DETERMINANTS OF ADOPTION OF GREEN TECHNOLOGIES IN THE CONSTRUCTION OF BUILDINGS IN NAKURU CITY, KENYA

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A Thesis Submitted to the Graduate School in Partial Fulfilment of the Requirements for the Master of Science Degree in Geography of Egerton University

EGERTON UNIVERSITY

OCTOBER, 2024

DECLARATION AND RECOMMENDATION

Declaration

This thesis is my original work and has not been presented in this University or any other for the award of a degree.

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Recommendation

This thesis has been submitted with our approval as university Supervisors.

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DEDICATION

I dedicate this thesis to my Dad Samuel Macharia Mwangi and Mum Ann Njeri Macharia who sacrificed their time and resources to educate me.

ACKNOWLEDGEMENTS

To begin with, I am grateful to the almighty God for the opportunity, good health, and provision of resources during my education period. I also extend my sincere gratitude to Egerton University for offering me the platform to pursue my postgraduate studies.

I wish to also acknowledge the Faculty of Environment and Resources Development as well as the Department of Geography and all the lecturers for imparting knowledge and wisdom during my studies. In a special way, I express my heartfelt gratitude to my supervisors, Dr. Amon Karanja and Dr. Humphreys Were Obulinji, whose expertise, understanding, and patience added considerably to my graduate experience at Egerton University. I appreciate their vast knowledge and skills in many areas which helped to hone my skills. They provided me with direction, and technical support and became inspirational mentors who have become my true friends. In a great way, I also wish to thank the research respondents and the Key Informants for without their data this study would not have been a success. Gratitude also goes to my friends, colleagues, and my classmate Moses Ngugi Mwicigi for the enchanting discussions during classes that contributed immensely to my knowledge base in Geography.

Finally, I wish to acknowledge my Dad Samuel Macharia Mwangi, Mum Ann Njeri Macharia and my Siblings Priscilla Muthoni, Benson Ngugi, Agnes Wanjiku and Wilfred Mathenge, for understanding and supporting me throughout the academic journey.

ABSTRACT

The adoption of green technologies in the construction of buildings is essential for sustainable development as it contributes significantly to the reduction in global natural resource consumption. It has the potential to positively impact environmental issues and help local governments achieve Sustainable Development Goals (SDGs). Green building technologies are therefore being adopted to address some of the socio-economic and environmental issues affecting the planet. Kenya is experiencing rapid urbanisation leading to an increase in built-up environment. This has led to pollution, poor housing, food insecurity, and loss of biodiversity. The objectives of this study were to: examine the level of adoption of green technologies in the construction of buildings in Nakuru City; establish the socio-economic and environmental benefits of adoption of green technologies in the construction of buildings in Nakuru City and determine the factors that influence adoption of green building technologies in the construction of buildings in Nakuru City, Kenya. The study adopted a mixed research design. The total target population (N=1191) of the study was the household heads. The sample size of the study was 155 households. Primary data was collected using structured household questionnaires and Key Informant Interviews. The data was analysed using both descriptive and inferential statistics where mean, percentages, frequencies, and multiple linear regression analysis tests were computed and presented in the form of graphs, pie charts, and tables. The findings on the level of adoption of green technologies in the construction of buildings in Nakuru City revealed that the extent to which these technologies have been adopted is still low i.e. the average mean value obtained in the Likert scale was 2.57 and this depicted little extent of adoption. The most perceived socio-economic benefit of the adoption of green building technologies was its ability to save on energy consumption (Likert scale value - 4.16) while that of the environmental benefits was its ability to mitigate climate change (4.52). The age of the household head, education level, employment status, and monthly household income had a significant influence on the adoption of green building technologies at 5% significance level. The findings of this study help in the evaluation and re-examination or refinement of existing policies on the adoption of green building technologies in Nakuru city.

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LIST OF ABBREVIATIONS AND ACRONYMS

BREEAM: Building Research Establishment and Environmental Assessment Method

CRBC: China Roads & Bridge Corporation

EIA: Environmental Impact Assessment

EPA: Environmental Protection Agency

EPRA: Energy and Petroleum Regulatory Authority

GBC: Green Building Council

GBS: Green Bonds Standard

GDP: Gross Domestic Product

GESIP: Green Economy Strategy and Implementation Plan

GHG: Greenhouse Gas

GMO: Genetically Modified Organisms

GPS: Global Positioning System

IMF: International Monetary Fund

IPCC: Intergovernmental Panel on Climate Change

KGBS: Kenya Green Building Society

KICC: Kenyatta International Convention Centre

LED: Light-Emitting Diode

LEED: Leadership in Energy and Environmental Design

NACOSTI: National Commission for Science, Technology and Innovation

NCA: National Construction Authority

NGO: Non-Governmental Organisation

RCRA: Resource Conservation and Recovery Act

SDGs: Sustainable Development Goals

UN: United Nations

UNCCC: United Nations Climate Change Conference

UNEP: United Nations Environmental Programme

USEPA: United States Environmental Protection Agency

USGBC: United States Green Building Council

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

In the past 50 years, the earth has experienced rapid environmental and climatic changes attributed to anthropogenic activities such as industrialisation and urbanisation leading to severe drought, sea level rise and depletion of underground water (Yang et al., 2023). Pollution, food insecurity and rising global temperatures have affected many sectors of the economy (Falkner & Buzan, 2022). Environmental degradation and climate shift have posed negative impacts on development (Bollinger, 2011). According to the Environmental Management and Science Report (2016), the Industrial Revolution saw an aggressive advancement of development that laid the groundwork for the environmental and climatic challenges facing the world. Industrial revolutions of the 18th, 19th, and 20th Centuries were propelled by the combustion of fossil fuels such as coal, oil, and gas, which emit heat-trapping gases (Stearns, 2012). In addition, changes in weather patterns and temperatures since the 1800s, primarily caused by human activities, have been the primary drivers of climate change (Dow & Downing, 2016). According to the Global Risk Report (2021), the environmental risk from the built-up environment and climate action failure ranks first among other societal risks, with the effects of inaction potentially having ten times the impact of the COVID-19 pandemic.

The state of the environmental conditions on a global scale is a result of increased consumption and overuse of natural resources such as water and fossil fuels. The depletion of these resources surpasses what is physically possible to sustain in the long term. These effects are culminating in the degradation of ecosystems and deteriorating health conditions of the human population (Glover, 2010**)**. The increased presence of pollutants in the atmosphere has led to environmental degradation in the major cities of the world (Singh, 2022). Around 40% of global emissions are thought to be produced by conventional buildings, which have an impact on humans, the environment and the climate (Malik & Marathe, 2021). This presents a huge risk to the standards of life for densely populated areas such as cities. Fresh water shortage, higher average temperatures and severe socio-economic and health impacts are some of the major setbacks that are being experienced in cities, hence the need for adopting sustainable development.

The environmental aspect is critical to the realisation of sustainable economic growth (Filho et al., 2016). For instance, in 2019, the European Commission established the European Union Green Bonds Standard to inspire investors to participate in green projects and sustainable initiatives. Furthermore, the Commission planned to fund similar projects and to always consider sustainability when making investment decisions in the European Green Deal. While developing countries in Africa have made slow progress on environmental and climate action, it is critical that they adopt sustainable development for the sake of future generations (Halisçelik & Soytas, 2019). The planet may not be able to withstand further industrial growth powered by conventional methods as is the case of many developing countries in Africa (Cunningham, 2016).

To achieve sustainability, African countries are creating awareness about the environmental and climate risks at all stages of the economy in their development projects. Despite moving slowly, sustainable buildings have gained ground in some African countries. This is demonstrated by the establishment of green building councils to promote sustainable development in several African nations. South Africa was the first to do so and named it the Green Building Council of South Africa (GBCSA). Other countries that have followed suit include; Kenya Green Building Society (KGBS), Tanzania Green Building Council (TGBC), Green Building Council of Cameroon (GBCC), Ghana Green Building Council (GGBC), Namibia Green Building Council (NGBC), Egypt Green Building Council (EGBC). To accelerate these councils' growth, African nations have capitalised on the opportunities presented by green technologies (Hafner et al., 2019). For instance, these councils and societies have been creating awareness of the importance of adopting green technologies, especially in the construction of buildings. The adoption of green technologies in building construction exhibits a spatial variation across the four seasons due to changes in environmental factors and energy demands. In winter, energy-efficient heating technologies become more critical, while in summer, cooling systems and insulation are prioritised (Pacheco et al., 2012). Spring and autumn often see a focus on renewable energy generation, such as solar and wind power, due to milder weather conditions (Zhang & Wang, 2020). These seasonal shifts influence the rate of adoption of various green technologies based on specific climate-related needs.

In Kenya, construction industries are adopting green building technologies (Jordan, 2011). Kenya boasts of several buildings that have been constructed in line with these green technologies, some of which are located in Nakuru City (United Nations, 2019). Nakuru Municipality formed a partnership with Kenya Green Building Society in 2018 through the Integrated Urban Structure Development Plan (IUSDP) to transform Nakuru into a Smart City through the construction of sustainable buildings. Nakuru County Government also partnered with the World Bank through the County Spatial Plan (2014 - 2024) in the project dubbed, 'Developing Partnership to Deliver Eco-friendly, Sustainable and Affordable Housing'. Nakuru City sources its energy from hydropower, solar, wind, geothermal and bioenergy (Osiolo, 2017). As a result, eco-friendly technologies are being adopted in the construction of buildings, roads, airports, railways, bridges and farming (World Bank, 2012). To achieve sustainable development in Nakuru City, there is a need to utilise green building technologies as well as introduce policies such as the polluter pays principle. These, therefore, aid in mitigating the negative impacts of the built-up environment as well as mitigating climate change. The city council is creating awareness among its population about the green global value chains while diversifying and moving toward more sustainable economic sectors. The city council is also adopting strong and sound policies and pursuing mutual international partnerships to improve the housing sector (Nakuru County Integrated Development Plans, 2023).

However, there are various determinants of the adoption of green building technologies in the construction of buildings (Koch, 2014). The adoption of green technologies in the construction of buildings in Nakuru City is influenced by different factors that have not been well defined. It's against this background that the study assessed the determinants of the adoption of green technologies in the construction of buildings in Nakuru City, Kenya. Green building technologies minimally disturb the natural environment and do not overuse or destroy natural resources but in turn create infrastructures that are secure, reliable, resilient and environmentally friendly (Beatley, 2000).

