facilities maintenance management and service delivery within the discipline Public Administration.
- To identify challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality.
- To determine the impact of challenges facing facilities maintenance management on the service delivery at the CoE Municipality.
- To make recommendations that the CoE Municipality may use to minimise the challenges on the service delivery at the CoE Municipality.

1.6 SIGNIFICANCE OF THE STUDY

The research helps to better understand the challenges that facilities maintenance management faces in their efforts to improve service delivery within the CoE

Municipality. The study adds to the existing body of knowledge on the challenges that facilities maintenance managers face from a theoretical standpoint. The study is also expected to contribute positively to empowering maintenance staff to identify challenges facing facilities maintenance management, in order to improve service delivery and to determine the effect of those challenges on service delivery within the CoE Municipality. It is trusted that the resulting theoretical framework and identified facilities maintenance management challenges will spark further discussion about policy development and implications at the CoE Municipality and among scholars of public administration. The study's theoretical framework is based on the facilities maintenance management approach. As a result, municipalities and scholars of public facilities management can use the study to further their academic research on the challenges that facilities maintenance management faces to improve service delivery. Finally, the recommendations emerging from this study provide clear guidelines and practices that the CoE Municipality can implement to ensure that there is improvement in service delivery by the CoE Municipality.

The study strictly adhered to recognised ethical standards throughout the research process, ensuring integrity, transparency, and the protection of all participants involved. As outlined in Chapter 3, section 3.11, ethical considerations were treated as a fundamental component of the research design and execution. The study was conducted in a scientific and morally sound manner, recognising the importance of building trust with participants and maintaining the authenticity of knowledge production.

1.7 RESEARCH DESIGN AND METHODOLOGY

This study adopted a qualitative research approach to explore the challenges facing facilities maintenance management and how these affect service delivery within the CoE Municipality. The qualitative method enabled the researcher to gain rich, descriptive insights into participants' lived experiences and the operational realities within the municipality. An inductive approach was used to move from specific observations to the development of general themes and theories, allowing the researcher to identify patterns emerging directly from the data.

A contextual and exploratory research design was followed, which was suitable given the limited prior research available on this topic in the municipal setting. This design helped deepen understanding of how these challenges manifest within the specific context of CoE's facilities maintenance division. Additionally, a case study method was employed to allow for an in-depth and flexible investigation of a bounded, real-life system. Case studies are particularly effective in examining interpersonal relationships and organisational dynamics.

The study targeted facilities management managers who were considered most knowledgeable and experienced in the maintenance of municipal buildings. A judgmental (purposive) sampling method was used to select 12 participants across different management levels, ensuring that only those who could meaningfully contribute to the research objectives were included. The sample included senior and middle managers, as well as executive leadership within the Facilities Management Division. Semi-structured, in-depth interviews were used to gather primary data. This method allowed participants to share their perspectives freely, while enabling the researcher to probe for deeper insights.

Detailed explanations of the research design, sampling, and data collection procedures are presented in Chapter 3 *Research Design and Methodology* of the mini-dissertation.

1.8 ETHICS CLEARANCE

Ethical clearance was obtained from the University of South Africa's Research Ethics Committee and relevant authorities, including the Department of Public Administration and the CoE Municipality. Informed consent was a central requirement, and all participants were fully briefed on the purpose, process, and implications of the study before signing consent forms. Participants were also informed of their right to withdraw from the study at any time without consequence. To minimise harm, the study was classified as low-risk, with no foreseeable physical or psychological threats to participants. Data confidentiality and anonymity were rigorously upheld. Pseudonyms and participant codes were used to protect individual identities, and data was stored and presented in a manner that preserved privacy. Participation was entirely voluntary, with clear communication of participants' rights. No coercion or pressure was applied.

Additionally, the researcher committed to upholding scientific ethical standards throughout the research process, including honest reporting, accurate referencing, and the avoidance of data fabrication or falsification.

Chapter 3, section 3.11 *Ethical Considerations* provides detailed explanations of each ethical consideration, including the processes followed to ensure full compliance with institutional and professional research ethics.

1.9 STRUCTURE OF THE MINI-DISSERTATION

This dissertation has been organised as follows:

Chapter 1, General introduction: Chapter 1 involves the general introduction of this research by discussing the research settings. It gives a full background to the study. The chapter also introduces the problem statement and research questions. The aim of the study and research objectives are also presented, followed by the significance of the study.

Chapter 2, Literature review: Chapter 2 is a literature review on the challenges facing facilities maintenance management. It expatiates on the conceptual and theoretical frameworks by delving deep into literature review related to setting direction of the challenges facing facilities maintenance management, facilities maintenance organisational structure, facilities maintenance inspection, facilities maintenance planning and facilities planned maintenance. It further discusses the effects of those challenges. A recent success story of facilities maintenance management is also shared.

Chapter 3, Research design and methodology: Chapter 3 provides a description of the design and methodology adopted for this research. It presents the research philosophy, research approach and the research design used in the study. This is followed by the population and sampling, data collection methods and data analysis techniques. The last sections of the chapter present the ethical considerations and the limitations of the study.

Chapter 4, Data analysis and findings: Chapter 4 presents the qualitative empirical evidence derived from in-depth one-on-one interviews based on the research

objectives. The literature is used throughout the discussion to confirm or contrast the findings.

Chapter 5, Conclusions and recommendations: Chapter 5 is the concluding chapter that provides the conclusions. Considerations are also given to recommendations and areas for further research on this topic.

1.10 CHAPTER SUMMARY

The background and rationale for the study was identified, and the influence of this study in contributing to the body of knowledge on the challenges facing facilities maintenance management was highlighted. The chapter also introduced the problem statement and research questions. Further, the aim of the study and research objectives were presented, followed by the significance of the study. The chapter ended with a short summary of the structure of the dissertation. The following chapter presents the literature review conducted on the challenges facing public facilities maintenance management.

The research design and methodology applied in this research are elaborated on in Chapter 3.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The purpose of this chapter is to provide insight into the challenges facing municipal facilities maintenance management, which constitutes the fundamental foundation of this study. It expatiates on the conceptual and theoretical frameworks by delving deep into literature review related to setting direction of the challenges facing municipal facilities maintenance management, facilities maintenance organisational structure, facilities maintenance inspection, facilities maintenance planning and facilities planned maintenance. The chapter further discusses the effects of those challenges on municipal service delivery.

2.2 CONCEPTUAL FRAMEWORK

Throughout the evolution of municipal facilities maintenance, many novel approaches such as corrective maintenance, preventive maintenance, condition-based maintenance, predictive maintenance, and reliability centered maintenance have been developed (Thenuwara & Sandanayake, 2018:548). According to Hadjor (2014:27), the primary goal of municipal facilities maintenance is to ensure that the structures continue to serve the purpose for which it was constructed, while, Ampofo, Nassè, Amoah and Peprah (2020:111) agreed that the municipal facilities maintenance theoretical framework approach is novel in that it allows stakeholders responsible for maintaining municipality facilities to determine in advance the level of maintenance that they would like to achieve. This is needed so that the facilities can continue to serve their purpose and then allocate the necessary resources. Amani, Ali, Mohammed and Samat (2012:86) are of the view that municipal facilities maintenance is a comprehensive approach to operating, maintaining and improving municipality facilities to create an environment that supports the municipality's goals. In addition, Shohet and Nobili (2017:59) also showed that the integrated approach to municipal facilities maintenance is based on the idea that facility maintenance is influenced by organisational, engineering, functional, and economic factors that must be considered during the municipal facilities maintenance decision-making process. Bikam and Chakwizira (2021:7) generally accepted that a comprehensive approach to municipal

facilities maintenance necessitates planning, design, and management so that services to communities can be provided throughout the facility's life cycle.

Despite the above descriptions of what municipal facilities maintenance entails, Xaba's (2012:216) concept of municipal facilities maintenance theoretical framework is an important contribution to municipal facilities maintenance management. According to Xaba (2012:216), the theoretical framework for municipal facilities maintenance includes aspects such as maintenance organisation, maintenance inspection, and maintenance planning that must be implemented for municipal facilities maintenance to be carried out effectively.

Furthermore, municipal facilities maintenance practices are a set of techniques, guiding principles, and procedures that support maintenance decisions, planning, management, and execution to keep the municipality facilities performing at the desired level throughout the lifecycle (Amponsah-Kwatiah *et al*., 2021:687). Reichelt, Melnikas and Vilutiene (2018:224) showed that municipal facilities maintenance problems should be considered within the context of facility management theory. Lavy and Shohet (2018:109) also stated that the model shed light on the parameters that influence municipal facilities maintenance. Moreover, Yousefli, Nasiri and Moselhi, (2017:363) argued that a municipality facility failure analysis model assists in identifying and ranking failures that have a critical impact on service delivery, which aids in prioritising planned or unplanned maintenance activities. It seemed clear from the arguments of Liao and Shaw (2019:235) that municipal facilities maintenance process necessitates planning, scheduling, controlling, and deploying maintenance resources. Indeed, Sameta, Chelbi and Hmida (2012:3621) recognised that municipal facilities maintenance models assume that maintenance actions are perfectly executed. As a result, the theoretical framework for municipal facilities maintenance is used to investigate the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. This is because the municipal facilities maintenance theoretical framework identifies the dynamics of the challenges that municipal facilities maintenance management faces, as well as the impact of those challenges on service delivery. The concept of service delivery in South Africa means the provision of basic services to citizens within the jurisdiction of a particular municipality to improve their quality of life (Zweni, Koma & Ndevu, 2024). It is a

Constitutional mandate that municipalities must provide services to residents, which so far, they are failing to do in many parts of South Africa. According to Zweni, Koma and Ndevu (2024), the Constitution requires municipalities to provide basic services including healthcare, housing, safety, sanitation and water, electricity, roads and infrastructure and Local Economic Development (LED).

2.3 THEORETICAL FRAMEWORK

2.3.1 Institutional theory

Institutional theory examines how institutions, including formal rules, norms, and organisational structures, influence behaviour and shape the actions of individuals and organisations. Within facility maintenance management, institutional theory can be used to explore the role of organisational structures, policies, and regulatory frameworks in governing maintenance practices within public agencies. It helps in understanding how institutional factors influence the adoption of best practices, the allocation of resources, and the overall effectiveness of maintenance efforts in public facilities. According to Hwang and Colyvas (2020:572), institutions are sets of organisational structures that connect jobs, resources, policies, and procedures. Organisational situations that are heavily impacted by custom, culture, history and the environment is made easier with the help of the institutional theory (Calderón-Hernández, Jiménez-Zapata & Serna-Gomez, 2020:628). Earlier research has found that the application of institutional theory aids in the comprehension of how various public policies operate (De Corte, Roose, Bradt & Roets, 2018:200). It follows from this that to comprehend a particular setting, one applies institutional theory (Vailatti, Rosa & Vicente, 2017:92). What is not in doubt is that the consensus in institutional theory is that structure and agency are important (Cardinale, 2018:132). A review of the literature reveals that institutions can be found in various contexts, such as personal and communal settings (Nite, Hutchinson & Bouchet, 2019:576). The logic of this position is that institutional theory supports the idea that an organisation is an institution (Calderón-Hernández et al., 2020:627). There is evidence that institutional theory emphasises how important norms, values, and beliefs are in explaining how organisations and individuals behave and make decisions (De Corte, *et al*., 2018:204). Pinho (2017:62) states that institutions are complex systems that use symbolic systems. This reflects the fact that institutions generate actors, arrange venues for

meetings, and coordinate the relationships and exchanges between actors (Hwang & Colyvas, 2020:573). Therefore, there are numerous subfields within institutional theory, such as institutional logics, institutional work, and institutional contradictions (Cardinale, 2018:134).

2.3.2 Asset management theory

Asset management theory focuses on optimising the management of physical assets, such as infrastructure and facilities, throughout their lifecycle to achieve organisational objectives efficiently and sustainably. In the context of facility maintenance management in public administration, this theory emphasises the importance of adopting strategic approaches to asset management, including asset inventory and condition assessment, prioritisation of maintenance needs, lifecycle costing, risk management, and performance measurement. It provides frameworks and tools for improving decision-making processes related to asset maintenance and ensuring the long-term sustainability and functionality of public facilities. According to Obicci (2022:12), measuring prescribed or standard indications of effectiveness in use, maintenance, renewal, and disposal responsibilities within the parameters of institutional structures compliance is known as asset management. There are also assertions that asset management refers to the procedure or cycle that assets go through to produce a good or service with maximum efficiency (Burnett & Vlok, 2014:163). Earlier work by Stimie and Vlok (2016:159) showed that the organised actions taken by an organisation to extract value from its assets is known as asset management. The suggestion is that asset management is the act of making decisions, organising, and controlling the purchase, use, protection, and disposal of assets to maximise their benefits and potential for service delivery (The National Treasury, 2021:10). The suggestion acknowledges that the written document that outlines the process for converting organisational goals into asset management goals is called an asset management plan (Nel & Jooste, 2016:53). Existing trends suggest that when assessing local government performance, operations and results, asset management is the most crucial factor to consider (Obicci, 2022:14). This is also to say that asset management involves making decisions based on a combination of technical and financial factors (Burnett & Vlok, 2014:164). The conventional wisdom is that asset management ensures that the goals of the organisation are translated

into the goals of asset management, and that choices and resources are then directed towards achieving those goals (The National Treasury, 2021:13). Therefore, asset management refers to the process of creating asset management plans, as well as the function of the asset management system in assisting in the accomplishment of asset management goals (Nel & Jooste, 2016:54-55).

2.4 CHALLENGES FACING FACILITIES MAINTENANCE MANAGEMENT

The goal of municipal facilities maintenance is to keep the facilities functioning (Kim, Yum, Son, Son & Bae, 2021:7; Andile, *et al*., 2018:433). Therefore, the significance of municipal facilities maintenance is critical in the context of sustainable facilities concept (Villa, Bruno, Aliev, Piantanida & Corneli, 2022:1; Shohet & Nobili, 2017:59). The main challenges facing facilities maintenance management are highlighted in this section to be able to identify, address and prevent these challenges to ensure sustainable facilities in the long run.

Ebekozien, Duru and Dako (2022:121) and Khalid, Abdullah, Hanafi, Said and Hasim (2019:2) recognised that maintenance is the combination of all technical and related administrative measures to keep facilities in a state where they can perform necessary functions. Prieto, Macías-Bernal, Chávez, Alejandre and Silva (2019:2-3) and Okereke (2020:1) also articulated that making sure that components operate as intended is the major goal of maintenance activities in municipal facilities. However, one of the difficulties in achieving municipal facilities maintenance success is the upkeep of municipal facilities (Ebekozien, 2021:32; Amani, *et al*., 2012:85). Recent studies in this field highlight that municipal facilities maintenance is challenging due to crucial operations, intricate engineering services, and stringent compliance with health and safety regulations (Wong, Olanrewaju & Lim, 2022:879; Thenuwara & Sandanayake, 2018:548). However, Ebekozien (2021:32-33) and Enshassi and Shorafa (2015:207) maintained that there are inadequate maintenance procedures for municipal facilities. This is confirmed by Khalid, *et al*., (2019:10) and Yi and Komatsu (2018:125) who maintained that maintenance management of municipal facilities is viewed as a burden on the municipality, rather than as a factor of production. Ebekozien, *et al*., (2022:121) and Mazele and Amoah (2021:4) also indicated that municipal facilities maintenance practices are a global problem, presumably because of the cost associated with the task. Besiktepe, Ozbek and Atadero (2020:1) and Reichelt, *et al*., (2018:227)

conceded that municipal facilities maintenance is an essential procedure that ensures the longevity of the facilities.

The general literature on the subject is consistent that municipal facilities inadequate maintenance creates a backlog of expenses that need to be paid in the future (Hopland & Kvamsdal, 2019:414; Peng, Chua, Ali & Tucker, 2019:10; Støre-Valen, 2021:3). It is not too far-fetched to argue that municipal facilities maintenance has received less attention due to the constantly low financial returns (Khalid, *et al*., 2019:4; Yousefli, *et al*., 2017:352). Recent efforts to prioritise municipal facilities maintenance is ineffective and could result in inefficient resource allocation (Peng, *et al*., 2019:3; Mazele & Amoah, 2021:10). Wong, *et al*., (2022:881) and Okereke (2020:5) illuminated that one issue that leads to the deterioration of the facilities is the lack of a maintenance culture within the municipalities. It is generally recognised that defects found following the municipal facilities assessment necessitate municipal facilities maintenance (Ogunbayo & Aigbavboa, 2019:1; Bajere, Abubakar & Muazu, 2016:30). There is widespread support that activities related to municipal facilities maintenance must be viewed as an investment opportunity that should be maximised (Prieto, *et al*., 2019:1; Hopland, Kvamsdal & Sandal, 2019:17). Other empirical evidence supports that municipal facilities maintenance is crucial since facilities are major resources used to provide public services (Hopland, *et al*., 2019:17; Sia, Yew, Lim & Ye, 2018:332). Indeed, it appears that to accomplish efficient facilities maintenance, municipalities must adopt innovative maintenance strategy (Khalid, *et al*., 2019:1; Au-Yong, 2019:2). Therefore, the maintenance performance of municipal facilities is maximised by prioritising maintenance tasks based on risk and cost considerations (Fernandes, Correia & Teixeira, 2024:2270; Peng, *et al*., 2019:3).

2.4.1 Facilities maintenance organisational structure

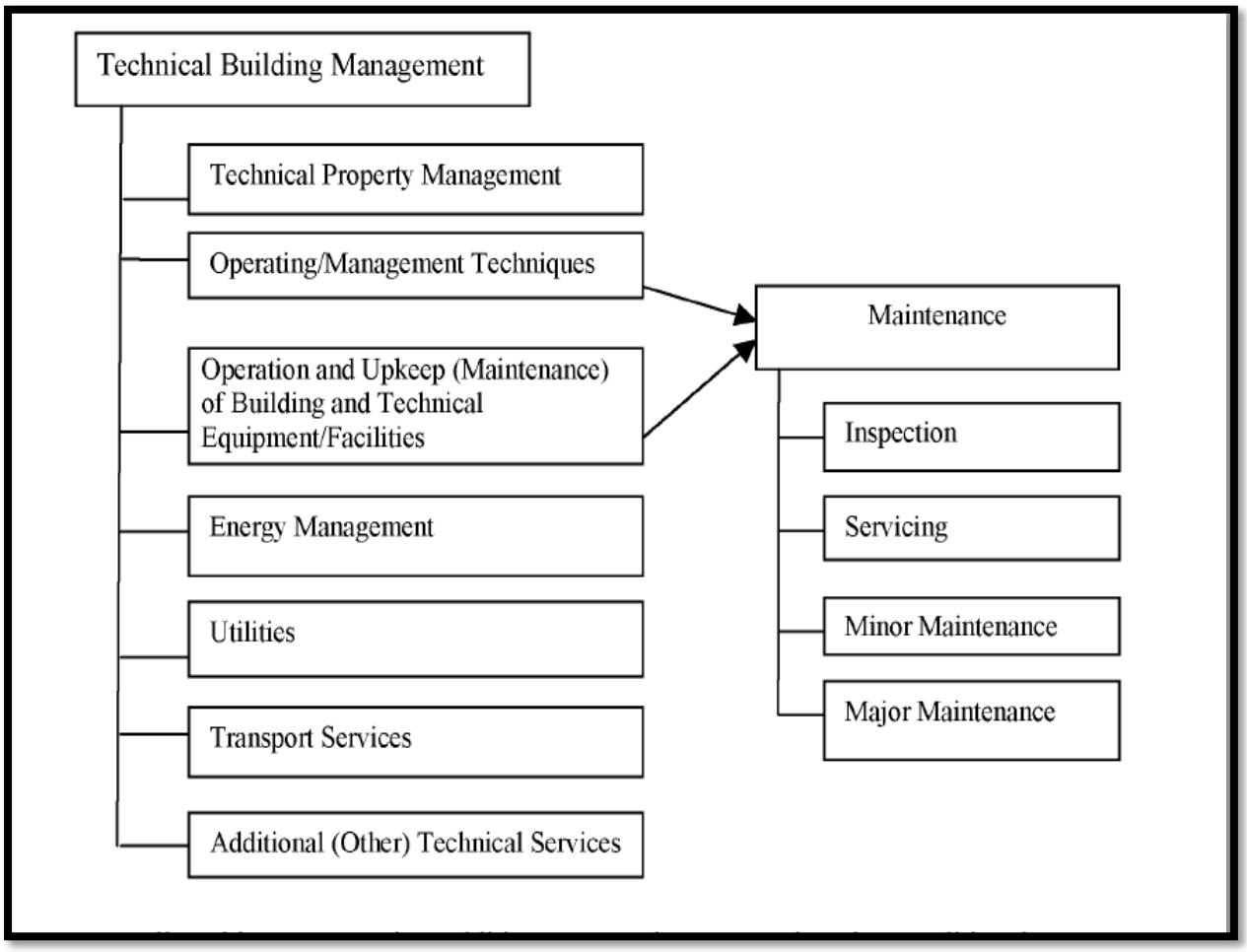
Xaba (2012:221) and Wahab and Basari (2015:453) found that the municipal facilities maintenance organisation should clearly define duties and responsibilities when it comes to creating an organisational structure for facility maintenance. Oladejo, Umeh and Egolum (2015:1) and Bajere, *et al*., (2016:30) also advised that the municipal facilities maintenance organisation's goal is to achieve zero defects, especially in areas where minor issues can have major ramifications. Empirical evidence provided by Fotovatfard and Heravi (2021:2) and Ensafi and Thabet (2021:237) suggested that

facility managers for municipalities are essential to maintenance management because, with their knowledge, they predict how all facilities will operate. It is without question that top management of the municipality is the key component of effective facilities maintenance management support (Wong, *et al*., 2022:882; Nhlapo, 2020:2). However, maintenance management of municipality facilities has been disregarded (Ebekozien, 2021:32; Peng, *et al*., 2019:2). Empirical evidence indicates that maintenance organisations are not aware of the advantages and significance of efficient municipal facilities maintenance (Enshassi & Shorafa, 2015:207; Au-Yong, Ali & Ahmad, 2017:35). This is further confirmed by Andile, *et al*., (2018:433) who argued that bureaucratic complexity is often associated with municipal facilities maintenance, and this often results in a decentralised maintenance practice. This means that leadership is essential in driving municipal facilities maintenance strategy (Amponsah-Kwatiah, *et al*., 2021:688). The takeaway point is that municipal facilities managers must prioritise work in a way that best serves the facilities' intended function, to maintain municipal facilities (Beauregard & Ayer, 2019:249; Ebekozien, *et al*., 2022:134). Therefore, effective maintenance organisational structure together with top municipal administration management provide facilities maintenance management (Wong, *et al.*, 2022:882; Bajere, *et al*., 2016:30).

Drawing from the above, worth noting is that facilities managers are responsible for overseeing the municipal facilities maintenance (Thenuwara & Sandanayake, 2018:547; Reichelt, *et al*., 2018:230). At this point, it can be confirmed that effective maintenance of municipal facilities can be achieved by appointing maintenance managers and staff who possess the necessary qualifications and expertise (Oladejo, *et al*., 2015:2). This reasoning is because poor planning results in inadequate maintenance management of municipal facilities (Mazele & Amoah, 2021:11-12; Kamal, Taghaddos & Metvaei, 2022:3). This position is justified with the argument that there is growing demand on managers of facilities maintenance in municipalities to give priority to facilities maintenance given their constantly diminishing resources (Bikam & Chakwizira, 2021:1; Yousefli, *et al*., 2017:358). This may also relate to the fact that the unexpected nature of facilities maintenance presents challenges for managers of municipal facilities maintenance (Thenuwara & Sandanayake, 2018:549). Enshassi and Shorafa (2015:208) also revealed that municipal facilities maintenance organisations have not put much effort to fulfil their duties to successfully

manage facilities maintenance. The reviewed literature suggests that it is important to gain more knowledge about the factors necessary for effective facilities maintenance management in municipalities (Hopland & Kvamsdal, 2019:414). There are indications that maintenance managers of the municipal facilities are anticipating achieving reduced operating expenses (Lavy & Shohet, 2018:107). The literature reveals that municipal facilities maintenance consists of both related administrative and technical tasks are reduced (Twumasi-Ampofo, Ofori, Tutu, Cobinah, Twumasi & Kusi, 2017:146; Moat & Coleman, 2020:1). However, the responsibility to care for municipal facilities maintenance results in the establishment of structures to provide sufficient resources to meet the level of care (Ampofo, *et al*., 2020:111). Figure 2.1 presents municipal facilities maintenance organisational structure.

Figure 2.1: Municipal facilities maintenance organisational structure



Source: Reichelt, *et al*., (2018:225).

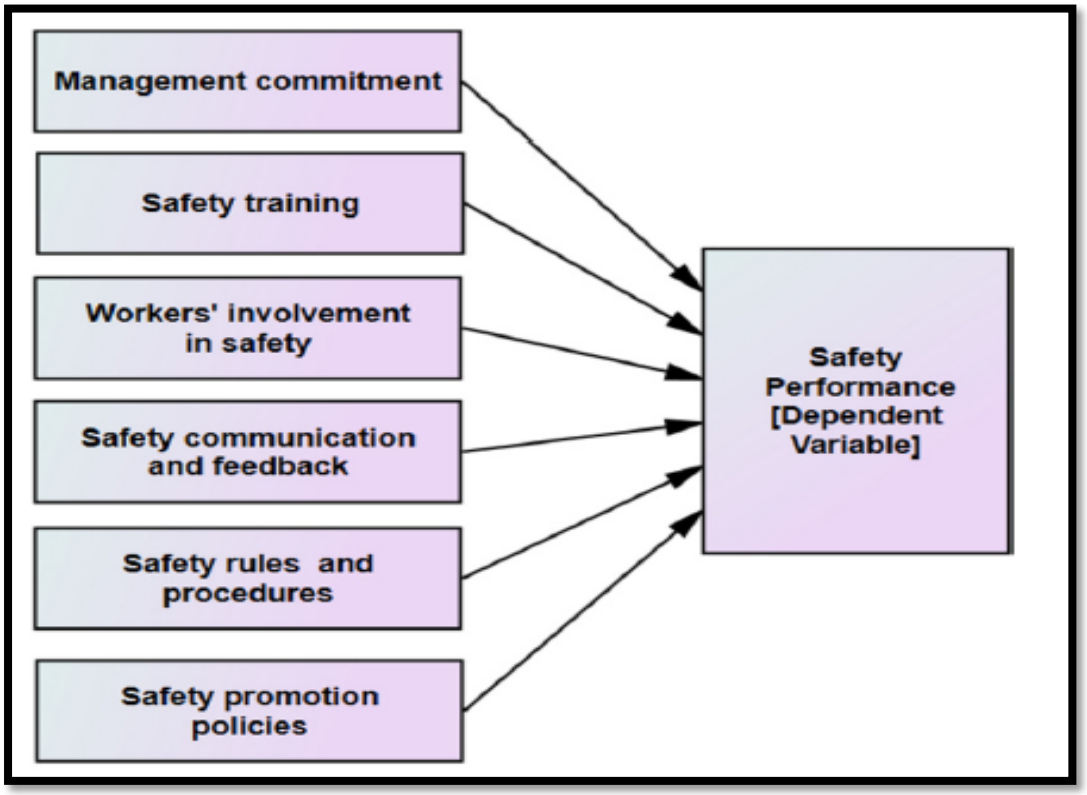
Figure 2.1 indicates that the implementation of maintenance plan to maintain municipal facilities is seen as a multifaceted problem (Reichelt, *et al*., 2018:220; Besiktepe, *et al*., 2020:1). This is because technical management and municipal facilities maintenance are related (Reichelt, *et al*., 2018:224). Research by Shohet and Nobili (2017:60) and Ebekozien (2021:43) also found that municipal maintenance managers can examine operational performance levels in municipal facilities, which helps identify the underlying causes of any problems with maintenance work. This lends support to assertions that one challenge that municipal facilities managers deal with is the shortage of funding for maintaining municipality facilities (Bikam & Chakwizira, 2021:3). It is also believed that municipal facilities maintenance managers need to look for solutions to maintenance problems (Amponsah-Kwatiah, *et al*., 2021:696). Therefore, maintenance managers and the head of the organisation's maintenance engineer are the two managerial levels responsible for municipal facilities maintenance (Shohet, 2016:347).

2.4.1.1 Facilities maintenance contractors

Contractors are appointed to perform facilities maintenance for municipalities to guarantee that the facilities meet user needs (Ampofo, *et al*., 2020:115; Au-Yong, *et al*., 2018:54). Alm, Paulsson and Jonsson (2021:81) also advise that contractors are hired to maintain municipal facilities. However, there has been doubt about the contractors' ability to maintain municipality facilities (Oladejo, *et al*., 2015:2). It is also asserted that there is evidence of the contractors' inadequate safety municipal facilities maintenance management practices (Jaafar, Choong & Mohamed, 2017:320; Wang, Almassy, Wei & Shohet, 2022:1). The assumption is that the management of maintenance for municipal facilities is found to be impacted by poor contractor workmanship (Hassanain, Al-Zahrani, Abdallah & Sayed, 2019:530; Wong, *et al*., 2022:883). Another study attests that municipality project managers and facilities maintenance contractors are required to set up the appropriate channels of communication and consultation with facilities maintenance consultants (Ebekozien, *et al*., 2022:122; Amani, *et al*., 2012:89). Therefore, the relationship between municipalities and contractors must be considered in facilities maintenance management (Shohet & Nobili, 2017:59; Ebekozien, *et al*., 2022:122).

Rahman (2014:1-3) and Au-Yong, Ali, Chua and Che-Ani (2018:54) indicated that contracts for municipal facilities maintenance have drawn attention since they lower risks by using professional services. Yousefli, *et al*., (2017:356) argued that the contractors appointed for municipal facilities maintenance are required to submit their preferred maintenance plans related to maintenance activities. This is because maintaining municipal facilities is a specialised job that requires specialised maintenance skills (Nhlapo, 2020:6; Ogunbayo & Aigbavboa, 2019:2). Khalid, *et al*. (2019:3) suggested that maintaining a clear picture of the maintenance priorities requires constant contact between the municipality's facilities maintenance specialist and the designer. Earlier work by Wang, *et al*. (2022:3) and Dickerson and Ackerman (2016:687) show that municipal facilities maintenance management is influenced by risk assessment. It is equally striking that maintenance of municipal facilities ensures security of both facilities and their occupants (Au-Yong, 2019:4; Bajere, *et al*., 2016:16). Figure 2.2 presents municipal facilities maintenance safety management practices.

Figure 2.2: Municipal facilities maintenance safety management practices



Source: Jaafar, *et al*., (2017:324)

Figure 2.2 indicates that the integration of municipal facilities maintenance safety activities is very important for contractors in achieving the overall performance of the facilities maintenance (Jaafar, *et al*., 2017:330). Reviews by Ampofo, *et al*. (2020:116) and Wong, *et al*., (2022:883) also reported that contractors are responsible for making sure the proper materials are used for municipal facilities maintenance. However, maintenance management of municipal facilities is shown to be impacted by a lack of in-house maintenance training (Hassanain, *et al*., 2019:530; Ogunbayo & Aigbavboa, 2019:3). A strong argument can be made that the outsourcing of municipal facilities maintenance depends on external expertise (Yousefli, *et al*., 2017:356). The point is simply that managers of facilities maintenance in municipalities feel that quality and safety are taken into account when doing facility maintenance tasks (Che-Ani & Ali, 2019:345; Enshassi & Shorafa, 2015:209). A similar view is expressed by Amponsah-Kwatiah, *et al*., (2021:687) who argue that good maintenance methods have highlighted the unrestricted exchange of information regarding the municipal facilities maintenance practices. Therefore, the maintenance of municipal facilities must be performed by contractors where there are facilities defects (Wong, *et al*., 2022:883; Hadjor, 2014:11).

2.4.1.2 Technology and computerised systems

Computerised facility management systems and maintenance management systems help maintenance operations for municipal facilities (Chen, Chen, Cheng, Wang & Gan, 2018:15; Wanigarathna, Jones, Bell & Kapogiannis, 2019:417). Besiktepe, Ozbek and Atadero (2021:6) also construed that information technology-based facilities maintenance tasks in municipalities are supported by the computerised maintenance management system. It is further conceded that the adoption of radio frequency identification technology enhances maintenance operations for municipality facilities (Ko, 2017:45; Villa, *et al*., 2022:1). However, one of the challenges facing municipal facilities maintenance management is the absence of trustworthy data to establish what is needed for facilities maintenance (Mazele & Amoah, 2021:4). The debate has been clarified by arguing that problems with resources include the lack of sophisticated computer software that municipal facilities maintenance managers need to help them make decisions about facilities maintenance management (Mazele & Amoah, 2021:5-6). Limited use of computerised maintenance management systems

has been observed in the municipal facilities maintenance (Besiktepe, *et al*., 2021:6; Liu & Issa, 2015:14-16). This view recognises that municipality facilities are maintained without the necessary instruments and trustworthy data (Prieto, *et al*., 2019:6; Bouabdallaou, Lafhaj, Yim, Ducoulombier & Bennadji, 2021:1). Therefore, municipal facilities maintenance organisations use computerised maintenance management systems to manage operations (Chen, *et al*., 2018:16; Reichelt, *et al*., 2018:230).

Furthermore, the requirement for technology assistance in municipal facilities maintenance practice is common knowledge to improve maintenance management (Amponsah-Kwatiah, *et al*., 2021:696; Thenuwara & Sandanayake, 2018:548). Research reveals that software-related problems lead to inadequate municipal facilities maintenance (Bikam & Chakwizira, 2021:20; Yousefli, *et al*., 2017:358). One argument that could be made is that the use of systems guarantees managerial decisions in the municipal facilities maintenance to consider relevant economic factors (Reichelt, *et al*., 2018:231; Ko, 2017:46). Some researchers have argued that assuring the efficient reading of on-site electronic tags is a challenge when utilising radio frequency identification for maintenance of municipality facilities (Ko, 2017:48; Villa, *et al*., 2022:2-3). Perhaps the most pragmatic response is to suggest that web technology for information exchange improves the efficiency of municipal facilities maintenance (Fernandes, *et al*., 2024:2271; Fraser, 2014:19). The Internet of Things and building information modelling could increase the effectiveness of municipal facilities maintenance management (Nota, Peluso & Lazo, 2021:1; Kamal, Taghaddos & Metvaei, 2022:2). The Internet of Things, also known as IoT is a network of interrelated devices that connect and exchange data with other IoT devices and systems over internet or other communication networks. Villa, *et al*., (2022:4) also affirmed that facility managers in municipalities rely on real-time accurate data to carry out facilities maintenance activities. Researchers also agreed that the use of technology and computerised systems in municipal facilities maintenance is expanding and needs to be harnessed (Amponsah-Kwatiah, *et al*., 2021:698; Fernandes, *et al*., 2024:2272). Many authors acknowledged that several information and communication technology solutions have been deployed to manage municipal facilities maintenance (Bouabdallaou, Lafhaj, *et al*., 2021:1; Villa, *et al*., 2022:4). In this respect, one must note that there are many advantages of using information technology in municipal facilities maintenance management, including lower costs and safety (Yousefli, *et al*.,

2017:363). Therefore, building information modelling is being explored as a possible technology for municipal facilities maintenance management (Chen, *et al*., 2018:15; Kamal, *et al*., 2022:3).