1.2 Statement of the Problem

Rapid urbanisation has led to an increase in the demand for housing in Kenya, which is estimated at 200,000 additional units annually (Kagochi & Kiambigi, 2019). Rapid urbanisation has resulted in an increase in built-up environment in Kenya especially in cities and if not well planned will have far-reaching consequences to both humans and the environment. Nakuru City, having achieved City status in June 2021, has attracted massive infrastructure transformation. This build-up environment translates to high water and energy consumption, food insecurity, increased waste production and reduced green spaces. To address this, the Kenya and Nakuru County Governments and other stakeholders are encouraging the adoption of green technologies in the construction of buildings. However, the determinants of the adoption of green technologies in the construction of buildings in Nakuru City are not clear. These are issues the study sought to investigate. Information and data generated by the study is critical to the County Government of Nakuru in the enforcement and formulation of policies that partly contribute to the sustainable development of the city.

1.3 Objectives of the Study

1.3.1 Broad Objective

The broad objective of the study is to contribute to the understanding of the key drivers and barriers influencing the adoption of green technologies in the construction of buildings.

1.3.2 Specific Objectives

i. Examine the level of adoption of green technologies in the construction of buildings in Nakuru City, Kenya.
ii. Establish the socio-economic and environmental benefits of the adoption of green technologies in the construction of buildings in Nakuru City, Kenya.
iii. Determine the factors that influence the adoption of green technologies in the construction of buildings in Nakuru City, Kenya.

1.4 Research Questions

i. What is the level of adoption of green technologies in the construction of buildings in Nakuru City, Kenya?
ii. What are the socio-economic and environmental benefits of the adoption of green technologies in the construction of buildings in Nakuru city, Kenya?
iii. What are the factors that influence the adoption of green building technologies in the construction of buildings in Nakuru City, Kenya?

1.5 Justification of the Study

Buildings where many people spend most of their time ought to be constructed in a way that enhances their health and general livelihood. It is essential that the construction of buildings adopts green technologies for the general well-being of the inhabitants, and the environment and to safeguard the world's limited resources (Malik & Marathe, 2021). Walker et al. (2019) reiterate that the UN came up with Sustainable Development Goals (SDGs) to help shape the planet into a sustainable place. Therefore, adopting green technologies in the construction of buildings is of great importance as it ensures that the buildings constructed are eco-friendly, safer, and sustainable as they use water and energy efficiently, minimise waste production as well as help address the issue of food insecurity as food is grown on the walls and rooftops of the green buildings. For instance, a study conducted in the United States demonstrates that the decline in public health was partially a result of the increased use of unsustainable houses among households (Pollack et al., 2010). As a result, sustainable housing could spare governments and policymakers from having to pay more for healthcare services (Darko et al., 2019). However, this is driven by the people's ability to adopt green building technologies in infrastructural developments. Therefore, this study assessed the determinants of the adoption of green technologies in the construction of buildings in Nakuru City, Kenya. This contributes to the realisation of SDG no. 11, which promotes for sustainable cities and communities, the 2063 African Union Agenda, Kenya's Vision 2030, the National Construction Authority (NCA) Act of 2011 as well as Kenya's government manifesto on sustainability and affordable housing in the project dubbed 'National Housing Corporation Strategic Plan 2023 – 2027'. The study also forms a basis for policymakers, stakeholders, and advocates in the formulation and implementation of proper strategies for the adoption of green building technologies.

1.6 Scope of the Study

The study was conducted in Nakuru City. The choice of the study area was informed by the fact that Nakuru, being the youngest city in Kenya after Eldoret City, has attracted more people and buildings with an emphasis on sustainable building infrastructures (Nakuru County Integrated Development Plan, 2023 - 2027). The study sites were Section 58, Milimani and Naka estates. This is because according to the Town and County Planners' Association of Kenya (2021), these estates are the highest ranked in terms of sustainable infrastructural development and sanitation. The data collection phase took place between the months of December 2023 to March 2024. This study assessed the determinants of the adoption of green technologies in the construction of buildings, with specific regard to owned/self-occupied residential households only. This is because there are far more residential buildings than commercial or industrial buildings in Kenya (KNBS, 2019). Therefore, regardless of the culture/belief, promoting green practices in residential construction can lead to widespread adoption due to the large number of these buildings. As a result, this widespread influence can have a more substantial cumulative impact on sustainability efforts.

1.7 Limitations of the Study

The researcher anticipated facing challenges such as the unwillingness of the respondent to provide adequate information due to the tight working schedules as well as some logistical challenges, such as access to research sites and coordination with the respondents. This challenge was however addressed through booking appointments with the respondents and being flexible to fit into their schedule. The logistic issue was addressed through planning and coordination of research activities in advance and establishing partnerships with local organisations/authorities to facilitate access and collaboration.

1.8 Assumptions of the Study

i. The information provided by the respondents was factual, honest and not biased.
ii. The respondents are aware of the green building technologies in the market.

1.9 Definition of Terms

Barriers/drivers of adoption: refers to the factors that either facilitate or hinder the acceptance, use, and integration of green technologies in the construction of buildings by the society/community. They are classified as either social, economic or environmental.

Construction Industry: refers to the industrial branches of manufacturing that incorporate green technologies in the construction of buildings as well as renovating, repairing and maintaining them.

Green Building Council: refers to the bodies that have been bestowed with the authority to give the criteria, evaluation and rating system for green buildings.

Green Building Technologies: the term was used to refer to the use of science and advanced technologies in the construction of self-sustaining buildings to have infrastructures that positively enhance the quality of life and are less polluting to the environment. They include energy and water efficiency technologies (use of solar and wind energies, glass walls, smart appliances, water collection and purification systems), waste minimisation as well as green roofs/walls where small-scale farming is practised (US Environmental Protection Agency, 2014). The term has been interchangeably used as "Green Technologies" in the study.

Green building: a green building is an infrastructure that mitigates or eliminates harmful environmental effects. The building in its design, construction, maintenance, operation, and demolition, can maintain or improve the quality of life and that of the environment. This means that the building can sustainably promote water and energy efficiency, waste minimisation and promote food security.

Household: refers to a group of people who live together in the same residence and share common living arrangements.

Household Head: refers to the person in the house who is responsible for making decisions.

Level of Adoption: refers to the degree or extent to which green building technologies are accepted, used, and integrated into society.

Owned/self-occupied residential households: the term was used in this study to refer to a residence, owned and occupied by the owner throughout the year for personal use without being rented out.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This section interrogated relevant literature on the history of green buildings, the green technologies adopted in the construction of buildings, socio-economic and environmental benefits of the adoption of green technologies in the construction of buildings, factors that influence the adoption of green building technologies in the construction of buildings as well as the theoretical and conceptual framework.

2.2 History of Green Buildings

The first Earth Day was celebrated on April 22, 1970, during which public education on environmental protection was carried out, and the establishment of the United States Environmental Protection Agency which provides a clear history of green buildings, marked the beginning of the modern environmental movement (McCloskey & Pete McCloskey, 2020). Montreal Protocol, which restricted the use of chlorinated fluorocarbons because of their harmful effects on ozone, laid the foundations for the idea of green buildings in the 1980s (Brack, 2019). This was one of the earliest pieces of international environmental legislation. Another important step toward the development of green buildings was the establishment of the Committee on the Environment in the American Institute of Architects. It started promoting environmentally friendly construction designs with ideas like environmental friendliness and the promotion of sustainable architecture being pushed by law and international institutions.

The United States Green Building Council, established in the 1990s laid the groundwork for green buildings. The Earth Summit of 1992 had an impact on the creation of the infamous United Nations Framework Convention on Climate Change, which promoted sustainable growth to reduce greenhouse gas emissions. The second factor was Earth Day in 1990 which was successful in uniting 141 nations and 200 million people worldwide in the fight for environmental protection. Through the Kyoto Protocol, the first international effort to control GHG emissions occurred in the late 1990s.

According to Ching and Shapiro (2020), the main objective of the concept is environmental protection. Given that it took approximately 30 years for the concept of "green buildings" to be clearly defined and coined, it is crucial to make sure that these structures follow sound maintenance management procedures so that they perform as intended and help reduce the world's carbon footprint. The Inter-governmental Panel on Climate Change (IPCC) states that green buildings are vital as they help to reduce Green House Gas (GHG) emissions, stimulate environmental protection, and job creation, promote cost-savings, and increase productivity and human health. The breakdown of construction and demolition waste in landfills releases GHG, as well as the extraction and production of building materials, are some of the sources producing dangerous gases.

Green buildings provide a means for balancing the needs for socio-economic development and environmental sustainability as there is a rising global need to address climate change, sustainable development, create jobs and attract investments (Dhingra, 2021).

According to the United Nations Framework Convention on Climate Change [UNFCCC] (2015), different governments committed to minimising greenhouse gas emissions by 45 per cent by 2030. This target was set upon receipt of climate finance funding, technology transfer, as well as capacity building from the developed nations (Ferry & Eckersley, 2016). This was an aspiration to raise awareness of the use of environmentally friendly approaches in all sectors especially in the construction of buildings in cities to minimise the damage to the environment.

In Kenya, some of the principal regulatory authorities in the race to net-zero emissions include: - NEMA which was established in 2002 to implement environmental policies in all sectors within the country; the constitution that was promulgated in 2010; the NCA act of 2011 whose role is to raise awareness on the importance of constructing sustainable infrastructures, oversee the works of construction industries and coordinate its development; Climate Change Act of 2016; the Energy and Petroleum Regulatory Authority; and Nakuru County Integrated Development Plans. Article 10 of the Kenyan Constitution defines sustainability as one of the national values and guiding principles of governance that policymakers and legislators must adhere to (Constitution of Kenya, 2010). Article 42 guarantees everyone the privilege to a healthy and clean environment, which includes the rights to have the environment guarded for the benefit of both present and future generations through various legislation, especially those contemplated in Article 69, and to have environmental obligations fulfilled under Article 70. Article 69(1) requires the government to: support sustainable exploitation, construction, and consumption, create awareness, monitor, and protect the environment and natural resources, as well as equally share the resulting benefits; cooperate to reach and keep a tree cover of at least 10% of Kenya's total land area; inspire public participation in environmental monitoring, preservation, and conservation; and establish systems of environmental impact assessment, and environmental auditing (Nyarango, 2013). This means the elimination of processes as well as activities that are more likely to cause harm to the environment such as the use of fossil fuels in the construction industry.