2.4.2 Facilities maintenance inspection

Xaba (2012:222) observed that the term 'maintenance inspection' refers to the examination of municipal facilities to prepare a maintenance plan and gather information for the maintenance program. Hadjor (2014:12) and Au-Yong (2019:3) also highlighted that inspection is a part of municipal facilities maintenance. The consensus in the literature is that inspections are carried out either on a regular or ad hoc basis, according to a predetermined municipal facilities maintenance schedule (Jeong, Cheon & Han, 2019:5). Contemporary practice suggests that inspection reduces risk exposure and maintenance costs associated with municipal facilities maintenance (Au-Yong, *et al*., 2018:54; Dickerson & Ackerman, 2016:688). However, most of the more recent literature shows that inspections of municipal facilities for maintenance are labour-intensive (Villa, *et al*., 2022:1-2; Bouabdallaou, *et al*., 2021:1). Mazele and Amoah (2021:7) also alluded to the difficulty that municipal facilities maintenance managers face in deciding when and how to conduct effective inspections of existing facilities. Existing trends suggest that the main disadvantage of municipal facilities maintenance is that facility managers fail to develop quantitative indicators for strategic decision making (Shohet, 2016:345). The assumption is that a challenge for municipal facilities maintenance managers is to learn from previous evaluation studies and combine this with technical physical data from the facilities to incorporate this into processes with the goal of improving facility quality (Valen & Olsson, 2012:289). However, it is certainly reasonable to argue that inspections of municipal facilities after maintenance increase the lifespan of the facilities components (Au-Yong, 2019:3). Moreover, it is argued that developing innovative instruments to assess municipal facilities' maintainability encourages the use of effective maintenance strategies (Prieto, *et al*., 2019:1). Therefore, it is possible to implement various municipal facilities inspection and maintenance interval policies to stop unnecessary maintenance (Au-Yong, *et al*., 2018:54).

Technical inspections by qualified assessors are used in municipal facilities maintenance evaluations to determine what needs to be maintained (Queensland

Department of Housing and Public Works, 2017:3). In this context, inspections of municipal facilities maintenance are conducted periodically or non-periodically (Moat & Coleman, 2020:4-5). Miya and Grobbelaar (2015:934) also stated that inspections of municipal facilities maintenance are intended to support decision-making that is well-informed and enhances safety. Indeed, historically the view has long been put that maintaining a clean environment is one of the prerequisites for municipal facilities maintenance (Ampofo, *et al*., 2020:117). This is because structural evaluation is used to evaluate the municipal facilities maintenance (Hamzah & Kobayashi, 2013:482). Reichelt, *et al*., (2018:222) also suggested that the focus of municipal facilities maintenance projects is on multicriteria methods for assessing facilities maintenance. This is /because risk management is involved in municipal facilities maintenance (Dickerson & Ackerman, 2016:690; Xaba, 2012:223). Couple this with the fact that common procedures for assessing the status of municipal facilities include visual inspections and walk-through surveys (Besiktepe, *et al*., 2021:1; Hamzah & Kobayashi, 2013:483). The clear implication is that the maintenance assessment section of the municipality must be independent in order to manage municipal facilities (Andile, *et al*., 2018:437). Therefore, maintaining municipal facilities requires careful observation and analysis (Ensafi & Thabet, 2021:241). The most crucial point is that the maintenance of municipal facilities involves inspection (Hadjor, 2014:14). Therefore, the management of maintenance for municipal facilities should be periodically reviewed (Wahab & Basari, 2015:449).

From the aforementioned, it is clear that maintenance inspection process for municipal facilities is prone to fatigue (Miya & Grobbelaar, 2015:934). It is highly desirable that a periodic maintenance inspection plan for municipal facilities is carried out as part of the procedure when allocating funds (Hamzah & Kobayashi, 2013:483). In general, prior literature suggests that the development of evaluation criteria could serve as a foundation for a successful study into the municipal facilities maintenance (Reichelt, *et al*., 2018:231). Indeed, Shohet (2016:351) submitted that inspection parameters allow for quick determination of maintenance requirements for municipal facilities. Miya and Grobbelaar (2015:935) also mentioned that quantitative risk assessment is integrated into the inspection process for maintenance of municipal facilities. The record clearly shows that the assessment of a municipal facilities maintenance includes identifying the necessary maintenance tasks (Queensland Department of

Housing and Public Works, 2017:4-5). There is also a strong sense that a thorough understanding of the state of the municipal facilities is necessary to maintain efficient facilities maintenance plans (Besiktepe, *et al*., 2021:5). Therefore, municipal facilities maintenance inspections should focus on the areas of uncertainty (Uotila, Saari & Junnonen, 2020:1).

2.4.3 Facilities maintenance planning

Xaba (2012:216) and Wong, *et al*., (2022:881) stated that municipal facilities maintenance planning is the process of developing a maintenance strategy to make better use of facilities while reducing the cost of resources tied up in grounds and facilities. Reichelt, *et al*., (2018:230) and Besiktepe, *et al*., (2021:6) also reported that municipal facilities maintenance planning is still considered during the design phase of a new facility or re-development. Hamzah and Kobayashi (2013:478) and Khalid, *et al*., (2019:3) further mentioned that the municipal facilities maintenance management policy is created with a long-term maintenance plan in mind. However, municipal facilities maintenance managers face planning challenges on existing facilities to meet municipal facilities purposes (Ogunbayo & Aigbavboa, 2019:4-5). The broader point is that several factors contribute to the poor quality of municipal facilities maintenance practices, including a lack of good quality management policies (Amponsah-Kwatiah, *et al*., 2021:690). There is clear evidence that municipalities lack sufficient policy alternatives to enhance facility maintenance practices (Ebekozien, *et al*., 2022:121).

Several authors suggest that facilities maintenance management is impacted by a municipality failure to implement a facilities maintenance policy during the facilities design stage (Khalid, *et al*., 2019:10; Bajere, *et al*., 2016:30; Mazele & Amoah, 2021:10). Consequently, community service delivery is ensured by the municipal facilities maintenance policy (Fotovatfard & Heravi, 2021:6; Wahab & Basari, 2015:452). There is also a strong sense that maintenance practices for municipal facilities reduce the cost of repairs (Moat & Coleman, 2020:6; Prieto, *et al*., 2019:1). Therefore, the development of a municipal facilities maintenance policy should consider short, mid and long-term strategic planning (Khalid, *et al*., 2019:3; Kamal, *et al*., 2022:4).

Several researchers acknowledge that municipal reluctance to invest in facilities maintenance is increasing the backlog of maintenance that needs to be performed on time (Wanigarathna, *et al*., 2019:419; Au-Yong, *et al*., 2018:54). One of the factors influencing municipal facilities backlog of maintenance is insufficient funding (Ebekozien, 2021:38). There is evidence that inadequate municipal facilities maintenance planning can limit municipal facilities lifespan and their accumulative value (Luy, Zhang & Han, 2013:1379). Thenuwara and Sandanayake (2018:550) also perceived that due to the complexity of municipal facilities maintenance requirements, it is difficult to make decisions about a proper maintenance policy. In this context, it is critical to note that the issue is a lack of consolidated municipal facilities maintenance reporting and management (Bikam & Chakwizira, 2021:7). At the same time, municipal facilities maintenance spending is less visible to voters than other forms of government spending (Hopland, 2015:196). Hence, it is common knowledge that the municipal facilities maintenance programme should be well defined during the design stage, taking into account both capital and maintenance costs (Andile, *et al*., 2018:433). This is because most governments around the world have established various types of municipal facilities maintenance policies and standard practices to aid in the facilities maintenance (Ampofo, *et al*., 2020:110). It is thus concluded that better municipal facilities maintenance management is achieved by establishing a separate budget for maintenance (Kayode & Tunrayo, 2022:8; Peng, *et al*., 2019:3; Luy, *et al*., 2013:1380). A consensus among scholars is that successful municipal facilities maintenance is reliant on planning (Besiktepe, *et al*., 2020:2 & Au-Yong, 2019:2). Hassanain *et al*. (2019:532) also believe that the development of an effective municipal facilities maintenance plan is critical for the normal operation of facilities. It is important to note that the effectiveness of municipal facilities maintenance planning and execution of the maintenance plan is critical in ensuring that facilities continue to function properly to enhance service delivery to the public (Besiktepe, *et al*., 2021:6; Enshassi & Shorafa, 2015:224). Therefore, maintenance of municipal facilities should be considered at every level of design (Wang, *et al*., 2022:4; Ebekozien, 2021:38).

It can therefore be concluded that poor maintenance practices in municipalities are partly caused by an absence of maintenance policies and strategic planning (Amponsah-Kwatiah, *et al*., 2021:691; Kamal, *et al*., 2022:5). Reichelt, *et al*., (2018:219) also perceived that lack of solid long-term strategy is one of the problems

with municipal facilities maintenance, while Hassanain, *et al*., (2019:532-533) argued that low-quality materials used for municipal facilities maintenance are one aspect causing inadequate maintenance of municipal facilities.

The overview of the researchers proved that setting priorities for different maintenance activities to suit facilities maintenance policy is part of the municipal facilities maintenance plan (Oladejo, *et al*., 2015:3-4; Wong, *et al*., 2022:880). The argument is that maintenance of municipal facilities should account for two to four percent of an asset manager's portfolio's capital replacement value (Vanier & Danylo, 2016:28; Ebekozien, 2021:38). The top management in municipalities have a responsibility to ensure that adequate budget is set aside each financial year to implement facilities maintenance plan effectively (Andile, *et al*., 2018:437; Bajere, *et al*., 2016:30). The reason for this is that the level of municipal facilities maintenance is contingent upon the availability of budget to enhance service delivery (Bikam & Chakwizira, 2021:5). Empirical evidence indicates that facilities maintenance becomes more expensive when there is no proper maintenance plan (Ensafi & Thabet, 2021:237). There is also strong evidence that proper maintenance objectives are used to achieve maintenance of municipal facilities (Khalid, *et al*., 2019:1). Essentially, the categorisation of municipal facilities based on their condition should guide the process of maintenance planning, budget allocation and implementation of a maintenance plan (Shohet, 2016:351). There are plenty of background norms that municipal facilities maintenance planning covers the creation of maintenance policies, as well as financial considerations for maintenance (Xaba, 2012:220). Therefore, municipal facilities maintenance policy is a written document that offers a framework for maintenance management to guarantee that the facilities are properly maintained (Zawawi, Khalid, Ahmad, Zahari & Salim, 2016:3; Khalid, *et al*., 2019:3).

Mazele and Amoah (2021:10) indicated that the absence of facilities maintenance policy in many municipalities is the reason behind inadequate planning. Amponsah-Kwatiah, *et al*., (2021:698) also ascertained that effective service delivery is hampered by the absence of a facilities maintenance policy in many municipalities. Earlier research found decision-making about the planning of the facilities maintenance works falls under the managers of facilities maintenance (Sia, *et al*., 2018:332). It is meaningful to note that there are insufficient strategies for municipal facilities

maintenance and appropriate decision-making techniques to lower the expenses of building maintenance management (Chen, *et al*., 2018:17). This situation leads to poor allocation of resources, capital and budget towards facilities maintenance (Bouabdallaou, *et al*., 2021:3-4; Bajere, *et al*., 2016:30). Ebekozien (2021:38) indicated that the biggest obstacle to the successful adoption of municipal facilities maintenance practices is the lack of funding. Reichelt, *et al*., (2018:230) also noted that long-term, realistic, and transparent cost planning is part of an effective municipal facilities maintenance planning programme. Yousefli, *et al*., (2017:354) also confirmed that the strategies for facility maintenance in municipalities also take customer satisfaction into account. Hadjor (2014:31) acknowledged that policies for municipal facilities maintenance serve as guidelines for allocating resources among the various kinds of facilities maintenance initiatives available to municipal management. In this respect, one must note that one factor influencing how much a municipality may spend on municipal facilities maintenance is the size of its budget (Alm, *et al*., 2021:84). This is because an integrated approach to municipal facilities maintenance management includes a methodical assessment of the facilities' condition using established performance standards (Shohet & Nobili, 2017:61). These examples may suffice to show that maintenance of municipal facilities long-term strategic planning for various functions of maintenance is necessary (Yousefli, *et al*., 2017:354). Empirical evidence showed that a decision-making approach that enables group decision-making on municipal facilities maintenance is necessary to accommodate all stakeholders and end users of facilities (Besiktepe, *et al*., 2020:2). This could mean that the strategy of facilities maintenance management plan serves as the foundation for promoting a constructive policy development to guide the implementation of maintenance plan (Hamzah & Kobayashi, 2013:478). Therefore, one problem facing municipal facilities maintenance is the lack of facilities maintenance policies (Ebekozien, *et al*., 2022:121).

2.5 IMPACTS OF FACILITIES MAINTENANCE CHALLENGES ON SERVICE DELIVERY

Several reviews in the literature indicate that there are two main types of maintenance strategies for municipal facilities: planned maintenance and unplanned maintenance (Che-Ani & Ali, 2019:344; Yousefli, *et al*., 2017:354; Støre-Valen, 2021:4). Nota, *et al*., (2021:3) and Nhlapo (2020:4) also admitted that planned and corrective maintenance

are the two primary categories for municipal facilities maintenance. Besiktepe, *et al*. (2021:7) and Hadjor (2014:34) are of the opinion that proper municipal facilities maintenance practice reduces the negative effects and prolongs the lifespan of facilities. This means that the poor condition of municipal buildings that leads to unfortunate eventualities including injuries on duty and non-compliance with OHS standards can be improved through effective facilities maintenance plan (Peng, *et al*., 2019:2; Ogunbayo & Aigbavboa, 2019:4). Furthermore, a proper facilities maintenance plan should be implemented to stop the deterioration of buildings and reinstate their original condition, to enhance the safety of occupants (Au-Yong, 2019:4; Besiktepe, *et al*., 2021:6). Generally, maintenance of municipal facilities improves facilities durability and performance (Adamu, Okereke & Hamidu, 2022:4001; Au-Yong, *et al*., 2018:54). Protecting the facilities is one of the municipality's facilities maintenance goals, given that its components are prone to wear in inclement weather (Wong, *et al*., 2022:885; Ogunbayo & Aigbavboa, 2019:5). Therefore, effective maintenance management of municipal facilities is essential for mitigating the effects of building defects (Khalid, *et al*., 2019:1; Au-Yong, *et al*., 2018:54).

Literature reveals that municipal facilities maintenance is crucial, since facilities are major resources used to provide public services (Hopland, *et al*., 2019:17). This means that there must be facilities that are in a functional state for services to be rendered properly and effectively. The concept of service delivery means the provision of basic services to citizens within the jurisdiction of a particular municipality to improve their quality of life (Zweni, Koma & Ndevu, 2024). Kemp and Vyas-Doorgapersad (2020:8-9) further define service delivery as the provision of a product or a service, by a government body to a community that it was pledged to, or which is anticipated by the public. It is a constitutional mandate that municipalities provide services to residents, which so far, they are failing to do in many parts of South Africa (Zweni, Koma & Ndevu, 2024). Basically, any municipality that fails to render services to its community is failing to deliver on its constitutional mandate. South Africa is currently experiencing serious infrastructure challenges due to inefficient maintenance of existing infrastructure that was installed in the late 1960s and early 1970s. Nhleko and Inambao (2019:644-645) further emphasise that for government through municipalities to effectively provide sustainable basic services that betters the life of citizens, facilitate economic growth and development activities, they require municipal

commitment and ownership of operations, infrastructure and technological developments. Well functional, safe and properly maintained facilities enhance effective service delivery. Municipal facilities include clinics, libraries, rates halls, community halls, human settlement facilities, sports facilities, public transport facilities (i.e. taxi ranks), CCCs, licensing centres, emergency services, EMPD Precincts and administrative buildings. All these facilities are central and key to service delivery and they need to be in a good condition and safe for municipal workers and the community.

2.5.1 Facilities planned maintenance

Moat and Coleman (2020:1&5) and Bajere, *et al*., (2016:19) have shown that planned maintenance of municipal facilities is a time-based approach that employs predetermined time interval to avoid the failure of municipal facilities. Nhlapo (2020:5) and Ebekozien, *et al*., (2022:121) also purport that preventive and condition-based maintenances comprise the planned maintenance of municipality facilities. Empirical evidence indicates that municipal facilities planned maintenance is organised with forethought and use of records to predetermined plan (Hadjor, 2014:16; Xaba, 2012:216). There is a strong sense that planned municipal facilities maintenance practice guarantees that facilities are kept in good condition and are safe for users (Amponsah-Kwatiah, *et al*., 2021:686; Oladejo, *et al*., 2015:4). Thus, planned maintenance of municipal facilities is the cornerstone to ensure that facilities function within their scope to fulfill their intended purpose or objectives (Støre-Valen, 2021:4; Hadjor, 2014:18). Khalid, *et al*., (2019:1) and Reichelt, *et al*., (2018:220) argue that planning for planned maintenance of municipal facilities necessitates understanding the resources needed, as well as the maintenance requirements. This implies that technical and economic analyses of facility maintenance tasks are part of the municipality's planned maintenance programme (Reichelt, *et al*., 2018:230). Moreover, research has shown that municipal facilities maintenance systems should be built around planned maintenance to prevent deterioration (Ogunbayo & Aigbavboa, 2019:6; Che-Ani & Ali, 2019:345). Scholars also took the view that improved facility performance is ensured by a planned maintenance strategy for municipality facilities (Peng, *et al*., 2019:10; Nota, *et al*., 2021:4). Therefore, municipal facilities maintenance policies must strike a balance between corrective and

preventative maintenance within the framework of maintenance strategy (Khalid, *et al*., 2019:3; Adamu, *et al*., 2022:4002).

2.5.1.1 Facilities preventative maintenance

Preventive maintenance must be regularly carried out on municipal facilities to enhance their performance (Besiktepe, *et al*., 2021:11; Wanigarathna, *et al*., 2019:419). Nota, *et al*., (2021:4-5) and Ebekozien (2021:37) also assert that preventive maintenance strategies for municipal facilities entail doing maintenance activities prior to facilities failure. Preventive maintenance lowers the frequency of municipal facilities failures (Bouabdallaou, *et al*., 2021:5; Bajere, *et al*., 2016:19). However, municipalities underutilise preventive maintenance for the facilities because they do not see the immediate benefits (Au-Yong, *et al*., 2018:54; Prieto, *et al*., 2019:1). This would again imply that an unfavorable outcome in municipal facilities maintenance is caused by inadequate preventative maintenance strategy (Au-Yong, 2019:2). Indeed, there is ample evidence indicating that municipalities are not sufficiently aware of the benefits of facilities preventive maintenance (Khalid, *et al*., 2019:1). This would again imply that preventive maintenance of municipal facilities is limited by the absence of budget (Bouabdallaou, *et al*., 2021:5-6). Omoregbe and Taiwo (2017:213) also explain that preventive maintenance for municipal facilities collects information on the state of the facilities to identify the optimum facilities maintenance. A consensus exists among scholars that the preventative maintenance strategy for sustainable municipal facilities helps to address several problems relating to facilities maintenance (Twumasi-Ampofo, *et al*., 2017:147). It is certainly ironic that the functionality of facilities elements is one benefit of municipal facilities preventive maintenance (Reichelt, *et al*., 2018:227; Sheu, Chang & Chen, 2012:1269). Therefore, municipal facilities preventive maintenance optimises the facilities' operational capabilities (Hadjor, 2014:21).

The conventional thinking is that the main question is always whether the municipal facilities preventive maintenance is financially justifiable (Reichelt, *et al*., 2018:227). More importantly, this view recognises that when applied to a large portion of the facilities register, municipal facilities preventive maintenance is labour intensive (Herbert, 2018:2; Lavy & Shohet, 2018:110). Reichelt, *et al*., (2018:227) and Valen and Olsson (2012:290) have argued that with municipal facilities preventive

maintenance, the actual condition of the facilities elements is not considered. In addition, Au-Yong (2019:3) indicated that preventive maintenance for municipality facilities that are unnecessary can be expensive. However, preventive maintenance of municipal facilities helps prevent the deterioration of facilities structural elements (Wong, *et al*., 2022:884). It is generally acknowledged that preventive maintenance for municipal facilities establishes the interval of the municipal facilities maintenance works systematically (Au-Yong, *et al*., 2018:56). Implementation of preventive maintenance is compulsory to maintain the good condition of municipal facilities (Au-Yong, 2019:4; Bouabdallaou, *et al*., 2021:7). This is because preventative maintenance on municipal facilities delays facilities failure (Che-Ani & Ali (2019:346). Moreover, the practices of preventive maintenance extend the lifespan of municipal facilities (Ebekozien, 2021:42; Besiktepe, *et al*., 2021:11). Still, preventive maintenance for municipality facilis is reliable and cost-effective (Au-Yong, 2019:3), as it aims to address the limitations of corrective maintenance (Nhlapo, 2020:5-6; Ebekozien, 2021:42; Au-Yong, 2019:3). Foremost is the pretension that building condition assessment exercises are performed to identify preventive maintenance activities for the development of a preventative maintenance plan to maintain municipality facilities (Wanigarathna, *et al*., 2019:420). Therefore, preventive maintenance is the most effective way to keep municipal facilities maintained (Ebekozien, 2021:42; Besiktepe, *et al*., 2021:11).

The broader point is that roof leaks and the development of mould are caused by failure to perform preventive maintenance in municipal facilities (Hadjor, 2014:23). For an example, a report based on building condition assessment that is conducted prior spring and summer rainfall will recommend performance of waterproofing, which is a form of preventative maintenance. This exercise prevents possible roof leaks caused by birds dropping, dead birds on rooftops, blockages of downpipes, damages caused by hail and storm. Earlier work by Store-Valen (2021:4) showed that preventive maintenance for municipal facilities deals with problems that affect the dependability of the facilities as well as its economy. Another research relied on the fact that municipal facilities preventive maintenance involves careful selection of facilities to be included in the maintenance plan (Wong, *et al*., 2022:881). Research also shows that municipal facilities are frequently undervalued, particularly when it comes to preventive maintenance (Au-Yong, 2019:2). This is because where maintenance is performed,

preventive maintenance procedures for municipal facilities are not proactively carried out (Khalid, *et al*., 2019:4). There is also strong evidence that municipal facilities preventive maintenance reduces the frequency of intermittent facilities failure (Omoregbe & Taiwo, 2017:214). The above discussion suggests that in municipal facilities preventive maintenance, facilities are as good as new (Pandeya, Kulkarnia & Vratb, 2012:2030). Yousefli, *et al*., (2017:354) demonstrated that municipal facilities preventive maintenance includes planning of periodical facilities maintenance. Couple this with the fact that municipal facilities preventive maintenance policies are implemented to lower the deterioration of facilities while they are in use (Sheu, *et al*., 2012:1270). Thus, to reduce unexpected facility failures, municipal facilities preventive maintenance is still required (Ebekozien, 2021:42). For an example, there are stadiums, libraries, clinics swimming pools and parks that are no longer functional in the CoE due to their inhabitability status caused by lack of preventative maintenance. The foregoing arguments reinforce that the aim of preventive maintenance in municipal facilities is to prevent deterioration in order to increase their lifespan and functionality (Akib, Abdullah, Niswaty, Arhas & Awaluddin, 2022:72). In summary, preventive maintenance plans must be implemented throughout the planning phase of municipal facilities (Khalid, *et al*., 2019:10; Besiktepe, *et al*., 2021:11).

2.5.1.2 Facilities scheduled maintenance

Available empirical evidence suggests that “scheduled maintenance for municipal facilities refers to the tasks carried out at prearranged intervals to address facilities wear and tear problems and subsequently lower the likelihood of facilities failure” (Au-Yong, 2019:3; Hopland, *et al*., 2019:17). Au-Yong, *et al*., (2018:54) and Zawawi, *et al*. (2016:3) also claim that scheduled maintenance for municipal facilities is a strategy to enhance the effectiveness of facilities maintenance performance. Moreover, it is well-established that scheduled maintenance for municipal facilities prolongs their lifespan and reduces disturbance (Che-Ani & Ali, 2019:346). Scheduled maintenance is preventive maintenance carried out for a predetermined period (Bajere, *et al*., 2016:19). Che-Ani and Ali (2019:347) disclose that facilities owned by municipalities deteriorate as a result of neglected scheduled maintenance needs. The broader point is that establishing performance evaluation of municipal facilities is hampered by the absence of scheduled maintenance activities (Yousefli, *et al*., 2017:361). Andile *et al*.,

(2018:437) further assert that scheduled maintenance practices are advantageous for maintaining municipal facilities. One might argue that scheduled maintenance for municipal facilities is more user-friendly (Yousefli, *et al*., 2017:354). This narrative suggests that scheduled maintenance is an excellent way to improve the state of municipal facilities (Enshassi & Shorafa, 2015:207). Essentially, scheduled maintenance for is preventive maintenance carried out at pre-arranged intervals of time to enhance utility and life span of municipal facilities (Hadjor, 2014:16; Xaba, 2012:216). There is also evidence that scheduled maintenance is a procedure to increase municipal facilities' efficiency with varying due dates (Khalid, *et al*., 2019:2). Previous literature suggests that scheduled maintenance for municipal facilities is a strategy for resolving possible future and defects (Au-Yong, 2019:2). Therefore, scheduled maintenance for municipal facilities should be established and properly adhered to, to prevent failures (Oladejo. *et al*., 2015:5; Che-Ani & Ali, 2019:345).

The arguments of Yousefli, *et al*., (2017:358) seem to provide some useful explanations that the repercussions of failing to establish scheduled maintenance of municipal facilities increases the inventory of old and inhabitable buildings that don't comply with occupational health safety standards. Enshassi and Shorafa (2015:206) also establish that the absence of scheduled maintenance for municipal facilities is regarded a serious problem. One piece of evidence in support of this narrative is that many municipal facilities maintenance projects encounter recurring problems with inadequate scheduled maintenance plan (Uotila, *et al*., 2020:2-3). It is noticeable that short time interval requires greater resource allocations (Au-Yong, *et al*., 2018:56). It is also suggested that scheduled maintenance for municipal facilities results in facilities service interruptions (Au-Yong, 2019:3). However, the age of municipal facilities is important for the purpose of scheduled maintenance (Hopland, *et al*., 2019:19). The key point is that scheduled maintenance aims to avoid periodic inspections of facilities maintenance (Hadjor, 2014:19). In this context, it is important to note that scheduled maintenance turns a dynamic facilities problem into a series of static states (Akib, *et al*., 2022:72). Andile, *et al*., (2018:433) further revealed that scheduled maintenance for municipal facilities is a practice that needs to be carefully planned because expenses can quickly become excessive. Some scholars have also argued that information technology provides a foundation for well-informed decision-making in the management of scheduled maintenance for municipal facilities (Yousefli,

et al., 2017:363). Thus, it is not surprising that scheduled maintenance is performed to keep municipal facilities in a good condition to achieve their normal operations (Hadjor, 2014:20-21; Okereke, 2020:2-3). This means that determining the appropriate maintenance interval of scheduled maintenance for municipality facilities is necessary to attain optimal resource performance (Au-Yong, *et al*., 2018:56). Hopland, *et al*. (2019:17) and Kamal, *et al*. (2022:5-6) argued that the level of optimal municipal facilities scheduled maintenance is moderate when a facility is first constructed. Therefore, scheduled maintenance is convenient because facilities require frequent maintenance as they age (Sheu, *et al*., 2012:1271).

2.5.1.3 Facilities condition based maintenance

Scholars found that condition-based maintenance is done in response to the outcomes of condition assessment exercise. (Nhlapo, 2020:2; Hadjor, 2014:26). Nota, *et al*., (2021:4) and Fraser (2014:31) also reaffirm that condition-based maintenance refers to the actions necessary to address the causes of malfunctions in municipal facilities. Dickerson and Ackerman (2016:691) and Khalid, *et al*., (2019:1) suggested that facilities condition assessment is the key factor used to determine maintenance decisions, maintenance plan and budget for implementation of condition-based maintenance to municipal facilities. However, long-term cost requirements cannot be predicted by building condition assessment to perform condition-based maintenance of municipal facilities (Wanigarathna, *et al*., 2019:421). Some of the factors that necessitate condition-based maintenance of municipal facilities are age-related nature of deterioration, as well as defects caused by environmental conditions. (Hassanain, *et al*., 2019:533). Condition-based maintenance decision making becomes limited when there is extensive deterioration in a municipal facility (Dickerson & Ackerman, 2016:692). Therefore, municipalities implement condition-based maintenance plans to reduce the exorbitant expenses of repairing extensively deteriorated buildings or facilities (Prieto, *et al*., 2019:1; Bajere, *et al*., 2016:16). Au-Yong (2019:2) showed that execution of maintenance work on municipal facilities is conditionally driven. Condition-based maintenance plays a big role in ensuring that facilities are operational at an original state and capability (Wanigarathna, *et al*., 2019:421). Essentially, condition-based maintenance is -an exercise performed by municipalities to maintain

various components of facilities at a predetermined stage in different conditions (Støre-Valen, 2021:5).

Recently, some researchers suggested that creating efficient plans for facilities maintenance is hampered by ageing municipal facilities (Besiktepe, *et al*., 2020:2; Wong, *et al*., 2022:880). Besiktepe, *et al*., (2021:5) also reiterate that effective measures must be taken to overcome the subjectivity of condition-based maintenance procedures in municipal facilities. This is due to the fact that the age of municipal facilities must be taken into account when allocating funds and providing maintenance (Wong, *et al*., 2022:880). It is probably the case that the appalling state of the facilities structures is a clear indication of poor maintenance of facilities (Bajere, *et al*., 2016:16). The argument is that maintenance is necessary to keep municipal facilities in an acceptable condition (Au-Yong, 2019:4). It is worth bearing in mind that condition-based maintenance of municipal facilities seeks to lower the likelihood of their failure (Zawawi, *et al*., 2016:2; Beauregard & Ayer, 2019:253). The literature reviewed state that condition-based maintenance for municipal facilities is focused on repairing defected and malfunctioning facilities in the shortest possible time (Nota, *et al*., 2021:5). Miya and Grobbelaar (2015:936) and Reichelt, *et al*., (2018:227) also present that condition-based maintenance for municipal facilities seeks to give sufficient information about the state of facilities for strategic planning and decision-making including budget allocation. One of the key factors in determining condition-based maintenance plans for municipal facilities is utility and occupancy (Shohet, 2016:351). Furthermore, one of the main goals of municipal facilities condition assessments is to develop a condition-based maintenance that supports facilities management practice at large (Besiktepe, *et al*., 2021:1; Amponsah-Kwatiah, *et al*., 2021:696). Therefore, improving the condition of municipal facilities is dependent on the prioritisation of condition-based maintenance (Peng, *et al*., 2019:3).

2.5.1.4 Facilities time-based maintenance

The literature review shows that preventive maintenance for municipal facilitiesmay involve time-based maintenance (Bouabdallaou, *et al*., 2021:8). The assumption is that time-based maintenance policy conducts preventive maintenance at fixed times (Reichelt *et al*., 2018:220; Amani, *et al*., 2012:85). Shi, Xiang and Li (2019:999) and Fraser (2014:28) also confirm that time-based maintenance for municipal facilities has

a specific duration of operation. Ampofo, *et al*., (2020:111) deduce that municipalities that follow time-based maintenance schedule in their facilities both extend their lifespan and guarantee that facilities retain their original and excellent condition. However, long term maintenance schedules or intervals increase the chance of facilities' deterioration (Au-Yong, *et al*., 2018:56). Further, time-based maintenance that is carried out with limited resources is not likely to sustain good condition of municipal facilities (Au-Yong, 2019:3). It is an agreeable fact that implementation maintenance plan on short notice causes problems with resource mobilisation (Au-Yong, *et al*., 2018:56). A plausible argument can be made that time-based maintenance is a performance indicator for municipal facilities maintenance activities (Enshassi & Shorafa, 2015:206). The above narrative suggests that a decision to adopt time-based maintenance of municipal facilities is imperative to sustain their good condition and durability (Yousefli, *et al*., 2017:363). Hassanain, *et al*., (2019:534) further agree that time-based maintenance is influenced by the duration maintenance contracts and the way contractors are categorised in line with their trades or expertise in built environment. There are indications that there are quite a few municipal facilities that have been upgraded on time to meet the necessary facilities management requirements (Reichelt, *et al*., 2018:220). However, time-based facilities maintenance is often replaced by condition-based facilities maintenance in most municipalities (Støre-Valen, 2021:5-6). Unfortunately, most municipalities do not allocate enough budget to implement time-based maintenance to their facilities and thereby create a backlog on effective facilities maintenance. (Alm, *et al*., 2021:81). Literature further reveals that implementation of time-based maintenance is implemented on time is cost effective and productive (Amani, *et al*., 2012:87). This is because the age of municipal facilities influences maintenance management expenses (Hassanain, *et al*., 2019:535). Bouabdallaou, *et al*., (2021:8-9) further comment that maintenance managers should determine the right to implement their time-based maintenance plan on municipal facilities. Therefore, municipal facilities maintenance plan should include a time-based maintenance strategy (Nota, *et al*., 2021:3).

2.5.1.5 Facilities value-based maintenance

Various researchers make mention of the fact that value-based maintenance guarantees minimal interruption to the facilities' operation (Au-Yong, 2019:2; Wahab

& Basari, 2015:453). There are arguments that value-based maintenance is an opportunistic maintenance strategy that develops the facilities in accordance with its current and future requirements (Støre-Valen, 2021:6). This is due to the fact that inadequate municipality facilities value-based maintenance practices lower the value of the facilities (Twumasi-Ampofo, *et al*., 2017:148). This implies that devastating socioeconomic consequences result from inadequate municipal facilities that lack a value-based maintenance culture (Amponsah-Kwatiah, *et al*., 2021:687). Hassanain *et al*. (2019:528) further infer that a portion of any facility's life cycle cost is attributed to value-based maintenance for municipality facilities. It is argued that value-based maintenance for municipal facilities has become a cost factor component of facilities maintenance process (Reichelt, *et al*., 2018:220). Essentially, value-based maintenance requires significant funding to maintain the quality standard of municipal facilities (Ebekozien, 2021:32). The primary goal of a value-based maintenance is to get the best value for the money spent on municipal facilities maintenance (Hadjor, 2014:18). Previous studies show that the likelihood that maintenance responsibilities will be accomplished without any errors is the measure of quality in maintenance (Khalid, *et al*., 2019:3; Au-Yong, 2019:2). It is important to note that municipal facilities with dependable maintenance contracts will raise the facilities' worth (Ogunbayo & Aigbavboa, 2019:7-8). Further, that value-based maintenance for municipal facilities guarantees optimal economic utilisation (Andile, *et al*., 2018:433). Therefore, municipal facilities that prioritise value-based maintenance projects protect social and economic well-being (Au-Yong, *et al*., 2018:54).

Maintenance backlog is caused by insufficient value-based maintenance in municipal facilities (Hopland, 2015:195). Empirical evidence also shows that the cost of value-based maintenance for municipal facilities is influenced by various factors, including limited budget and poor usage of resources (Hassanain, *et al*., 2019:529). A lack of value-based maintenance does not enhance appreciation of municipal facilities' value (Wong, *et al*., 2022:879; Sia, *et al*., 2018:334). Another aspect causing facilities defects, is the lack of municipalities' commitment and investment to value-based maintenance strategy in their facilities (Au-Yong, 2019:2). Bikam and Chakwizira (2021:17) point out that redefining the parameters for allocating municipal operations will help to improve the underinvestment in value-based maintenance of the municipal facilities. More importantly, economic considerations must be made when

implementing appropriate value-based maintenance plans in municipal facilities (Reichelt, *et al*., 2018:224). Empirical evidence indicates that efficiency in municipal facilities value-based maintenance is caused by dividing annual maintenance costs by a facility's performance rating (Shohet, 2016:351). Ampofo, *et al*. (2020:113) also discover that facility value appreciation is guaranteed by maintaining the economy of municipality facilities. Therefore, value-based maintenance for municipal facilities maximises the benefits of facility maintenance activities (Khalid, *et al*., 2019:1; Okereke, 2020:3; Au-Yong, 2019:4).

2.5.1.6 Facilities routine maintenance

Routine maintenance is carried out almost every day to keep the municipal facilities ready for use (Akib, *et al*., 2022:71; Zawawi, *et al*., 2016:2). The goal of routine preventive maintenance is to service facilities to a predetermined maintenance control plan (Van der Mescht & Van Jaarsveld, 2012:4). In practice, this means that routine maintenance is preventive maintenance (Hadjor, 2014:18). It is well known that the value of the municipal facilities is maintained by routine maintenance (Au-Yong, 2019:15). However, municipalities face the problem of not having enough money for routine maintenance of the facilities (Bikam & Chakwizira, 2021:14). Reichelt, *et al*. (2018:222) further identify that routine maintenance strategies for municipal facilities are still severely lacking in implementation. This is because dilapidated municipal facilities affect the environment and contribute to social deprivation (Ampofo, *et al*., 2020:113). There is a strong argument that routine maintenance is necessary to keep municipal facilities in a state that allows for continuous usage (Hadjor, 2014:11). Scholars take the view that routine maintenance helps to maintain the economic life of municipal facilities and preserves the value of investment (Ampofo, *et al*., 2020:115; Støre-Valen, 2021:7). Xaba (2012:216) also provides evidence that routine maintenance refers to the general upkeep of municipal facilities. Therefore, routine maintenance work must be prioritised by municipal facilities management (Beauregard & Ayer, 2019:250).

2.5.1.7 Facilities deferred maintenance.

Delayed maintenance of municipal facilities is referred to as deferred maintenance (Xaba, 2012:216). Hadjor (2014:18) also acknowledges that deferred maintenance is

the term for facility maintenance that is deemed necessary but is postponed because of resource constraints. The premise is that spending on facilities maintenance is typically reduced by municipalities with weak financial performance (Hopland & Kvamsdal, 2019:416; Ampofo, *et al*., 2020:133). It has shown that deferred maintenance practice in municipal facilities is caused by low standard of contract work and a limited budget (Yousefli, *et al*., 2017:356). Facilities maintenance management in municipalities has been plagued by a lack of proactive maintenance management (Khalid, *et al*., 2019:11). Indeed, it can be argued that delaying maintenance increases the amount of maintenance work required to rescuscitate the condition of facilities (Hopland, *et al*., 2019:19). This further exercibates maintenance costs (Hassanain, *et al*., 2019:528). There are persuasive arguments that deferred maintenance in municipal facilities leads to rapid decay of facilities (Valen & Olsson, 2012:291). On further consideration, it is felt that facilities deterioration is one of the ignored repercussions of deferred maintenance in municipal facilities (Shi *et al*., 2019:999). Some analysts have argued that budgetary provisions are needed for maintenance of municipal facilities (Mazele & Amoah, 2021:11). Ignoring maintenance of municipal facilities results in OHS hazard for the public and end users of buildings (Ogunbayo & Aigbavboa, 2019:7). Therefore, delaying municipal facilities maintenance is not a financially or technically sound decision for municipalities (Van der Mescht & Van Jaarsveld, 2012:5).

Drawing from the literature, both academics and practitioners agree that deferred maintenance of municipal facilities leads to ineffective planning for facilities maintenance (Shi, *et al*., 2019:999). Bikam and Chakwizira (2021:14) cite that budget allocation for facilities maintenance in municipalities is diverted to other uses, which results in deferred maintenance. There is a consensus within the literature that deferred maintenance, or the decision to address maintenance problems later than sooner, is the cause of the backlog in municipal facilities maintenance (Hopland, 2015:196). The argument is valid that deferred maintenance of municipal facilities impairs facilities effectiveness (Bikam & Chakwizira, 2021:7). Twumasi-Ampofo *et al*. (2017:146) further prove that the occupants are negatively impacted by deferred maintenance in municipal facilities. This is the reason Shohet and Nobili (2017:59) argue that the integrated approach to municipal facilities maintenance management entails allocating optimal resources to facilities maintenance work to achieve optimal

performance while minimising costs. Through the lens of Amponsah-Kwatiah *et al*. (2021:689), municipal facilities maintenance policy serves to guarantee the long-term and planned management of facilities. Therefore, the maintenance of municipal facilities should be prioritised to ensure that buildings are safe and compliant with relevant building regulations and standards (Mazele & Amoah, 2021:12).

2.5.1.8 Facilities predictive maintenance

Predictive maintenance of municipal facilities is based on an evaluation of the facilities' condition with the goal of minimising unexpected facilities failures (Prieto, *et al*., 2019:1; Moat & Coleman, 2020:5). Nota, *et al*., (2021:3) and Wahab and Basari (2015:449) also submit that the detection of prospective and hidden facilities' defects is the focus of predictive maintenance in municipal facilities. The common view may still be that predictive maintenance for municipal facilities seeks to identify which facilities components are most likely to fail (Bouabdallaou, *et al*., 2021:7; Zawawi, *et al*., 2016:2). However, predictive maintenance for municipal facilities is ineffective since the aim of maintenance has always been to reduce operating expenses associated with maintenance (Hassanain, *et al*., 2019:530). This underlines the fact that predictive maintenance for municipality facilities has been impacted by the facilities' age and high maintenance costs (Enshassi & Shorafa, 2015:207). The literature reveals that predictive maintenance has become an essential strategy for maintaining municipality facilities (Moat & Coleman, 2020:6-7). This is because predictive maintenance for municipality facilities forecasts both the likelihood of facilities incidents occurring and the reasons of causes (Nota, *et al*., 2021:6-7 & Bouabdallaou, *et al*., 2021:9). Research scholars such as Yousefli, *et al*. (2017:354) and Hadjor (2014:23) are of the opinion that predictive maintenance is determined on the actual condition of the municipal facilities. Xaba (2012:223) also attests that predictive maintenance uses metrics such as age and performance to predict the failure of municipal facilities. Therefore, predictive maintenance is essential for municipal facilities to maintain functional performance level (Amponsah-Kwatiah, *et al*., 2021:692; Ampofo, *et al*., 2020:113).

Ampofo, *et al*. (2020:133) further predicts that predictive maintenance strategy for municipal facilities is always unsuccessful. Research has discovered that the maintenance budget and the complexity of the facilities are the two most important

factors in selecting municipal facilities predictive maintenance strategy (Yousefli, *et al*., 2017:354). Scholars take the view that predictive maintenance for municipal facilities monitors the probability of facilities failure to enable proactive maintenance interventions (Yousefli, *et al*., 2017:354). It is admitted that expectations of end users of municipalities influence the cost of predictive maintenance management (Hassanain, *et al*., 2019:532-533). Similar views are shared by Xaba (2012:216) that predictive maintenance for municipal facilities seeks to minimise damage to facilities. Essentially, another degree of facilities planned maintenance is provided by municipal facilities predictive maintenance (Hadjor, 2014:24). Predictive maintenance for municipal facilities is based on the analysis of operational data using data analytics techniques (Villa, *et al*., 2022:5). Therefore, predictive maintenance for municipality facilities presents an opportunity to reduce unplanned facilities failure (Bouabdallaou, *et al*., 2021:9).

2.5.1.9 Facilities reliability-centred maintenance

The practice of identifying a facility's maintenance requirements in the operating context is known as reliability-centered maintenance (Fraser, 2014:30; Besiktepe, *et al*., 2021:6). Rahman (2014:3) also alludes that reliability-centered maintenance for municipality facilities is an analytical method used to identify the necessary maintenance needs to guarantee both safe and cost-effective operation. There is a strong argument that unnecessary exposure to legal and social hazards may arise from municipal facilities lacking reliability-centered maintenance (Queensland Department of Housing and Public Works, 2017:5). Fraser (2014:30) further writes that technology is the focus of municipal facilities reliability-centered maintenance, which provides a solid foundation for determining maintenance requirements. This is due to the possibility that early municipal facilities' failures could arise from a lack of reliability-centered maintenance (Queensland Department of Housing and Public Works, 2017:5-6). Resulting evidence indicates that reliability-centered maintenance for municipal facilities minimises disruptions to facilities occupants (Hadjor, 2014:21). Moreover, research has shown that the development of a reliability-centered maintenance strategy for municipal facilities begins with an understanding of the reliability (Rahman, 2014:4-5). This would again imply that reliability-centered maintenance for municipal facilities involves integrated planned maintenance

decision-making (Reichelt, *et al*., 2018:230). It almost goes without saying that municipalities can create appropriate strategies and actions for municipal facilities and investment by utilising the reliability-centered maintenance approach (Queensland Department of Housing and Public Works, 2017:8). Therefore, information technologies are essential to municipality facilities reliability-centered maintenance (Yousefli, *et al*., 2017:363).

2.5.2 Facilities corrective maintenance

Literature supports that municipal facilities corrective maintenance is passive process that entails repairing municipal facilities after failure or damaged (Wang, *et al*., 2022:6; Moat & Coleman, 2020:7; Luy *et al*., 2013:1380-1381). Bouabdallaou, *et al*. (2021:10) and Wanigarathna, *et al*. (2019:420) also affirm that corrective maintenance for municipal facilities consists of intervening after the failure. It is important to underline that municipal facilities corrective maintenance is the type of maintenance that is dependent on facilities failures (Nhlapo, 2020:6; Bajere, *et al*., 2016:19). However, evidence indicates that, personnel may be unfamiliar with the root cause of municipality facilities breakdown, which may result in service disruption and an increase in maintenance costs for corrective maintenance (Yousefli, *et al*., 2017:354). There is recognition that inadequate workmanship during the constructing phase of municipality facilities necessitates corrective maintenance after the facilities is completed (Wong, *et al*., 2022:883). Research shows that inspections are not scheduled as part of the municipal facilities corrective maintenance policy (Omoregbe & Taiwo, 2017:212). Literature also shows that the facility's run-to-failure strategy is typically used for municipal facilities corrective maintenance (Herbert, 2018:4). Twumasi-Ampofo, *et al*., (2017:148-149) further explain that inadequate corrective maintenance shortens the life of the facilities, which can lead to accidents for the occupants, hence undermines the facility's intended purpose (Twumasi-Ampofo, *et al*., 2017:146). It is evident that insufficient municipal facilities corrective maintenance creates a backlog of expenses that must be paid in the future (Hopland & Kvamsdal, 2019:414; Zawawi, *et al*., 2016:2). In this regard, corrective maintenance's function is to maximize the economic values of the facilities while also improving the health and safety of the occupants (Ampofo, *et al*., 2020:113; Bikam & Chakwizira, 2021:19). Therefore, municipal facilities corrective maintenance procedures are similar to

preventive maintenance procedures, with the exception that they are less systematic (Hadjor, 2014:16).

Reactive maintenance of municipal facilities is a contingency plan for the corrective maintenance (Omoregbe & Taiwo, 2017:215). Amponsah-Kwatiah, *et al*. (2021:686) also ascertain that inadequate maintenance practices have impeded the necessary corrective maintenance of municipal facilities. This is because corrective maintenance of municipal facilities is not given enough attention (Bikam & Chakwizira, 2021:7). The key insight from extant research is that municipalities are faced with challenges of facilities corrective maintenance (Ampofo, *et al*., 2020:115). Xaba (2012:216) and Nhlapo (2020:8) acknowledge that corrective maintenance addresses deficiencies that inevitably arise because of unforeseen events. Rahman (2014:5-6) also argues that municipal facilities corrective maintenance refers to unscheduled actions taken to return a facility to its operational state, following the occurrence of a defect. More revealing is the fact that municipality facilities proactive maintenance reduces the demand for corrective maintenance (Che-Ani & Ali, 2019:346). Some research also suggests that municipal facilities corrective maintenance occurs when facilities components need intervention (Yousefli, *et al*., 2017:354). The argument is that municipal facilities corrective maintenance activities are generated from preventive maintenance inspections (Zawawi, *et al*., 2016:2). Twumasi-Ampofo, *et al*. (2017:147) further comment that corrective maintenance is a part of sustainable municipal facilities maintenance. This is due to the fact that renovations that include work done to restore facilities structures integrity are included in municipal facilities corrective maintenance (Hadjor, 2014:23). Omoregbe and Taiwo (2017:216) further contend that the traditional method of maintenance is the corrective maintenance of municipality facilities. It is generally acknowledged that the goal of corrective maintenance for municipal facilities is to increase the facilities' lifespan (Støre-Valen, 2021:7). It may be observed that corrective maintenance for municipal facilities may differ based on unique economic circumstances (Amponsah-Kwatiah, *et al*., 2021:687). Suffice it to recall that the use of corrective maintenance approach is a challenge in the management of municipal facilities maintenance (Khalid, *et al*., 2019:11). Therefore, corrective maintenance is not a suitable practice for municipal facilities (Peng, *et al*., 2019:2; Nota, *et al*., 2021:7).

2.5.2.1 Facilities unplanned maintenance

Municipal facilities unplanned maintenance is the performance of unexpected work (Bajere, *et al*., 2016:19). Hadjor (2014:16) also asserts that municipal facilities unplanned maintenance is the maintenance that occurs unexpectedly and is unavoidable. Enshassi and Shorafa (2015:207) discloses that the facility maintenance managers prefer to perform reactive maintenance rather than proactive maintenance. However, this assertion is located within the argument that because of unplanned and delayed maintenance, the facilities are being pushed to their limits (Bikam & Chakwizira, 2021:7). That is the reason why Ampofo, *et al*., (2020:115) reiterate that end users of facilities are the primary initiators of municipal facilities unplanned maintenance, and they, along with other stakeholders, influence the amount of maintenance work to be performed. This echoes the view by Hopland and Kvamsdal (2019:414) that it is more expensive to cover municipal facilities unplanned maintenance backlog than it is to maintain upfront. This is due to the fact that poor maintenance leads to faster decay of facilities (Hopland & Kvamsdal, 2019:414). This implies that in developing countries, lack of a maintenance culture is more prevalent (Amponsah-Kwatiah, *et al*., 2021:694). The above remarks clearly show that facilities functions collapse as a result of ineffective maintenance (Che-Ani & Ali, 2019:345). Therefore, dilapidated municipal facilities contribute to social deprivation and have an impact on the environment (Hadjor, 2014:27).

2.5.2.2 Facilities emergency maintenance

Literature suggests that emergency maintenance of municipal facilities is performed as a result of unanticipated damage (Akib, *et al*., 2022:74; Zawawi, *et al*., 2016:2). Bajere, *et al*., (2016:19) and Wahab and Basari (2015:454) also stress that emergency maintenance is necessary to instantly avoid adverse consequences in municipal facilities. However, the import of this view lies in its recognition that higher costs and working expense are associated with municipal facilities emergency maintenance (Reichelt, *et al*., 2018:227). Thenuwara and Sandanayake (2018:551) further establish that municipal facilities emergency maintenance could have a significant negative impact on the facility's performance. Indeed, there is ample evidence that failure to maintain municipal facilities is where the maintenance is undertaken only after the facilities have failed (Fallahnezhad & Najafian, 2017:5845). Moreover, municipalities

consistently place a premium on building new facilities while neglecting to maintain existing ones (Bikam & Chakwizira, 2021:7). Empirical research has provided evidence that the accumulation of maintenance neglect has resulted in rapidly increasing facility deterioration (Hadjor, 2014:31). As previously indicated, the primary goal of facility maintenance is to ensure that the facilities continue to serve the purpose for which they were constructed (Ampofo, *et al*., 2020:113). Prior research has shown that municipalities should use innovative maintenance strategies to handle unforeseen emergency maintenance problems. (Thenuwara & Sandanayake, 2018:548; Ampofo, *et al*., 2020:115). There is a consensus that strategies for maintaining municipal facilities have shifted from being reactive and preventive to being proactive maintenance (Hopland, *et al*., 2019:19). Xaba (2012:216) and Oladejo, *et al*. (2015:2) discover that emergency maintenance is concerned with the repair or replacement of facility components that require immediate attention due to the impairment of the operation of a critical facilities system. Hadjor (2014:16) also attests that day-to-day maintenance resulting from incidents is referred to as municipal facilities emergency maintenance. History tells that minimising associated operational expenses is the primary objective of maintenance for municipal facilities (Oladejo, *et al*., 2015:6-7). Therefore, municipal facilities emergency maintenance must be completed immediately to avoid major facilities damages (Hadjor, 2014:18; Amponsah-Kwatiah, *et al*., 2021:686).

Essentially, poor facilities maintanance leads to increased cost for emergency maintenance, OHS hazards of users and customers, deterioration and delapidating of facilities' lifespan, as well as malfunctioning and abandonment of facilities.

Effective facilities maintenance is a cost-effective solution to keep facilities in good functioning state and prolonged lifespan. Neglecting facilities maintenance results in a disrepair of buildings, non-compliance with OHS standards, as well as massive financial costs to restore buildings functional state. Furthermore, poor maintenance of municipal facilities can pose a threat to the health and safety of facilities users and municipal customers, as well as stakeholders that visit facilities. This may affect the productivity of employees and negatively affect service delivery at large. Municipal facilities can also suffer structural depreciation deterioration as a result of poor maintenance. This may lead to depreciation of buildings' economic value and lifespan.

Structural integrity of buildings and equipment may further result in high cost to repair and facility resuscitation. Facilities like clinics, libraries, rates halls, license centres, emergency services, fire stations, city planning, human settlement and community halls are mainly CCCs, where services are rendered directly to communities. Some of these facilities are revenue generating centres of the city. Communities visit these facilities regularly, and they expect to see and feel value for their money. They also expect to feel safe and professionally serviced when visiting the facilities. Therefore, effective maintenance of these buildings is imperative and mandatory to enhance service delivery (Akib, *et al*., 2022:74-75).

2.6 FACILITY MAINTENANCE MANAGEMENT IN PRACTICE

In 2012, the Real Estate Department of the City of Ekurhuleni Municipality appointed consultants, specifically Professional Quantity Surveyors, to develop a Prioritisation Model for Building Maintenance. This model was intended to form an integral part of the Facilities Maintenance Policy, which was to be submitted to the Council for approval (South African Government, 2012).

As part of the process to establish a Prioritisation Model for Building Maintenance, the appointed consultants undertook a series of data collection exercises to assess the condition of municipal facilities. These efforts entailed evaluating the criticality of different facility types, which were systematically categorised in a matrix against building components requiring maintenance.

The first phase involved the development of an Infrastructure Assets Management Plan, which compiled a comprehensive inventory of municipal facilities. These facilities were classified into three categories: Buildings for Community Services, Municipal Operational Buildings, and Buildings for Public Amenity Services. The primary objective of this plan was to demonstrate the municipality’s capability to manage its infrastructure effectively, thereby enhancing credibility with funding agents and stakeholders. Additionally, provisions were made for continuous updates and refinements to align with the municipality’s commitment to service excellence and sustained improvement in service delivery.

The second phase entailed integrating the Infrastructure Assets Management Plan into the Comprehensive Municipal Infrastructure Plan. This plan provided a corporate-

level framework for infrastructure investment, enabling the municipality to prioritise investment needs and allocate financial resources strategically. Investment decisions were made in alignment with the city's strategic priorities and fiscal capacity to ensure the sustainability of municipal facilities (South African Government, 2012).

The third phase involved conducting comprehensive Building Condition Assessments across various municipal buildings. The primary objective was to establish the scope of maintenance work required, develop project specifications, and estimate high-level costs. This process informed the formulation of a Prioritisation Model for Building Maintenance and the development of a twenty-year Building Maintenance Plan for each facility. Furthermore, it contributed to the creation of a Facilities Maintenance Policy to guide maintenance practices across the city.

The Building Maintenance Plans were formulated to identify both immediate and long-term maintenance requirements, ensuring that municipal buildings remained functional throughout their intended lifespan. These plans incorporated cost estimates and timeframes for required maintenance interventions, which were categorised into immediate, medium-term, and long-term actions. Another key objective of the condition assessment was to establish the life-cycle costs of municipal buildings, thereby facilitating the adoption of a comprehensive and well-informed budget plan.

Given the extensive maintenance backlog, a strategic decision was made to segment and prioritise specific facility categories. The highest priority was assigned to the twenty Customer Care Centres, followed by clinics and libraries. Condition assessments were conducted for three key categories of municipal facilities: twenty CCCs (including nine Civic Centres), all libraries, and all clinics.

The findings of the Building Condition Assessment were documented in a report, which underscored the importance of prioritising maintenance budgets based on statutory compliance, occupational health and safety regulations, business operational needs, asset lifecycle costs, and the prevention of consequential damage. The assessment encompassed various structural and functional aspects of the buildings, including structural integrity, plumbing systems (sewerage, drainage, piping), roofing and flooring, internal finishes (carpeting, carpentry, lighting, painting, ceilings, skirting, cornices), accessories (windows, trellis doors), external aesthetics (landscaping,

facades), fencing (repairs, upgrades, replacements), and electrical and mechanical systems.

The condition assessment findings revealed that most municipal buildings were in a severe state of disrepair, necessitating urgent interventions to restore their functionality. Critical deficiencies were identified across multiple structural and infrastructural components, including plumbing, roofing, flooring, electrical systems, and aesthetic finishes.

The development of the Prioritisation Model for Building Maintenance was a structured and methodical process that incorporated various key assessments, including the Infrastructure Assets Management Plan, the Comprehensive Municipal Infrastructure Plan, and the Building Condition Assessments. The culmination of these efforts resulted in an evidence-based Prioritisation Model that outlined maintenance activities required for each facility, along with detailed cost estimates.

As highlighted by Ebekozien, *et al*., (2022:121), preventive and condition-based maintenance approaches are essential for the planned upkeep of municipal facilities. Such approaches enable maintenance managers to develop structured maintenance schedules and allocate appropriate budgets. Omoregbe and Taiwo (2017:213) emphasise the importance of collecting accurate information on facility conditions to formulate optimal maintenance strategies. The City of Ekurhuleni, through its condition assessment exercise, sought to achieve this objective by developing a comprehensive maintenance plan underpinned by specific budgetary requirements.

Through the condition assessment process, the municipality obtained a comprehensive report on the state of its facilities, leading to the formulation of a building maintenance plan that addressed the identified deficiencies. Consequently, an integrated Prioritisation Model for Building Maintenance was successfully developed, with clearly defined maintenance programs aimed at prioritising the most critical buildings.

The recommendations arising from the Prioritisation Model for Building Maintenance in CoE's municipal facilities included the following (South African Government, 2012):

- The prioritisation model and accompanying facilities maintenance plan should be adopted to develop structured maintenance programs, ensuring that the most critical facilities receive priority attention.
- Key performance indicators should be developed and gradually integrated into the maintenance management framework.
- Both qualitative and quantitative measures should be employed to cultivate a proactive and planned maintenance culture across municipal facilities.
- Performance measures should align with the four *Es* of performance management: *Economy*, *Effectiveness*, *Efficiency* and *Efficacy*.

Despite the extensive efforts undertaken to develop the Prioritisation Model, the proposed framework was ultimately not approved by the Council. This decision resulted in the continued reliance on unplanned maintenance practices, which predominantly involve reactive repairs to already deteriorated buildings. Such an approach, classified as corrective or emergency maintenance, leads to exorbitant and unsustainable costs. Deferred maintenance due to inadequate budget allocations has entrenched emergency repairs as the predominant maintenance strategy in CoE.

The financial implications of emergency repairs are significant yet unavoidable, and the lack of an approved Facilities Maintenance Policy, along with insufficient maintenance budgets, has led to severe consequences. These include persistent staff shortages in the Facilities Maintenance Division, increased exposure of building users to occupational health and safety hazards, and non-compliance with Occupational Health and Safety regulations. Additionally, the situation has resulted in disruptions to service delivery and a rise in community unrest and protests due to the deteriorating condition of public facilities.

The failure to institutionalise a structured maintenance framework has thus undermined the city's ability to manage its infrastructure effectively, necessitating urgent policy interventions to reverse the adverse consequences of deferred maintenance.

2.7 CHAPTER SUMMARY

The purpose of this chapter was to provide insight into the challenges facing municipal facilities maintenance management, which constitutes the fundamental theoretical foundation of this study. It expatiated on the conceptual and theoretical framework by delving deep into literature review related to setting direction of the challenges facing municipal facilities maintenance management, facilities maintenance organisational structure, facilities maintenance inspection, facilities maintenance planning and facilities planned maintenance. The literature review also shows that institutional theory emphasises how important norms, values, and beliefs are, in explaining how organisations and individuals behave and make decisions. Further, the literature review confirmed that asset management refers to the process of creating asset management plans, as well as the function of the asset management system in assisting in the accomplishment of asset management goals. The literature review has established that municipality facilities inadequate maintenance creates a backlog of expenses that need to be paid in the future. The literature review has also confirmed that poor maintenance practices are partly caused by the absence of policies for the municipal facilities maintenance. The chapter further discussed the impact of those challenges on the municipal service delivery. The literature review has discovered that municipalities underutilise preventive maintenance for the facilities because they do not see the immediate benefits. The literature review also has shown that corrective maintenance is not a suitable practice for municipality facilities. The next chapter presents research design and methodology.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

The chapter provides a description of the overall design and methodology adopted for this research. It presents the research philosophy, research methodology and research approach used in the current study. This is followed by the research design and research methods, as well as population and sampling methods. The discussions also include data collection methods and data analysis techniques. Trustworthiness of the study is described in terms of credibility, transferability, dependability and confirmability. Further, ethical considerations and limitations of the study are presented. Finally, the chapter summary sums up the procedures, research design and methodology.

3.2 RESEARCH PHILOSOPHY

Ormrod and Leedy (2021:30) define a research philosophy as a broad framework of assumptions about fundamental aspects of reality, which yield themselves to a particular worldview. Ryan (2018:2) states that the foundation for any research project is the philosophical paradigm which influences research decisions and the way the study is tackled. Moreover, there are basically four philosophical assumptions which influence the choice of a research approach, namely ontology, epistemology, axiology and methodology (Saunders, Lewis & Thornhill, 2020:109). A philosophical worldview consists of assumptions about ontology and epistemology (Nguyen, 2019:3).

In this research, methodology, ontology, and epistemology were crucial components. This study uses the many and varied voices of the participants to situate itself within the subjective perspective of knowledge formation about the challenges facing facilities maintenance management. From this perspective, facilities management managers were the ones who have the experience and knowledge of the reality of what happens within the facilities maintenance management to enhance service delivery by the CoE Municipality. Creswell and Plano Clark (2018:52) indicate that the ontological premise is that there are various socially produced realities, and that value permeates social interactions. Research also reveals that the question of whether social reality is external to individuals is at the heart of ontological assumptions

(Silverman, 2016:9). It is widely acknowledged that a diverse and subjective aspect of reality is referred to as ontology (Raghvan, 2021:14).

The usage of epistemology was employed in this investigation. The focus of this study was on the fundamental ideas of epistemology and how knowledge is developed in real-world situations. It seems clear that research philosophy's field of epistemology addresses how knowledge is acquired and concentrates on what and how much a researcher can learn about the world (Al-Ababneh, 2020:77). Alharahsheh and Pius (2020:40) advise that the way that one thinks, learns and interprets knowledge that informs research methods, is known as epistemology.

Research shows that positivism, post-positivism, constructivism, critical theory, and participatory paradigms are among the paradigms that are deemed important in particular research setting (Babbie, 2020:35). Leavy (2017:25) determined constructivism, transformational thinking, pragmatism, and post-positivism as the four research paradigms or worldviews. Creswell and Creswell (2018:45) advise that the fundamental goal of the positivist and interpretive paradigms is to comprehend things using two distinct epistemic vantage points. Ormrod and Leedy (2021:30) substantiate that the main goal of positivism in research is to support or refute a hypothesis by applying statistical analysis and standardised scientific methodologies. Dawadi, Shrestha and Giri (2021:26) highlight that in order to ensure the validity of the study, positivist researchers maintain objectivity and distancing from the world they are studying. This argument is consistent with the fact that the goal of positivism is to use deductive empirical research to validate a preconceived theory (Alharahsheh & Pius, 2020:41). Significant evidence also suggests the idea that reality may be created in social situations, which is central to post-positivism, gave rise to a different paradigm that supported and encouraged the use of subjective interpretation (Collis & Hussey, 2021:40). It would be accurate to state that post-positivism combines aspects of determinism based on priori theories, logic, empirical research, and cause-and-effect orientation (Creswell & Clark, 2018:38).

Essentially, the meaning of these concepts and their focus are clarified below:

- Positivism relies on measurable phenomena and seeks to establish generalisable facts through empirical research.

- Building on positivism but acknowledging its limitations, post-positivism maintains that while objective reality exists, our understanding of it is always mediated by human perceptions.
- Constructivism focuses on how individuals and groups create their own understanding and meanings through interactions and experiences, rather than discovering an objective truth.
- Critical theory aims to critique and change society by addressing power structures and inequalities. It seeks to uncover and challenge the underlying assumptions that perpetuate social injustices and aims to promote social transformation.
- Participatory paradigms emphasise collaboration between researchers and participants in the research process. The goal is to ensure that research is conducted in a way that reflects the voices and experiences of those being studied, often aiming to achieve practical outcomes that benefit the participants and empower communities.

Constructivism and participatory paradigms are particularly suitable for this study as they align with the qualitative, exploratory nature of the research objectives. Constructivism acknowledges that reality is socially constructed and shaped by individuals' experiences and perceptions. This is particularly relevant in the context of facilities maintenance management at the CoE, where the lived experiences, insights, and perspectives of municipal staff, maintenance personnel and service recipients provide crucial understanding of the challenges encountered on the ground. By focusing on how participants interpret and give meaning to their roles, responsibilities, and systemic constraints, constructivism enables the researcher to uncover the root causes behind service delivery inefficiencies.

The participatory paradigm further enhances this approach by promoting engagement with stakeholders as co-constructors of knowledge. It aligns with the study's objective to not only identify challenges, but also involve those directly affected in reflecting on and contextualising the issues. This is critical in addressing the identified problem statement, namely the urgent need to investigate the challenges of facility maintenance management to improve service delivery at the CoE Municipality. Through participatory inquiry, the researcher ensured that proposed insights and

potential interventions are grounded in the actual experiences of those responsible for maintaining municipal facilities, thereby increasing the relevance, accuracy and potential impact of the findings.

Critical theory is also considered because the focus of this study includes critiquing systemic issues and advocates for transformative changes. Furthermore, this research was an interpretive study that focused on the practices of research participants in investigating the challenges facing facilities maintenance management to enhance service delivery within the CoE Municipality. The researcher subjectively interacted with facilities management managers in order to have an understanding of the reality of the phenomenon. Bryman and Bell (2017:14) state that interpretivism studies people's experiences and their interpretations of those events because it holds that truth can be found in human experience. It is widely accepted that the interpretivist paradigm, sometimes referred to as the constructivist or qualitative paradigm, aims to comprehend that social reality is essentially subjective (Creswell & Creswell, 2018:8). A review of the literature suggests that the premise of interpretivism is that the social sciences and natural sciences deal with fundamentally different subjects (Alharahsheh & Pius, 2020:42).

3.3 RESEARCH METHODOLOGY

Previous study has indicated that research methodology refers to the set of techniques used by researchers to carry out their investigations (Maxfield & Babbie, 2018:6). Al-Ababneh (2020:79) also indicates that methodology is the approach or course of action that guides the selection and application of specific techniques. Sharma (2018:3) differentiated between the two fundamental research inquiry methodologies, namely qualitative and quantitative research. Also, it has been claimed that methodologies differ between qualitative and quantitative approaches (Melnikovas, 2020:39). The purpose of qualitative research is to investigate and comprehend the meaning that individuals or groups attribute to a social or human situation (Ormrod & Leedy, 2021:112).

Fischler (2020:12) confirmed that a quantitative approach uses numerical analysis. It has moreover been argued that one drawback of quantitative approaches is that they are limited to data that can be quantified and outputs that can be measured numerically

(Romm, 2018:449). Fischler (2020:14-15) found that statistical logic is used in quantitative research to test hypotheses and collect data in large quantities. More importantly, a single study or a series of studies employing both qualitative and quantitative approaches are referred to as mixed method research (Sheppard, 2020:72). Shorten and Smith (2017:1-2) found that studies that incorporate both qualitative and quantitative methods into their research process are referred to as mixed methods research. Creswell and Creswell (2018:217) argue that stronger and more accurate conclusions can be drawn by leveraging a mixed methods approach, which neutralises the shortcomings of each methodology while building on its strengths.

This research followed qualitative research to investigate the challenges facing facilities maintenance management to enhance service delivery by the CoE Municipality. It was the researcher's conviction that qualitative research would enable the collection of qualitative data to discover the natural flow of events and processes concerning the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. It is arguable that the main goals of qualitative research are to gain a comprehensive understanding of human experiences and to analyse social reality (Fischler, 2020:1). Dantzker, Hunter and Quinn (2018:61) also indicate that the results of qualitative research are not obtained using statistical methods.

Jha (2024:38) defines qualitative research as an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process involves emerging questions and procedures, data typically collected in the participants' setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data. This definition highlights the interpretive and flexible nature of qualitative research, which focuses on understanding the complexity of human experience within real-life contexts.

Similarly, Stockless and Brière (2024:4-5) describe qualitative research as a situated activity that locates the observer in the world, consisting of a set of interpretive, material practices that make the world visible. These practices turn the world into a series of representations, including field notes, interviews, conversations,

photographs, recordings, and memos. This perspective emphasises the researcher's active role in capturing and interpreting lived experiences and the social world through various qualitative techniques and tools.

Qualitative research is highly relevant and appropriate for this study, which seeks to explore the challenges facing facilities maintenance management within a public administration context. Given the complex and multifaceted nature of service delivery in the municipal sector, qualitative methods allow for in-depth exploration of individual and collective experiences, institutional practices, and operational challenges. This methodology enables the researcher to delve into the perceptions and interpretations of municipal officials, maintenance staff, and service recipients, providing a deeper, context-sensitive understanding of the problem. The applicability of qualitative research lies in its ability to capture the lived experiences and subjective insights of key stakeholders. It provides a detailed and nuanced understanding of the internal processes, systemic obstacles and organisational culture that influence facilities management outcomes. Furthermore, qualitative research allows for open-ended inquiry, enabling the researcher to uncover unforeseen issues and patterns that may not emerge through quantitative methods. Methods such as interviews and document analysis serve as effective tools for collecting rich, descriptive data that reflect the real-world dynamics within the CoE Municipality. By applying this methodology, the study contributed to a deeper understanding of how and why specific challenges persist in the municipality's facilities maintenance function and how these challenges affect service delivery.