According to the Climate Change Act (2016), there is an urgent need to combat the ever-increasing climate changes that are affecting our planet. These can be done through the creation of awareness and strict measures by different stakeholders especially in the construction industries. The Climate Change Act of 2016 was passed to enhance low-carbon technologies, boost productivity and minimise emissions levels by promoting strategies as well as the adoption of technologies that encourage low-carbon and climate-resilient growth; to enhance institutional capacities for public awareness, and engagement in climate change responses through educational campaigns, consultation, illustration, and access to information; and to mobilise and transparently manage public and other monetary resources for environmental change responses, and to strengthen the national governments' and county governments' collaboration on environmental change governance.

Even though Kenya contributes little to global greenhouse gas (GHG) emissions, several primary development initiatives highlighted in Vision 2030 imply Kenya's GHG emissions levels (OECD, 2019). As a result, the Kenyan parliament drafted the National Green Fiscal Incentives Policy Framework, tax policy, as well as other possible alternatives in priority areas with high GHG emission remediation potential that elevate sustainable development; mainstream carbon-free growth possibilities into national and county government planning operations and systems; and put mechanisms in place to determine a GHG emissions inventory to attain effective and efficient collection, tracking, sharing, and proper monitoring of GHG emissions.

Furthermore, the constitution of Kenya guarantees the right to "a healthy and clean environment, accessible and adequate housing as well as a reasonable standard of sanitation to every citizen." These liberties are upheld by the country's development blueprint – the Vision 2030 which identifies building and infrastructure development as key pillars. This vision has been captured in the Country's Green Economy Strategy and Implementation Plan 2016-2030 (GESIP) and the National Climate Change Action Plan which guide the country's transformation to an inclusive green economy anchored on a low-carbon climate and resilient development pathway.

2.3 Green Technologies Adopted in the Construction of Buildings

2.3.1 Water Efficient Technologies

Water is a renewable, but finite resource with global, regional and national constraints (Jacobs, 2012). Water management is one major economic and environmental benefit brought about by green technology (United Nations Water Agency, 2021). Sustainable water management advocates for the ability to meet water demands without hindering the ability of future generations to benefit from the same resource. On a global scale, having sustainable water means providing affordable access to a minimum of 20 to 50 litres of water required to sustain a life daily (Chen, 2016). Green et al. (2015) found that most of the World's groundwater and surface water supplies are at risk of overconsumption, with the demand exceeding the amount supplied by rain and snow melt. Industries account for 20% of total water demand with more-developed countries having a significantly larger proportion of freshwater needs for industries and homes than less-developed countries, where rain-fed agriculture dominates (Sengupta, 2017). Balancing sustainability requirements with the conventional view of industrial mass production creates several complexities for industries. According to the Energy Consumption and Optimisation Report (2016), one of the most pressing concerns is globalisation and how to spread the benefits of industrialisation globally while avoiding unsustainable impacts on water and other natural resources.

According to the United Nations Water Agency (2021), more than 80% of industrial and societal wastewater flows back into the ecosystem without being treated or reused. Apart from water recycling, new technological innovations are being employed to help speed up the process of providing safe drinking water. According to Cheah et al. (2015), a new application of anaerobic granular systems is applied in wastewater treatment and is linked to certified emission reduction or carbon credit under the Kyoto Protocol. This is an opportunity for construction industries to use green technology as they will be able to recycle the wastewater (Ranade & Bhandari, 2014). More than half of the world's population resides in urban areas, and by 2050, more than two-thirds of the world's population will be living in cities (World Population Prospects, 2019). Furthermore, the majority of this growth is expected to occur in developing countries, which have limited capacity to deal with such rapid change and result in an increase in the number of people living in slums, and insufficient water and sanitation facilities (Roy et al., 2016). As a result, the development of water resources for economic growth, social equity, and environmental sustainability is inseparably linked with the development of cities for long-term viability and this is being realised by the incorporation of the concept of green technologies in the construction of buildings.

One significant issue with water use is that, in many places, the aquifer that supplies the water cannot keep up with the rising demand and therefore, green technologies are advocating for the construction of buildings that rely more on water that is harvested, used, filtered, and reused on-site as much as possible (Gou, 2019). Designing for dual plumbing that reuses water for toilet flushing, grey water recycling, pressure reduction, or even underground rainwater storage can help safeguard and conserve water over the life of a building. By using water-saving devices like low-flow showerheads, low-flow taps as well as ultra-low flush toilets, wastewater is reduced substantially.

Nakuru City, which is situated in the Great Rift Valley of Kenya, faces significant problems related to water scarcity, increased population and urbanisation (Mwanzia & Misati, 2013). As a rapidly expanding urban area, Nakuru City fights with increasing demands for water supply, sanitation and sustainable water management. This comes after the elevation of the former municipality into a city in December 2021. In response to these problems, there has been growing interest in the adoption of water-efficient technologies to enhance water conservation, reduce water consumption, as well as improve water resource management in the city. The adoption of water-efficient technologies holds many fortunes for addressing water scarcity, enhancing water resilience, as well as promoting sustainable urban development in Nakuru City (Peletz et al., 2021). Rainwater harvesting systems, greywater recycling, use of water-efficient fixtures, and smart water management systems represent a diverse number of strategies that could help optimise water use, reduce water waste, and ensure water security for the present and future generations. However, the successful implementation of water-efficient technologies in the City requires aggregated efforts from government agencies, civil societies and the private sector to overcome challenges, foster innovation and promote a culture of water conservation and stewardship (Gachuru, 2022). By tapping the full potential of water-efficient technologies, Nakuru City can emerge as a leader in sustainable water management practices, setting an example for other urban areas facing similar water problems across the globe.

2.3.2 Energy Efficient Technologies

Energy use reduction is another major benefit/opportunity associated with the use of green technology (Gabriel, 2021). Green technology brings about significant reductions in both energy consumption and greenhouse gas emissions. These benefits are a result of increased efficiency in both residential and commercial buildings. It has also made it possible to use renewable resources of energy such as geothermal, solar and wind energy as these sources are less expensive than traditional fossil fuels and offer an alternative to the growing reliance on imported fossil fuels (Abbasi & Abbasi, 2011).

In 2018, the Kenyan government committed to generating energy/power that would be 100% generated from renewable resources. By 2019, Kenya was already generating 87% of renewable energy (Kiprono & Kiplagat). They also stated that Kenya as a country is very rich in terms of natural resources and among them is geothermal energy which is harnessed in Olkaria and Menengai Geothermal power plants, wind energy harnessed in Ngong Hills Wind Farm (Kajiado County) and the Lake Turkana Wind Plant. Kenya is among the world leaders in terms of the solar power plants installed per capita and is mainly harnessed at the Lake Turkana solar energy plant and Garissa solar plant which is the largest in East and Central Africa (Bwire, 2019). Other renewable sources of energy include biofuels such as ethanol procured from local sugarcane manufacturers in Western Kenya and is used in cooking stoves by both rural and urban dwellers. In Kenya, most of the urban households have opted for the utilisation of solar energy, use of energy-efficient appliances such as motion sensor bulbs, use of natural ventilation instead of air conditioners as well as switching off power during the day as they've constructed houses using glass walls to take advantage of natural lighting/daylighting and consequently save on energy use as well as energy bills.

The initial construction cost of green buildings is high, but the long-term operating cost in terms of energy efficiency and water efficiency is relatively low (Ching & Shapiro, 2020). Green technology allows people to spend less money on electricity for heating their homes or offices with minimum or zero negative effects on the environment (Singh & Srivastava, 2022). This is because using renewable energy, such as wind power, solar power, and geothermal power among others reduces reliance on fossil fuels for electricity generation. This in turn helps reduce air pollution, which is important because air pollution is one of the leading causes of death globally (Kahraman & Sivri, 2021). Furthermore, because it reduces the energy and resources used to create, store, install and transport the building materials, green technology is important in reducing greenhouse gas emissions. A study by Nhamo (2016) shows that the transition to a green economy will not only protect the environment but will also provide long-term solutions to modern living problems. This shift will help reduce greenhouse gas emissions by lowering our reliance on fossil fuels, which are highly polluting and, if unchecked will be ultimately dangerous. Nhamo (2016) further states that other energy efficiency strategies include the use of sensors that detect motions and hence control lighting, systems for smart heating and cooling, improved ventilation by reducing the amount of air that escapes from the buildings, painting the outer walls of the buildings to reflect away excess sunlight and hence minimise absorption of heat by the walls of the buildings which adds up to urban heat island effect. Others use LED glow lights to save energy. Marlow (2014) asserts that LED bulbs consume approximately 75% less energy than incandescent bulbs. They also have a 25 times longer lifespan than the incandescent bulbs and hence help to reduce municipal solid e-waste over time.

Nakuru city faces the dual challenges of rapid urbanisation and energy scarcity (Maina & Oyugi, 2015). As the city continues to grow, there is a pressing demand to adopt energy-efficient technologies to mitigate the strain on limited energy resources, reduce greenhouse gas emissions, and enhance energy security. The adoption of energy-efficient technologies plays a crucial role in reducing electricity consumption and lowering carbon emissions (Ma et al., 2023). According to Mbaka (2022), LED bulbs, and solar systems, among other energy-efficient fixtures offer significant energy savings compared to other traditional methods such as the use of incandescent bulbs. In Nakuru City, initiatives to promote energy-efficient lighting have gained momentum, driven by government-led programmes as well as consumer awareness campaigns. By replacing outdated energy systems with energy-efficient alternatives, Nakuru City could achieve substantial reductions in electricity demand, enhance lighting quality, and realise cost savings for consumers and businesses. However, challenges such as affordability, availability, and consumer preferences pose barriers to the widespread adoption and acceptance of energy-efficient technologies. If the city can address all these issues, it could emerge as a model for energy-conscious urbanisation, setting an example for other cities in Kenya and beyond.

2.3.3 Waste Minimising Technologies

Water minimisation technologies are implemented in the entire process of waste reduction, waste collection, transportation, segregation as well as disposal of waste (Mulvaney, 2011). According to Gabriel and Stefano (2020), contamination of the environment due to hazardous waste from domestic, industrial and municipal has become a complex problem across the globe, including in Kenya. Sustainable green production advocates for the production of building construction products with low environmental impact which entails reduced environmental impact, and increased production efficiency as well as reusing and recycling to reduce waste generation (Singh & Kumar, 2018). Efficient collection of wastewater from the end users to obtain value and effective disposal also entails maximising the value of waste and reducing landfill size without negatively impacting the environment (Brebbia & Itoh, 2016). Sustainable green technology has numerous applications in environmental protection and waste management, brought about by incorporating this technology into the construction of buildings (Singh & Kumar, 2018). For example, the organic waste produced from the green buildings can be harnessed to produce organic fertilisers which are later used in rooftop farming in the same building. Through recycling and reusing plastics, metals as well as other waste products generated from the construction of green buildings, green technology can minimise waste generation and disposal costs (Rundle et al., 2019). Recovered materials can be subjected to energy recovery procedures as this also helps in reducing the amount of solid waste that ends up in landfills while also reducing the need to continually extract new raw materials from our planet, thereby helping to preserve natural resources (Majwa, 2019).

Waste minimisation has numerous positive environmental, human health and safety as well as economic impacts. Therefore, it’s an important goal for green building construction industries and their construction projects as it provides better protection of human health and safety by reducing exposures and generating less demand for waste disposal on the environment. It also lowers the GHG emissions such as volatile organic compounds from the production and transportation of construction materials (Ovodenko, 2017).

Waste minimisation technologies play a vital role in promoting sustainability, resource efficiency, and environmental stewardship for buildings in Nakuru City. Recycling, reusing, use of biodegradable materials, separation of waste products at the point of disposal, as well as On-site composting of waste products. On-site waste segregation and recycling represent fundamental strategies for waste minimisation in green buildings in Nakuru City. By setting up designated recycling stations and bins within the green buildings, occupants can separate recyclable materials such as paper, plastic, glass, and metal from other organic waste products (Gachuru, 2022). These materials can then be collected and sent to recycling facilities for processing and reuse, thereby diverting them from finding their way into landfills. In Nakuru City, initiatives to promote on-site waste segregation and recycling have gained traction, supported by public education campaigns, and waste management regulations, among others (Kirea & Omwenga, 2023). These management practices offer a wide range of solutions for minimising waste generation, conserving resources, and reducing environmental impacts. However, the successful adoption of waste minimisation technologies in Nakuru City requires collaborative efforts from government agencies, building developers, waste management companies, and community stakeholders to overcome challenges, foster innovation, and promote a culture of waste reduction and recycling. By embracing waste minimisation technologies, Nakuru City can demonstrate leadership in sustainable urban development, conserve resources, and promote a circular economy.

2.3.4 Green Walls/Roofs Technologies

The use of water is one of the most significant concerns in agriculture. Water is plentiful on Earth, but freshwater is scarce and only 3% of the water is fresh (Hering, 2020). Substantial quantities of it are used to cultivate the crops annually. Today, responsible urban planners are exploring ways to make our cities more environmentally friendly and sustainable. This is a vital part of the changes made to ensure that the world continues to thrive for future generations (Halisçelik & Soytas, 2019). Communities and cities seeking to be more sustainable are benefitting greatly from urban agriculture even though, cities have a scarcity of space, which makes it expensive and difficult to obtain. This has caused many urban dwellers to rely on methods such as Kitchen gardening, planting of vegetation in containers, and planting of vegetation on the walls/rooftops.

As stated by Urban Agriculture and Regional Food Systems (2019), growing fresh and healthy foods locally allows individuals to provide better health to their cities without the expense and carbon emissions associated with transporting produce across the nation or around the globe. As urban agriculture spreads, the problem of urban food scarcity will be solved, with fresh food being grown on the walls and rooftops of buildings.

Construction industries are integrating green building technologies into urban areas in numerous ways. Crops are being stacked by agricultural professionals to optimise space, light, and moisture (Tomar & Kaur, 2021). Engineers are creating vertical farming facilities on the buildings' walls and rooftops (Sabry, 2021). Aquaponic technologies are being used to rear the fish inside buildings or on the rooftops. Natural aquatic ecosystem features are installed in vertical aquaponic systems. Farmers incorporate fish into their farming practices to produce soil nutrients and oxygenate water supplies. The oxygenated water is then distributed throughout the vertical farms by specific aquaponic pumps (Ezzahoui et al., 2021). Other studies by Ezzahoui et al. (2021) show that building construction industries are creating autonomous smart sprinklers that can measure the exact amount of water required by specific plants using sensors that can capture the moisture content and temperature. This helps to avoid under or over-watering the crops using Internet of Things software hence minimising waste water.

Rainwater harvesting systems are also helping city farmers optimise their water supplies. These systems reduce stormwater runoff and farmers' reliance on freshwater. The system collects runoff water in barrels and purifies it using advanced purification devices (Haq, 2017). Purified stormwater is then used for irrigation on rooftop farms during dry periods. Growing bioengineered crops is another concept that the construction industries are embracing. Even though it's still a matter of public debate in Kenya, these biotechnologies are seen to bring about crops that can capture and store pollutants from the soil and this translates to a reduction in ecosystem degradation as these also prevent nutrient depletion as well as soil erosion (Srivastava et al., 2021). The bioengineered plants can grow in very minimal amounts of soil and water, and resist climate changes, pests and diseases hence increasing the production while mitigating environmental pollution as very little or no chemicals are used in the entire plant life (Molnar & Kinnucan, 2019). Through the incorporation of all these concepts as well as many others like the soil free hydroponics, aeroponics farms, hanging plants, container gardens and rooftop greenhouses by the construction industries especially in cities of Kenya, urban agriculture will be able to increase food security to sustain the urban population while also mitigating environmental effects such as urban heat island because the crops have a low albedo and thus help reduce extreme temperatures especially in summer (Krishnan et al., 2016).

2.4 Socio-Economic and Environmental Benefits of the Adoption of Green Technologies in the Construction of Buildings

The adoption of green technologies in the construction of buildings is widely recognised as an essential pathway towards achieving sustainable development, addressing environmental challenges, and promoting economic growth. Green technologies encompass a diverse range of practices, materials, and innovations designed to reduce environmental impact, enhance energy efficiency, and improve resource utilisation throughout the building lifecycle among others (Gou, 2019).

Buildings consume 40% of global energy and emit more than one-third of global greenhouse gas emissions (Malik & Marathe, 2021). According to Conant and Balint (2016), buildings are responsible for 39 per cent of total energy use, 12 per cent of total water usage, 68 per cent of total electricity consumption as well as 38 per cent of total carbon dioxide emissions. These effects are being recognised and addressed across the planet in specialised building design techniques and technologies aimed at reducing the dangers posed by buildings to the environment. These methods and technologies constitute the benefits of using green building technologies and are vital in addressing issues of climate change as well as lowering the negative impacts on the environment associated with built-up environments (Singh & Kumar, 2018). These buildings address the issues of high electricity costs, perennial water shortages, disposal of wastes, as well as occupants' health issues among many others such as addressing the issue of carbon emissions and global warming.

According to McGraw (2013), many construction industries anticipate that green buildings will comprise the majority of projects. Creating spaces that sustain health and well-being, as well as the economy and adaptability to a changing environment will be critical in speeding up sustainable development and delivering a higher standard of living in the long run. As stated by LEED, each year, green buildings reduce day-to-day expenditures as their modifications significantly decrease the operation costs by nearly 10% in just one year, with nearly 20% lower maintenance costs than the typical buildings. Green building technologies benefit people on a social, financial and environmental level (Ademilade, 2020). People are healthier and have a higher quality of life. Employee productivity increases when they work in a cleaner, more pleasant environment and this translates to a more prosperous economy (Gou, 2019). A growing number of authorities, organisations and companies are collaborating on raising awareness about sustainable construction. Standards such as LEED, BREEAM, Green Energy Africa, and Kenya Green Building Society among other international and local codes are increasingly governing and driving it (Hassan et al., 2021).

Continually, more and more people are moving towards sustainable development which is being pioneered by booming green building concepts and innovations (Dixon, 2015). This is critical in ensuring that the planet Earth remains habitable even for future generations. However, despite the rapid expansion of green building technologies, there are still many barriers influencing its widespread implementation (Gou, 2019). Additionally, the obstacles that stop the adoption of green buildings differ from one nation to another. Due to different country-specific aspects including demography, culture, economics, and location, factors that are more crucial in one place may be less crucial in another (Kühn & Hausdorf, 2010). Investigating the dangers and uncertainties associated with putting the green building idea into practice is also necessary. To create a suitable strategy for effectively marketing and implementing green building technologies, it's essential to analyse the drivers and barriers of the industry for cities such as Nakuru.

The adoption of green technologies in the construction of buildings in Nakuru City has a significant number of socio-economic and environmental benefits. By embracing sustainable construction practices and green building technologies, stakeholders in Nakuru City can boost economic returns, enhance environmental performance, and improve social well-being, thereby fostering sustainable urban development and resilience. However, realising the full potential of green technologies requires collaboration, innovation, and aggregated efforts from policymakers, developers, and communities to overcome barriers, incentivise adoption, and accelerate the transition towards a more sustainable built environment in Nakuru City (Filho et al., 2016). Through strategic investment, policy support, and stakeholder engagement, the adoption of green technologies can pave the way for a greener, healthier, and more resilient future for Nakuru City and its residents.

The use of green technologies in building development can create new job opportunities for Nakuru people, particularly in the green construction, maintenance, and energy sectors (Okeyo & Munene, 2024). Training programmes to improve skills in sustainable building practices could empower local workers and help Nakuru citizens find work in a burgeoning industry. Green buildings also require less energy and water, resulting in long-term benefits for

Nakuru residents and companies (Bollinger, 2011). This might be especially advantageous in Nakuru, where growing electricity and water expenses are a major worry.

In Nakuru, where urbanisation is increasing, the desire for sustainable, energy-efficient houses may increase the value of real estate and contribute to economic development. The city is rapidly developing, resulting in a surge in buildings (Cheraisi et al., 2021). By using green technologies, Nakuru may minimise its carbon footprint and contribute to climate change mitigation by utilising renewable energy and energy-efficient materials that reduce reliance on fossil fuels, resulting in cleaner city air. The technology also guarantees that natural resources are used efficiently, such as rainwater harvesting systems and energy-efficient appliances, which can help Nakuru save water and electricity. With the growing population, sustainable resource management is critical to avoiding resource depletion, decreasing construction waste, and improving waste management in Nakuru. Encouraging the use of eco-friendly materials can also assist in minimising the city's environmental impact and improve construction waste management efficiency (Filho et al., 2016). This is because green building practices frequently include elements such as green roofs, urban greening, and sustainable landscaping, all of which can help the city's biodiversity. Promoting green spaces in the urban area will also help combat the heat island effect, improve air quality, and provide natural habitats within the city.