3.4 RESEARCH APPROACH

Generally, a research approach is employed by the researcher to interpret the research findings and reach a reasonable conclusion (Tuffour, 2017:2-3). Saunders, *et al*., (2020:144) also advise that the research approach is important when deriving findings or inferences for data analysis in research. This leaves little room to argue that determining what constitutes qualitative research requires knowing how to distinguish between inductive and deductive approach (Melnikovas, 2020:34). Saunders, *et al*., (2020:815) believe that the methods of induction, deduction and abductive are thought of as research approaches. Deductive research begins with a general theory or hypothesis and tests it against empirical data. It moves from general

principles to specific observations, aiming to confirm or refute the theory (Ishfaq, Davis & Gibson, 2021:4). A deductive approach makes it possible to identify and critically assess the causes. This reinforces the argument that deductive approach is characterised by its ability to proceed from broader to more detailed findings (Woiceshyn & Daellenbach, 2018:7).

Abductive research starts with observations and seeks to generate or refine theories that can best explain those observations. It moves from specific observations to broader generalisations or hypotheses, often involving an iterative process of theory-building and data collection. This suggests that the abductive research approach is utilised in research projects when the goal is to test or expand a theory through empirical investigations (Melnikovas, 2020:35-36). Mir and Jain (2018:115) further indicate that mixed-method research is linked to abductive reasoning because of the inter-subjectivity of the researchers and their shared meaning-based understanding.

This research employed an inductive approach. An inductive approach begins with specific observations or data and works toward developing general theories or patterns. It moves from particular instances to broader generalisations. Through interactions with research participants, the study established subjective meanings, which further aided the study in developing a theory inductively. A review of literature reveals that the inductive approach is typically applied in situations where there is little to no understanding about the topic under investigation (Creswell & Creswell, 2018:257). Polit and Beck (2017:8) also advise that inductive approaches to theory within the qualitative paradigm are used in qualitative analysis. This claim is based on the premise that when developing theory from fieldwork, qualitative researchers employ the inductive approach (Leavy, 2017:9).

3.5 RESEARCH DESIGN

William (2020:1) considers research design as a blueprint outlining the method of the study. Abutabenjeh and Jaradat (2018:237) also note that the process of combining the many elements of a study in a logical and cogent manner to successfully accomplish the goals of the study is known as research design. This argument is supported by the view that the framework for gathering data to answer the research questions is provided by the research design (Ormrod & Leedy, 2021:106). Denzin

and Lincoln (2018:311) further state that any research method must include the crucial step of choosing an acceptable research design. Empirical evidence indicates that research designs can be broadly classified into two categories: exploratory and conclusive (Tracy, 2020:75). Leavy (2017: 20) further advises that three categories of research designs, namely, descriptive, causal, and exploratory are used to achieve most research goals. There is evidence that a descriptive research design is used to explain a phenomenon and how it occurs in the real world (Kim, Sefcik & Bradway, 2017:23). Babbie (2020:93) also indicates that when more specific information is needed about a given area of interest, descriptive research design is conducted. One study showed that an explanatory research design is a two-phase mixed methods design in which quantitative data are first collected and analysed, and then qualitative data are collected and analysed (Malhotra, Nuna & Birks, 2017:79).

Contextual research design was used for this study. In this study, the findings are understood within the context of facilities management managers by the CoE Municipality. The prevailing stated view is that a qualitative researcher's constant goal is to comprehend processes, behaviours, and events in relation to their surroundings (Creswell & Creswell, 2018:46). Ravitch and Carl (2016:148) also point out that the contextual environment in which a phenomenon arises is crucial for identifying the circumstances around it and for facilitating human response to it.

An exploratory research design was also selected for this investigation. The study's objectives and research questions guided the decision to use an exploratory research design for this investigation. An exploratory research design has the advantage of contributing to a deeper understanding of the challenges facing facilities maintenance management to enhance service delivery by the CoE Municipality. Sekaran and Bougie (2020:158) indicate that when studying a particular population to determine needs, an exploratory research design is recommended. There can be no doubt that when there is little prior knowledge to draw from, an exploratory research design is employed (Babbie, 2020:93). Bell, Bryman and Harley (2018:45) further state that creating methods for identifying and measuring future data is one of the investigative objectives of exploratory research.

3.6 RESEARCH METHODS

Research method refers to the procedures and frameworks utilised in the collection, analysis, and interpretation of data (O'Leary, 2017:119). Chinelo (2016:6) also indicates that research designs, particular techniques, and philosophical presumptions are at the intersection of research methods. The research method process is a logical framework for organising, compiling, and analysing data through the application of inquiry techniques (Polit & Beck, 2017:11). One possible explanation is that many methods are employed in qualitative research, including case study, phenomenology, action, grounded theory, ethnography, and narrative inquiry (Creswell & Poth, 2018:37). Charmaz (2021:155) further advises that the use of grounded theory research method reveals in-depth information about the similarities and contrasts between the groups being studied. There is also evidence that the narrative research method culminates in a story that integrates perspectives from the researcher's and participant's lives (Creswell & Creswell, 2018:13). Brown, McIlwraith and de González (2020:48) indicate that ethnography is the study of social interactions, behaviours, and perceptions that take place in communities, teams, organisations, and groups. It is assumed by most writers that the utilisation of secondary sources and a range of primary documentary material, including logs, diaries, official records, reports, archives, and non-textual information, are integral components of historical research method (Zikmund, D'Allesandro, Lowe, Winzar & Babin, 2017:99).

The phenomenological research method has been incorporated into this study. A phenomenological research method is a qualitative approach that focuses on exploring and understanding individuals' lived experiences and the meanings they attach to those experiences. It aims to uncover the essence of phenomena as perceived from the participants' perspectives, often through interviews and thematic analysis (Ormrod & Leedy, 2021:31). The study aimed at exploring facilities management managers' experiences of the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. Ormrod and Leedy (2021:32-33) also indicate that phenomenological investigations look for human comprehension of the events. This supports the argument that phenomenology is the perspective that individuals can provide meaning to situations they encounter in daily life, and then form opinions based on that meaning (Creswell & Creswell, 2018:13).

Polit and Beck (2018:465) also advise that the subjective perspectives of those who have encountered a phenomenon are studied using phenomenology.

This research was also well suited for case study method. The research employed the case study method to its adaptability and ability to investigate a current, real-world bounded system by means of comprehensive, in-depth data gathering. It is also common knowledge that case studies focus on the interpersonal relationships and the in-depth contextual examination of a small number of chosen research participants (Rossman & Rallis, 2017:81). Schurink, Schurink and Fouché (2021:303) also state that case studies are used to explain or investigate current events or occurrences. Moreover, there is a convincing argument that a case study is an approach that looks at a current event in the context of real-world events (Schwandt & Gates, 2018:351). Nieuwenhuis (2020:90) further asserts that a case study aims to comprehend phenomena within its working context.

3.7 POPULATION AND SAMPLING

Babbie (2020:66) describes population as the collection of all objects, subjects, or individuals who meet a given set of requirements. Polit and Beck (2017:273) also posit that the collection of components from which a sample is chosen is referred to as the study population. The study population for the study included 22 FMD managers at the CoE Municipality.

Facilities management managers were targeted because of their experience in the maintenance of buildings and facilities in the city. Bairagi and Munot (2019:90) perceive that all the units of analysis about which the researcher hopes to draw particular conclusions about the problems posed by the research objective are collectively referred to as the target population.

3.7.1 Sampling methods

A sample is a subset of measurements taken from the population that is the subject of the investigation (Bhardwaj, 2019:158). Shimelis, Shamuyarira, Mathew and Tsilo (2019:367) also define sampling as a quick method to investigate an entire population. There is an increasing perception that sample is a subset of a larger whole study population, and it is useful to distinguish between probability and non-probability

sampling in this context (Howitt & Cramer, 2016:536). Bryman and Bell (2017:168) further advise that there are two types of sampling namely, probability and non-probability. Strydom (2017:226) also mention that sampling techniques vary but can be broadly classified into two groups: probability sampling and non-probability sampling. Lohr (2021:21-22) states that probability sampling suggests that every component of the population is chosen at random, giving each component a known chance of being chosen. There is support for the view that research findings can be extrapolated to the intended audience by probability sampling (Leavy, 2017: 211). The important point is that the techniques of probability sampling include cluster sampling, systematic sampling, stratified random sampling, and simple random sampling (Bryman & Bell, 2017:172). Non-probability sampling was utilised in the study to choose research participants who could respond to the research questions. A non-probability sampling was employed since this research followed a qualitative inquiry strategy. Rahi (2017:3) indicates that a study using non-probability sampling cannot predict or ensure that every aspect of the population is included in the sample. Research has also discovered that participants in the study are those who can offer the most insightful details regarding the topic being studied (Saunders *et al*., 2020:596). Creswell and Plano Clark (2018:233) further indicate that qualitative researchers typically employ non-probability sampling.

Non-probability sampling techniques come in a variety of forms, including judgement, quota, snowball, accidental, and theoretical sampling (Baloyi & Geyer, 2019:13971). Convenience sampling refers to participants who are chosen because they are easily accessible (Leedy & Ormond, 2019:82). More importantly, this view recognises that the term "snowball sampling" refers to a chain referral technique in which individuals who have previously committed to participating in the "hidden population" are utilised to entice new members to join them (Bairagi & Munot, 2019:98). Kirchherr and Charles (2018:3-4) also advise that referral networks are used in snowball sampling in order to find research participants. The available evidence shows that in quota sampling, the researcher divides the population into several categories and then select a judgement quota from each of the subgroups (Sharma, 2017:751). Alvi (2016:32) further states that quota sampling involves the researcher selecting individuals non-randomly from strata that have been identified up until the predetermined subject count is met.

This study used a judgmental sample technique, sometimes referred to as purposeful sampling (Bryman, 2016:409). The setting for the study was purposefully selected. To acquire the pertinent and knowledgeable individuals to take part in the interview process, judgmental sampling was employed. The key criteria for the selection of those to be interviewed was their position within the FMD at the CoE Municipality. This included their level of involvement with facilities maintenance management to enhance service delivery at the CoE Municipality. Creswell and Plano Clark (2018:233) also indicate that only those research participants who can most effectively contribute to the study's aims through their pertinent expertise and experience are chosen by the researcher. It must be remembered in this context that the researcher first defines the target population before identifying certain people who are subsequently recruited to participate in the study in purposeful sampling (Patten & Newhart, 2018:100-101). Therefore, a purposeful selection of a participant based on their personal attributes is known as purposive sampling (Patten & Newhart, 2018:102).

3.7.2 Sample size

The term "sample size" describes the quantity of items in a certain sample that is part of a study (Al Kindy, Shah & Jusoh, 2016:896). The number of subjects enlisted and willing to participate in the research is known as the sample size (Rahi, Alnaser & Abd Ghani, 2019: 1163). Studies with smaller sample sizes, where the researcher is concentrating on an inductive technique to generate new hypotheses, are better suited for a qualitative approach (Holloway, 2020:364). Nieuwenhuis (2020:84) contends that the sample size in qualitative research is not governed by any rules. Table 3.1 presents target population and sample size used in this research study.

Table 3.1: Target population and sample size

Management Levels	Population	Sample Size
City Manager in the CoE	1	1
Head of Department in RED	1	1
Divisional Heads in RED	4	2
Senior managers in facilities management division	8	4

Management Levels	Population	Sample Size
Managers	8	4
	22	12

Source: Author's interpretation

3.8 DATA COLLECTION METHODS

Empirical evidence shows that there are several ways to gather data, including focus groups, document analysis, observations, and one-on-one interviews (Rahman, 2017:105). A data collection instrument is a practical tool for gathering information, including opinions and facts (Flick, 2017:7). Charmaz (2021:158) also states that the gathering of information about the research raw data is made possible by data collection instrument. The nature of the engagement with the research participants and the information needed determine the data collection instrument (Creswell & Plano Clark, 2018:53). An interview guide (Annexure E), which included information on the subjects to be discussed with the research participants, was utilised to gather data for this study. After receiving informed consent from the participants (Annexure D), a digital voice recorder was used to record the interviews, and field notes were manually recorded. Denzin and Lincoln (2018:37) explain that interviews are used to collect data for qualitative research. As participants stopped providing new information, data collection was discontinued. The saturation point was achieved, indicating that no further information would be provided. Data saturation point is the moment at which no new information is collected, and the sample size is assessed to be appropriate (Saunders *et al*., 2020:590). Braun and Clarke (2021a:203) state that data saturation is the state in which no more information can be obtained from data gathering efforts because themes and categories within the data have become redundant and repetitive.

3.8.1 Source of data

Researchers should be able to identify the sources of data they intend to use since data from study helps solve research problem (Yin, 2018:15). Mukherjee (2020:76) also indicates that researchers need to make sure that data sources and the procedures for gathering data from the sources are clear. Therefore, the sources of the data were primary sources that gave information pertinent to the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. In essence, sources of data may be primary or secondary data. Primary data are first-hand raw data that researchers have gathered specifically for that study (Xian & Meng-Lewis, 2018:103). In contrast, some form of secondary raw data is available, however it was not gathered for the current study (Okeke & Von Wyk, 2016:365).

3.8.2 Interviews

One-on-one, in-depth interviews were crucial for gathering primary data in this research. The researcher used in-depth interviews to gather the participants' view on the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. The interview technique was chosen in order to facilitate the collection of detailed information from research participants. Merriam and Grenier (2019:11) indicate that the purpose of an in-depth interview is to gather "opinions, facts, and stories that shed light on the research questions" from the subject. Creswell and Clark (2018: 262) indicate that through interviews, the researcher can gain further insight into people's experiences from their own perspective and in their own language. The essential point is that interviewing is an adaptable method of gathering data that allows information to be obtained through spoken, non-spoken, vocal, and auditory channels (McGrath, Palmgren & Liljedahl, 2019:1002).

Bairagi and Munot (2019:37) state that unstructured, semi-structured, and structured interviews are the three primary interview styles. Interviews that are structured involve asking the same questions to every participant in the same way and with the same language (Saunders, *et al*., 2020:320). Bairagi and Munot (2019:39) also indicate that the format of the structured interview technique is quite similar to that of a questionnaire and consists of a carefully regulated sequence of questions. It is not

surprising that interview questions in an unstructured format are contingent upon the interviewee's response (Khanal, 2016:102). Saunders, *et al*., (2020:320) further indicate that there are no predetermined questions in unstructured styled interviews. Existing research shows that social interaction between the researcher and participants is essential to unstructured styled interviews (Bairagi & Munot, 2019:40).

In this study, 'one-on-one' denotes the interview format, focusing on direct interaction between the interviewer and interviewee, while 'semi-structured interviews' characterise the interview style, allowing for a flexible yet guided conversation.

Participants in this study were interviewed using a semi-structured style to investigate the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. The interview style was semi-structured, allowing for some flexibility. Saunders, *et al*., (2020:320) state that researcher can reword questions for the research participants by employing semi-structured interviews. DeJonckheere and Vaughn (2019:5-6) also opine that semi-structured styled interviews enable the investigator to pursue particularly intriguing paths that surface. This argument presupposes that the interviewee's responses to semi-structured questions might lead to the discussion of fresh ideas (Finesurrey, 2019:85).

A search of the literature shows that there is less social pressure during telephone interviews than in-person interviews (Maree & Pietersen, 2020:199). Geyer (2021:358) also indicates that interviews over the telephone are often conducted for shorter durations than in-person interviews. The idea is that telephonic interviews provide lower response rates than in-person interviews (Farooq & De Villiers, 2017:293). The 1990s also saw the emergence of electronic mail (e-mail) as a qualitative method of inquiry, making it a relatively new notion in the field of qualitative research (Greeff, 2020:3). Merriam and Tisdell (2015:183) further indicate that the person to whom the questions are addressed might not respond to the interview is one of the drawbacks of using email to collect data. Archibald, Ambagtsheer, Casey and Lawless (2019:2) note that with the growth of the internet as a communication tool through instruments like Zoom and MS Teams, and its increasing use, a new kind of knowledge exchange is currently rapidly broadening the range of resources.

In-depth face-to-face interviews gave the study the chance to concentrate the discussion with participants in order to extract rich data for analysis. The semi-

structured interviews gave the study the chance to investigate the participants attributed to their experiences regarding the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. Farooq and De Villiers (2017:292) remark that during in-person interviews, the participant is asked questions by the researcher or interviewer and their answers are recorded. Geyer (2021:356) note that personal interviews are defined as those that take place face-to-face. The interview approach involves direct face-to-face interaction between the interviewee and the interviewer in order to gather data (McIntosh & Morse, 2015:7).

3.8.3 Construction of research instrument

There is general consensus within the literature that semi-structured interviewing guides are useful for eliciting participants' subjective opinions, which provide new insights into the study questions (Finesurrey, 2019:86). Evans (2018:6) also notes that a less structured interview can be facilitated by using an interview guide, which is essentially a list of subjects to cover in a suggested order. The researcher developed an interview guide using open-ended questions. The research objectives and literature review of the study served as the foundation for the development of the data gathering instrument. The interview guide was developed in a formal business language of English at the CoE Municipality. The first section of the interview guide consisted of general rules, where the purpose of an interview, rules and guidelines were outlined to participants.

The second section of the interview focused on firstly identifying the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. Secondly, it focused on determining the impact of those challenges on the service delivery at the CoE. This section of the research process is among the most crucial ones given that it makes data collecting more effective and efficient. The literature study, which was covered in Chapter 2, served as the basis for the interview guide's questions. Further, in order to prevent biassing the research participants' responses, these questions were formulated in the most objective and judgment-free manner feasible. The interview questions were open ended and broadly stated in order to explore the research phenomenon of the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. The research participants were afforded the option to answer and share their own interpretations

and understandings, experiences, beliefs, and motives, in their own words, through the use of open-ended questions. Nieuwenhuis (2020:108) advises that participants are given more freedom to elaborate and expand upon their answers in open-ended interviews, which is advantageous for qualitative research. Straits and Singleton (2018:255) confirm that the researcher's questions are important because they influence how the research participants interact. A common response is that open-ended questions are the foundation of interviews and provide qualitative information (Creswell & Creswell, 2018:46). The research Supervisor and Research Ethics Committee approved the semi-structured interview guide before the pilot study was carried out. Annexure E illustrates the interview guide.

3.8.4 Pilot study

A pilot study uses a limited sample size to assess the suitability of the questions and the participants' understanding (Silverman, 2016:45). Blaţev, Babarović, and Serracant (2020:18) also indicate that the main purposes of pilot study are to find omissions, redundant, and irrelevant material, as well as to remove any ambiguities or issues in the phrasing. It is certainly the case that a pilot study enables the researcher to make the required adjustments, helps estimate the time and expense associated with the data collection of the research (Polit & Beck, 2018:266). The pilot study of the semi-structured interview guide questions was done on two subjects who were drawn from the targeted population. The first goal of the pilot study was to obtain a sense of the research locations, establish a strong rapport with the research participants, and allow the researcher to become acquainted with the research subjects. The pilot study was also conducted to determine the success of the semi-structured interview guide and to spot any potential problems with the interview guide. The pilot study gave the researcher confidence that participants would be able to relate their experiences of the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. The research questions presented no difficulties for the participants to respond. Therefore, the original interview guide did not require any modifications. The main study's results were not combined with the findings of the pilot study.

3.8.5 Administration of research instrument

The raw data was collected from research participants who manage facilities maintenance management to enhance service delivery at the CoE Municipality. Details of the research participants were obtained from the FMD at the CoE Municipality. After signing a confidentiality agreement (Annexure F), a 3rd party fieldworker personally contacted each research participant who was chosen for qualitative data collection. This is because the principal researcher is FMD manager at the CoE Municipality.

The selection of the fieldworker for this study was guided by several key criteria to ensure ethical integrity, data quality and participant trust. Firstly, the fieldworker was required to have a solid understanding of research ethics, including principles such as confidentiality, informed consent, voluntary participation, and the prevention of harm, as outlined in Chapter 3, section 3.11 *Ethical Considerations*. It was essential that the fieldworker demonstrated professionalism, neutrality and emotional intelligence to create a safe and non-threatening environment where participants could express themselves freely. Familiarity with the public sector, particularly municipal operations and facilities maintenance was another important criterion, as it enabled the fieldworker to accurately interpret participants' responses within context. Strong communication and interpersonal skills were also vital to effectively conduct semi-structured interviews and to probe for deeper insights without leading or influencing the responses. To further protect participant anonymity and avoid any potential conflict of interest, the fieldworker was selected from outside the CoE Municipality's internal staff structure. This helped promote trust, especially among senior officials participating in the study. Finally, the fieldworker received adequate training and a thorough briefing on the research objectives, ethical protocols and interview process to ensure consistency and alignment with the study's overall methodology. These criteria collectively ensured that the fieldworker was well-prepared to conduct high-quality, ethically sound interviews that contributed meaningfully to the validity and reliability of the research findings.

Throughout the research process, the third-party fieldworker maintained continuous communication with all of the chosen research participants by phone or email. Before agreeing to engage in the study, the third-party fieldworker had to fully explain the goal

of the research and the function of the fieldworker in the process. The participants were then asked if they would like to participate in this study, and for those participants who agreed, appointments were set up for the interviews. Evidence that the study has ethical approval from the relevant authorities at the University of South Africa and the CoE Municipality was also provided to potential participants. The third-party fieldworker agreed with the participants about the time allocated for interviews and the venue. Before the actual interviews, appointments were set up and the research participants received an interview guide. The third-party fieldworker called each participant a few days before the interviews to confirm the time and date. Moule, Aveyard and Goodman (2017:197) maintain that researchers can make sense of and understand events by conducting studies in natural settings, which may necessitate the researcher's presence for a specified amount of time. Creswell and Creswell (2018:148) also indicate that establishing communication and maintaining that contact is crucial to ensuring that study participants are not lost.

Participants in the research selected the time for the semi-structured interviews, which did not interfere with their work schedules and were held at participants workplaces. Introductions were given at the beginning of each interview, restating the overall goal of the research as well as the part that the interview would play. The participants were made to feel comfortable and at ease by the warm welcome and greetings, which helped to establish rapport. The third-party fieldworker also explained how ethical considerations would be guaranteed to the research participants. An explanation of the format and order of questions was provided before to the interview. The research participants' informed consent was acquired before to the interviews by giving them a consent form to read and sign. Every participant gave permission for their interviews to be audio recorded and to be interviewed. For the purpose of accurately capturing the opinions of the chosen participants, audio recordings of the interviews were made during the interviews. In this context, the study participants were asked to provide as many insightful comments as they could concerning the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. The third-party fieldworker in this study had intimate interactions with research participants to determine how they experienced the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. Participants were given clear instructions for each question to ensure understanding and for answers to

be coded without any potential of ambiguity. The participants were given the opportunity to respond freely and without being influenced by the third-party fieldworker.

Probing was used to elicit more details about a participant's thoughts or emotions or to investigate a subtopic that kept coming up. The participant's response to a question was further explored through probing, which improved the quality of the data provided. In-depth inquiries prompted participants to share their individual perspectives on the topics at hand, creating a unique speaking event during the study's interview process. During the data collecting procedure, the third party fieldworker employed careful probing since he was studying a phenomenon that was not well understood. Through observations, more qualitative data was gathered. Throughout the interview, field notes were also recorded. The duration of each interview varied, and the additional questions asked by the third-party fieldworker gave each interview its own distinct flavour. An average of sixty minutes was spent on each interview. The duplication of experiences shared by other research participants in interviews indicated that the interviews were conducted until no new topics emerged. This enabled detailed descriptions of the participants' experiences with the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. Twelve research participants participated in semi-structured interviews. After expressing gratitude to the participants once more for their participation, time, and insightful comments, the third party fieldworker ended the interview.

The framework for the interview questions is summarised in Table 3.2. Although the framework informed the design and contents of the interview questions, the responses were not limited thereto, and the participants were encouraged to elaborate on their answers.

Table 3.1: Framework for data gathering

INTERVIEW QUESTIONS	RESEARCH AIM/ OBJECTIVE	RESEARCH QUESTION	SECTION IN LITERATURE REVIEW
1. In your opinion, does the FMD of the RED render effective facilities maintenance service to enhance service delivery in the CoE Municipality? Please motivate your answer.	• To Identify challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. • To determine the impact of challenges facing facilities maintenance management on the service delivery at the CoE Municipality.	• What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality? • What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?	Chapter 2, section 2.4: *Challenges facing facilities maintenance management.* Chapter 2, section 2.5: *Impacts of facilities maintenance challenges on service delivery*
2. What is your perception of the CoE's Facilities Management organisational structure and its key performance indicators regarding its responsibility for facilities maintenance functions?	• To Identify challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality.	• What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?	Chapter 2, section 2.4: *Challenges facing facilities maintenance management.*
3. What is your experience on the effectiveness of facilities maintenance culture and top	• To Identify challenges facing facilities maintenance management to enhance	• What are the challenges facing facilities maintenance management	Chapter 2, section 2.4: *Challenges facing*

INTERVIEW QUESTIONS	RESEARCH AIM/ OBJECTIVE	RESEARCH QUESTION	SECTION IN LITERATURE REVIEW
management support in driving the facilities maintenance strategy in the CoE?	service delivery at the CoE Municipality. • To determine the impact of challenges facing facilities maintenance management on the service delivery at the CoE Municipality.	to enhance service delivery at the CoE Municipality? • What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?	*facilities maintenance management.*
4. What is your view on the general condition of buildings or facilities owned by the city and their compliance with occupational OHS standards?	• To Identify challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality.	• What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?	Chapter 2, section 2.4: *Challenges facing facilities maintenance management.*
5. What complications does facilities maintenance management encounter in improving service delivery at the CoE Municipality?	• To Identify challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. • To determine the impact of challenges facing facilities maintenance management on	• What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality? • What are the effects of challenges facing facilities	Chapter 2, section 2.4: *Challenges facing facilities maintenance management.* Chapter 2, section 2.5: *Impacts of facilities*

INTERVIEW QUESTIONS	RESEARCH AIM/ OBJECTIVE	RESEARCH QUESTION	SECTION IN LITERATURE REVIEW
	the service delivery at the CoE Municipality.	maintenance management on service delivery at the CoE Municipality?	*maintenance challenges on service delivery*
6. What are the effects of complications facing facilities maintenance management on service delivery at the CoE Municipality?	• To determine the impact of challenges facing facilities maintenance management on the service delivery at the CoE Municipality.	• What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?	Chapter 2, section 2.5: *Impacts of facilities maintenance challenges on service delivery*
7. Based on your experience, do you find services provided by internal employees of the CoE to be better or worse than those provided by appointed contractors responsible for facilities maintenance?	• To Identify challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality.	• What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?	Chapter 2, section 2.4: *Challenges facing facilities maintenance management*
8. Does the CoE have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise?	• To Identify challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality.	• What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?	Chapter 2, section 2.4: *Challenges facing facilities maintenance management*

INTERVIEW QUESTIONS	RESEARCH AIM/ OBJECTIVE	RESEARCH QUESTION	SECTION IN LITERATURE REVIEW
	• To determine the impact of challenges facing facilities maintenance management on the service delivery at the CoE Municipality.	• What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?	Chapter 2, section 2.5: *Impacts of facilities maintenance challenges on service delivery*
9. What is your view on the CoE's facilities planned maintenance in line with preventive, condition-based, deferred and preventative maintenance plan?	• To determine the impact of challenges facing facilities maintenance management on the service delivery at the CoE Municipality.	• What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?	Chapter 2, section 2.5: *Impacts of facilities maintenance challenges on service delivery*
10. Based on your understanding, does the CoE's corrective maintenance for facilities align with the unplanned and corrective maintenance plan?	• To Identify challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. • To determine the impact of challenges facing facilities maintenance management on the service delivery at the CoE Municipality.	• What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality? • What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?	Chapter 2, section 2.4: *Challenges facing facilities maintenance management* Chapter 2, section 2.5: *Impacts of facilities maintenance challenges on service delivery*

3.9 DATA ANALYSIS TECHNIQUES

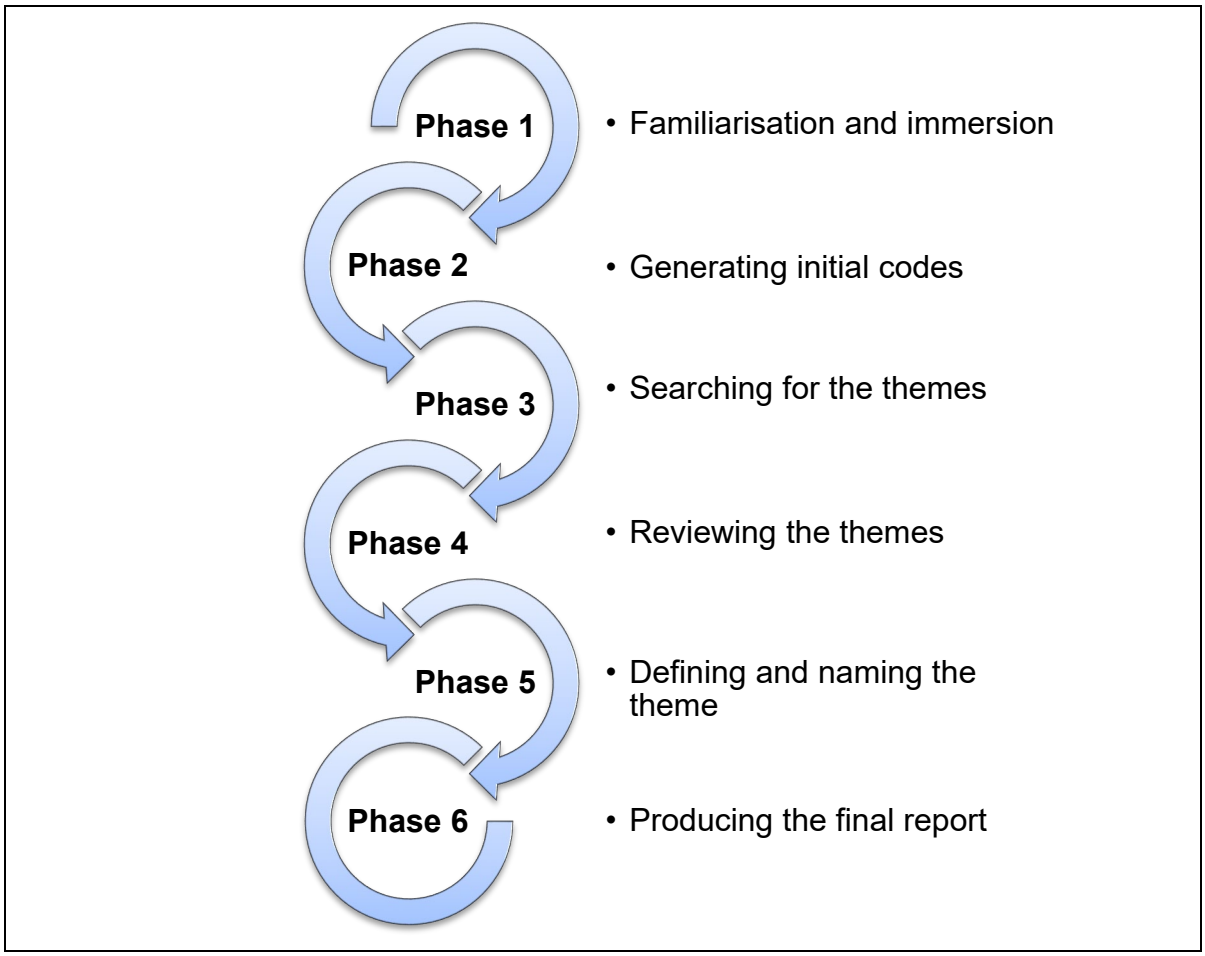
Saunders, *et al*., (2020:564) state that analysing data entails classifying, arranging, modifying, and summarising data to find answers to research questions. The goal of data analysis is to arrange, give the data some structure, and extract meaning from it (Creswell & Poth, 2018:248). The process of analysing qualitative data is regarded as essential to understanding, interpreting, and theorising the information gathered (Neale, 2016:1097). The study used thematic analysis to look for themes or meaningful patterns in the data. The researcher was able to verify responses to questions and uncover the truth about the participants' perceptions through the use of thematic data analysis. Pillay and Manning (2020:2-3) share the view that the goal of thematic analysis is to comprehend the social structure of related group of texts. One of the most popular types of analysis used in qualitative research is thematic analysis (Braun & Clarke, 2021:37).

Thematic content analysis is a qualitative data analysis method used to identify, analyse and interpret patterns or themes within textual data. In the context of this study, it served as a practical tool to organise and make sense of the rich, narrative data collected through in-depth, semi-structured interviews. The process involved carefully reading through the interview transcripts, coding significant statements, and grouping similar codes to form overarching themes related to the challenges facing facilities maintenance management and their impact on service delivery in the CoE Municipality. This method allowed the researcher to move beyond surface-level responses and uncover deeper meanings and shared experiences among participants. Thematic content analysis is particularly well-suited for studies aiming to explore complex social issues, as it enables the researcher to capture both the explicit content and underlying context of participants' views. It also supported the inductive nature of the study, where theories and conclusions emerged from the data itself. Overall, thematic content analysis provided a structured yet flexible framework for interpreting the qualitative data in a meaningful and rigorous way (Braun & Clarke, 2021:37-38).

Addressing the research question by using themes is a useful technique for organising a collection of thoughts (Maguire & Delahunt, 2017:3352). Therefore, phased

procedures for data processing and interpretation were employed in the study, as illustrated in Figure 3.1.

Figure 3.2: Data analysis phases and techniques



Source: Author's interpretation.

3.9.1 Phase 1: Familiarisation and immersion

The researcher also went over the transcripts of the interviews and the field notes that were made during interviews to become acquainted with the text's contents. Tracy (2020:220) states that before beginning the coding process, it is crucial to go through all the data to have a general understanding of the material and to think about its overall meaning. Polit and Beck (2017:748) also note that the researcher read and re-read to become familiar with the data and obtain a sense of the whole. In this study,

the researcher listened to the audio recordings several times to completely comprehend the information.

3.9.2 Phase 2: Generating initial codes

The researcher carefully examined each piece of data manually and colour coded. Linneberg and Korsgaard (2019:263) note that data are categorised through the process of coding to make analysis easier. This perspective implies that different components of the data are identified by codes (Saldaña, 2021:8). Leavy (2017:151) also states that the process of classifying data into distinct sections according to how relevant they are to the themes is called coding.

3.9.3 Phase 3: Searching for the themes

The third stage was completed by looking for the major themes that appeared in the data that was gathered and categorising the information appropriately. The researcher categorised various codes into possible themes and gathered all pertinent coded data extracts within the themes that were identified. The categories were examined and arranged into themes in order to address the study questions. Empirical research has provided evidence that the process of classifying data and finding patterns through inductive reasoning is typically the focus of qualitative data analysis (Braun & Clarke, 2021:39). Saldaña (2021:180) also states that sorting the various codes into prospective themes and gathering all the pertinent coded data extracts within the themes that are found are the steps in the theme search process.

Initially, the following major themes were identified. These themes were lateron refined into more focused themes as listed in below section 3.9.5 *Phase 5: Defining and naming the themes*.