Nakuru County Government regulations and urban planning initiatives are also important in promoting the use of green technologies (Nakuru County Integrated Development Plans, 2023). They can provide incentives, subsidies, or tax breaks to developers who incorporate green technology into their construction projects. Enforcing environmental regulations requiring energy efficiency or sustainable building standards can help encourage the widespread adoption of green technologies (Oduho et al., 2022).

2.5 Factors Influencing the Adoption of Green Technologies in the Construction of Buildings

Developing focused strategies and policies to support sustainability and environmental conservation requires an understanding of the factors influencing the adoption of green technologies in the construction of buildings (Zeng et al., 2022). They further said that age, gender, education, employment status, as well as household income levels among others, are just an overview of the demographic variables that play a significant role in shaping attitudes, behaviours, and preferences towards green building technologies across the globe. To create focused strategies, distribute resources efficiently, and handle the many demands and concerns of the people, legislators, researchers, corporations, as well as organisations must have a great understanding of the demographic features.

Gender refers to the distribution of people according to whether they are male, female, or other non-binary identities (Posel, 2011). Gender influences societal roles, and chances for participation in a variety of fields, including politics, work, education, healthcare, as well as access to resources among many others (Lee et al., 2013). Many countries are still experiencing gender inequality, with women frequently encountering obstacles to political representation, economic empowerment, and equal rights. To address gender inequality, advance gender equity, and advance policies and programmes that support the rights and well-being of all genders, it is imperative to have a thorough understanding of the gender characteristics of a population.

Age emerges as one of the most significant factors influencing the adoption of green technologies in the construction of buildings (Nguyen et al., 2019). Young generations (below 35 years) show a stronger inclination towards embracing sustainability and environmental protection. According to Dezdar (2017), research indicates that younger people are more inclined to value energy-efficient technologies and environmentally friendly amenities when buying or renting a home. Climate change concerns, a desire for healthier and more energy-efficient living spaces, and environmental knowledge are some of the elements driving this generational shift towards sustainability. To appeal to younger populations and satisfy changing market demand, developers and builders are consequently increasingly implementing green technologies into residential and commercial buildings (Dezdar, 2017).

Households' monthly income plays a major role in determining access to and adoption of green building technologies. According to Jacksohn et al. (2019), higher-income households are frequently able to invest in energy-efficient systems, renewable energy technology, and green building certifications because they have more disposable cash. Nonetheless, affordability continues to be a major obstacle that prevents lower-class households from using and benefiting from green technologies (Guta, 2020). Policymakers, developers, and financial institutions must put in place tailored incentives, subsidies, and financing mechanisms to address this inequality by lowering the cost and increasing the accessibility of green technologies for all income levels. Furthermore, creative financing options like pay-as-you-save plans, energy-efficient mortgages, and green bonds can assist in removing financial obstacles and encouraging the widespread adoption of green technologies across different socio-economic categories (Mulvaney, 2011).

Income and occupation reflect the distribution of individuals based on their earnings and employment status. According to Singh and Kumar (2018), in many countries, income inequality is a serious problem that affects social mobility, economic stability, and poverty. Employment status sheds light on changes in employment, the demand for certain abilities, and the dynamics of the labour market by illustrating how workers are distributed throughout various sectors, industries, and job categories. Designing policies and programmes to alleviate income inequality, support decent work, and advance economic possibilities for all population segments requires a thorough understanding of the employment situation of the people (Kibert, 2018).

Education characteristics capture the distribution of individuals based on their level of education, including primary, secondary, and tertiary education (Zeng et al., 2022). A person's socioeconomic standing, career prospects, and life outcomes are significantly influenced by their level of education, which also has an impact on their health, social mobility, and income (Nguyen et al., 2019). There are differences in educational achievement between various demographic groups, which have an impact on social justice, economic growth, and intergenerational mobility. Designing interventions, workforce development initiatives, and educational policies to enhance student achievement and lessen educational inequities requires an understanding of the education levels of the population (Darko, 2019). Education is crucial in influencing the adoption of green technologies in the construction of buildings. As societies become increasingly aware of environmental challenges and the importance of sustainability, education serves a critical role in driving change by shaping attitudes, knowledge, and behaviours. It also plays a transformative role in shaping the adoption and implementation of green building technologies (Omamo, 2012). He further found that by creating awareness, fostering innovations, and encouraging skills development, education enables individuals and organisations to adopt sustainable practices and technologies in building designs and construction. As institutions of learning, industry stakeholders, and policymakers continue to prioritise sustainability through education and training, the construction industry promotes positive transformation towards a greener, more resilient, and eco-friendly built-up environment for both the present and future generations (Mureya et al., 2020).

Therefore, factors such as age, income level, and education among others exert significant influence on the adoption of green technologies in the construction of buildings (Omamo, 2012). Individuals with higher levels of education, a younger age group, and households that have higher incomes are more inclined to favour green building methods and embrace sustainability. However, to guarantee the widespread adoption of green technology across socio-economic levels, it is still imperative to resolve discrepancies in affordability and access (Kibert, 2018). Other factors include cost-effectiveness and potential savings, government regulations and incentives, market demand and consumer preferences, improved occupant health and productivity, availability and accessibility of green building materials and lack of awareness or knowledge about green building technologies. Policymakers, developers, and stakeholders are therefore creating tailored policies and interventions to support sustainable urban development and create a more equitable and resilient built environment by recognising the distinct requirements, preferences, and restrictions of various demographic segments.

2.6 Summary of Knowledge Gaps

Adopting green technologies in building construction has become a crucial element in sustainable development globally. Numerous studies have investigated factors influencing the uptake of green technologies, particularly in developed countries. These studies frequently highlight factors such as cost, technical expertise, market demand, government policies, and environmental awareness as key determinants of adoption (Darko et al., 2017; Mokhlesian & Holmén, 2012). In Africa, studies have begun to address the relevance of these technologies, but most have been concentrated in larger economies like South Africa and Nigeria (Akinyemi et al., 2019).

In Kenya, the construction sector has witnessed a gradual shift toward sustainability. Several studies indicate that government regulation, environmental consciousness, and economic incentives play significant roles in promoting green technologies (Ndunge, 2020). Cost and financing challenges have been identified as critical barriers (Gitonga, 2019), while technical expertise remains a significant limitation due to inadequate skills and training programmes in green construction technologies. Despite the national push for sustainability, there is limited research specifically focused on Nakuru City. Nakuru is a rapidly growing urban centre with increasing construction activities, yet there is a knowledge gap regarding the specific factors driving or hindering green technology adoption in its construction industry. The city faces unique challenges such as limited awareness of green technologies, and insufficient local policies that could foster widespread adoption (Maina, 2021).

Another major factor influencing adoption is awareness among stakeholders and the general public. A few studies have touched on the low level of environmental awareness in Kenyan construction (Kimani, 2018), but there is little detailed analysis of how this awareness—or the lack thereof—plays out specifically in Nakuru City. Understanding the degree to which the dwellers in Nakuru are informed about the benefits and practices of green technologies remains a gap in the literature.

While there has been considerable research on the factors influencing green technology adoption globally and in Kenya, there is a specific knowledge gap concerning Nakuru City. Very few studies have focused on local determinants such as the unique economic, environmental, and regulatory contexts of Nakuru. Additionally, there is a lack of comprehensive data on how government policies, public awareness, and financial incentives affect the decision-making processes of stakeholders in the construction industry within Nakuru. Therefore, this study focused on understanding the level of adoption of green technologies in the construction of buildings as well as the specific socioeconomic and environmental factors that influence green technology adoption in Nakuru, and how they differ from other regions in Kenya. This can provide valuable insights into how local policies and strategies can be tailored to promote sustainable building practices in Nakuru City's fast-growing urban environment.

2.7 Theoretical Framework

The study was informed by the theory of sustainability.

2.7.1 Sustainability Theory

The main goals of this theory are to prioritise and integrate existing social, economic and environmental solutions to any issues that may fall under the heading of environmental and climate challenges. The theory was first used by Rachel Carson (1962) in her book "Silent Spring". In practice, the theory has influenced a wide range of policies and practices aimed at promoting sustainable development. These include the creation of awareness to reduce GHG emissions and combat climate change, promote the use of renewable energy, protect biodiversity and ecosystem services, as well as promote socio-economic equity. The tenets of this theory are utilised in this study to envision the adoption of green building concepts in present and future infrastructural developments. The model places a strong emphasis on protecting both human and natural resources through reduced emissions and reduced global warming. On the other hand, the model also supports the preservation of both biological and ecological phenomena. To maximise sustainability, planning, policy formulation and decision-making, stakeholders must be well-informed and conscious of the complexity of systems, especially those dealing with the construction of green buildings. The principles described here are tied to applied geography and related applications. Sustainability concerns include scales of consideration, links within and across systems, and conditions like adaptive capacity and resilience. These considerations are linked to the well-being and sustainability of humanity, natural ecosystems, social-ecological systems, and the Earth as a whole.

Therefore, the adoption of green technologies is impacted not just by individual variables, but also by the overarching goal of sustainability. This means that high acceptance of green technologies is crucial to attaining sustainable growth in the construction industry, but low adoption may signal barriers to properly implementing sustainability principles. Thus, the Sustainability Theory serves as a guiding lens for evaluating the adoption (or lack thereof) of green technologies, implying that the more these technologies match with sustainability goals, the more likely they are to be embraced.

2.8 Conceptual Framework

The relationship between the independent and dependent variables in this study was presented using a conceptual framework (Figure 2.1). The independent variables were the factors influencing the adoption of green building technologies such as; the level of awareness of green building technologies, the socio-economic characteristics of the population, cost-effectiveness and potential savings, market demand and consumer preference, and availability and accessibility of green building materials. The dependent variable was the increased/decreased adoption of green building technologies. The intervening variables were government policies and regulations such as; tax credits, the creation of awareness, and the provision of incentives, grants and Subsidies in green building projects. As a result, government policies play an important role in strengthening or weakening the relationship between the independent variables (factors influencing green technology adoption) and the dependent variable. These regulations can mitigate the impact of issues such as cost, awareness, and skill by either promoting adoption or, if ineffectual, serving as impediments. The interaction within the framework can be described as a dynamic process in which independent variables directly influence adoption levels, but government actions intervene to adjust this influence, so determining the outcome.

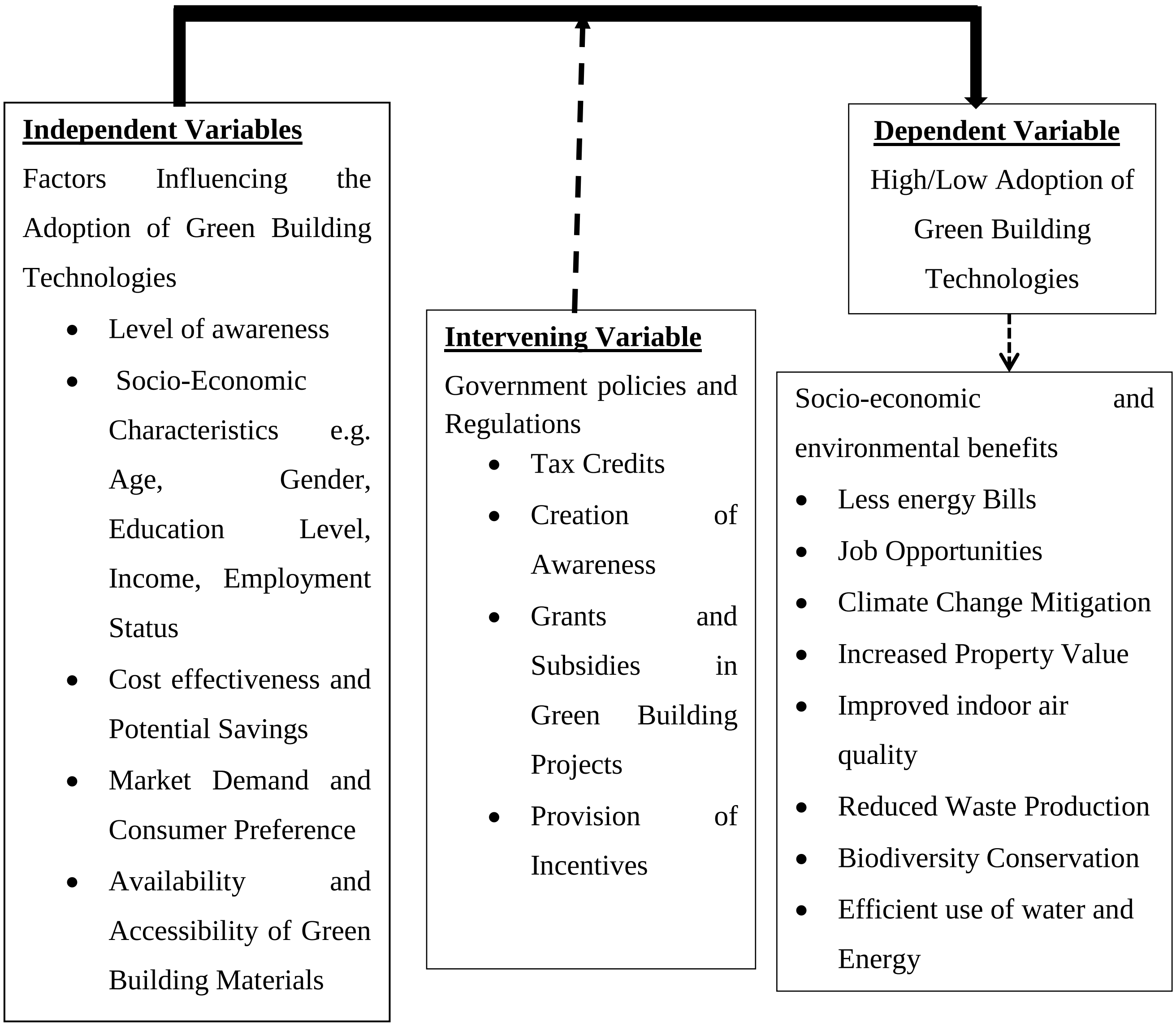

Figure 2.1: Conceptual Framework Showing the Relationship between Variables

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presented the description of the study area, research design, target population, sample size and sampling procedures, data collection, validity and reliability of data, data analysis and ethical considerations.

3.2 Description of the Study Area

This section described the location, administration, climatic condition, hydrology, population, economic activities and infrastructural development of the study area.

3.2.1 Location of the Study Area

The study area was Nakuru City, Nakuru County. Nakuru means *the place of the dust storms* in the Maasai language (CDIDP, 2018). According to the National Geographic Maps (2012), the County lies in the central part of the Kenyan Rift Valley, 31 km south of the Equator, at Latitude 0°17`47``S to 0°43`32``S and Longitude 35°31`48`` E to 36°26`2``E (Figure 3.1) with an elevation of 1850 m (6,070 ft.) above the sea level and covers an area of 7495.1 km^2. The city is 160km (100 miles) northwest of Nairobi (Capital city).

3.2.2 Administration

Nakuru City is the headquarters of Nakuru County. Nakuru is known for its economic, administrative and political power in the republic as a virtue of its geographical location (Ese & Ese, 2020). Hope (2011) asserts that due to its centrality, it's an economic gateway to the neighbouring parts of the country as well as neighbouring countries such as Uganda, Tanzania, Rwanda and Burundi. The major administrative sub-counties of Nakuru include; Kuresoi South, Kuresoi North, Molo, Njoro, Rongai, Subukia, Bahati, Nakuru Town West, Nakuru Town East, Gilgil and Naivasha.

3.2.3 Climatic Condition

The area experiences temperate climate throughout the year but temperatures drop significantly at night as well as during the cold season of June to August. Nakuru city is characterised by a subtropical highland climate (Maina & Muhindi, 2022). The area receives an average annual temperature of 17.5 °C and an average annual rainfall of 762 mm.

3.2.4 Hydrology

The drainage system of Lake Nakuru includes minor river basins like the Menengai crater and the lake area, and stretches outside the city, particularly into the Mau escarpment. Runoff from the city and the general drainage area is collected and deposited in the lake. Rainfall and recharge from streams including River Njoro, Makalia and Nderit also feed the lake pan. Groundwater may occur in fractured zones and weathered layers. These are layers of erosion that have developed between successive flows of lava; occasionally, they contain impermeable alluvial deposits known as cracked zones. The majority of the rocks in the region's geological succession are either impermeable or poorly permeable, and the aquifers are large but irregular.

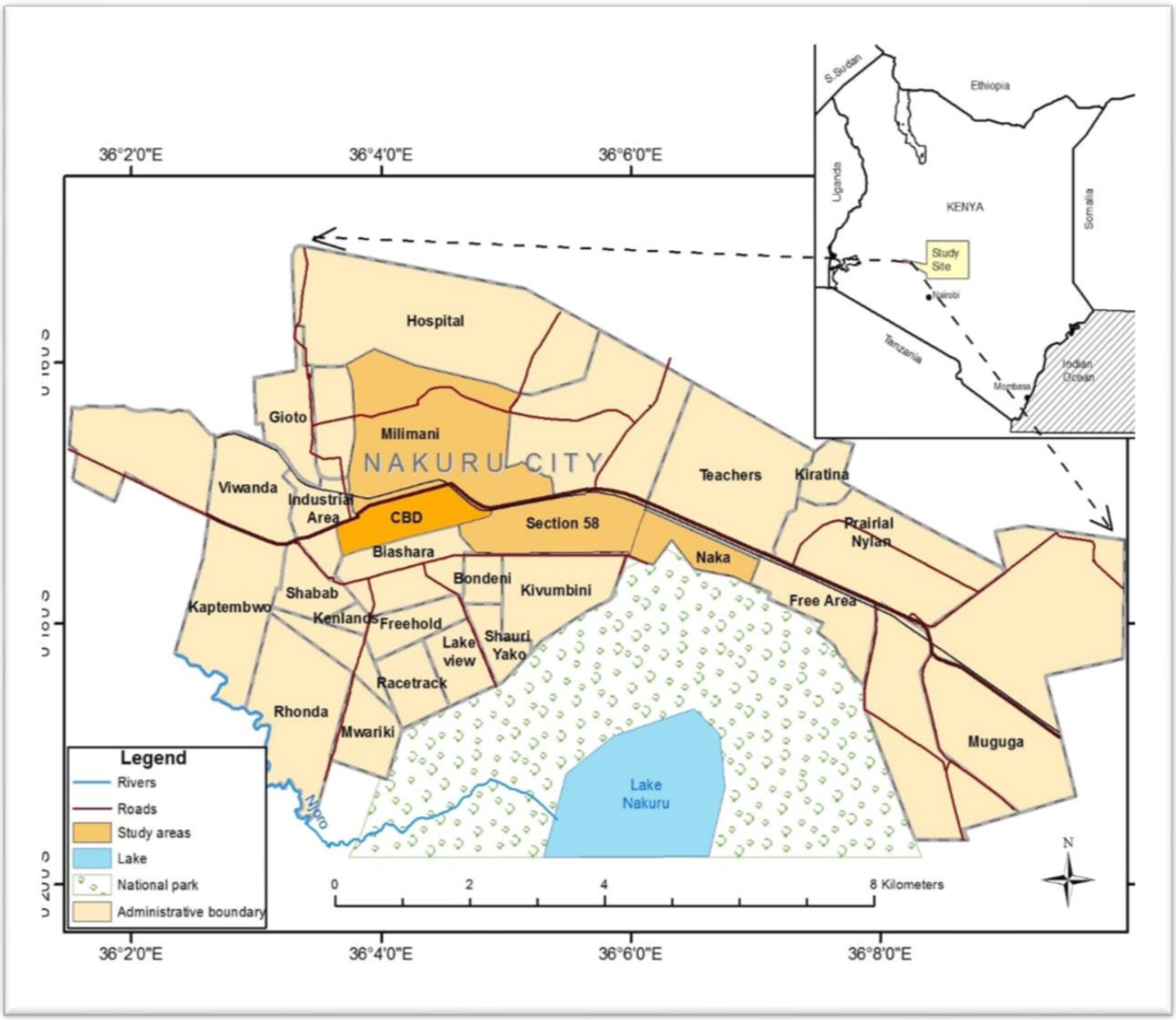

Figure 3.1: A Map of Nakuru City Showing the Study Sites

Source: Survey of Kenya (2022).

3.2.5 Population

According to the 2019 census data, Nakuru County has a population of 2,162,202 people with a population density of 290 km^2 and an annual growth rate of 3.4%. Accordingly, 50.2% of the total population are females and 49.8% are males. The rural population is 51.6% while the urban population stands at 48.4%. The largest inhabitants in the area are the Kikuyu and the Kalenjin. Nakuru City has a total of 11 estates with the highest ranked in terms of infrastructural development being Milimani, Section 58, and Naka.