- Effectiveness of Facilities Maintenance Services by FMDin Enhancing Service Delivery
- Facilities Management Organisational Structure and Key Performance Indicators in Facilities Maintenance Responsibilities
- Facilities Maintenance Culture and Top Management Support in Advancing Facilities Maintenance Strategy

- Condition of City-Owned Buildings and Compliance with OHSStandards
- Challenges Faced by Facilities Maintenance Management in Enhancing Service Delivery
- Impact of Facilities Maintenance Management Challenges on Service Delivery
- Comparison of Facilities Maintenance Services by Internal Employees vs. Appointed Contractors
- Adequacy of Capacity, Resources, and Budget in Implementing the CoE's Building Maintenance Plan
- Evaluation of Planned Facilities Maintenance Strategies: Preventive, Condition-Based, and Deferred Maintenance
- Alignment of Corrective Maintenance Practices with Unplanned Maintenance Plans

3.9.4 Phase 4: Reviewing the themes

Making the themes more logical was the primary goal of this analytical phase. The recordings and written transcripts were reviewed in order to conduct the data synthesis and review. Themes that were emerging were identified. The researcher employed inductive reasoning to determine the final themes and sub-themes of this study. Moreover, research has shown that comparing similarities and differences in the conclusions from each individual case is made easier with the help of the cross-case analysis method (Creswell & Creswell, 2018:118). Saldaña (2021:188) also indicate that the result of a code, classification, and analytical reflection is a theme.

3.9.5 Phase 5: Defining and naming the themes

Continuous analysis was conducted throughout this phase in order to improve the details of each theme and the overall narrative that the study conveyed. The research findings have been discussed and interpreted using the main themes that emerged from the codes. The procedure was guided by the data analysis, which was connected to the theoretical framework and the literature study. The key insight from extant research is that finding meaning and comprehension from the data require defining

and naming the themes which involve moving between existing theories and presenting insights of the aspects that may enhance existing theory (Leavy, 2017:152). Nowell, Norris, White and Moules (2017:10-12) also note that the reconstruction step, which entails developing and repackaging the key codes and themes, is the final phase in the interpretive analysis of qualitative data.

As confirmed in Chapter 4, section 4.3. *Interview Responses and Analysis of Data*, the following themes manifest from the data analysis process:

- Effectiveness of Facilities Maintenance Services
- Organisational Structure and KPIs in Maintenance
- Facilities Maintenance Culture and Management Support
- Building Condition and Health and Safety Compliance
- Challenges in Facilities Maintenance Management
- Impact of Maintenance Challenges on Service Delivery
- Internal Employees vs. Contractors in Maintenance Services
- Capacity, Resources, and Budget for Maintenance Plan
- Evaluation of Maintenance Strategies

3.9.6 Step 6: Producing the final report

A report of the analysis was then presented in Chapter 4 *Data Analysis and Findings*, which connected the final analysis to the research question and literature review. The researcher combined the literature and the analysed data to investigate the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. The findings were then enfolded with existing literature in order to draw conclusions and construct theory based on the cross-case conclusions. Creswell (2018:22) also note that the report should not only describe the facts, but also present an argument related to the research question and offer adequate support for each of the themes. Chapter 4, which deals with analysis, elaborate further on the themes.

This demonstrated the coding and theme assigning process as well as transparency in the data analysis. Some scholars have argued that the process of determining and validating research findings by the application and replication of the findings with the same research participants under identical conditions is known as dependability (Schurink *et al*., 2021:394).

Korstjens and Moser (2018:121) also argue that one must consider phenomena such as instability, unforeseen events, or design-induced modifications in order to achieve dependability. This could mean that consistency of the data generated, and explanation of the research procedure are two aspects of dependability (Wood, Sebar & Vecchio, 2020:463).

3.10 TRUSTWORTHINESS OF THE STUDY

In short, the extent to which findings reflect the genuine value of the data gathered, is what is known as trustworthiness (Brigitte, 2019:255). Korstjens and Moser (2018:120) also note that trustworthiness aims to bolster the claim that the investigation's conclusions are worth paying attention to in a qualitative investigation. This genuine and comprehensive study that was the subject of investigating the challenges of facility maintenance management to improve service delivery at the CoE Municipality, was presented using the standards of trustworthiness. The study employed several factors to ensure the quality of the research, including credibility, transferability and confirmability, as described in the following sections.

3.10.1 Credibility

Prolonged involvement of the researcher and the third-party field worker during data collection resulted in a thorough grasp of the participants, guaranteed the study's credibility. In addition, a number of probing questions were utilised to double-check previously provided information by the participants to ensure the credibility of the findings. Credibility was furth increased by providing a comprehensive explanation of the research design (see above section 3.5 *Research design*), sample method (see above section 3.7.1 *Sampling methods*), and context in which the study was carried out (see Chapter 1, section 1.2 *Background information*). Lincoln, Lynham and Guba (2018:140) indicate that credibility is the degree to which the results of qualitative study agree with reality. Truth value and truth in reality are key components of a research

study's credibility (Mohajan, 2017:59). Korstjens and Moser (2018:122-123) further indicate that credibility pertains to the accuracy with which the phenomenon is depicted.

3.10.2 Transferability

A thorough explanation of the study's circumstances was provided to guarantee transferability. The study established transferability by obtaining detailed and comprehensive descriptions of all the contributing components during data collection and by applying purposive sampling techniques. The description of the literature review in Chapter 2, and the research methods (see above section 3.6 R*esearch methods*) used, helped to establish the study's ability to be transferred. All sources are provided (see the *List of References*) to increase the research study's accessibility and worth by enabling readers to apply it in other contexts. Prior research has shown that transferability tackles the issue of representativeness because qualitative research typically uses small sample sizes (Creswell & Creswell, 2018:244). Lemon and Hayes (2020:605) also maintain that transferability is the degree to which the results of a study can be applied in different contexts. Some take the position that the term "transferability" describes how well research findings may be utilised and translated to contexts outside of the studied area (Brigitte, 2019:257).

3.10.3 Confirmability

The research conclusions presented in Chapter 5 *Conclusions and recommendations* are true to the experiences of the research participants and were unaffected by any biases. Every step taken was intended to guarantee that the experiences and preferences of the research participants, not the researcher, would be the basis for the findings. For this reason, the services of a third-party fieldworker were sacred to personally contacted each research participant who was chosen for qualitative data collection. Furthermore, the study employed direct verbatim quotations from the transcripts, which are the participants' spoken words, in order to verify and authenticate the interpretations. The participants were asked to note any instances in which the researcher's observed patterns were suitable and relevant, as well as whether any crucial information had been omitted. Brigitte (2019:255) argues that the confirmability principle requires the researchers to be aware of their own biases.

Haven and van Grootel (2019:231) also explain that confirmability is demonstrated by providing a thorough account of the data gathering and analysis procedures. Scholars have stressed that confirmability is a quality control tool that makes sure the study findings accurately represent the informants' shared knowledge with the researcher (Brink, Van der Walt & Van Rensburg, 2018:110).

3.11 ETHICAL CONSIDERATIONS

This investigation was conducted with adherence to research ethics norms and standards. The research study required to be done in a scientific and ethical manner with an emphasis on the integrity and justifiability of the research practice because it involved human subjects. Strydom and Roestenburg (2021:118) indicate that the trust relationship between study participants and the researcher is referred to as an ethical consideration. O'Leary (2017:70) also states that the goals of a research study are furthered by ethical considerations in terms of knowledge that is authentic and not produced or misrepresented. Moreover, some research has shown that the goal of ethics is to draw lines that separate what is morally acceptable and unacceptable from what should be used to guide behaviour and decision-making in daily life (Ghauri, Grønhaug & Strange, 2020:23). The specific ethical issues described below were considered and complied with.

3.11.1 Permission

The research proposal was reviewed and approved by the Department of Public Administration before being submitted to the University of South Africa's Department of Public Administration and the Research Ethics Committee for academic and ethical approval. The Ethics Clearance Certificate number that was allocated, is **3002** (Annexure A). The Departmental Ethics Screening Committee approved the study, and it was conducted in compliance with the University of South Africa's ethical and professional requirements. Permission to conduct the study in the CoE Municipality was also requested by the researcher to ensure ethical conduct of the study (Annexure B). Gray (2020:84) indicates that formal approval from the relevant authorities is required for all research projects to safeguard the recruited participants. Collyer, Willis and Lewis (2017:97) caution that gatekeepers have the authority to deny access unless they are provided with relevant information. Therefore, as confirmed by Kay

(2019:39), before beginning any research, it was crucial for the investigator to work with the relevant authorities at the CoE Municipality to secure permission to enter the field.

3.11.2 Informed consent

Interview dates were scheduled with research participants after clearances were received. The participants were also shown the letters from the appropriate authorities for the third-party fieldworker to conduct the study after the permissions were given. A Participant Information Sheet (Annexure C) also provided the research participants with further information about the purpose and nature of the study, as well as its potential advantages and value to the field of facilities maintenance management. All participants signed informed consent forms (Annexure D) and received an explanation of the informed consent prior to the official interview. All research participants gave their consent after being informed about the overall purpose of the study, their time and effort commitment, and the protocols that would be followed to maintain their privacy and confidentiality. The third-party fieldworker made sure that the participants were informed about the purpose and specifics of the study project. Sekaran and Bougie (2020:159) elucidate that informed consent refers to providing participants with as much information as possible about the research so they may make an informed decision about whether to participate or not. Patten and Newhart (2018:35) also state that participants in research must be informed about the study and asked to confirm that they are willing to participate. This means that the consensus across almost all disciplines is that human subjects should only be used in research with their permission (Polit & Beck, 2018:542).

3.11.3 Prevention of harm

The third-party fieldworker used in this study ensured that none of the participants were placed in any scenario where their participation could endanger their physical or mental health. This study was classified as a low-risk category with the only foreseeable risk of harm as the potential for minor discomfort or inconvenience. The research did not pose a risk above the everyday norm. There was no expectation of any additional danger of harm or pain. Leedy, Ormrod and Johnson (2019:121) indicate that the guiding principles consist of safeguarding the privacy and informed

permission of the participants, preventing harm to participants, and protecting and securing the created data. Participants should not be subjected to undue physical, emotional, or psychological stress during research (Polit & Beck, 2017:90). Bell, Bryman and Harley (2019:114) underlined the importance of no harm to the participants, researcher, relevant institutions and role-players by stating that researchers make sure that participants are not harmed in order to adhere to accepted study ethics.

3.11.4 Confidentiality and anonymity

The research participants' identities and confidentiality were ensured. The study's data were solely utilised for academic purposes. The data analysis was presented without tying any specific information to any specific person. Ensuring confidentiality and anonymity from this study was crucial. Respect and professionalism were shown to every piece of information that was obtained. The research participants' privacy was protected using pseudonyms. The study protected anonymity by employing codes to obscure the names of the participants. In this study, the participants were referred to as Participant A, Participant B, Participant C, etc. Gray, Grove and Sutherland (2017:688) note that all research participants must have their identities protected in accordance with ethical standards. Lune and Berg (2017:48) also state that before beginning the study, it is crucial to protect the participants' privacy and confidentiality and get their informed consent. Sotuku and Duku (2016:124) further pointed out that the researcher has an obligation to always maintain confidentiality, and confidentiality issues must be addressed. Lune and Berg (2017:49) assert that preserving the participants' identities is crucial.

3.11.5 Voluntary participation

Free will and choice were the basis for participation, and individuals who consented to take part were given Informed consent forms to sign (Annexure C). The participants were not victimised or coerced into taking part. All participants in this research study were given information on the procedures to be followed for gathering data and the goal of the study so they could give their consent to participate. The participants were advised by the third-party fieldworker that even after signing a consent form, they could withdraw from the study at any point, and without providing reasons for doing so. Arifin

(2018:30) states that the right to discontinue participation in the study at any time as well as the option to abstain from participating should be made clear to participants. Patten and Newhart (2018:36-37) also indicate that participants must be able to exercise free will for study participants to behave voluntarily and independently. The participants must have the authority to voluntarily consent to participating or not participating (Polit & Beck, 2018:139). It is very telling that the autonomy of everyone taking part in the research project must be respected by researchers (Halej, 2017:4).

3.11.6 Scientific ethical considerations

Throughout the whole research project, the researcher made a conscious effort to be truthful about the techniques, methods, results, and reporting of the results. Acknowledging all the sources studied for this study helped the researcher avoid being accused of plagiarism. The researcher accurately explained the methodologies and the rationale behind their use in order to describe the legitimacy of the research and wrote and reported the findings. Every effort was made by the researcher to guarantee that the interactions with the participants were open, honest, transparent, and non-intrusive. The third-party fieldworker honoured commitments made to participants and acted with the appropriate sincerity and integrity. Khadilkar (2018:2) notes that data fabrication and falsification are two examples of unethical research practices. Halej (2017:3) also states that data fabrication and falsification can be avoided by making sure research abides by ethical guidelines. Gray, *et al*. (2017:309) further argue that research ethics encompass the researcher's conduct during both the data gathering and report writing phases of the study. Other scholars point out that researchers uphold appropriate research ethics by making sure that analysis and reporting are carried out impartially and truthfully (Polit & Beck, 2018:132). the empirical data (recordings of the interviews) are available on request.

3.12 LIMITATIONS OF THE STUDY

This study has some limitations, just like any other scientific study. Making meaning of vast amounts of data is a challenge in qualitative analysis. The approach of coding, however, is criticised for attempting to reduce detail by turning qualitative information into numeric statistics. Due to the relatively small sample size, a disadvantage of this qualitative research could be that the recommendations may not be generalisable. The

findings of this research are specific to the CoE Municipality and cannot be compared with other municipalities in South Africa. Notwithstanding the restrictions mentioned above, the quality of the data was excellent. The researcher tried to overcome the study constraint by utilising many cases in the current study. Therefore, potential biases and assumptions were avoided during the data analysis process to guarantee the trustworthiness of the study findings. Bryman (2016:398) agrees that because qualitative studies focus on a small number of people in a highly subjective situation, their generalisability is limited.

3.13 CHAPTER SUMMARY

The chapter provided a description of the overall methodology adopted for this research. This research was an interpretive study that focused on the practices of research participants. The research followed qualitative research to investigate the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality. This research employed an inductive approach. Further, an exploratory research design was selected for this investigation. Hence, the phenomenological research method has been incorporated into this study. It was also confirmed in this chapter that this research was also well suited for case study method. The study population for the study included 22 FMD managers within the CoE Municipality. Hence, this study used a judgmental sample technique. The one-on-one, in-depth interviews were crucial for gathering data. The study also used thematic analysis to look for themes. Further, the study employed several factors to ensure the quality of the research, including dependability, credibility, transferability, and confirmability. Therefore, investigation was conducted with adherence to research ethics norms and standards. An analysis and interpretation of the data obtained from the semi-structured interviews are presented in the following chapter.

CHAPTER 4: DATA ANALYSIS AND FINDINGS

4.1 INTRODUCTION

In Chapter 3, a description of the research design and methodology adopted for this research was provided. The research philosophy, research approach and the research design used in the study were presented in detail. This was followed by the population and sampling, data collection method and data analysis techniques. The last sections of chapter three presented ethical considerations and limitations of the study. Chapter 4 focusses on data analysis through the presentation of qualitative empirical evidence derived from in-depth one on one interviews based on the research objectives. The literature is used throughout the discussion to analise data gathered and confirm findings. The qualitative approach is used, and the analysis and interpretation of data is carried out based on the results of the interviews and is a qualitative interpretation. Including a summary of findings in the mini-dissertation is essential as it consolidates the key outcomes of the research in a clear and accessible format. This section allows readers to grasp the main conclusions without revisiting the full analysis, supports the logical progression to recommendations or conclusions, and demonstrates how the research objectives have been addressed.

The following research questions are specifically addressed in this chapter:

- What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?
- What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

Chapter 2 *Literature Review* answered the research question ‘What does the literature say about facilities maintenance management and service delivery within the discipline of Public Administration?’, while the following chapter, Chapter 5 *Conclusions and Recommendations* answers the research question ‘What recommendations can be made to the CoE Municipality to minimise the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?’

4.2 PRESENTATION OF DATA

The study used thematic analysis to look for themes or meaningful patterns in the data collected by means of in-depth one on one interviews. The researcher was able to verify responses to questions and reveal the truth about the participants' perceptions on challenges facing facilities maintenance in the CoE Municipality, using thematic data analysis:

- Effectiveness of facilities maintenance services
- Organisational structure and KPIs in maintenance
- Facilities maintenance culture and management support
- Building condition and OHScompliance
- Challenges in facilities maintenance management
- Impact of maintenance challenges on service delivery
- Internal employees vs. contractors in maintenance services
- Capacity, resources, and budget for maintenance plan
- Evaluation of maintenance strategies
- Alignment of corrective and unplanned maintenance

4.3 INTERVIEW RESPONSES

The interview guide were developed in line with the following research questions:

- What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?
- What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

Including verbatim responses from interviews in the mini-dissertation is important as it provides direct evidence from participants, adds authenticity to the research, and supports the credibility of the findings. These responses offer valuable insight into participants' lived experiences and perspectives, allowing readers to understand the context and depth behind the analysis. Verbatim quotes also help to illustrate themes, clarify interpretations, and demonstrate how conclusions were drawn. The data analysis and summary of findings will follow the presentation of verbatim responses. This structure ensures that the reader first engages with the raw data before exploring the interpretation and synthesis of those insights.

4.3.1 Effectiveness of Facilities Maintenance Services

Question 1 of the interview guide dealt with the participants' opinions about the effectiveness of facilities maintenance services by FMD in enhancing service delivery. The aim of interview **Question 1** was to seek answers to research questions: (1) 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' and (2) 'What are the effects of these challenges on service delivery?'

Question 1	In your opinion, does the FMD of the RED render effective facilities maintenance service to enhance service delivery in the CoE Municipality? Please motivate your answer.

The verbatim answers received from the interviewees on **Question 1** are followed by an analysis thereof and a summary of the main findings:

- Participant 1: "*Yes, FMD is trying its level best to render effective facilities maintenance under different challenging circumstances. The division is underfunded, with old work force that is retiring every month, without any replacements, and most importantly without technical skills transfer, which makes it difficult to render effective services*."
- Participant 2: "*Yes, the FMD of the RED does render effective facilities maintenance service to enhance service delivery in the CoE Municipality. The division has a maintenance plan in place which is intended to respond to*

planned and unplanned maintenance requirements, however the stumbling block is the limited budget."

- Participant 3: "*To a certain extent I would say no, there are too many challenges within the department or division. Firstly, budget allocated for maintenance of facilities is too little to carry the load. Secondly, it's the long chain of internal processes (red tape) that delay implementation of projects and thirdly is the staff shortage*."
- Participant 4: "*No, FMD does not render effective facilities maintenance at the moment because of staff shortage, there is serious shortage of human capacity, and the city is unable to fill vacant positions due to financial constraints. Further, budget allocation for building maintenance is too little to even buy material for internal staff to assist with minor maintenance*."
- Participant 5: "*Yes, given the fact that the budget allocation for rendering of maintenance services across the city is way too little, and the division is lagging behind with skilled workers due to vacant positions*."
- Participant 6: "*No, FMDdoes not render effective maintenance of facilities because of budget constraints, lack of resources and staff shortage*."
- Participant 7: "*Yes, the FMD does render effective facilities maintenance services to enhance service delivery even through they are constrained by the budgetary allocations. They do their best with the little resources they have to ensure that buildings meet the required standard to ensure the safety of employees in the city through effective maintenance and meet the regulatory requirements of the building by the built environment.*"
- Participant 8: "*No, poor maintenance programs, improper maintenance systems, inefficient process flow linked to Supply Chain Management (scm) policy leads to ineffective facilities maintenance in the CoE Municipality. Insufficient budget allocation makes it impossible to render efficient and effective maintenance system. Lack of resources/expertise not available to improve the turnaround times after emergency work is reported by client departments. FMD only executes reactive maintenance, which is costly. Condition assessment reports assist in ensuring that the budget allocation is*

linked to prioritisation model and planned projects schedule, but implementation is a challenge due to budget constraints."

- Participant 9: "*Not too rapidly as possible as it should happen, but they are trying the level best under constrained budget for maintenance and inadequate resources to perform effective maintenance of buildings*."
- Participant 10: "*Facilities Management does not render effective facilities maintenance due to lack of adequate budget. Also, the division does not have proper systems and process from the Council approved policy. Lastly, the Division does not have capacity*."
- Participant 11: "*Not accordingly, FMD does not have proper planned maintenance due to lack of capacity, enough budget and resources. The city cannot buy equipment for internal staff to carry out maintenance work cost effectively*."
- Participant 12: "*No, the city has a huge assets portfolio of physical structures (buildings and other facilities) which are hardly maintained. Most of these assets are in a fast-depreciating state due to lack of effective maintenance. so therefore no, Facilities Management of the RED does not render effective maintenance service to enhance service delivery*."

4.3.2 Organisational Structure and Key Performance Indicators in Maintenance

Question 2 of the interview guide dealt with the participants' opinions about the Facilities Management Organisational Structure and Key Performance Indicators in Facilities Maintenance Responsibilities. The aim of interview **Question 2** was to seek answers to research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?'

Question 2	What is your perception of the CoE's Facilities Management organisational structure and its key performance indicators regarding its responsibility for facilities maintenance functions?

The verbatim answers received from the interviewees on **Question 2** are followed by an analysis thereof and a summary of the main findings:

- Participant 1: "*The organisational structure is in line with the responsibilities, and functions of the divisions. The challenge with the structure, is vacant posts and inability to fill positions, especially technical positions, such as Plumbers, Electrician, Carpenters etc. This results to poor performance and failure to achieve key performance indicators, such as to attend to a blocked toilet within turnaround time of two hours, but with currently available staff, it takes more than two days. The division needs to engage Human Resources department to develop a plan of filling all critical positions, so that it can improve on its key performance indicators*."
- Participant 2: "*I perceive the FMD's organisational structure to be perfectly designed. The division prioritises maintenance of buildings to ensure compliance with its statutory obligations, amongst the division's Key Performance Indicators is to ensure that all municipal buildings are properly maintained to comply with OHS standards. As such the division has a position of Senior Manager: Building Safety and Security (OHS) that is responsible for such a function. This KPI is reported to the Risk Committee and Council every quarter*."
- Participant 3: "*Currently, the structure is weakened by many challenges to drive and achieve the responsibilities of the division such as staff shortage and limited maintenance budget. The key performance indicators of the division are clear. But a lot of vacant positions due to financial constraints contribute to making it difficult for the division to deliver in line with its KPIs. This results to the lack of acknowledgement and a breakdown of facilities maintenance strategy*."
- Participant 4: "*FMD of RED is responsible for the maintenance of CoE's facilities so that their useful lifecycle is improved and enhanced. The approved structure for the division has all required technical positions to achieve this responsibility. However, the challenge is that most of these positions are vacant, and they continuously become vacant, but the city makes no effort to fill them. Facilities Management key performance indicators that include maintenance of council owned facilities are achieve by utilising internal labour*

and external service providers. Planned maintenance, reactive maintenance, unplanned maintenance of all council owned buildings including public toilets, parks, swimming pools, stadia, libraries, clinics, etc. are all major KPIs of Facilities Maintenance division. However, due to unavailability of funds, absence of policy and staff shortage, the division is struggling to achieve them to the on time."

- Participant 5: "*Human capital as it relates to the division ought to be capacitated to enable delivery of services. In essence the structure is good however all vacancies ought to be filled to meet the FM's key performance targets*."
- Participant 6: "*The division is well structured to achieve its main key performance indicator, which is to render effective facilities maintenance activities. However, there a many critical vacant positions that contribute to the division's inability to achieve its KPI mandate within stipulated turnaround times. More so, focus needs to be directed to Total Facilities Management and a comprehensive strategy for the division is required to fill up the gaps.*"
- Participant 7: "*My perception in relation to the organisational structure is that they are understaffed as they are expected to oversee maintenance of all buildings in the whole city and that requires enough capacity through personnel, but they manage to acieve their performance indicators under this difficult and stressful situation. The city has a lot of facilities and others are multi-purpose facilities, mostly situated in towns with multi-floors, and maintenance of escalators and lifts requires a specialised skill. They are functioning optimally though overstretched with high demand of the work.*"
- Participant 8: "*The approved structure is not fully functional due to lack of expertise and funding to fill the vacant positions, and the city is now relying on outsourced services to maintain buildings which is dangerous and technically not working due to lack of Facilities Management software systems that will generate reports when needed, especially condition assessment reports. Each building operates on 0 budget due to insufficient allocated of funds*."
- Participant 9: "*I have moderate perception about the division's organisational structure, it can serve well if all vacant positions can be filled, but the current set up tries to perform as expected. Key performance indicators are clear, but*

there is a backlock in achieving or maintenance of facilities due to limited budget allocation and inadequate resources."

- Participant 10: "M*y perception of Facilities Management organisational structure is that it is well designed to drive and serve its purpose with clearly outlined key performance indicators, including facilities maintenance. however, it takes long time to repair reported defects or damages in facilities because of limited resources and non-payment of contractors. Further, there is staff shortage due to unfilled vacant positions.*"
- Participant 11: "*Some key performance indicators that belong to FMD are still dicentralised to other departments such as Water and Sanitation, Roads and Stormwater, Information and Communication Technology (ICT) department, etc. Furthermore, the division does have enough technical positions in the structure, but most of these positions are vacant, contributing to inefficient and ineffective achievement of its key performance indicators, mainly maintenance of facilities*."
- Participant 12: "*Facilities Management has a fluid structure that is changed from time to time. Key Performance Indicators are in line with what the division is mandated, to render facilities maintenance, however there are many vacant positions that are not filled which makes the division looks lacking required skills and capacity at large*."

4.3.3 Facilities Maintenance Culture and Management Support

Question 3 of the interview guide dealt with the participants' opinions about the facilities maintenance culture and top management support in advancing facilities maintenance strategy. The aim of interview **Question 3** was to seek answers to research questions: (1) 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' and (2) 'What are the effects of these challenges on service delivery?'

Question 3	What is your experience on the effectiveness of facilities maintenance culture and top management support in driving the facilities maintenance strategy in the CoE?

The verbatim answers received from the interviewees on **Question 3** are following by an analysis thereof and a summary of the main findings:

- Participant 1: "*The current financial situation (financial constraints) of the CoE, is making it difficult for the top management to support the maintenance strategy because of other more competing priorities, such as service delivery departments including delivery departments Water and Sanitation, Energy, Waste Management Services, etc. Therefore, in my experience, facilities maintenance culture not effective and the division's facilities management strategy does not enjoy the support of top management as expected.*"
- Participant 2: "*My experience on the effectiveness of facilities mainetenace culture is good and, the maintenance strategy is effective and supported by the Senior Management despite its challenges of limited budget and resources, which they don't have control over*."
- Participant 3: "*Personally, I would say my experience on the effectiveness of facilities maintenance culture is very poor and lacks vision in driving facilities maintenance strategy. Top management does not give any effective support at all*."
- Participant 4: "*My experience on the effectiveness of facilities maintenance culture is not good, due to limited budget allocation and shortage of human capacity with required skills and experience. In my view, no facilities maintenance strategy can be put to good use if it is not funded, so the top management does not support the strategy. Top Management should assist FMD to achieve its objectives through allocation of adequate budget, filling of vacant positions and availing required resources.*"
- Participant 5: "*Good governance is seriously espoused by our top management and support is provided by both political and administrative legs of the city*."

- Participant 6: "*Facilities maintenance culture is not effective in the city due to inadequate resources and capacity. There is no adequate support from the top management in terms of availability of maintenance budget, filling of vacant positions as well as procurement of required material and equipment that should be allocated to internal staff to carry day to day operations and drive facilities maintenance strategy*."
- Participant 7: "*My experience is that facilities management is crucial part of the municipal effective operations and in the city, it is well coordinated to ensure the safety and comfortable work environment for employees, visitors and customers at large and this can be motivated by the fact that the municipality never received litigations from customers and employees who claimed injuries on duty due to the safety of the facilities. The top management of the city has also categorised its facilities for effective maintenance and management for efficiency and effectiveness to support the facilties maintenance strategy. They have the prestige buildings which ensures that certain facilities are of more prioritised and ensures that the turnaround is met.*"
- Participant 8: "*Lack of technology systems and clear goals affect the Facility Management strategy, which cannot be implemented. As a results, facility managers cannot optimise operations and achieve a clear comprehensive facilities management Plan. The division can implement a proper facilities management strategy by improving on Communication, staff management and improved facilities management systems, including current technology. So, in my view, there is less support of facilities maintenance strategy by top management in the CoE*."
- Participant 9: "*The top management is trying its best to support facilities maintenance strategy under the current financial situation of the city. My view is that more effort should be made to recover the financial state of the city, then the rest will be addressed.*"
- Participant 10: "*My experience on the effectiveness of facilities maintenance culture is not good as planned or proactive maintenance is not practiced in the city due to unavailability of budget. Only building repairs is performed at high*

costs. Support from the top management is also not visible, there is no improvement on the budget allocated to facilities maintenance function."

- Participant 11: "*My understanding of building maintenance culture is that there must be means to support the strategy by top management through availing financial and operational resources to enhance effective facilities maintenance activities. Unfortunately, the adverse is experienced in the CoE*."
- Participant 12: "*The Facilities Management strategy is available, but it is unknown to its client departments, it is only known by the Facilities Management officials. Top management is currently failing to support FMD in its mission to render effective facilities maintenance function in a way of adequate budget allocation, filling of vacant positions and provision of resources in general*."

4.3.4 Building Condition and Health and Safety Compliance

Question 4 of the interview guide dealt with the participants' opinions about the condition of city-owned buildings and compliance with OHS standards. The aim of interview **Question 4** was to seek answers to research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?'

Question 4	What is your view on general condition of buildings or facilities owned by the city and their compliance with OHS standards?

The verbatim answers received from the interviewees on **Question 4** are followed by an analysis thereof and a summary of the main findings:

- Participant 1: "*The buildings or facilities are in an acceptable condition, with some facilities that needing more attention, while others are in acceptable conditions and comply with the OHS standards.*"
- Participant 2: "*I have mixed views on this question, some of the buildings were constructed decades ago and they are in a state of disarray due to limited budget which result in non-compliance with Occupational Healths and Safety*

standards. Some of the buildings are in good condition as they were recently constructed, and maintenance work is done constantly to ensure they comply with OHS standards."

- Participant 3: "*My view on the condition of buildings is that they are poor and a lot of them don't comply with OHS standards.*"
- Participant 4: "*The CoE have spent large amounts of money to develop the buildings or facilities it owns but less maintenance has been done to ensure value for money. General condition of buildings and facilities are in a poor state as a results of insufficient allocation of funding. Half of the buildings or facilities are not incompliant with Occupational Health and Healthy standards. The information management system is not used extensively, and the awareness and training of facilities management personnel can greatly benefit the institution.*"
- Participant 5: "*My view on the condition of facilities is they are in a bad state. Most of them need serious attention since general maintenance has not been effective in most of them, owing it to budget constraints.*"
- Participant 6: "*The condition of facilities in the city is in a bad state since FMD is not able to perform planned maintenance. Recommendations made through building condition assessment is not implemented due to lack of funding. Therefore, facilities or buildings owned by the city are not in good condition and most of them are non-compliant with OHS standards.*"
- Participant 7: "*My view is that to the larger extent, facilities and buildings owned by the city are still compliant with OHS standards even though others need touch up to ensure they cope with the current number of employees working in them. The practical example is the building still using water tanks and others which are failing due to plumbing works. Most buildings need to be upgraded to accommodate the population of end users, one can conclude that some of the buildings needs minor upgrade to ensure compliance with OHS standards as things have changed now.*"
- Participant 8: "*In General, the Buildings and Facilities are in a poor condition due to lack of maintenance and insufficient budget allocation to the city's infrastructure, financial implications and challenges over the previous years*

created a lot of maintenance backlog and failure of some of the equipment's which are now posing a serious health hazard. Most facilities do not comply with OHS standards."

- Participant 9: "*The buildings and facilities are stable needing more improvement and maintenance to comply with Occupational Health and Safety standards, including safeguarding end users from being exposed to unnecessary risks.*"
- Participant 10: "*The condition of buildings is bad and their compliance with OHS standards is poor due to the failure of the city to implement planned maintenance programmes proactively*."
- Participant 11: "*The condition of buildings in the city is fair (not good but not very bad). Compliance with OHS is partial, some comply, and some don't comply.*"
- Participant 12: "*Buildings in the city are delipidating and depreciating rapidly. In my view, most buildings are non-compliant with OHS standards.*"

4.3.5 Challenges in Facilities Maintenance Management

Question 5 of the interview guide dealt with the participants' opinions about the challenges faced by facilities maintenance management in enhancing service delivery. The aim of interview **Question 5** was to seek answers to research questions: (1) 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' and (2) 'What are the effects of these challenges on service delivery?'

Question 5	What complications does the facilities maintenance management encounter in improving service delivery at the CoE Municipality?

The verbatim answers received from the interviewees on **Question 5** are followed by an analysis thereof and a summary of the main findings:

- Participant 1: "*Lack of resources (Technical Skills and budget), aged infrastructure that have reached its design life span and required to be replaced.*"
- Participant 2: "*With the limitation on budget, the division does encounter no compliance with OHS, which result into issuing of Contravention Notices by Department of Labour and Internal Audit Department.*"
- Participant 3: "*Lack of staff, budget is too small, long internal processes to appoint and rollout contractors, the city takes too long to pay service providers and lack of planning and priotisation model.*"
- Participant 4: "*Lack of funding complicates facilities maintenance management implementation, resulting to the poor state of facilities. There is a need for transformation strategies on policy reviews, support from top management intervention and development of framework that will assist facilities managers to execute necessary services.*"
- Participant 5: "*Too many expectations from sister departments with no adequate budget allocations.*"
- Participant 6: "*Lack of resources in terms of Technicians and material, positions that become vacant due to retirement and other reasons are not filled because of unavailability of budget. On the other hand, the city is unable to procure equipment and material for available internal staff due to non-availability of budget. Appointed contractors are not providing effective maintenance of building due to late or absolute delayed payment because of financial contains in the city*."
- Participant 7: "*Well, the complications of facilities management are many they range form increased costs on material, little budget allocations, maintenance of old equipment and facilities, lack of skilled staff shortage, leading to outsource and poor turn around by service providers.*"
- Participant 8: "*Facilities Maintenance strategy and process flow to be aligned with prioritisation Model for effective and efficient Facilities Maintenance Plan.*"
- Participant 9: "*Slow pace in responding to repairs and maintenance reported by client departments due to long internal processes, lack of resources, limited*

budget and delay in the payment of contractors which results to failure to meet turnaround time."

- Participant 10: "*Complications experienced by facilities maintenance management include insufficient budget, lack of proper systems and policy, lack of equipment and material for internal staff as well as lack of skilled workers.*"
- Participant 11: "*Budget constraints, capacity and resources.*"
- Participant 12: "*Resource constraints (budget), tendering system (appointment and effectiveness of tenders), shortage of material, internal capacity (shortage of staff and experience)*."

4.3.6 Impact of Maintenance Challenges on Service Delivery

Question 6 of the interview guide dealt with the participants' opinions about the impact of facilities maintenance management challenges on service delivery. The aim of interview **Question 6** was to seek answers to research question: 'What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?'