3.2.6 Economic Activities

Nakuru City is a vibrant economic hub. The city's economy is diverse, including agriculture, manufacturing, tourism, and services. Agriculture remains a cornerstone, with fertile soils in the surrounding areas enabling the growth of crops like maize, beans, potatoes, and flowers, which are consumed both locally and internationally. The manufacturing industry is also prominent, with companies producing processed foods, drinks, textiles, and building materials. Tourism thrives in Nakuru because of its closeness to significant attractions such as Lake Nakuru National Park, which is well-known for its flamingo population and various fauna. The local economy also relies heavily on the service industry, which includes retail, banking, education, and healthcare. The city's strategic location along the Nairobi-Kisumu highway further enhances its status as a commercial and logistical hub, facilitating trade and the movement of goods across the region.

3.2.7 Infrastructural Development

The real estate sector in Nakuru City has experienced rapid growth, driven by both private and public sector investments. New residential estates, commercial buildings, and mixed-use developments are springing up, catering to the housing needs of the City's expanding population. Urban renewal projects are also in place to upgrade informal settlements and improve living conditions (KNBS, 2019).

3.3 Research Design

A mixed-method research design was adopted for this study. This is because it combines elements of both qualitative (descriptive data) and quantitative (numerical data) research methods to gain a better understanding of the research topic (Kothari, 2013). This research methodology was applied in this study as several instrumental and bounded cases were examined using multiple data collection methods such as semi-structured household questionnaires (quantitative data), and Key Informant Interviews (qualitative data).

3.4 Target Population

The target population in this study were all the self-occupied residential households (residential buildings) located within the 3 selected estates (Milimani, Naka, Section 58) in Nakuru City and the respondents were the household heads. The total target population was 1,191 households as obtained from the Department of Land, Physical Planning & Housing - Nakuru on October 2023.

3.5 Sample Size and Sampling Technique

3.5.1 Sample Size

Slovin's formula (Latpate et al., 2021) was used to obtain a sample size (n).

$n = N / (1 + Ne^2)$

Where:

n = Sample size

N =Total population (1191)

e = Margin of error (0.075)

n=1191/ (1+1191x0.075^2)

n=1191/ (1+6.699375)

n=1191/7.699375

n=154.6879 **n=155**

According to Shubina et al. (2023), a margin of error that ranges between 4% and 8% at a confidence level of 95% is acceptable for a survey. Therefore, this study used a marginal error (e) of 7.5%.

Table 3.1: Distribution of Sampled Households per Estate

Estate	Total no. of Households	Sample Size	Percentage (%)
Milimani	564	73	47.36
Naka	443	58	37.19
Section 58	184	24	15.45
TOTAL	**1191**	**155**	**100%**

3.5.2 Sampling Technique

Household data was stratified into the respective estates. A simple random sampling technique was used in the selection of the respondents to be included in the survey for each estate (Table 3.1). A random number generator was then used to generate the samples used in the study. This technique was relevant as it enabled a random selection of respondents whose characteristics permitted an understanding of research questions.

In this study, purposive sampling was also used to identify 13 key informants. There are eight registered firms in the city dealing with the architectural design of buildings under which there are several architects in each of the firms (Cheraisi et al., 2021). Therefore, one respondent from each firm was purposively selected giving a total of eight respondents. The choice of this class of respondents was made on the basis that they have adequate information, gender balance and their willingness to participate in the study. The study also interrogated two city planners in the Department of Lands, Physical Planning, housing and Urban Development in Nakuru City, who have adequate knowledge of the subject under study. The study also interrogated: one official from real estate developers i.e. developers with projects in Nakuru City; one official from Kenya Power knowledgeable about energy consumption patterns and initiatives to promote energy efficiency in buildings and one official from Nakuru Water and Sanitation Services Company (NAWASSCO) knowledgeable about water conservation measures in buildings.

3.6 Data Collection

3.6.1 Household Questionnaire

A semi-structured household questionnaire (Appendix I) was used to collect primary data relevant to the objectives of the study from a total of 155 households. The households were identified by the use of a Global Positioning System (GPS) as the coordinates were available. For convenience purposes, each household head was interviewed from their household. In the case where the household head was not present at the time of the survey, the questionnaire was left behind and collected after 2-7 days to allow the respondents to give responses at their convenience. The questionnaire was subdivided into four sections which included the respondent's demographic details, the level of adoption of green building technologies, socioeconomic and environmental benefits of the adoption of green technologies in the construction of buildings as well as factors influencing the adoption of green technologies in the construction of buildings in Nakuru City, Kenya. A 5-point Likert scale was used in the study to measure the extent to which the respondents agreed or disagreed with the sentiments under study. Weight values of the Likert Scale ranged as follows, 1.00-1.80, 1.81-2.60, 2.61-3.40, 3.41-4.20 and 4.21-5.00. Negative levels ranged from 1.00 – 2.60, Neutral levels 2.61 – 3.40, whereas the positive levels ranged from 3.41 – 5.00 (Roy, 2020). In this study, the survey was carried out in person so that the researcher could approve/observe some of the responses to avoid biased data. The data collection process took place between the months of December 2023 to March 2024.

3.6.2 Key Informants Interviews

A Key Informant Schedule (Appendix II) was used to collect qualitative data from the selected Key Informants. The Schedule was used to ensure uniformity during the interviews and also helped Key Informants offer quick insight on the research questions with the interviewer taking notes as the respondent answered. These interviews took place between the months of December to February 2024. Each key informant was interviewed individually for 25-40 minutes. The data obtained was then used to supplement the results obtained from the household surveys.

3.7 Validity and Reliability of Research Instruments

The validity and reliability of the instruments were verified by the instrument's pretesting. Before actual data collection, a pilot study was conducted in Kiamunyi as it possessed similar characteristics to the areas identified for this study. This enabled the researcher to familiarise with the study area with the aim of testing and refining the effectiveness of data collection tools while gathering preliminary information. Reconnaissance also enabled the researcher to identify potential factors that could constrain the actual data collection. Lessons learnt provided crucial input in the finalisation of the tools and implementation strategies.

Cronbach’s Alpha Scale test was used to measure the reliability/internal consistency of the questionnaire. This was made possible by running the reliability command in SPSS version 22. The reliability value was 0.72 and thus, the instrument was deemed reliable for use in the study. The pre-test also aided in making necessary adjustments to the questionnaire.

3.8 Data Analysis

The data collected was analysed using Microsoft Excel and SPSS. Percentages, means and Standard deviation were used to analyse the level of adoption of green technologies in the construction of buildings. Multiple Linear Regression was used to analyse the factors influencing the adoption of green building technologies. Qualitative data obtained from Key Informants was analysed by coding and arranging the data to look for similarities or differences, and subsequently finding themes and developing categories.

3.9 Ethical Considerations

The researcher introduced himself to the respondents, outlined the purpose of the research as academic, intended to generate scientific knowledge on the community and informed them that their participation was voluntary. This was done purposely to get their informed consent. The respondents consented as they were assured that the information they gave would be held confidential and their anonymity would be maintained in the research report. Ethical clearance (Appendix III) was sought from the Egerton University Ethics Committee. A research permit (Appendix IV) was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) and permission was sought from the County Administrator in Nakuru County before the data collection exercise.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents results and discussions based on the objectives of the study and includes the demographic characteristics of the household heads.

4.2 Response Rate of the Household Survey

During the household survey, 155 questionnaires were administered to the randomly selected respondents within the 3 selected estates in Nakuru City. Out of 155 questionnaires administered, 2 questionnaires were incomplete and could not be considered during analysis. Therefore, one hundred and fifty-three (153) questionnaires were considered during data analysis representing 98.71% response rate, which was considered satisfactory to make conclusions for the study. According to Mugenda and Mugenda (2003) a 50% response rate is considered adequate, 60% good and above 70% response rate very good. The high response rate was attributed to the fact that the researcher obtained the data on face-to-face contact. For convenience purposes, for those respondents that the researcher couldn't meet face to face, the questionnaire was left behind and obtained later after 2-7 days.

4.3 Demographic Characteristics of the Household Heads

The general bio-data generated from the respondents included their gender, age, household income, education and employment status. These aspects were important for the study as they influence the adoption of green technologies in the construction of buildings (Thomas & Abraham, 2020). Exploration of these aspects was also important for analysing their influence on the adoption of green technologies in the construction of buildings in Nakuru City, Kenya.

4.3.1 Gender of the Household Heads

Results in Figure 4.1 show that, 59.48% of the respondents were males while 40.52% were females. The high number of male-headed households could be attributed to the patriarchal social order in the African culture (Posel, 2011). Household heads are the pillars of the day-to-day decisions and solutions adopted at the household level (Lee et al., 2013). The study found that most of the households that had adopted green building technologies were male-headed. This is because males may have greater access to financial resources, decision-making power, and control over household assets, enabling them to invest in technology adoption, including green building technologies as compared to female-headed households (Posel, 2011).

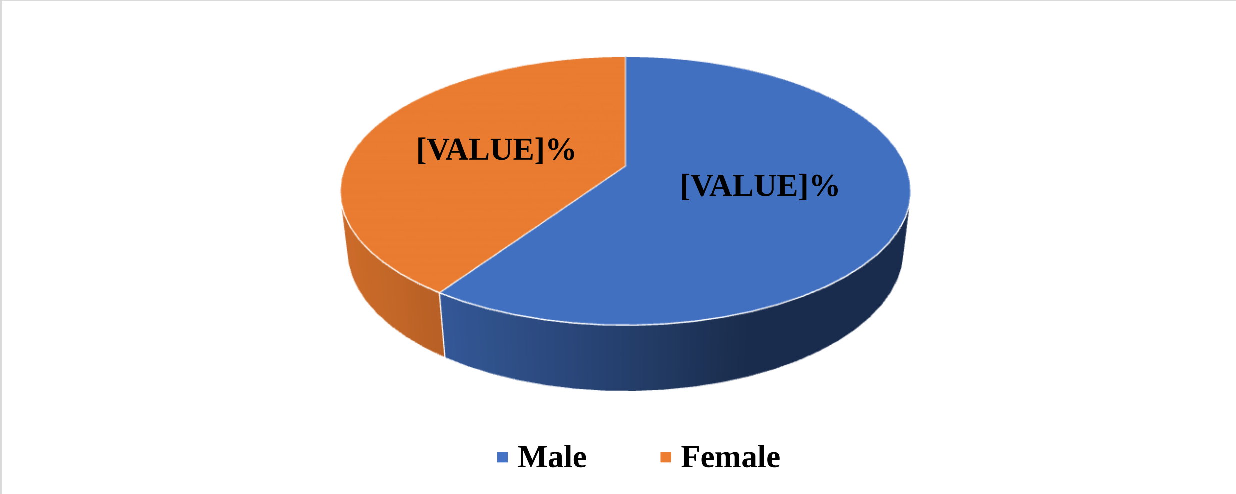

Figure 4.1: Gender of the Household Heads

4.3.2 Age of the Household Heads

Human responsibilities increase with age and therefore the study sought to know the age bracket of the household heads to come up with a picture of how the situation looks like in Nakuru city. The age of the household head was therefore an important consideration not only in the decisions made by an individual household but also in the general process of absorbing a technology. Results in Table 4.1 shows that 44.44% of the respondents were aged between 18-35 years, 36.60% ranged between 36-55 years, and 18.96% were aged 56 years and above. The high population of youths in the study area is a reflection of the general age structure in Kenya (KNBS, 2019). Adoption of green building technologies made by individual households varies according to several factors such as age (Koch, 2014). In terms of technology adoption, young people are found to easily adopt new technology as compared to the old (Wang et al., 2018).