Question 6	What are the effects of complications facing facilities maintenance management on service delivery at the CoE Municipality?

The verbatim answers received from the interviewees on **Question 6** are followind by an analysis thereof and a summary of the main findings:

- Participant 1: "*The political interference and redtape processes that delay and hamper service delivery*."
- Participant 2: "*The most dominant effect of compliance is the issuing of Contravention Notices by Department of Labour and Internal Audit Department.*"
- Participant 3: "*Slow turnaround time, performance of minor maintenance where major maintenance is required, inability to meet quarterly budget expenditure,*

service providers refuse to continue with work when they are not paid as well as poor expenditure controls."

- Participant 4: "*The effects of complications include but not limited to poor quality maintenance outcome, deterioration of useful lifecycle of buildings. Non-compliance with building regulations and OHS standards, unsafe and hazardous work entrainment for employees and clients. Poor revenue collection and high costs for building repairs and maintenance*."
- Participant 5: "*Limited footprint of building maintenance implementation thereby compromising service delivery*."
- Participant 6: "*Deterioration of buildings and dilapidating of infrastructure due to lack of maintenance makes it difficult for the city to render effective service delivery to its citizens. unsafe work environment for the officials, low staff performance morale and less effective contribution to the value chain of service delivery process*."
- Participant 7: "*Poor turnaround times and poor quality of work*."
- Participant 8: "*Non-compliance with building safety regulations and Occupational Health and Safety standards, deterioration and delipidating of buildings*."
- Participant 9: "Maintenance *backlog, instigate vandalism by the public, poor revenue collection, poor maintenance work, high costs for repairs and collapse of infrastructure*."
- Participant 10: "*Deterioration of buildings, ineffective revenue collection, dilapidated buildings that are not compliant with building regulation requirements, non-compliant with OHS standards as well as non-performance of staff.*"
- Participant 11: "*The condition of buildings deteriorates, conviction notices from the department of Labour, non-compliance with building safety regulations and Occupational Health and Safety*."
- Participant 12: "*The brand image of the city is compromised, staff moral goes down and affecting effective service delivery e.g., Tokoza CCC has a leaking*

roof, when it rains service delivery stops in the facility. Poor customer service leading to protest actions."

4.3.7 Internal Employees vs. Contractors in Maintenance Services

Question 7 of the interview guide dealt with the participants' opinions about the comparison of facilities maintenance services by internal employees vs. appointed contractors. The aim of interview **Question 7** was to seek answers to research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?'

Question 7	Based on your experience, do you find services provided by internal employees of the CoE to be better or worse than those provided by appointed contractors responsible for facilities maintenance?

The verbatim answers received from the interviewees on **Question 7** are followind by an analysis thereof and a summary of the main findings:

- Participant 1: "*The internal employees are better than the appointed contractors (that was before the vacancy rate was at more than 60%). The skilled and qualified Artisans take pride in their job, and they also have institutional memory, which makes it easier for them to provide effective and efficient services compared to contractors, who are focusing on the profit, and render low quality work, with the aim of coming back and maximise on profit*."
- Participant 2: "*The services provided by external service providers is much better because of the resources and equipment they possess. The internal employees eager to perform their duties, but they are limited due to non-availability of equipment and tools of trade caused by limited budget from the Municipality*."
- Participant 3: "*Services provided by internal employees is worse because of material shortage, lack of required skill, poor efficient and effective performance*

to produce quality services, lack of accountability as well as poor turnaround time."

- Participant 4: "*Internal employees can be effective when all tools of trade are provided. Internal employees do not have sufficient tools and equipment availability at their disposal due to lack of funding. Also, unavailability of qualified experts, insufficient expertise and inadequate training or workshop. Appointed contractors can also be effective, however, due to non-payment by the city, they render poor services and they sometimes abundan sites and do not complete work due.*"
- Participant 5: "*External contractors are better than internal employees. Contractors deliver within turnaround time; they have better equipment, and they have a budget to carry out work assigned to them. Finally, they have capacity and the required skills*."
- Participant 6: "*Internal staff would render better services given the availability of material because they can get work done with minimal budget. Therefore, external contractors currently render better maintenance service because they have better resources and material to perform work. However, their effectiveness has later become questionable due to late or non-payment of invoices. That has led to some degree of complacency*."
- Participant 7: "*Services rendered by internal employees is better than appointed contractors whom you can't engage on the quality of work unless they are appointed by you.*"
- Participant 8: "*Insourcing is currently not working due to delays in filling critical vacancies and the only option which is more viable and effective is outsourcing, which provides access to specialised skills and its cost effective. Outsourcing offers a cost saving measure for now, but it requires sufficient budget to improve and change the status quo of our buildings.*"
- Participant 9: "*Services provided by internal employees of the city is better that services provided by external contractors. Services provided by contractors in many cases is not up to standard as they mostly use cheap material*."

- Participant 10: "*Services rendered by contractors is better that services rendered by internal employees because internal staff don't have resources, skills and equipment. Internal staff also lack protective clothing. However, the challenge facing contractors is delayed payment of invoices, which kills their morale to deliver on time*."
- Participant 11: "*Service provided by internal employees are better than those provided by contractors because the city pays a lot of money towards contractors, yet they do not buy genuine and quality material. Contractors appointed to supply material and equipment to be used by internal employees also do not buy genuine and quality products.*"
- Participant 12: "*Internal employees have a lot of experience and expertise needed for quality services. However, building capacity through training is neglected by the city. Contractors provide shoddy work because they often work without supervision. The city gets shoddy work because of poor workmanship of contractors*."

4.3.8 Capacity, Resources and Budget for Maintenance Plan

Question 8 of the interview guide dealt with the participants' opinions about the adequacy of capacity, resources, and budget in implementing the CoE's building maintenance plan. The aim of interview **Question 8** was to seek answers to research questions: (1) 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' and (2) 'What are the effects of these challenges on service delivery?'

Question 8	Does the CoE have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise?

The verbatim answers received from the interviewees on **Question 8** are followind by an analysis thereof and a summary of the main findings:

- Participant 1: "*With more than 60% vacancy rate, the city has no capacity nor resources and budget to implement effective building maintenance.*"
- Participant 2: "*The city does not have adequate capacity, resources and budget which is caused by non-filling of critical vacancies caused by retirement, resignation and death. The limited budget also plays a critical role in this dilemma. Conducting Condition Assessment requires a high level of expertise which the city does not have budget to acquire such expertise.*"
- Participant 3: "*No, the does not have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise*."
- Participant 4: "*CoE has approximately 201 appointed employee, and appointed service provider to further assist in the implementation of maintenance plan and building condition assessment exercise. However, lack of funding complicates facilities maintenance management implementation and poor conditions of state properties. There is a need for transformation strategies on policy reviews, support from top management intervention to assist Facilities Managemet with adequate budget allocation, required resources and capacity to execute necessary services. So no, the CoE have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise.*"
- Participant 5: "*Not at all, budget has been cut for the past few years consecutively. Leading to inability to fill vacant positions and the procurement of required resources to effectively implement building maintenance plan developed through building condition assessment exercise*."
- Participant 6: "*The City does not have adequate capacity, resources and budget to effectively implement building maintenance. There is no adequate capacity as there are many vacant positions that the city is unable to fill due to lack of budget. The little number of internal staff available cannot perform their work due to lack of equipment and materials. Further, external contractors have a reluctancy to perform effectively due to late or non-payment of their invoices. To a larger extent, FMD is unable to implement planned maintenance programme due to unavailability of budget.*"

- Participant 7: "*No, the depreciating state of facilities in the city stems from inadequate capacity, lack of resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise*."
- Participant 8: "*Yes, the city does have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise. The issue is excessive outstanding maintenance work or work back lock*."
- Participant 9: "*I trust the city does CoE have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise. The challenge is that there is a lot of outstanding maintenance work.*"
- Participant 10: "*No, the city does not have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise.*"
- Participant 11: "*No, the city does not have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise.*"
- Participant 12: "*No, the depreciating state of facilities in the city stems from inadequate capacity, lack of resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise*."

4.3.9 Evaluation of Maintenance Strategies

Question 9 of the interview guide dealt with the participants' opinions about the evaluation of planned facilities maintenance strategies: preventive, condition-based, and deferred maintenance. The aim of interview **Question 9** was to seek answers to research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?'

Question 9	What is your view on the CoE's planned facilities maintenance in line with preventive, condition-based, and deferred maintenance?

The verbatim answers received from the interviewees on **Question 9** are following by an analysis thereof and a summary of the main findings:

- Participant 1: "*The city's planned maintenance is non-existent, the budget is only enough to cover the emergency (unplanned) maintenance, and the preventative maintenance plan was last reviewed more than 5 years ago, which is not a true reflection of the current conditions of the facilities*."
- Participant 2: "*The division has a Maintenance Plan in place that seeks to respond to various maintenance issues but due to budget constraints, it is not possible to realise the effectiveness of same*."
- Participant 3: "*Currently there is zero preventative measures or preventative maintenance as there is no planned maintenance in place. Building condition assessments are conducted, and reports are produced but there is less effort towards implementing or performing preventative, condition based or even deferred maintenance since there is no maintenance budget.*"
- Participant 4: "*The CoE does not have planned facilities maintenance in place. The type of maintenance performed in the city does not accommodate preventive, condition-based, or deferred maintenance due to unavailability of budget. The city only attends to building repairs where damages have been reported by end users*."
- Participant 5: "*The integrated maintenance plans are in place, however they ought to be properly financed to be implemented.*"
- Participant 6: "*The city does not have planned maintenance in place. Building condition assessments are conducted, but the development of a planned maintenance programme in line with condition-based, deferred, and preventative maintenance principle can be done when there is funding to implement it. Implementation is the problem due to inadequate budget allocation as well as lack of resources and staff shortage*."

- Participant 7: "*There is currently no planned maintence in place, the city does conduct building condition assessment and produce recommendations or facilities maintenance plan based on the assessment, but the plan is never implemented due to insufficient budget. Preventative and condition-based maintenance are also impossible to carry out since the little budget is used to perform corrective and emergency maintenance. Deferred maintenance is never in line with planned maintenance, since deferred buildings are never scheduled for maintenance, unless there are emergencies*."
- Participant 8: "*All requirements must be outlined in the maintenance plan and scheduled to keep a facility or building in a good condition or acceptable standard. Preventative maintenance can help to keep the building in good condition and improve efficiency in terms of its performance. Allocating resources and implementing prioritisation model to develop performance metrics and schedule maintenance task and plans to improve the condition of the building. Maintenance of buildings is always deferred due to insufficient resources to implement the maintenance plan. Now, there is no planned facilities maintenance in the city. No preventive, condition-based or deferred maintenance is performed due to budget constraints.*"
- Participant 9: "*It is mostly not highly effective as things stands.*"
- Participant 10: "*Reports on condition assessment of buildings are produced by implementation is the challenge. There is no planned maintenance at all (preventative, condition-based or deferred maintenance). The city uses little budget set aside for maintenance to do repairs of existing building defects*."
- Participant 11: "*Planned maintenance based on building condition reports is in place every financial year, however what makes it invisible is the fact that it cannot be implemented. The city does not have budget to perform preventative, condition-based or deferred maintenance.*"
- Participant 12: "*Preventative maintenance is not happening, as buildings have defects, and they are deteriorating rapidly. Condition assessment is conducted in the city's buildings, but implementation of recommendations is not happening, so there is no condition-based maintenance performed. Deferred*

maintenance is basically not in place either, there is no planned maintenance at all."

4.3.10 Alignment of Corrective and Unplanned Maintenance

Question 10 of the interview guide dealt with the participants' opinions about the alignment of corrective maintenance practices with unplanned maintenance plans. The aim of interview **Question 10** was to seek answers to research questions: (1) 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' and (2) 'What are the effects of these challenges on service delivery?'

Question 10	Based on your understanding, does the CoE's corrective maintenance for facilities align with the unplanned and corrective maintenance plan?

The verbatim answers received from the interviewees on **Question 10** are following by an analysis thereof and a summary of the main findings:

- Participant 1: "*The aim was to align the corrective with the unplanned maintenance, but due to financial constraints, the city is dealing with emergency, Occupational Health and Safety maintenance, the corrective maintenance for facilities is not aligned with the unplanned and corrective maintenance*."
- Participant 2: "*As the maintenance plan, the corrective maintenance for facilities does align with unplanned maintenance plan*."
- Participant 3: "*Yes, it does align with unplanned maintenance plan. It only focusses on repairing emergencies and physical defects of buildings*."
- Participant 4: "*The CoE's corrective maintenance for facilities is aligned with unplanned maintenance and key performance indicators of FMD, which is maintenance facilities in the city. The little budget set aside for maintenance is*

directed to emergencies and/or corrective maintenance, therefore corrective maintenance is linked to unplanned maintenance plan."

- Participant 5: "*Partly, in that most unplanned maintenance activities occur unexpectedly therefore erodes the limited resources the division has*."
- Participant 6: "*Yes, the City's corrective maintenance for facilities is in line with unplanned and corrective maintenance principle because facilities are attended to on a reactive basis. Basically, the city waits for damages to happens and reactively repair to correct defects. Most of maintenance work is done to repairs already existing defects to correct the situation. Essentially, the city provides unplanned maintenance of facilities than planned maintenance.*"
- Participant 7: "*Yes, it does align with unplanned maintenance of the city, it also accommodates the unplanned events and fatalities to ensure efficient restoration of service with a view of driving excellence in facilities management*."
- Participant 8: "*No, lack of resources delays the city to implement its strategy and to comply with OHS and this causes a lot of unplanned maintenance due to failure or challenges of implementing the maintenance plan*."
- Participant 9: "*As it stands, I don't think that the CoE's corrective maintenance for facilities align with the unplanned and corrective maintenance plan. Emergency maintenance is implemented to attend to building defects*."
- Participant 10: "*Yes, corrective maintenance does align with unplaned maintenance as it pays attention to building repairs and emergencies on defects that already exist. This because, budget allocated to maintenance is way too little to cover planned maintenance*."
- Participant 11: "*Corrective maintenance of facilities in the city is aligned with unplanned maintenance, but it is not implemented to the tee because of budget constraints*."
- Participant 12: "*Facilities Management strategy provides for corrective maintenance; however, it is not aligned with unplanned maintenance due to resource constraints (budget and material). Internal capacity could assist but*

they also don't have tools of trade to perform corrective maintenance. this is assigned to contractors, who are also faced with the challenge of nonpayment."

4.4 DATA ANALYSIS

The *Data Analysis* section presents a detailed examination of key themes emerging from the study on facilities maintenance. It begins by evaluating the effectiveness of maintenance services and explores the role of organisational structure and performance indicators in supporting maintenance functions. It further analyses the culture of maintenance and the extent of management support, followed by a review of building conditions and compliance with health and safety standards. The section also identifies challenges in maintenance management and assesses how these impact service delivery. Comparisons are made between the use of internal employees versus contractors, while issues around capacity, resources, and budgeting for maintenance are critically reviewed. Lastly, the section evaluates existing maintenance strategies and discusses the alignment between corrective and unplanned maintenance, offering insights into the overall effectiveness and sustainability of current maintenance practices.

4.4.1 Effectiveness of Facilities Maintenance Services

The responses to the interview question '*In your opinion, does the FMD of the RED render effective facilities maintenance service to enhance service delivery in the CoE Municipality? Please motivate your answer.*' reveal mixed perspectives on the effectiveness of the FMD within the RED of the CoE Municipality. Participants number 1, 2, 5 and 7 responded "Yes" and confirmed that the FMD of RED does render effective facilities maintenance to enhance service delivery in the CoE Municipality. However, Participants 1 and 5 indicated that there is a challenge with insufficient budget allocated for maintenance of facilities, but the division tries its best to get buildings maintained. Participant 1 highlighted the division's struggles with an underfunded budget that impacts their ability to maintain service levels. Participants 1 and 5 also cited another challenge of staff shortage with required skills since vacant positions are not filled. The frequent retirement of existing staff without replacement or skills transfer further compounds this issue. On the other hand, Participant 2 stated

that FMD has a maintenance plan in place which is intended to respond to planned and unplanned maintenance requirements, however the stumbling block is the limited budget. Participant 7 commended the division's efforts to maintain facilities under these conditions, ensuring safety and regulatory compliance. Despite limitations, the division strives to meet maintenance requirements. This group of participants acknowledges that the division's efforts are commendable, but significantly limited by external factors, such as budget and staffing deficits, which prevent fully effective service delivery.

Participants 3, 4, 6, 8, 9, 10, 11 and 12 expressed a negative view, stating that the division does not render effective maintenance services. In line with the argument by Andile *et al*. (2018:433) that bureaucratic complexity is often associated with municipal facilities maintenance (see Chapter 2, section 2.4.1 *Facilities maintenance organisational structure*), the participants stated different reasons, ranging from udget onstraints, staff shortage and inadequate resources allocated for facilities maintenance. Participant 6 added that limited resources exacerbate the division's inability to meet maintenance demands effectively. Staff shortages were frequently highlighted, with several participants (3, 4, 6, and 10) describing an inability to fill vacant positions due to financial constraints. Participant 4 noted that the severe human resource shortage leaves the division without sufficient capacity to address maintenance needs adequately. Participant 3 criticised the "long chain of internal processes" or red tape, which they believe delays project implementation. Participant 8 similarly pointed to inefficiencies in process flow, attributing some of these issues to SCM policies.

Participant 8 further cited poor maintenance programmes, improper maintenance systems, inefficient process flow linked to SCM policy, as some of the challenges that lead to ineffective facilities maintenance in the CoE Municipality. Participant 10 added that there are no proper systems and process from the Council approved policy.

Participant 12 added a broader perspective, noting that the city's vast portfolio of assets and physical structures exacerbates the challenges of effective maintenance. This viewpoint underscores the potential mismatch between the city's growing maintenance needs and the division's limited capacity and resources.

The summary of findings orgnanises the interview responses around two research questions: (1) ‘What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?’ and (2) ‘What are the effects of these challenges on service delivery?’

Research Question 1: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

Limited financial resources prevent the FMD from addressing both planned and emergency maintenance needs effectively, acquiring essential materials, and investing in necessary equipment. Budget constraints were cited as a barrier to implementing proactive maintenance plans, resulting in a primarily reactive approach that is more costly and less effective. In addition, the shortage of experienced workers and technical skill transfer challenges further impair the division’s ability to carry out effective maintenance.

Bureaucratic delays and cumbersome internal processes were also highlighted as significant obstacles to effective maintenance. Complex procedures and inefficient workflows, often linked to SCM policies, slow down project implementation and delay maintenance activities, negatively impacting service delivery. Furthermore, limited resources, improper maintenance programmes and inadequate tools further undermine the division’s ability to address facilities upkeep promptly and cost-effectively.

Research Question 2: What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

The effect of insufficient funding, staffing and resources has led to a largely reactive maintenance approach, resulting in higher costs and contributing to the rapid deterioration of assets; poorly maintained infrastructure is in a fast-depreciating state, complicating efforts to provide reliable, long-term service delivery. Participants observed that budget and staffing constraints often delay maintenance response times, while inadequate resources and lengthy internal processes hinder the timely resolution of maintenance issues, affecting the division’s ability to ensure safe, functional facilities for city employees and the public.

Concerns about safety and compliance were also raised, as the division's inability to adequately maintain facilities risks failing to meet regulatory standards, potentially endangering the health and safety of employees and visitors. The current maintenance model lacks preventive measures because budget and resource constraints limit the division's capacity to engage in planned maintenance, reducing overall maintenance effectiveness, accelerating asset depreciation, and impacting the municipality's ability to provide consistent, high-quality service delivery.

4.4.2 Organisational Structure and Key Performance Indicators in Maintenance

As stated in Chapter 2, section 2.4.1 *Facilities maintenance organisational structure*, Wahab and Basari (2015:453) found that the municipal facilities maintenance organisation should clearly define duties and responsibilities when it comes to creating an organisational structure for facility maintenance. The responses to the interview question '*What is your perception of the CoE's Facilities Management organisational structure and its key performance indicators regarding its responsibility for facilities maintenance functions?*' on the perception of the CoE's Facilities Management organisational structure and its key performance indicators (KPIs) reveal several recurring themes related to staffing challenges, vacant positions, budget constraints, and the effectiveness of the organisational structure in supporting the maintenance function. Participants number 1, 2, 3, 4, 5, 6, 7, 8, 10 and 11 all indicated that they perceive an organisational structure to be well designed to drive and achieve the goals of FMD. They further stated that the division's key performance indicators regarding facilities maintenance function are clearly outlined, however the challenges they raised were pertaining staff shortages (infilled vacant positions), limited budget and resources. absence of policy lack of facilities management software or systems that will generate reports when needed, Facilities Management KPIs that are still decentralised to other departments such as Water and Sanitation, Roads and Stormwater, Information and Communication Technology (ICT) department, etc.

Participant 9 expressed mixed feelings about the structure, saying that it can serve well if all vacant positions can be filled, but the current staff is trying to perform as expected. On the other hand, participant number 12 indicated that FMD has a fluid structure that is changed from time to time.

Vacant positions were the most frequently mentioned challenge in nearly every response. The need to fill critical technical positions such as plumbers, electricians, and carpenters was highlighted as a major issue. Participant 1, Participant 4, Participant 6, and Participant 10 emphasised that the vacancy of technical positions significantly hampers the ability of the division to meet its KPIs. The shortage of skilled staff, combined with financial constraints, leads to delays in maintenance tasks and failure to meet performance expectations. Participant 4 and Participant 11 specifically noted that vacant positions, particularly technical roles, are continuously unfilled, which undermines the division's ability to function effectively and impacts its ability to achieve maintenance KPIs. Participant 12 mentioned that the division lacks required skills and capacity due to the vacancy of positions, which contributes to difficulties in delivering on KPIs.

It was confirmed in Chapter 2, section 2.2 *Conceptual framework*, that municipal facilities maintenance is based on the idea that facility maintenance is influenced by organisational, engineering, functional, and economic factors that must be considered during the municipal facilities maintenance decision-making process (Shohet & Nobili, 2017:59). Several participants expressed that the organisational structure is well-designed in theory but not fully functional due to the challenges in staffing and funding. Participant 2, Participant 9 and Participant 10 indicated that the organisational structure is generally fit for purpose and the division’s KPIs are clearly defined, but the absence of a sufficient workforce and resources prevents the structure from operating optimally. Participant 7 acknowledged that the division is understaffed but still manages to achieve its performance indicators despite these challenges, particularly considering the high demand for maintenance across many multi-purpose facilities. Participant 8 added that the structure is not fully functional due to lack of expertise and funding, with the reliance on outsourced services exacerbating the problem. The division's inability to use Facilities Management software for efficient reporting and condition assessments further hampers its effectiveness.

Several participants mentioned that the lack of internal capacity has led to a reliance on outsourced services to maintain facilities, which is problematic. Participant 8 pointed out that the outsourcing of services due to insufficient resources is a technically flawed approach, especially since the division lacks proper systems to track and manage outsourced work effectively. Participant 4 highlighted the challenge of achieving KPIs through outsourced service providers in the absence of a fully functioning internal team, which leads to inefficiencies and the potential for higher costs.

Staffing shortages were consistently linked to delays in maintenance operations and the division's inability to meet its KPIs. Participant 7 acknowledged the understaffed nature of the division, which affects the ability to oversee the maintenance of a large number of facilities, especially with the complexity of multi-purpose buildings requiring specialized skills (e.g., escalators and lifts). Participant 6 also mentioned that staffing gaps hinder the division's capacity to meet turnaround times for maintenance, impacting overall service delivery.

The summary of findings organises the interview responses around research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' The analysis reveals several common themes and challenges faced by the FMD in the CoE:

- Vacant positions and staffing shortages, especially for critical technical roles, are the most significant barriers to achieving the division's KPIs. These vacancies lead to delays in maintenance, poor performance, and difficulties in meeting key targets.
- The organisational structure is generally seen as well-designed, but it is not fully functional due to staffing gaps and lack of resources, which hinder its effectiveness in fulfilling its responsibilities.
- Key Performance Indicators (KPIs) are clearly defined, but the division struggles to meet them due to the combined challenges of vacant positions, budget constraints, and insufficient resources.
- Financial limitations and budget constraints are consistently cited as significant obstacles to achieving KPIs and maintaining the city's facilities effectively.

- The division’s reliance on outsourced services due to internal capacity challenges further exacerbates the situation, as it leads to inefficiencies and potentially higher costs.

The findings highlight the need to address staffing shortages, increase the maintenance budget, reduce reliance on outsourcing, implement a comprehensive strategy, and improve inter-departmental communication for better facilities management.

4.4.3 Facilities Maintenance Culture and Management Support

It was highlighted in Chapter 2, section 2.4.3 *Facilities maintenance planning*, that a municipal facilities maintenance management policy must be created with a long-term maintenance plan in mind. However, municipal facilities maintenance managers face planning challenges on existing facilities to meet municipal facilities purposes (Ogunbayo & Aigbavboa, 2019:8). The responses to the interview question ‘*What is your experience on the effectiveness of facilities maintenance culture and top management support in driving the facilities maintenance strategy in the CoE?*’ on the effectiveness of facilities maintenance culture and top management support in driving the facilities maintenance strategy in the CoE reveal a variety of perspectives. These perspectives highlight the challenges faced by the FMD, particularly in terms of budget constraints, lack of resources, and insufficient support from top management. Participants 1, 3, 4, 6, 8, 10 and 12 indicated that their experience on the effectiveness of facilities maintenance culture is not good, their reasons include staff shortage, limited budget and resources. Participant 1 added that one of the reasons is that there are more competing priorities, such as service delivery departments including delivery departments Water and Sanitation, Energy, Waste Management Services, etc. They all concluded that the top management does not support facilities management strategy in the CoE.

A few participants reported that despite the challenges, there is a commitment to good governance and support from top management. Participant 5 highlighted that top management actively supports the facilities maintenance function through both political and administrative support, underscoring their commitment to governance. Participant 7 praised the coordination and strategic categorisation of the city's facilities, which ensured the safety and comfort of employees and visitors. This

participant also mentioned that top management prioritises certain facilities, which demonstrates their support for the maintenance strategy in certain cases.

Several responses highlighted the issue of insufficient resources and capacity within the FMD. Participant 4, Participant 6, and Participant 8 all pointed to the lack of resources, like budget, skilled staff and equipment as key barriers to effectively implementing the facilities maintenance strategy. Participant 6 specifically mentioned the inability to fill vacant positions due to budget constraints, as well as the lack of materials and equipment for internal staff to perform day-to-day operations.

As confirmed in Chapter 2, section 2.4.1.2 *Technology and computerised systems*, computerised facility management systems and maintenance management systems help maintenance operations for municipal facilities (Wanigarathna, Jones, Bell & Kapogiannis, 2019:417). Some participants highlighted the need for improvements in technology and communication to support the facilities management strategy. Participant 8 emphasised the lack of technology systems and clear goals, which prevent the FMD from optimising operations. Improvements in these areas, along with enhanced communication and staff management, were seen as critical to making the strategy more effective.

Participant 12 further raised a concern that facilities management strategy is unknown to its client departments, it is only known by the Facilities Management officials.

On the other hand, participants 2, 5, 7 and 9 indicated that their experience on the effectiveness of facilities maintenance culture is good the top management supports in driving the facilities maintenance strategy is quite visible. Participant 7 highlighted that the municipality categorises its facilities for effective management, ensuring that prestige buildings receive more attention to meet performance expectations and ensure safety compliance. However, participant 9 suggested that more effort should be made to recover the financial state of the city, then the rest will be addressed.

This summary of findings is organised according to two main research questions: (1) ‘What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?’ and (2) ‘What are the effects of these challenges on service delivery?’

Research Question 1: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

Most participants emphasised that limited budget allocation is a primary challenge hindering effective facilities maintenance management. Financial resources are often diverted to other essential services such as Water and Sanitation, Energy, and Waste Management, leaving insufficient funds for facilities maintenance. The underfunding limits the division's ability to carry out planned maintenance, hire skilled staff, and procure necessary materials and equipment.

Several participants expressed concern about the lack of visible support from top management. While some participants felt that senior management supports the strategy despite financial challenges, others observed limited backing in terms of budget, filling vacancies, and providing resources necessary for efficient operations. Without strong management support, it becomes challenging to implement a cohesive maintenance strategy.

Participants highlighted a shortage of human resources and skilled personnel, which prevents effective maintenance practices. Unfilled positions and limited staff capacity reduce the ability of the FMD to meet its objectives and deliver consistent maintenance services.

Participants noted the absence of advanced facilities management systems and technology as a barrier to optimisation. The lack of a comprehensive facilities management plan and modern systems impedes efficient communication, staff coordination, and data-driven maintenance decisions, which would otherwise enhance maintenance outcomes.

Research Question 2: What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

Due to financial constraints and staffing issues, the division is unable to conduct planned or proactive maintenance. Participants noted that only reactive repairs are performed, often at a higher cost, which contributes to the rapid deterioration of city facilities and increases maintenance costs over time.

Several participants indicated that limited maintenance capabilities affect the safety and functionality of facilities for employees and the public. However, some participants pointed out that despite these challenges, safety standards are maintained to some extent, as the city has not received litigation related to workplace injuries. Nonetheless, the lack of consistent maintenance weakens the municipality's ability to provide a secure and efficient work environment.

In addition, one of the participants noted that the Facilities Management strategy is poorly communicated to client departments, limiting its effectiveness. Without clear awareness of and alignment with the strategy across departments, it is challenging for the FMD to achieve coordinated and consistent maintenance practices across the municipality.

In conclusion, financial constraints, limited management support, inadequate staffing, and outdated systems are the main challenges hindering effective facilities maintenance management in the CoE Municipality. These challenges contribute to reactive maintenance practices, affect safety and efficiency, and reduce overall service delivery quality.

4.4.4 Building Condition and Health and Safety Compliance

It was confirmed in Chapter 1, section 1.3 *Problem statement*, that because of FMD's reactive approach to facilities maintenance, most maintenance problems exacerbate to OHS problems, resulting to inflated costs with legal ramifications (Grobler, 2019:21). The responses to the interview question '*What is your view on general condition of buildings or facilities owned by the city and their compliance with OHS standards?*' regarding the general condition of buildings and their compliance with OHS standards in the CoE Municipality reflect a range of opinions and concerns about the state of the facilities. Participants 3, 4, 5, 6, 8, 10 and 12 responded that the condition of buildings in the CoE is poor and most of the do not comply with OHS standards. Participant 6 mentioned that the city's facilities are in a bad state because planned maintenance was not implemented, and recommendations from building condition assessments were not acted upon due to lack of funding. Participant 12 described the buildings as rapidly deteriorating and largely non-compliant with OHS standards. Participant 8 added that many facilities are health hazards due to lack of maintenance and failure

of equipment, which not only poses a risk to health but also highlights the city's inability to keep up with essential maintenance needs. Participants 4, 5, 6 and 8 stated limited budget allocation for maintenance of facilities, as one of the reasons for the bad condition of buildings. Participant 12 stated that buildings in the city are delipidating and depreciating rapidly.

There was a consensus that a lack of proactive maintenance has contributed to the deterioration of buildings. Participant 10 specifically noted that the city's failure to proactively implement maintenance programs has led to the poor condition of buildings and non-compliance with OHS standards.

Participants 1, 7 and 9 responded that the condition of buildings in the city is acceptable and most of them comply with OHS standards. However, they do state that some of the buildings are bad and need attention, but the majority is in an acceptable state.

Participant 2 expressed mixed feelings on the condition of buildings in the city, citing that some of the buildings were constructed decades ago and they are in a state of disarray due to limited budget which result in non-compliance with Occupational Healths and Safety standards. Some of the buildings are in good condition as they were recently constructed, and maintenance work is done constantly to ensure they comply with OHS standards. Participant 11 responded that the condition of buildings in the city is fair (not good but not very bad).

Their compliance with OHS standards is partial, some comply, and some do not comply.

The summary of findings orgnaises the interview responses around research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' The analysis reveals that:

- Mixed opinions exist regarding the overall condition of buildings, with some being in acceptable condition and others requiring significant attention.
- The condition of many facilities is poor, largely due to insufficient maintenance, aging infrastructure, and the lack of a proper maintenance strategy.

- Budget constraints are a major factor, limiting the city's ability to maintain facilities, implement recommended repairs, and comply with OHS standards.
- There is widespread non-compliance with OHS standards, particularly in older and poorly maintained buildings.
- Proactive maintenance is a significant issue, with many buildings requiring upgrades and ongoing attention to ensure compliance with safety and health regulations.
- Some facilities, particularly newer ones, are in better condition and comply with OHS standards, though they still require some upgrades to meet current demands.

Ekurhuleni should boost facilities maintenance budgets, prioritise health and safety upgrades, develop a proactive strategy, regularly assess facility conditions, and ensure OHS compliance through audits and long-term planning to prevent further deterioration.

4.4.5 Challenges in Facilities Maintenance Management

The responses to the interview question '*What complications does the facilities maintenance management encounter in improving service delivery at the CoE Municipality?*' regarding the complications faced by facilities maintenance management in improving service delivery at the CoE Municipality highlight a range of systemic, resource-related, and procedural challenges. All 12 participants responded by stating different complications that facilities maintenance management encounter in improving service delivery at the CoE Municipality. Budget constraints were consistently identified as a primary issue:

It was concluded in Chapter 2, section 2.4.3 *Facilities maintenance planning*, that better municipal facilities maintenance management is achieved by establishing a separate budget for maintenance (Kayode & Tunrayo, 2022:8-9). Participants 1, 4, 6, 7, 9, 10, and 11 emphasised that limited budgets severely affect the ability to maintain infrastructure, procure necessary materials, and hire or retain skilled staff. This has

led to issues with filling vacant positions due to financial limitations, for example Participant 6 and Participant 12, which impacts the overall capacity of the FMD.

Participant 5 also noted that there are too many expectations from other departments, but the lack of an adequate budget allocation prevents facilities management from meeting these demands, which contributes to service delays.

Participant 2 indicated that with the limitated budget allocation for facilities maintenance, most buildings do not comply with Occupational Health and Safety, resulting to the issuing of Contravention Notices by Department of Labour, closing of buildings and Internal Audit findings.

The shortage of qualified technical staff, including technicians and skilled workers, is another major complication. Participants 1, 6, 7, 10 and 12 highlighted that a lack of skilled staff, due to vacancies or insufficient training, hampers the ability to execute maintenance tasks effectively. The absence of qualified personnel increases dependency on external contractors and makes it difficult for internal staff to provide efficient services.

Aged infrastructure and the maintenance backlog are also significant challenges in facilities management. Participant 1 pointed to the aging infrastructure that has reached or exceeded its design life, which needs replacement. The ongoing deterioration of these assets increases the cost and complexity of maintenance. Participants 3, 9 and 12 also referenced delays in addressing maintenance needs, which create a backlog, further escalating repair costs and complicating service delivery. Participant 9 emphasised that slow response times to repairs due to long internal processes contribute to this issue.

The tendering system itself was criticised by Participant 12, who mentioned that it is not always effective in ensuring the right contractors are appointed, which can affect the quality of work performed.

Participant 8 stated that facilities maintenance strategy and process flow need to be aligned with a prioritisation model for effective and efficient facilities maintenance plan. A robust framework or prioritisation strategy could help address the most urgent issues first, optimising limited resources. Participant 10 added lack of proper systems and

policy as part of complications encountered by facilities maintenance management in improving service delivery at the CoE Municipality.

Several responses indicated that external contractors often fail to deliver adequate service due to payment delays and contract management issues. Participants 6, 9 and 12 pointed out that external contractors are sometimes reluctant to perform due to late or non-payment, which affects their turnaround times and the quality of their work. Participant 7 noted that poor performance from contractors, combined with the need to outsource due to internal staff shortages, exacerbates the situation.

Research Question 2: What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

Due to the persistent resource constraints, facilities are inadequately maintained, contributing to their deterioration. A participant noted that the state of facilities reflects the lack of funding and support, limiting the municipality's ability to deliver quality, reliable service.

The challenges faced in facilities maintenance affect compliance with OHS(OHS) standards. One of the participants specifically mentioned contravention notices issued by the Department of Labour and Internal Audit Department, indicating safety risks due to inadequate maintenance.

The lack of resources, skilled staff, and long internal processes result in delayed response times to maintenance requests. This slow response affects service delivery, creating inefficiencies and reducing overall satisfaction among client departments and the public.

Given the staffing and resource limitations, the division has been outsourcing maintenance to contractors. However, several participants noted that delayed contractor payments and the absence of skilled workers among contractors lead to inconsistent maintenance quality and slow turnaround times, undermining the effectiveness of outsourced maintenance.

The summary of findings addresses the two research questions on challenges and effects related to facilities maintenance management at the CoE Municipality.

Research Question 1: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

Budget limitations were widely noted as a critical challenge affecting facilities maintenance. Multiple participants highlighted that insufficient funding hinders the ability to effectively manage and maintain facilities, impacting everything from procurement of materials to contractor payments.

Many participants cited a shortage of skilled staff as well as an inability to fill vacant positions due to financial constraints. The scarcity of technicians and experienced personnel reduces the division's internal maintenance capacity, necessitating reliance on external contractors, which brings further complications.

The challenges associated with maintaining aged infrastructure were also noted. The existing infrastructure has surpassed its intended lifespan, requiring extensive repairs or replacements, which the current budget cannot accommodate.

Participants observed that long internal processes for contractor appointments and delayed payments to service providers cause slow response times for repairs and maintenance. These delays disrupt the efficient execution of maintenance projects and reduce contractor effectiveness.

Participants expressed a need for improved policy frameworks, transformation strategies, and alignment of maintenance processes with prioritisation models. These changes could streamline the Facilities Maintenance Plan and support better resource allocation.

4.4.6 Impact of Maintenance Challenges on Service Delivery

The responses on the interview questions '*What are the effects of complications facing facilities maintenance management on service delivery at the CoE Municipality?*' on the effects of complications in facilities maintenance management on service delivery in the CoE reveal a variety of critical challenges that impact service quality, safety, and

the overall functionality of municipal buildings. All 12 participants responded differently on the effects of complications encountered by facilities maintenance management on service delivery at the CoE Municipality. Participants 4, 6, 8, 9, 10 and 11 stated among other effects, the deterioration of facilities and infrastructure because of poor maintenance.

Participant 1 stated the effect of political interference and the red tape that delays and hampers service delivery. Participant 2 and 11 stated that the most dominant effect of compliance is the issuing of Contravention Notices by Department of Labour and Internal Audit Department.

Respondent 3 mentioned poor turnaround time, performance of minor maintenance where major maintenance is required, inability to meet quarterly budget expenditure, resistance by service providers to continue with work when they are not paid as well as poor expenditure controls. Inconsistent quality in maintenance work and backlogs contribute to a cycle of reactive maintenance, which is both costlier and less effective over time. Participant 4 and 9 included poor revenue collection among other. Participant 6 stated among other thing, unsafe work environment for the officials, low staff performance morale and less effective contribution to the value chain of service delivery process.

Several participants emphasised the direct impact of facilities issues on service delivery. For example, Participant 5 mentioned that a limited scope for building maintenance implementation compromises the municipality's capacity to meet service demands across its area of responsibility. Participant 9 included maintenance backlog, instigation of vandalism by the public, poor revenue collection, poor maintenance work, high costs for repairs and collapse of infrastructure as part of effects.

As highlighted in Chapter 2, section 2.5.2.2 *Facilities emergency maintenance*, neglecting facilities maintenance results in a disrepair of buildings, non-compliance with OHS standards as well as massive financial costs to restore buildings functional state (Akib *et al*., 2022:74). In line with this argument, Participants 2, 4, 8, 10, and 11 mentioned that non-compliance often results in Contravention Notices issued by the Department of Labour and audits from the Internal Audit Department. Such legal actions may not only strain the city's resources but also risk closures, potential legal liabilities and public safety hazards. Non-compliance can erode public trust and harm

the city's reputation, especially if issues are publicised due to incidents or accidents in unsafe facilities (Participants 4, 8 and 10).

Employee morale and the city's reputation suffer because of poor facilities maintenance: Participants 6 and 12 highlighted that inadequate facilities maintenance lowers staff morale and affects employee performance, as unsafe or unpleasant working conditions make it challenging for staff to fulfill their duties effectively. Participant 12 also pointed out that compromised building conditions negatively impact the city's brand image, which can lead to community dissatisfaction and even protest actions when services are disrupted. In addition, poor customer service and increased community frustration were noted as consequences of failing facilities. Participant 12 cited the example of service delivery interruptions causing public frustration, which can lead to protests, particularly if issues are recurrent and disrupt access to critical services.

The summary of findings organises the interview responses around research question: 'What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?' The complications facing facilities maintenance in the CoE are multi-dimensional, with cascading impacts on service delivery, legal compliance, financial management, and employee and public morale. These findings highlight that maintenance challenges result in:

- Increased safety and legal risks due to non-compliance with building and OHS standards.
- Physical deterioration of infrastructure, leading to higher repair costs and limited functional spaces.
- Service delivery interruptions and diminished public satisfaction due to unsafe or poorly maintained facilities.
- Financial strain due to high repair costs and missed revenue opportunities.
- Reduced staff morale and organisational reputation, potentially leading to a less motivated workforce and public protests.

Ekurhuleni should streamline maintenance processes, secure sufficient funding, and implement preventive strategies. A comprehensive maintenance plan prioritising compliance, safety, and service delivery could enhance efficiency and boost public confidence in municipal services.

4.4.7 Internal Employees vs. Contractors in Maintenance Services

As mentioned in Chapter 2, section 2.4.1.1 *Facilities maintenance contractors*, contractors are appointed to perform facilities maintenance for municipalities to guarantee that the facilities meet user needs (Ampofo, *et al*., 2020:115). The responses to the interview question '*Based on your experience, do you find services provided by internal employees of the CoE to be better or worse than those provided by appointed contractors responsible for facilities maintenance?*' regarding the comparison between internal employees and external contractors for facilities maintenance in the CoE provide a range of perspectives, revealing strengths and weaknesses in both approaches. Participants 1, 7, 9, 11 and 12 responded that services provided by internal employees is better than services provided by appointed contractors. However, they commonly state that the challenge with internal employees is limited budget, lack of resources (material and working tools) as well as skilled workers due to vacant positions that are not filled. Participant 1 further stated that skilled and qualified Artisans take pride in performing their jobs and they also have institutional memory, which makes it easier for them to provide effective and efficient services compared to contractors, who are focusing on the profit, and render low quality work with the aim of coming back and maximise on profit. Participant 9 and 11 also stated that appointed contractors have a tendency of buying low quality material, yet the city pays them a lot of money. Participant 12 also added that contractors provide shoddy work because they often work without supervision.

On the other hand, participants 2, 3, 5, 6, 8 and 10 all answered that services provided by appointed contractors are better that those provided by internal employees because contractors have budget, resources, material and skilled workers. However, they also stated that the challenge faced by appointed contractors is non-payment of invoices by the city. Despite the high-quality potential, participants identified severe resource constraints affecting internal employees. Participants 2, 3, and 4 cited issues like limited tools, insufficient budget, and staff shortages that restrict internal staff's

effectiveness. Participant 10 added that internal employees even lack essential protective clothing, which further hampers their ability to perform effectively. Participant 3 stated that services provided by internal employees is worse because of material shortage, lack of required skills, inefficient and ineffective performance to produce quality services, lack of accountability as well as poor turnaround time.

Participant 4 expressed mixed feelings and stated that Internal employees do not have sufficient tools and equipment at their disposal due to lack of funding. Also, unavailability of qualified experts, insufficient expertise and inadequate training or workshop. Appointed contractors would be effective, however, due to non-payment by the city, they render poor services and they sometimes abundan sites and do not complete work due.

The summary of findings organises the interview responses around research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' The responses reveal a complex landscape of strengths and challenges for both internal employees and contractors in the CoE's facilities maintenance. Internal Employees: While internal employees are appreciated for their skill, commitment, and institutional knowledge, they face significant limitations due to budget constraints, resource shortages, and high vacancy rates. With adequate resources and funding, they could potentially offer superior, more consistent service.

Contractors: Contractors generally have better access to resources, which can translate to faster and more efficient service delivery. However, concerns about profit-driven motives, substandard material use, and lack of accountability highlight potential risks to service quality. Payment delays also impact their performance and reliability.

In summary, a mixed approach with enhanced oversight, adequate resourcing for internal teams, and a structured payment system for contractors may improve the facilities maintenance services in Ekurhuleni. Resource allocation and budget restructuring appear crucial for achieving a sustainable and effective balance between insourced and outsourced maintenance efforts.

4.4.8 Capacity, Resources and Budget for Maintenance Plan

As mentioned in Chapter 2, section 2.4.1 *Facilities maintenance organisational structure*, the responsibility to care for municipal facilities maintenance results in the establishment of structures to provide sufficient resources to meet the level of care (Ampofo, *et al*., 2020:111). The responses to the question '*Does the CoE have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise?*' on the CoE's capacity, resources, and budget for implementing its building maintenance plan reveal strong consensus on inadequate support for facilities maintenance. Participants 1, 2, 3, 4, 5, 6, 7, 10, 11, 12 all responded that the CoE does not have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise. Participants 1, 2, 5, and 6 emphasised the city's inability to fill critical vacancies, citing retirement, resignation, and budget limitations as contributing factors. Participant 1 highlighted a 60% vacancy rate, indicating severe capacity constraints. Participant 4 noted that the city employs about 201 individuals and relies on external service providers to assist with building maintenance. However, Participant 6 added that the current staff cannot fully perform their duties due to insufficient equipment and materials. Additionally, delayed payments to contractors contribute to inefficiencies in outsourced maintenance work. Participants 2 and 5 indicated that the budget has faced repeated cuts in recent years, which prevents the city from procuring necessary resources or hiring additional staff. Participant 5 mentioned that these financial constraints lead to an inability to fill vacant positions and acquire essential maintenance tools. Participants 4 and 6 highlighted the dependency on budget for maintenance implementation. Participant 4 suggested that top management support, policy transformation, and budget allocation improvements could help address current challenges. Without such interventions, maintenance remains limited to emergency repairs rather than preventive, condition-based maintenance. participants 7 and 12 observed that facilities in the CoE are visibly deteriorating due to the lack of a consistent, well-funded maintenance programme. They pointed out that without sufficient budget or resources, the city struggles to keep up with its building condition assessments, which only results in further degradation of properties. Participants 3, 6, 10, 11, and 12 reiterated the city's inability to implement

planned maintenance, with several noting that, as it stands, the FMD primarily reacts to emergencies rather than conducting proactive maintenance.

Two participants presented a differing view, stating that the city has the necessary capacity, resources, and budget but faces challenges in handling outstanding maintenance work. Participants 8 and 9 stated that the CoE does have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise, the only issue is outstanding maintenance work or work backlog.

The following summary of findings addresses the two research questions by synthesizing interview responses related to the challenges faced by facilities maintenance management at the CoE Municipality and the resulting effects on service delivery.

Research Question 1: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

Most participants identified budget constraints as a major barrier to implementing effective building maintenance. Many pointed out that ongoing budget cuts over recent years have limited the division's ability to purchase necessary equipment, materials, and resources and to fill critical vacant positions, resulting in restricted maintenance capabilities.

The vacancy rate, estimated at over 60%, poses a substantial challenge to the municipality’s capacity to conduct effective maintenance. Participants noted that many positions remain unfilled due to budget limitations, leaving insufficient internal staff to manage maintenance needs effectively.

Several participants emphasised the lack of essential resources and equipment needed to support maintenance tasks. Without access to adequate materials and tools, the internal staff is unable to carry out necessary repairs and maintenance effectively, creating further operational obstacles.

Some participants mentioned issues with contractors, specifically pointing to delayed or non-payment of invoices as a cause of reluctance among

contractors to perform their duties effectively. This problem undermines the reliability of outsourcing and creates further delays in maintenance.

Though a minority view, some participants believed the city has adequate capacity, resources, and budget but suffers from excessive backlogs of outstanding maintenance work. They suggested that the existing backlog rather than a lack of resources is the core challenge, impeding progress in meeting current maintenance needs.

Research Question 2: What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

Participants highlighted that insufficient capacity, resources, and budget result in delayed maintenance, causing the facilities to deteriorate further. This ongoing depreciation worsens facility conditions, ultimately diminishing the municipality's ability to provide safe, functional environments for employees and the public.

Most participants agreed that the municipality is unable to effectively implement its building maintenance plan, which was developed based on condition assessment exercises. Due to budget constraints, limited staffing, and insufficient resources, the maintenance division is hindered from addressing key repairs and preventive measures.

Participants observed that these challenges negatively impact service quality. The inadequate maintenance of buildings affects the municipality’s ability to deliver consistent, high-quality services, and raises concerns about safety and compliance. The lack of upkeep in municipal facilities could lead to potential safety hazards for staff and the public.

4.4.9 Evaluation of Maintenance Strategies

It was mentioned in Chapter 2, section 2.5 *Impacts of facilities maintenance challenges on service delivery*, that a proper facilities maintenance plan should be implemented to stop the deterioration of buildings and reinstate their original condition,

to enhance the safety of occupants (Besiktepe, *et al*., 2021:6). It was added that effective maintenance management of municipal facilities is essential for mitigating the effects of building defects (Khalid, *et al*., 2019:1). Unfortunately, the responses to the question '*What is your view on the CoE's planned facilities maintenance in line with preventive, condition-based, and deferred maintenance?*' on the CoE's approach to planned facilities maintenance highlight a consensus on the lack of effective implementation due to budget constraints, resource shortages, and deferred maintenance challenges. Participants 1, 3, 4, 6, 7, 8, 9, 10 and 12 responded that there is no planned maintenance in place in the CoE due to budget constraints and unavailability of resource. Participant 1 stated that the city's planned maintenance is non-existent, the budget is only enough to cover the emergency (unplanned) maintenance, and the preventative maintenance plan was last reviewed more than 5 years ago, which is not a true reflection of the current conditions of the facilities.

Participant 3 indicated that currently there is zero preventative measures or preventative maintenance as there is no planned maintenance in place. Building condition assessments are conducted, and reports are produced but there is less effort towards implementing or performing preventative, condition based or even deferred maintenance since there is no maintenance budget. Participant 8 added that maintenance of buildings is always deferred due to insufficient resources to implement the maintenance plan. Now, there is no planned facilities maintenance in the city. No preventive, condition-based or deferred maintenance is performed due to budget constraints. Participant 8 recommended adopting a prioritisation model to allocate resources, schedule maintenance tasks, and improve facilities management. Participant 8 further noted that deferred maintenance could be made more effective through performance metrics, although this remains unfeasible under current budget constraints. Participant 10 also added that the city uses little budget set aside for maintenance to do repairs of existing building defects.

Participant 2 stated that the city has a maintenance plan in place that seeks to respond to various maintenance issues but due to budget constraints, it is not possible to realise the effectiveness of same. Participant 5 further registered the view that integrated maintenance plans are in place, however they ought to be properly financed to be implemented. Participant 11 also added that planned maintenance based on building condition reports is in place every financial year, however what makes it

invisible is the fact that it cannot be implemented. The city does not have budget to perform preventative, condition-based or deferred maintenance.

It was confirmed in Chapter 2, section 2.4.2 *Facilities maintenance inspection*, that inspection is a part of municipal facilities maintenance (Au-Yong, 2019:3). Unfortunately, several participants pointed out that while the city conducts building condition assessments and produces maintenance plans, these assessments are rarely acted upon. According to Participants 7 and 8, deferred maintenance is essentially abandoned, with deferred facilities rarely prioritised for repairs unless urgent needs arise. This lack of prioritisation further contributes to building deterioration.

Some participants offered less definitive responses. For example, Participant 9 described the maintenance plans as "*mostly not highly effective*," indicating some acknowledgment of effort, though without confidence in the results due to the prevailing limitations in resources.

The summary of findings is focused on partially answering the research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' Overall, the responses reveal a clear consensus on the lack of effective planned maintenance in the CoE. The city performs limited, reactive maintenance due to significant budget and resource constraints, resulting in deferred, preventive, and condition-based maintenance being largely unaddressed. Although condition assessments are conducted, they lack implementation, leading to deteriorating facilities. Participants suggest that adopting a prioritisation model, securing adequate financial backing, and implementing preventive maintenance could significantly improve the city's facilities management, although these improvements are contingent upon overcoming financial and resource limitations.

4.4.10 Alignment of Corrective and Unplanned Maintenance

The responses to the interview question ''*Based on your understanding, does the CoE's corrective maintenance for facilities align with the unplanned and corrective maintenance plan?*' reveal mixed perspectives. Participants 1, 5, 8, 9, and 12 expressed concerns about the lack of alignment between corrective and unplanned

maintenance due to resource and budgetary challenges. Participant 1 mentioned that financial constraints hinder the alignment of corrective maintenance with unplanned maintenance, as the city is primarily addressing emergency maintenance and OHS needs, rather than the planned corrective measures. Participant 5 noted that while corrective maintenance partly aligns with unplanned maintenance, the unexpected nature of many unplanned maintenance activities places additional strain on already limited resources, undermining the effectiveness of the maintenance plan. Participant 8 emphasised that a lack of resources delays the city's ability to implement its maintenance strategy and comply with safety standards, leading to an increase in unplanned maintenance activities. Participant 9 expressed that emergency maintenance and repairs of defects are implemented without clear alignment with a structured maintenance plan, which indicates a reactive, rather than proactive, approach to corrective maintenance. Participant 12 further expanded on resource constraints, noting that while the facilities management strategy calls for corrective maintenance, it is not aligned with unplanned maintenance due to a lack of internal resources, such as budget, tools and capacity. The reliance on contractors, who also face challenges like nonpayment, further complicates the alignment.

Participants 2, 3, 4, 6, 7, 10, and 11 expressed that there is an alignment between corrective maintenance and unplanned maintenance, though some noted exceptions or nuances. Participants 2, 3, and 4 agreed that the corrective maintenance aligns with unplanned maintenance, with Participant 4 further explaining that the limited budget for maintenance forces the city to direct resources towards emergencies and corrective repairs, which fits the unplanned maintenance model. Participants 6 and 7 also confirmed alignment, emphasising the reactive nature of the city’s maintenance approach. Participant 6 noted that the city waits for defects to occur and addresses them reactively, making the system inherently aligned with unplanned maintenance needs. Participant 7 highlighted that unplanned events, including emergencies, are addressed quickly to restore services and maintain efficiency. Participant 10 noted that corrective maintenance aligns with unplanned maintenance due to the limited budget, which forces the city to focus on addressing existing defects rather than planned maintenance activities. Participant 11 also agreed with the alignment, but pointed out that while it aligns, the plan is not fully implemented due to financial constraints.

The responses reflect a divided view on the alignment between the CoE's corrective maintenance and its unplanned maintenance plan. A significant number of participants acknowledged that the maintenance approach is reactive and aligned with unplanned maintenance due to the prioritisation of emergencies and limited resources. However, several participants highlighted those financial constraints, resource shortages, and implementation delays hinder the full effectiveness of this alignment. Budget limitations and the city's reliance on external contractors were identified as key factors that prevent a comprehensive and efficient alignment with the maintenance plans.

The responses from participants reveal key insights into the challenges facing facilities maintenance management at the CoE Municipality and the impact of these challenges on service delivery.

Research Question 1: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

The predominant challenge identified by participants is insufficient budget, which limits the municipality's ability to conduct both planned and corrective maintenance. This lack of resources forces the FMD to prioritise emergency repairs over preventive or planned maintenance, resulting in a reactive approach rather than a proactive one.

Participants had mixed opinions on whether corrective maintenance aligns with unplanned maintenance. While some stated that the corrective maintenance approach aligns with unplanned maintenance by addressing emergencies and defects, others noted that budget constraints prevent full alignment with planned maintenance. The focus remains primarily on responding to emergencies, compromising the ability to perform scheduled preventive maintenance.

Several participants mentioned a lack of internal resources, including skilled personnel and materials, as a barrier to effective maintenance. Due to these limitations, the municipality relies on contractors for maintenance tasks. However, delays in contractor payments further hinder the efficiency of these outsourced maintenance services, exacerbating the already strained capacity.

Research Question 2: What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

It was confirmed in Chapter 2, section 2.5.1.1 Facilities preventative maintenance, that preventive maintenance is the most effective way to keep municipal facilities maintained (Ebekozien, 2021:42; Besiktepe, et al., 2021:11). However, due to budget constraints and limited resources, the FMD is forced into a reactive maintenance model, focusing on emergencies and unplanned repairs as they arise. This approach limits the ability to implement planned maintenance and instead focuses on addressing immediate defects, which, over time, leads to further deterioration of facilities.

Participants highlighted that the lack of alignment between maintenance plans, coupled with limited resources, results in frequent unplanned maintenance and operational inefficiencies. This unplanned maintenance approach, driven by a focus on emergencies, results in a cycle of repairs rather than preventive action, impacting service reliability and quality.

Some participants noted that resource limitations hinder the municipality's ability to meet OHS standards. The reliance on reactive maintenance reduces the division's capacity to address health and safety risks proactively, increasing the likelihood of compliance issues.

4.5 SUMMARY OF FINDINGS

This section provides a concise overview of the key insights drawn from the data analysis presented in directly above section 4.4 *Data Analysis*. It highlights the overall effectiveness of facilities maintenance services, examines the role of organisational structure and performance indicators, and assesses the influence of maintenance culture and management support. The condition of buildings and adherence to health and safety standards are also addressed, alongside the challenges in maintenance management and their impact on service delivery. Further findings compare the roles of internal staff versus contractors, evaluate the availability of resources and budget,

and analyse the effectiveness of maintenance strategies. Finally, the section considers how well corrective and unplanned maintenance efforts are aligned.

4.5.1 Effectiveness of Facilities Maintenance Services

The summary of findings orgnanises the interview responses around two research questions: (1) ‘What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?’ and (2) ‘What are the effects of these challenges on service delivery?’

Research Question 1: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

Limited financial resources prevent the FMD from addressing both planned and emergency maintenance needs effectively, acquiring essential materials, and investing in necessary equipment. Budget constraints were cited as a barrier to implementing proactive maintenance plans, resulting in a primarily reactive approach that is more costly and less effective. In addition, the shortage of experienced workers and technical skill transfer challenges further impair the division’s ability to carry out effective maintenance.

Bureaucratic delays and cumbersome internal processes were also highlighted as significant obstacles to effective maintenance. Complex procedures and inefficient workflows, often linked to SCM policies, slow down project implementation and delay maintenance activities, negatively impacting service delivery. Furthermore, limited resources, improper maintenance programmes and inadequate tools further undermine the division’s ability to address facilities upkeep promptly and cost-effectively.

Research Question 2: What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

The effect of insufficient funding, staffing and resources has led to a largely reactive maintenance approach, resulting in higher costs and contributing to the rapid deterioration of assets; poorly maintained infrastructure is in a fast-depreciating state, complicating efforts to provide reliable, long-term service delivery. Participants observed that budget and staffing constraints often delay

maintenance response times, while inadequate resources and lengthy internal processes hinder the timely resolution of maintenance issues, affecting the division's ability to ensure safe, functional facilities for city employees and the public.

Concerns about safety and compliance were also raised, as the division's inability to adequately maintain facilities risks failing to meet regulatory standards, potentially endangering the health and safety of employees and visitors. The current maintenance model lacks preventive measures because budget and resource constraints limit the division's capacity to engage in planned maintenance, reducing overall maintenance effectiveness, accelerating asset depreciation, and impacting the municipality's ability to provide consistent, high-quality service delivery.

4.5.2 Organisational Structure and Key Performance Indicators in Maintenance

The summary of findings organises the interview responses around research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' The analysis reveals several common themes and challenges faced by the FMD in the CoE:

- Vacant positions and staffing shortages, especially for critical technical roles, are the most significant barriers to achieving the division's KPIs. These vacancies lead to delays in maintenance, poor performance, and difficulties in meeting key targets.
- The organisational structure is generally seen as well-designed, but it is not fully functional due to staffing gaps and lack of resources, which hinder its effectiveness in fulfilling its responsibilities.
- Key Performance Indicators (KPIs) are clearly defined, but the division struggles to meet them due to the combined challenges of vacant positions, budget constraints, and insufficient resources.

- Financial limitations and budget constraints are consistently cited as significant obstacles to achieving KPIs and maintaining the city's facilities effectively.
- The division's reliance on outsourced services due to internal capacity challenges further exacerbates the situation, as it leads to inefficiencies and potentially higher costs.

The findings highlight the need to address staffing shortages, increase the maintenance budget, reduce reliance on outsourcing, implement a comprehensive strategy, and improve inter-departmental communication for better facilities management.

4.5.3 Facilities Maintenance Culture and Management Support

This summary of findings is organised according to two main research questions: (1) 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' and (2) 'What are the effects of these challenges on service delivery?'

Research Question 1: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

Most participants emphasised that limited budget allocation is a primary challenge hindering effective facilities maintenance management. Financial resources are often diverted to other essential services such as Water and Sanitation, Energy, and Waste Management, leaving insufficient funds for facilities maintenance. The underfunding limits the division's ability to carry out planned maintenance, hire skilled staff, and procure necessary materials and equipment.

Several participants expressed concern about the lack of visible support from top management. While some participants felt that senior management supports the strategy despite financial challenges, others observed limited backing in terms of budget, filling vacancies, and providing resources necessary for efficient operations. Without strong management support, it becomes challenging to implement a cohesive maintenance strategy.

Participants highlighted a shortage of human resources and skilled personnel, which prevents effective maintenance practices. Unfilled positions and limited staff capacity reduce the ability of the FMD to meet its objectives and deliver consistent maintenance services.

Participants noted the absence of advanced facilities management systems and technology as a barrier to optimisation. The lack of a comprehensive facilities management plan and modern systems impedes efficient communication, staff coordination, and data-driven maintenance decisions, which would otherwise enhance maintenance outcomes.

Research Question 2: What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

Due to financial constraints and staffing issues, the division is unable to conduct planned or proactive maintenance. Participants noted that only reactive repairs are performed, often at a higher cost, which contributes to the rapid deterioration of city facilities and increases maintenance costs over time.

Several participants indicated that limited maintenance capabilities affect the safety and functionality of facilities for employees and the public. However, some participants pointed out that despite these challenges, safety standards are maintained to some extent, as the city has not received litigation related to workplace injuries. Nonetheless, the lack of consistent maintenance weakens the municipality's ability to provide a secure and efficient work environment.

In addition, one of the participants noted that the Facilities Management strategy is poorly communicated to client departments, limiting its effectiveness. Without clear awareness of and alignment with the strategy across departments, it is challenging for the FMD to achieve coordinated and consistent maintenance practices across the municipality.

In conclusion, financial constraints, limited management support, inadequate staffing, and outdated systems are the main challenges hindering effective facilities maintenance management in the CoE Municipality. These challenges contribute to reactive maintenance practices, affect safety and efficiency, and reduce overall service delivery quality.

4.5.4 Building Condition and Health and Safety Compliance

The summary of findings orgnaises the interview responses around research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' The analysis reveals that:

- Mixed opinions exist regarding the overall condition of buildings, with some being in acceptable condition and others requiring significant attention.
- The condition of many facilities is poor, largely due to insufficient maintenance, aging infrastructure, and the lack of a proper maintenance strategy.
- Budget constraints are a major factor, limiting the city's ability to maintain facilities, implement recommended repairs, and comply with OHS standards.
- There is widespread non-compliance with OHS standards, particularly in older and poorly maintained buildings.
- Proactive maintenance is a significant issue, with many buildings requiring upgrades and ongoing attention to ensure compliance with safety and health regulations.
- Some facilities, particularly newer ones, are in better condition and comply with OHS standards, though they still require some upgrades to meet current demands.

Ekurhuleni should boost facilities maintenance budgets, prioritise health and safety upgrades, develop a proactive strategy, regularly assess facility conditions, and ensure OHS compliance through audits and long-term planning to prevent further deterioration.

4.5.5 Challenges in Facilities Maintenance Management

The summary of findings addresses the two research questions on challenges and effects related to facilities maintenance management at the CoE Municipality.

Research Question 1: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

Budget limitations were widely noted as a critical challenge affecting facilities maintenance. Multiple participants highlighted that insufficient funding hinders the ability to effectively manage and maintain facilities, impacting everything from procurement of materials to contractor payments.

Many participants cited a shortage of skilled staff as well as an inability to fill vacant positions due to financial constraints. The scarcity of technicians and experienced personnel reduces the division's internal maintenance capacity, necessitating reliance on external contractors, which brings further complications.

The challenges associated with maintaining aged infrastructure were also noted. The existing infrastructure has surpassed its intended lifespan, requiring extensive repairs or replacements, which the current budget cannot accommodate.

Participants observed that long internal processes for contractor appointments and delayed payments to service providers cause slow response times for repairs and maintenance. These delays disrupt the efficient execution of maintenance projects and reduce contractor effectiveness.

Participants expressed a need for improved policy frameworks, transformation strategies, and alignment of maintenance processes with prioritisation models. These changes could streamline the Facilities Maintenance Plan and support better resource allocation.

4.5.6 Impact of Maintenance Challenges on Service Delivery

The summary of findings organises the interview responses around research question: 'What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?' The complications facing facilities maintenance in the CoE are multi-dimensional, with cascading impacts on service delivery, legal compliance, financial management, and employee and public morale. These findings highlight that maintenance challenges result in:

- Increased safety and legal risks due to non-compliance with building and OHS standards.

- Physical deterioration of infrastructure, leading to higher repair costs and limited functional spaces.
- Service delivery interruptions and diminished public satisfaction due to unsafe or poorly maintained facilities.
- Financial strain due to high repair costs and missed revenue opportunities.
- Reduced staff morale and organisational reputation, potentially leading to a less motivated workforce and public protests.

Ekurhuleni should streamline maintenance processes, secure sufficient funding, and implement preventive strategies. A comprehensive maintenance plan prioritising compliance, safety, and service delivery could enhance efficiency and boost public confidence in municipal services.

4.5.7 Internal Employees vs. Contractors in Maintenance Services

The summary of findings organises the interview responses around research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' The responses reveal a complex landscape of strengths and challenges for both internal employees and contractors in the CoE's facilities maintenance. Internal Employees: While internal employees are appreciated for their skill, commitment, and institutional knowledge, they face significant limitations due to budget constraints, resource shortages, and high vacancy rates. With adequate resources and funding, they could potentially offer superior, more consistent service.

Contractors: Contractors generally have better access to resources, which can translate to faster and more efficient service delivery. However, concerns about profit-driven motives, substandard material use, and lack of accountability highlight potential risks to service quality. Payment delays also impact their performance and reliability.

In summary, a mixed approach with enhanced oversight, adequate resourcing for internal teams, and a structured payment system for contractors may improve the facilities maintenance services in Ekurhuleni. Resource allocation and budget restructuring appear crucial for achieving a sustainable and effective balance between insourced and outsourced maintenance efforts.

4.5.8 Capacity, Resources and Budget for Maintenance Plan

The following summary of findings addresses the two research questions by synthesizing interview responses related to the challenges faced by facilities maintenance management at the CoE Municipality and the resulting effects on service delivery.

Research Question 1: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

Most participants identified budget constraints as a major barrier to implementing effective building maintenance. Many pointed out that ongoing budget cuts over recent years have limited the division's ability to purchase necessary equipment, materials, and resources and to fill critical vacant positions, resulting in restricted maintenance capabilities.

The vacancy rate, estimated at over 60%, poses a substantial challenge to the municipality’s capacity to conduct effective maintenance. Participants noted that many positions remain unfilled due to budget limitations, leaving insufficient internal staff to manage maintenance needs effectively.

Several participants emphasised the lack of essential resources and equipment needed to support maintenance tasks. Without access to adequate materials and tools, the internal staff is unable to carry out necessary repairs and maintenance effectively, creating further operational obstacles.

Some participants mentioned issues with contractors, specifically pointing to delayed or non-payment of invoices as a cause of reluctance among contractors to perform their duties effectively. This problem undermines the reliability of outsourcing and creates further delays in maintenance.

Though a minority view, some participants believed the city has adequate capacity, resources, and budget but suffers from excessive backlogs of outstanding maintenance work. They suggested that the existing backlog rather than a lack of resources is the core challenge, impeding progress in meeting current maintenance needs.

Research Question 2: What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

Participants highlighted that insufficient capacity, resources, and budget result in delayed maintenance, causing the facilities to deteriorate further. This ongoing depreciation worsens facility conditions, ultimately diminishing the municipality's ability to provide safe, functional environments for employees and the public.

Most participants agreed that the municipality is unable to effectively implement its building maintenance plan, which was developed based on condition assessment exercises. Due to budget constraints, limited staffing, and insufficient resources, the maintenance division is hindered from addressing key repairs and preventive measures.

Participants observed that these challenges negatively impact service quality. The inadequate maintenance of buildings affects the municipality's ability to deliver consistent, high-quality services, and raises concerns about safety and compliance. The lack of upkeep in municipal facilities could lead to potential safety hazards for staff and the public.

4.5.9 Evaluation of Maintenance Strategies

The summary of findings is focused on partially answering the research question: 'What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?' Overall, the responses reveal a clear consensus on the lack of effective planned maintenance in the CoE. The city performs limited, reactive maintenance due to significant budget and resource constraints, resulting in deferred, preventive, and condition-based maintenance being largely unaddressed. Although condition assessments are conducted, they lack implementation, leading to deteriorating facilities. Participants suggest that adopting a prioritisation model, securing adequate financial backing, and implementing preventive maintenance could significantly improve the city's facilities management,

although these improvements are contingent upon overcoming financial and resource limitations.

4.5.10 Alignment of Corrective and Unplanned Maintenance

The responses from participants reveal key insights into the challenges facing facilities maintenance management at the CoE Municipality and the impact of these challenges on service delivery.

Research Question 1: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

The predominant challenge identified by participants is insufficient budget, which limits the municipality's ability to conduct both planned and corrective maintenance. This lack of resources forces the FMD to prioritise emergency repairs over preventive or planned maintenance, resulting in a reactive approach rather than a proactive one.

Participants had mixed opinions on whether corrective maintenance aligns with unplanned maintenance. While some stated that the corrective maintenance approach aligns with unplanned maintenance by addressing emergencies and defects, others noted that budget constraints prevent full alignment with planned maintenance. The focus remains primarily on responding to emergencies, compromising the ability to perform scheduled preventive maintenance. Several participants mentioned a lack of internal resources, including skilled personnel and materials, as a barrier to effective maintenance. Due to these limitations, the municipality relies on contractors for maintenance tasks. However, delays in contractor payments further hinder the efficiency of these outsourced maintenance services, exacerbating the already strained capacity.

Research Question 2: What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

It was confirmed in Chapter 2, section 2.5.1.1 Facilities preventative maintenance, that preventive maintenance is the most effective way to keep municipal facilities maintained (Ebekozien, 2021:42; Besiktepe, et al., 2021:11).

However, due to budget constraints and limited resources, the FMD is forced into a reactive maintenance model, focusing on emergencies and unplanned repairs as they arise. This approach limits the ability to implement planned maintenance and instead focuses on addressing immediate defects, which, over time, leads to further deterioration of facilities.

Participants highlighted that the lack of alignment between maintenance plans, coupled with limited resources, results in frequent unplanned maintenance and operational inefficiencies. This unplanned maintenance approach, driven by a focus on emergencies, results in a cycle of repairs rather than preventive action, impacting service reliability and quality. Some participants noted that resource limitations hinder the municipality's ability to meet OHS standards. The reliance on reactive maintenance reduces the division's capacity to address health and safety risks proactively, increasing the likelihood of compliance issues.

4.6 CHAPTER SUMMARY

Chapter 4 of the mini dissertation presents an in-depth analysis of the interview responses, focusing on key aspects of facilities maintenance management. It explores the effectiveness of the FMD in improving service delivery, emphasising the influence of organisational structure and performance indicators on maintenance responsibilities. The chapter also highlights the role of maintenance culture and top management support in advancing maintenance strategies, while assessing the condition of city-owned buildings and compliance with OHS standards.

Additionally, the analysis addresses the challenges faced by facilities maintenance management, their impact on service delivery, and compares the effectiveness of internal employees versus contractors. The adequacy of resources, capacity, and budget for implementing the CoE's maintenance plan is evaluated, alongside an assessment of various planned maintenance strategies, such as preventive and condition-based maintenance. Finally, the alignment of corrective maintenance practices with unplanned maintenance plans is examined, offering insights into the integration of reactive and planned maintenance efforts.

Conclusions and recommendations are presented in the following chapter, Chapter 5.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In Chapter 4, data was collected from twelve research participants who are involved in the management of facilities maintenance in the CoE Municipality. Qualitative research methodology was used to collect data. Collected data was presented, interpreted and analysed.

This chapter is focused on providing the conclusions and recommendations of the study. The study was undertaken to investigate the challenges facing facilities maintenance management to enhance service delivery in the CoE Municipality. The findings of the study reflect on the effectiveness of facilities maintenance management to enhance service delivery in the CoE, the challenges facing facilities maintenance management to enhance service delivery in the CoE Municipality and the effects of challenges facing facilities maintenance management to enhance service deliver in the CoE Municipality.

5.2 SUMMARY OF CHAPTERS

In Chapter 1, an overview of the study was presented, which is the general introduction of the research, background to the study, the problem statement and research questions. aim the study and research objectives as well as the significance of the study.

In Chapter 2, the literature review on the challenges facing facilities maintenance management was conducted. The chapter focused on the conceptual and theoretical frameworks by probing the literature review related to the challenges facing facilities maintenance management, facilities maintenance organisational structure, facilities maintenance inspection, facilities maintenance planning and facilities planned maintenance. The chapter further discussed the effects of those challenges, and the recent success story of facilities maintenance management was also presented.

Chapter 3 presented the design and methodology adopted for this research, research philosophy, research approach and the research design. This was followed by the

population and sampling, data collection method and data analysis techniques. The last sections of the chapter presented ethical considerations and the limitations of the study.

Chapter 4 presented qualitative empirical evidence derived from in-depth one-on one interviews, based on the research objectives. The literature was used throughout the discussion to confirm the findings.

This chapter is the concluding chapter that providesthe conclusions and recommendations. Considerations are also given to areas for further research on this topic.

5.3 CONCLUSIONS

This qualitative research made a critical analysis of challenges facing facilities maintenance management to enhance service delivery in the CoE Municipality. Conclusions made were based on the following research questions that are presented below, followed by recommendations and lastly, areas for further search.

5.3.1 Research question 1: What does the literature say about facilities maintenance management and service delivery within the discipline of Public Administration?

Literature reveals that municipal facilities maintenance is crucial since facilities are major resources used to provide public services (Hopland, *et al*., 2019:17; Sia, *et al*., 2018:332). Municipal facilities should always be in good condition, safe and compliant with building safety regulations and OHS for members of the community to receive and pay for services effectively.

Ebekozien, *et al*., (2022:121) and Mazele and Amoah (2021:4) also indicated that municipal facilities maintenance practices are a global problem, presumably because of the cost associated with the task. Essentially, the reluctance to avail adequate budget for facilities maintenance in most municipalities leads to deterioration of facilities and hampers effective service delivery. Therefore, the maintenance performance of municipal facilities should be maximised by prioritising maintenance tasks based on risk and cost considerations (Fernandes, Correia & Teixeira, 2024:2270; Peng, *et al*., 2019:3).

To achieve this goal, Xaba (2012:216) and Wahab and Basari (2015:453) state that municipal facilities maintenance departments should clearly define duties and responsibilities when it comes to creating an organisational structure for facility maintenance. Clearly defined roles and responsibilities enhance the employment of the right people with the required technical skills to perform facilities maintenance duties effectively and efficiently. Skilled and experience employees in the space of facilities maintenance contributes to the goal of a municipality, to render quality service delivery to its communities.

Contractors are appointed to perform facilities maintenance for municipalities to guarantee that the facilities meet user needs (Ampofo, *et al*., 2020:115; Au-Yong, *et al*., 2018:54). However, there has always been doubt about the contractors' ability to maintain municipality facilities (Oladejo, *et al*., 2015:7). The assumption is that the management of maintenance work for municipal facilities is found to be impacted by poor contractor workmanship (Hassanain, *et al*., 2019:530; Wong, *et al*., 2022:883). There is also evidence that computerised facility management systems and maintenance management systems help maintenance operations for municipal facilities (Chen, *et al*., 2018:15; Wanigarathna, *et al*., 2019:417).

Xaba (2012:216) observed that the term ‘maintenance inspection’ refers to the examination of municipal facilities to prepare a maintenance plan and gather information for the maintenance programme. There is also a strong sense that a thorough understanding of the state of the municipal facilities is necessary to maintain efficient facilities maintenance plans (Besiktepe, *et al*., 2021:5). Building assessment further helps to generate a comprehensive maintenance plan and the budget required to implement the plan. Xaba (2012:219) and Wong, *et al*., (2022:881) stated that municipal facilities maintenance planning is the process of developing a maintenance strategy to make better use of facilities while reducing the cost of resources tied up in grounds and facilities.

The broader point is that several factors contribute to the poor quality of municipal facilities maintenance practices, including a lack of good quality management policies (Amponsah-Kwatiah, *et al*., 2021:687). It can therefore be concluded that poor maintenance practices in municipalities are partly caused by an absence of

maintenance policies and strategic planning (Amponsah-Kwatiah, *et al*., 2021:687; Kamal, *et al*., 2022:3).

A proper facilities maintenance plan should be implemented to stop the deterioration of buildings and reinstate their original condition, to enhance the safety of occupants (Au-Yong, 2019:4; Besiktepe, *et al*., 2021:6). Planned maintenance includes preventative maintenance, facilities scheduled maintenance, facilities condition-based maintenance, facilities time-based maintenance, facilities value-based maintenance, facilities routine maintenance, facilities deferred maintenance, facilities predictive maintenance, facilities reliability-centered maintenance. On the other hand, corrective maintenance is a passive process that entails repairing municipal facilities after failure or damaged (Wang, *et al*., 2022:7-8; Moat & Coleman, 2020:8; Luy, *et al*., 2013:1379). It includes unplanned and facilities emergency maintenance.

5.3.2 Research question 2: What are the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

The predominant challenge is insufficient budget, which limits the city's ability to effectively manage and maintain its facilities. Limited financial resources prevent the FMD from addressing both planned and emergency maintenance needs effectively, acquiring essential materials, investing in necessary equipment and filling of critical vacancies. This therefore exposes municipal workers to an unsafe work environment, which kills their work morale and affect their productivity, and that hampers effective service delivery.

Furthermore, limited resources and inadequate tools undermine the city's ability to address facilities maintenance promptly and cost-effectively. It leads to prioritisation of emergency repairs over preventive or planned maintenance, resulting in a reactive approach rather than a proactive one. Without adequate resources, the city is unable to carry out necessary repairs and maintenance effectively. As a result of this challenge, the city ends up having buildings that are in bad condition, non-compliant with building regulations and OHS and ultimately receive contravention notices from the department of Labour. This usually leads to an ultimate closure of buildings that were put in place for the purpose of rendering services. this further leads to possible

community unrest and unnecessary vandalism of municipal property by aggrieved communities.

Staff shortage is one of the major barriers in implementing proactive maintenance plans, resulting in a primarily reactive approach that is more costly and less effective. In addition, the shortage of experienced workers and lack of technical skills transfer impair the city's ability to carry out effective maintenance. Many positions remain unfilled due to budget limitations, leaving insufficient internal staff to manage maintenance needs effectively. Due to staff shortage, the city is forced to outsource maintenance services to external contractors which exacerbates the situation, as it leads to inefficiencies and potentially higher costs. Contractors are profit-driven, procure substandard material and lack accountability which possess a potential risk to service quality. This is posing a serious challenge to effective service delivery and value for, as the city pays high rates to contractors who in turn render substandard work and sometimes leave projects incomplete.

Bureaucratic delays, lack of facilities maintenance policy and cumbersome internal processes are also significant obstacles to effective facilities maintenance in the City. Complex procedures and inefficient workflows, often linked to SCM policies, slow down project implementation and delay maintenance activities, negatively impacting service delivery. The absence of advanced facilities management systems and technology is also a barrier to optimisation. The lack of a comprehensive facilities management plan and modern systems impedes efficient communication, staff coordination, and data-driven maintenance decisions, which would otherwise enhance maintenance outcomes. The city lacks maintenance policy frameworks, transformation strategies, and alignment of maintenance processes with prioritisation models.

Lack of support from top management to allocate sufficient budget, provide adequate resources and fill vacant positions hinders the effective implementation of maintenance strategy. Top management needs to understand and accept facilities maintenance strategy to be able to support it by way of availing budget, resources and capacity, to effectively implement it. This will be cost effective, increase the durability of facilities and maintain the safety of facilities end users and clients.

5.3.3 Research question 3: What are the effects of challenges facing facilities maintenance management on service delivery at the CoE Municipality?

The findings from the literature review, data analysis and participant feedback underscore the significant impact of maintenance management challenges on municipal service delivery. These challenges manifest through operational inefficiencies, compromised safety, and broader socio-economic consequences, which are particularly evident in the CoE.

Both the literature and participant insights emphasise the foundational role of effective facilities maintenance in ensuring uninterrupted and high-quality service delivery. Municipal facilities, such as clinics, libraries, and public transport hubs, are central to fulfilling constitutional mandates and supporting the well-being of communities. However, the inability to carry out planned maintenance due to funding shortages, lack of skilled personnel, and procurement challenges compromises the functionality and safety of these critical assets. This neglect results in building defects that endanger users and incite community protests, further straining municipal resources and public trust.

The adoption of a reactive maintenance approach, driven by insufficient funding and resources, worsens the deterioration of municipal infrastructure. Participants highlighted the rapid depreciation of assets, high maintenance costs, and frequent non-compliance with OHS standards as direct outcomes of this approach. These issues often lead to legal contraventions issued by regulatory bodies, such as the Department of Labour, resulting in facility closures that disrupt service delivery and hinder community access to essential services.

The challenges also extend to the efficiency of maintenance processes. Delayed response times due to long internal procedures and resource limitations create inefficiencies that reduce client department and public satisfaction. Additionally, outsourcing maintenance work, a necessity driven by budget constraints and staff shortages, often results in substandard outcomes. Contractors, faced with delayed payments, may abandon projects or use inferior materials, leaving facilities in unsafe and unhealthy conditions. The over-reliance on outsourcing inflates costs that could otherwise be minimised by leveraging internal staff for maintenance tasks.

Employee morale and public perception further suffer from these challenges. Unsafe working conditions, caused by poorly maintained facilities, reduce staff productivity and hinder effective service delivery. Simultaneously, the visible decline in infrastructure quality erodes public trust and damages the municipality's reputation. Community dissatisfaction with service disruptions, particularly when recurrent, often escalates to protest actions, adding another layer of complexity to the municipality's efforts to maintain social stability.

5.3.4 Research question 4: What recommendations can be made to the CoE Municipality to minimise the challenges facing facilities maintenance management to enhance service delivery at the CoE Municipality?

The challenges facing maintenance management in municipalities such as the CoE highlight the urgent need for systemic reforms. Addressing these issues requires prioritising planned maintenance strategies, ensuring adequate funding, and investing in skilled personnel and efficient procurement systems. Proactive maintenance can reduce long-term costs, enhance infrastructure durability, and improve compliance with safety standards. Furthermore, minimising reliance on outsourcing by strengthening internal capabilities will promote cost efficiency and ensure higher-quality outcomes. By adopting a comprehensive and strategic approach to facilities maintenance, municipalities can mitigate risks, enhance service delivery, and rebuild public trust, ultimately fulfilling their constitutional mandate to provide essential services to communities.

Further detailed recommendations to minimise the challenges facing facilities maintenance management and to enhance service delivery at the CoE Municipality, are included in the following section 5.4 *Recommendations*.

5.4 RECOMMENDATIONS

Based on the preceding conclusions, the following recommendations emerge regarding challenges facing facilities maintenance management at the CoE Municipality.

5.4.1 Allocation of sufficient facilities maintenance budget

It is recommended that the CoE Municipality should improve on the allocation of budget for facilities maintenance management to enhance service delivery. This study revealed that the FMD does conduct condition-based assessment and produce maintenance plan which is later not implemented due to lack of funding. The city can only do corrective and emergency maintenance due to unavailability of budget to implement a maintenance plan based on the assessment conducted. As a result of failure to perform planned maintenance, the city has deteriorating buildings, fast aging infrastructure, buildings that are not safe to occupants and clients as well buildings that are non-compliant with OHS.

5.4.2 Allocation of adequate resources for facilities maintenance

It is recommended that the city provides adequate resources, tools, materials and equipment for the performance of effective maintenance of facilities to enhance service delivery. The study revealed that available internal employees as willing to work, but the main challenge with unavailability of resources to perform maintenance work. As a result of limited resources, the city now relies on external contractors to render facilities maintenance services. This situation further compromises the quality of work, as most contractors are profit driven, and they buy substandard materials. Furthermore, the delay in the payment of their invoices leads to poor quality of work and incompletion of projects as some contractors abandon sites. Additionally, a resource optimization framework could be introduced to identify and reallocate underutilized resources across departments.

5.4.3 Filling of vacant positions

A recommendation is made that the city fills all critical vacant positions in FMD. Currently, there is vast shortage of staff due to reasons ranging from retirements, resignations and deceased officials. The vacant positions create a gap in the performance of facilities maintenance effectively. Most of the vacant posts are critical and technical positions which are required to perform effective facilities maintenance in the city. This is in addition to reasons why the city resorted to utilising external contractors at a high cost, compromising the quality of work.

The municipality must prioritise filling technical and critical positions, as highlighted in the findings. Efforts should include targeted recruitment campaigns, competitive compensation packages, and career development programmes to attract and retain skilled professionals. Furthermore, leveraging partnerships with educational institutions can facilitate the upskilling of internal staff and create a pipeline of qualified professionals. Internally, succession planning and mentoring programmes should be implemented to address the knowledge gap caused by retirements and resignations.

5.4.4 Establishment of Facilities Maintenance Policy, processes and procedures

It is recommended that the CoE Municipality establishes a Facilities Management Policy that will guide the practice of facilities maintenance. The policy will provide clear processes and procedure of total facilities management practice to eliminate unecessary long bureaucratic processes that prevent maintenance of buildings within prescribed turnaround times. The policy will eliminate the complex procedures and inefficient workflows, that are often linked to SCM policies, lowering down project implementation and delaying maintenance activities, negatively impacting service delivery. The existence of a clear Facilities Management Policy will enhance the introduction of advanced facilities management systems and technology in the entire facilities maintenance practice. The policy will further provide clear procedures on the establishment and implementation of a comprehensive facilities management plan and modern systems to enhance communication, staff coordination, and data-driven maintenance decisions. The policy must also include an accountability framework to ensure transparency and alignment with safety regulations and standards.

5.4.5 Top management support of the facilities maintenance strategy

A recommendation is made that the top management of the CoE Municipality to support the facilities maintenance strategy of the FMD. The top management of the city is capacitated to making decisions on the administrative operations, including allocation of budget, filling of vacancies, provision of resources, establishment of policies. All the challenges that are facing facilities maintenance in the city can be resolved through the support of the top management. The top management needs to clearly understand the strategy, adopt and support it by making sure that they

adequately avail funding for its implementation to enhance effective maintenance of facilities in the city. This support should extend to regular progress reviews, advocacy for increased budget allocation, and a commitment to fostering an organisational culture that values maintenance as integral to service delivery.

By implementing these enhanced recommendations, the CoE Municipality can address the systemic challenges hindering effective facilities maintenance management and service delivery.

5.5 AREAS FOR FURTHER RESEARCH

Further research is encouraged on the effectiveness of facilities maintenance in the CoE Municipality to reveal more in-depth information that will improve the current situation and enhance service delivery. The focus should be on the establishment of a policy that will guide the implementation of maintenance strategy, to be supported by top management through prioritising adequate budget allocation, provision of resources and capacity for facilities maintenance.

The following topics are suggested for Master's and Doctoral degrees respectively:

- The effect of total facilities management policy to enhance service delivery at the CoE Municipality
- Implementation of total facilities management policy to enhance service delivery at the CoE Municipality

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ANNEXURE A: ETHICS CLEARANCE APPROVAL

UNISA university of south africa

College of Economic and Management Sciences_ERC Public Administration and Management

Ref #: 3002
Name: Mr Vusi Mtungwa
Student #: 41845609

Date: 01/10/2024

Dear: Mr Vusi Mtungwa

Decision: Ethics Approval from 01/10/2024 to 30/09/2027

Researcher: Mr Vusi Mtungwa

Corner Cross and Rose Streets, Germiston 1500

Germiston

41845609@mylife.unisa.ac.za 0119993532

Supervisor: Prof Corlia Alers

Email address: alersc@unisa.ac.za

Challenges Facing Facilities Maintenance Management to Enhance Service Delivery: City of Ekurhuleni Municipality

Qualification: MPA

Thank you for the application for research ethics clearance by the College of Economic and Management Sciences_ERC Public Administration and Management for the above mentioned research study Ethics approval is granted for {three years }.

The **{low } risk application** was **reviewed** by College of Economic and Management Sciences_ERC Public Administration and Management and it is in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the College of Economic and Management Sciences_ERC Public Administration and Management .
3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.

5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.

6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data requires additional ethics clearance.

7. No field work activities may continue after the expiry date (30/09/2027). Submission of a completed research ethics progress report will constitute an application for renewal, for Ethics Research Committee approval.

Additional Conditions

1. Disclosure of data to third parties is prohibited without explicit consent from Unisa.
2. De-identified data must be safely stored on password protected PCs.
3. Care should be taken by the researcher when publishing the results to protect the confidentiality and privacy of the university.
4. Adherence to the National Statement on Ethical Research and Publication practices, principle 7 referring to Social awareness, must be ensured: "Researchers and institutions must be sensitive to the potential impact of their research on society, marginal groups or individuals, and must consider these when weighing the benefits of the research against any harmful effects, with a view to minimising or avoiding the latter where possible." Unisa will not be liable for any failure to comply with this principle.

Note

The reference number 3002 should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.

Kind regards,

Dr Promise Raseala
Chair of College of Economic and Management Sciences_ERC Public Administration and Management
E-mail: raseaps@unisa.ac.za

Professor Maelekanyo Christopher MULAUDZI
Executive Dean / By delegation from the Executive Dean of College of Economic and Management Sciences_ERC Public Administration and Management
E-mail: tshilmc@unisa.ac.za

ANNEXURE B: GATEKEEPER PERMISSION LETTER

Memorandum

City of Ekurhuleni

To: Vusi Mtungwa

From: JeffreySenoelo
Divisional Head: Facilities Managenment

Email: Jeffery.senoelo@ekurhuleni.gov.za
Tel: 011 999-4559

REAL ESTATE DEPARTMENT

5th Floor Kempton Park
Civic Centre
Cnr Pretoria Rd & CR Swart Dr
KEMPTON PARK

P.O. BOX 13
KEMPTON PARK
1620

Tel: 011 999-3719/0333
www.ekurhuleni.gov.za

Date 22 November 2022

RESPONSE ON THE REQUEST TO CONDUCT A RESEARCH AT THE CITY OF EKURHULENI. TOPIC: CHALLENGES FACING FACILITIES MAINTENANCE MANAGEMENT TO ENHANCE SERVICE DELIVERY: CITY OF EKURHULENI MUNICIPALITY

The above matters bears reference,

The City of Ekurhuleni received your letter dated 25 October 2022, in which a request was made to conduct a reasech on the above stated topic within the City.

The City of Ekurhuleni hereby grants you permission to conduct the above-mentioned research study, on the basis that participants will be provided with proof of enthical clearance prior commencememt of the afore-mentioned research.

You are further requested to submit a copy of your research report to the City of Ekurhuleni upon completion of your study.

The City of Ekurhuleni wishes you well on your research study.

Yours Truly,

Jeffrey Senoelo
Divisional Head: Facilities Management

ANNEXURE C: PARTICIPANT INFORMATION SHEET

Human participant information sheet and consent template

PARTICIPANT INFORMATION SHEET

Ethics clearance reference number:
Research permission reference number: N/A

Date: 15 February 2024

Title: Challenges facing facilities maintenance management to enhance service delivery at the City of Ekurhuleni.

Dear Prospective Participant

My name is Vusi Mtungwa, I am doing research with Professor Corlia Alers, a Senior Lecturer in the Department of Public Administration and Management at the University of South Africa. We are inviting you to participate in a study entitled:

Challenges facing facilities maintenance management to enhance service delivery at the City of Ekurhuleni.

WHAT IS THE PURPOSE OF THE STUDY?

This interview is based on a study to explore the challenges facing facilities maintenance management to enhance service delivery at the City of Ekurhuleni

WHY AM I BEING INVITED TO PARTICIPATE?

You have been invited to participate in this study because of your extensive experience about facilities maintenance management and the manager position that you hold within the Facilities Management division at the City of Ekurhuleni Municipality. This includes your level of involvement with facilities maintenance management to enhance service delivery at the City of Ekurhuleni Municipality. 22 managers have been selected to participate in this study and their information, including contact details was sourced from Facilities Management division of Real Estate Department in the City of Ekurhuleni Municipality in respect of the Protection of Personal Information Act, nr 4 of 2013.

The confidentiality and anonymity of your participation in this research is guaranteed. Data from the study will be used for academic purposes only. Pseudonyms will be used to ensure your anonymity. Analysis of data will be discussed without linking any information to you.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

You are kindly requested to answer the interview questions as honestly and completely as possible. In this study, semi-structured interviews will be used to conduct research, investigating the challenges facing facilities maintenance management to enhance service delivery at the City of Ekurhuleni Municipality. You are to share your thoughts as meaningful as possible when engaging in a semi-structured interview. An individual in-depth interview is important in this study because it affords the researcher an opportunity to listen to participants explaining in their own words what they consider as the challenges facing facilities maintenance management to enhance service delivery at the City of Ekurhuleni Municipality.

Interview guide with open-ended questions is developed by the researcher as a data collection tool based on the research objectives and theoretical framework for the study. Time allocation for your semi-structured interview will not exceed 60 minutes and it will be conducted in the comfort of your office at your convenient time.

Bracketing will be used to set aside ideas and judgements in order to describe experiences. During the information session, the audio recordings will be done to ensure your views are accurately captured. Questions will be clearly explained to ensure that you understand in order for your answers to be coded without the possibility of doubt. The researcher will allow you to have the freedom to give your own responses without being influenced.

Probing will be used to extract additional information on your ideas or feelings or to explore a sub-topic that may emerge further. Probing will further deepen your responses to questions and thereby increasing the richness of the data given. Qualitative data will further be collected through observations. Field notes will be taken during the interview as well. The interviews will continue until no new themes surface.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

You have the right to withdraw your participation at any time. Hence, your participation is regarded as voluntary. If you decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

Participating in this study is voluntary and there are no benefits for the participants at the end of the research. However, the recommendations of this study may provide clear guidelines and practices that the City of Ekurhuleni Municipality can implement to improve service delivery.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

No one will be able to connect you to the answers you give. The risk assessment, divided into four categories ranging from negligible risk to high risk, will place this research in category 2 (low risk). There will be no indication of any personal discomfort from being involved in this research. The confidentiality and anonymity of your participation will be guaranteed with no personal identification of information being solicited from you. Data from this study will be used for academic purposes only. The pseudonyms will be used to ensure your anonymity. Analysis of the data will be discussed without linking any information to any particular individual.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

Information collected from you will be treated with strict confidentiality and used for research purposes only. Your name will not be recorded anywhere and no one, apart from the researcher and identified members of the research team, will know about your involvement in this research or your name will not be recorded anywhere, and no one will be able to connect you to the answers you give. Your answers will be given a code number, or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Your answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Review Committee of Public Administration and Management, UNISA. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored safely in a locked cupboard/filing cabinet of the University library for a maximum period of five years, and for future research or academic purposes; electronic information will be stored on a password protected computer.

Future use of the stored data will be subject to further Research Ethics Review and approval if applicable (such as using the data for a purpose unrelated to the initial aim and objectives or the study).

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

You will not receive any payment or reward, financial or otherwise, and the study will not incur undue costs to you. The researcher will ensure that any undue costs on you are avoided.

HAS THE STUDY RECEIVED ETHICS APPROVAL?

This study has received written approval from the Research Ethics Review Committee of the Department of Public Administration and Management, Unisa. A copy of the approval letter can be obtained from the researcher if you wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Vusi Mtungwa on 067 401 9088, email address: vusimtungwa@gmail.com. The findings are accessible for the period of five years. Should you require any further information or want to contact the researcher about any aspect of this study, please contact Vusi Mtungwa on 067 401 9088, email address: vusimtungwa@gmail.com.

Should you have concerns about the way in which the research has been conducted, you may contact Prof Corlia Alers on (012) 421-6286, email address alersc@unisa.ac.za.
Alternatively, you can contact the CEMS Research Ethics and Integrity Advisor if you have any concerns:
Dr Marianne Engelbrecht
engelm1@unisa.ac.za

Thank you for taking time to read this information sheet and for participating in this study.
Thank you.

Vusi Mtungwa

ANNEXURE D: INFORMED CONSENT FORM (TEMPLATE)

CONSENT TO PARTICIPATE IN THIS STUDY

CHALLENGES FACING FACILITIES MAINTENANCE MANAGEMENT AT THE CITY OF EKURHULENI METROPOLITAN MUNICIPALITY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

- I have read and understood the study as explained in the information sheet.
- I have had sufficient opportunity to ask questions and am prepared to participate in the study.
- I understand that my participation is voluntary and that I am free to withdraw at any time without penalty.
- I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential.
- I agree to the recording of the online interview.
- I have received a signed copy of the informed consent agreement.

Participant Name and surname…… (please print)

Participant Signature…….. Date……

Researcher's Name & Surname:

Researcher's signature…….. Date……

ANNEXURE E: INTERVIEW GUIDE

INTERVIEW QUESTIONS

SECTION A: GENERAL RULES

1. This interview is based on a study to explore the challenges facing facilities maintenance management to enhance service delivery at the City of Ekurhuleni Municipality.
2. You have been invited to participate in this study because of extensive experience about facilities maintenance management.
3. You are kindly requested to answer the interview questions as honest and completely as possible.
4. The interview will take a maximum of 60 minutes to complete.
5. Participation is anonymous: You are not requested to disclose your identity. Your privacy will be respected.
6. No one will be able to connect you to the answers you give.
7. The information collected from you will be treated with strict confidentiality and used for research purposes only.
8. You have the right to withdraw your participation at any time. Hence, your participation is regarded as voluntary.
9. You will not receive any payment or reward, financial or otherwise, and the study will not incur undue costs to you.
10. The survey data will be stored in a locked cupboard and the stored in a computer will be protected by use of a password.
11. The survey data will be destroyed when it is no longer of functional value (after five years).
12. An electronic copy of the mini dissertation will be available at the library of the University of South Africa (Unisa), Pretoria.

INTERVIEW QUESTIONS

SECTION B: STRUCTURED QUESTIONS

1. In your opinion, does the Facilities Management Division of the Real Estate department render effective facilities maintenance service to enhance service delivery in the City of Ekurhuleni Municipality? Please motivate your answer.

2. What is your perception of the City of Ekurhuleni's Facilities Management organisational structure and its key performance indicators regarding its responsibility for facilities maintenance functions?

3. What is your experience on the effectiveness of facilities maintenance culture and top management support in driving the facilities maintenance strategy in the City of Ekurhuleni?

INTERVIEW QUESTIONS

4. What is your view on the general condition of buildings or facilities owned by the city and their compliance with occupational health and safety standards?

_____
_____
_____
_____
_____

5. What complications does facilities maintenance management encounter in improving service delivery at the City of Ekurhuleni Municipality?

_____
_____
_____
_____
_____

6. What are the effects of complications facing facilities maintenance management on service delivery at the City of Ekurhuleni Municipality?

_____
_____
_____
_____
_____

7. Based on your experience, do you find services provided by internal employees of the City of Ekurhuleni to be better or worse than those provided by appointed contractors responsible for facilities maintenance?

_____
_____
_____
_____
_____

INTERVIEW QUESTIONS

8. Does the City of Ekurhuleni have adequate capacity, resources and budget to effectively implement building maintenance plan developed through building condition assessment exercise?

_____
_____
_____
_____
_____

9. What is your view on the City of Ekurhuleni's facilities planned maintenance in line with preventive, condition-based, deferred and preventative maintenance plan?

_____
_____
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_____
_____
_____

10. Based on your understanding, does the City of Ekurhuleni's corrective maintenance for facilities align with the unplanned and corrective maintenance plan?

_____
_____
_____
_____
_____
_____

THANK YOU FOR YOUR COOPERATION

ANNEXURE F: CONFIDENTIALITY AGREEMENT WITH FIELDWORKER

UNISA | university of south africa

UNISA RESEARCH ETHICS 3rd Party Confidentiality Agreement
(Transcriber, Co-coder, Statistician and/or Fieldworkers)

A. INSTRUCTIONS

Please read through the entirety of this form carefully before signing.

After completing the required fields, please sign the form. After this form has been signed by the transcriber, co-coder, statistician or fieldworker, it should be given to the principal researcher for submission to the relevant UNISA Research Ethics Committee.

The transcriber, co-coder, statistician and/or fieldworker should keep a copy of the *Confidentiality Agreement* for their records.

B. CONFIDENTIALITY OF A RESEARCH STUDY

Confidentiality is the treatment and maintenance of information that an individual has disclosed in a relationship of trust and with the expectation that it will not be divulged to others in ways that are inconsistent with the understanding of the original disclosure (the informed consent documentation) without permission. Confidential information relating to human participants in a research study may include, but is not limited to the personal information listed below:

a) information relating to the race, gender, sex, pregnancy, marital status, national, ethnic or social origin, color, sexual orientation, age, physical or mental health, well-being, disability, religion, conscience, belief, culture, language and birth of the person;

b) information relating to the education or the medical, financial, criminal or employment history of the person;

c) any identifying number, symbol, e-mail address, physical address, telephone number, location information, online identifier or other assignment to the person;

d) the biometric information of the person;

e) the personal opinions, views or preferences of the person;

f) correspondence sent by the person that is implicitly or explicitly of a private or confidential nature or further correspondence that would reveal the contents of the original correspondence;

g) the views or opinions of another individual about the person; and

h) the name of the person if it appears with other personal information relating to the person or if the disclosure of the name itself would reveal information about the person.

As a third party you will have access to research information (e.g. audio or video recordings, DVDs/CDs, transcripts, data, etc.) that include confidential information. Participants have revealed information to the researcher(s) since they have been assured by the researcher(s) that every effort will be made to maintain their privacy throughout the study. That is why it is of the upmost importance to maintain confidentiality when conducting your duties as a transcriber, statistician, co-coder and/or fieldworker during the research study. *Below is a list of expectations you will be required to adhere to in your role as a third party in this study. Review these expectations carefully before signing this form.*

C. THIRD PARTY EXPECTATIONS

To maintain confidentiality, I agree to:

1. Keep all research information that I collect or that is shared with me confidential by not discussing or sharing this information verbally or in any format with anyone other than the principal researcher of this study;

2. Ensure the security of research information (e.g. audio or video recordings, DVDs/CDs, transcripts, data, etc.) while it is in my possession. This includes:
- Keeping all data and/or transcript documents and digitized interviews on a password protected computer with password-protected files;
- Closing any programs and documents when temporarily away from the computer;
- Keeping any printed transcripts or data in a secure location such as a locked file cabinet;
- Permanently deleting any digital communication containing the data.

3. Not make copies of research information (e.g. audio or video recordings, DVDs/CDs, transcripts, data, etc.) unless specifically instructed to do so by the principal researcher;

4. Give all research information (e.g. audio or video recordings, DVDs/CDs, transcripts, data, etc.) and research participant information, back to the principal researcher upon completion of my duties as a transcriber;

5. After discussing it with the principal researcher, erase or destroy all research information (e.g. audio or video recordings, DVDs/CDs, transcripts, data, etc.) that cannot be returned to the principal researcher upon completion of my duties in this study.

Name of 3rd party involved in research activities: **Dickiel Kachekenje Kusainda**

Research activity responsible for (transcribing interviews, co-coding of data, statistical analysis, collecting data, etc.): **Collecting data**

Title of Research Study: **CHALLENGES FACING FACILITIES MAINTENANCE MANAGEMENT AT THE CITY OF EKURHULENI METROPOLITAN MUNICIPALITY**

Name of Principal Researcher: **MR VUSI MTUNGWA**

By signing this form, I acknowledge that I have reviewed, understand, and agree to adhere to the expectations described above. I agree to maintain confidentiality while performing my duties as acquired by the principal researcher. I recognise that failure to comply with these expectations may result in legal action.

Signature of 3rd party

14/05/2024
Date

DICKIEL KACHEKENJE KUSAINDA

Print Name

ANNEXURE G: LANGUAGE EDITOR'S CERTIFICATE

EDITOR'S CERTIFICATE

6 December 2024

Re: LANGUAGE EDITING STATEMENT

I, THE UNDERSIGNED, hereby confirm that I have edited the dissertation titled:

CHALLENGES FACING FACILITIES MAINTENANCE MANAGEMENT AT THE CITY OF EKURHULENI METROPOLITAN MUNICIPALITY

by

VUSI MTUNGWA

Professional EDITORS Guild 30+ Est 1993
Promoting excellence in editing

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