Table 4.1: Age of the Household Heads

	Description (years)	Frequency	Number of Household heads (%)
Age	18-35	68	44.44
	36-55	56	36.60
	56 and above	29	18.96
	Total	**n=153**	**100.0**

4.3.3 Education Levels of the Household Heads

The educational background of the household head is a valuable resource that influences the housing sector as a whole (Guta, 2020). Results in Figure 4.2 show that, 4.58% of the household heads had completed primary education while 26.14% had completed secondary education. Due to their metropolitan location and the large percentage of respondents with tertiary education (69.28%), the household heads may have had the chance to discover how crucial it is to adopt green building technologies, as doing so is essential to the development of sustainable cities and communities. This also has a positive influence on the adoption of green technologies as it makes the head of the household more empathetic, sensible, and capable of evaluating the advantages of new technologies (Gikonyo, 2014).

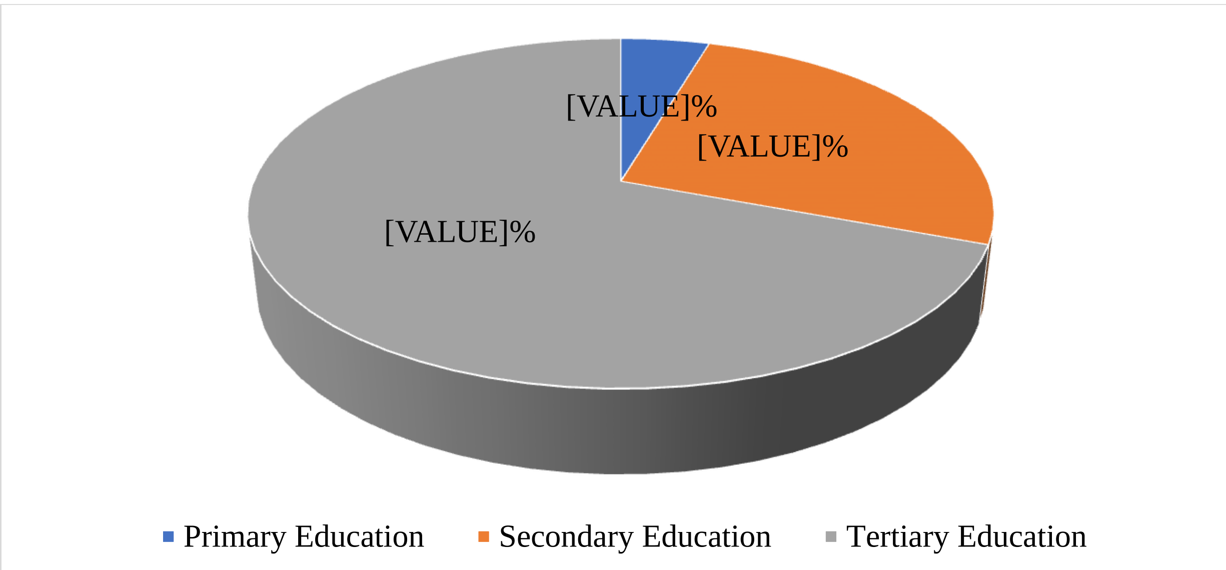

Figure 4.2: Household Heads' Level of Education

4.3.4 Employment Status and Households' Monthly Income

Employment status was an important factor to consider in this research as this translates to the amount of income that a household gets at the end of the month. Results in Table 4.2 show that 56.2% of the household heads were self-employed, 41.8% were employed and 2.0% were unemployed. This is in line with the findings in Kenya, conducted by the World Bank where self-employment status was reported at 61.4 % in 2022. This means that in Kenya, the main source of income is through self-employment (Simiyu, 2010). The study also found that the source of household monthly income for the unemployed household heads was from their partners. The monthly income levels were divided into four parts where 3.3% of households were earning Kes 10,000 and below, 19.6% of households earning between Kes 10,001 and Kes 50,000, 54.9% of households earning between Kes 50,001 and Kes 100,000, 22.2% were earning more than Kes 100,000 per month. According to the KNBS (2019), an economic survey which was conducted in Kenya found that the lower income group comprised households with a monthly income of Kes 23,670 and below; while middle income group comprised households with incomes ranging between Kes 23,671 and Kes 119,999 and finally the Upper-income group enjoy remunerations of above Kes 120,000. Therefore, the findings of this study concur with the KNBS (2019) report which indicates that most of the population ranked between the middle-income group and the high-income group. The study cross-tabulated the employment status with the households' monthly income as shown in Table 4.2.

The high rates of self-employment amongst the respondents can be attributed to the few formal employment opportunities available in the country with the high labour force seeking employment (Simiyu, 2010). This has forced the unemployed to seek solace in informal sector activities to meet their households' needs. The study also found out that most of the households were earning between Kes 50,001 and 100,000. These findings go along with the greater picture of the household income levels in Kenya where most households earn an average monthly income of Kes 80,000 (KNBS, 2019).

Table 4.2: Cross Tabulation of Employment Status against Households' Monthly Income

Employment Status	**Households' Monthly Income (Kes)**				
	10,000 and below	**10,001 – 50,000**	**50,001 – 100,000**	**100,000 and above**	**Total (n)**
Employed	1	11	41	11	**64**
Self-Employed	3	19	42	22	**86**
Unemployed	1	0	1	1	**3**
Total (n)	**5**	**30**	**84**	**34**	**153**

4.4 Level of Awareness of Green Technologies Adopted in the Construction of Buildings in Nakuru City, Kenya

This study analysed various aspects concerning the adoption of green technologies applied in the construction of buildings within the three study estates in Nakuru City, Kenya. To find out the level of adoption of the various green technologies applied in the construction of the buildings, household heads were first assessed on their awareness of the pre-determined green building concepts. The green building technologies were classified into four parts namely; Energy efficient technologies, Water efficient technologies, Waste minimisation technologies as well as Green walls/rooftop technologies. These were further divided into specific concepts regarding each technology to increase the data precision. Assessing the awareness of these technologies was essential for making informed decisions as it provides valuable insights into the adoption and understanding of the most appropriate ways of disseminating information regarding green building technologies. The summary of the findings is shown in Table 4.3.

From the data obtained in this study, awareness about green building technologies and their specific concept was relatively high. Most people were aware of energy-efficient technologies such as the utilisation of renewable energy sources (94.8%), natural lighting/daylighting (98.7%), use of energy-efficient fixtures (89.5%), use of natural ventilation instead of air conditioners (98.7%), and switching off power when not in use (98.7%). This was closely followed by green walls/roof technologies such as planting vegetation on the walls and rooftop (68.0%), planting vegetation in containers (93.5%), use of glass walls instead of concrete walls (73.2%) and kitchen gardening (98.7%). Third was waste minimisation technologies which included on-site composting of waste (61.4%), recycling of some waste products (85.0%), use of re-usable materials (95.4%), and separation of waste products at the point of disposal (83.7%) and use of bio-degradable materials (82.4%). Last was the water-efficient technologies which included harvesting rainwater (97.4%), reusing/recycling grey water (75.8%), use of leak-proof plumbing and pressure-reducing valves (69.3%) and use of water-saving fixtures (81.0%).

Therefore, the data showed that more than 60% of the population was aware of these concepts. This can be attributed to the high levels of education in the area where 96% of the population have at least gained a secondary level of education. This is significant as the education of the household heads tends to increase the level of awareness for most of the technological advancements. Dhadho and Okeyo (2023) found out that highly educated people tend to have higher levels of awareness of new technologies than those with less education.

Table 1.3: Awareness of the Green Building Concepts

Energy Efficient Technologies (% Awareness)		Water Efficient Technologies (% Awareness)	
Utilisation of renewable energy sources such as solar energy	**94.8**	Harvesting rainwater	**97.4**
Natural lighting/daylighting	**98.7**	Reusing/recycling of grey water	**75.8**
Use of energy-efficient fixtures	**89.5**	Use of leak-proof plumbing and pressure-reducing valves	**69.3**
Use of natural ventilation instead of Air Conditioners	**98.7**	Use of water-saving fixtures	**81.0**
Switching off power when not in use	**98.7**		
Waste Minimisation Technologies (% Awareness)		**Green walls/ Rooftop Technologies** (% Awareness)	
On-site composting of waste	**61.4**	Planting of vegetation on the walls and rooftop	**68.0**
Recycling of some waste products	**85.0**	Planting of vegetation in containers	**93.5**
Use of reusable materials	**95.4**	Use of glass walls instead of concrete walls	**73.2**
Separation of waste products at the point of disposal	**83.7**	Kitchen gardening	**98.7**
Use of bio-degradable materials	**82.4**		

Furthermore, this study assessed the levels of awareness (Figure 4.3) for the four green building technologies. These data were obtained using a 5-point Likert scale where **1** was denoted as (Not Aware);**2** (Less Aware);**3** (Moderately Aware);**4** (Much Aware); and **5** (Very Much Aware). Subsequently, weight values were attributed to each point. Not aware was valued at 1.00-1.80, less aware at 1.81-2.60, moderately aware at 2.61-3.40, much aware at 3.41-4.20

while very much aware was valued at 4.21-5.00. Therefore, as shown in Figure 4.3, energy-efficient technologies obtained a composite score of 3.44, water-efficient technologies 2.31, and waste minimisation technologies 2.35, whereas green walls/roofs obtained a score of 2.06. The researcher attributes the moderate awareness of energy-efficient technologies as a result of the many campaigns being raised across the globe in the quest to minimise greenhouse gas emissions and the overall over-dependency on fossil fuels (Hafner et al., 2019).

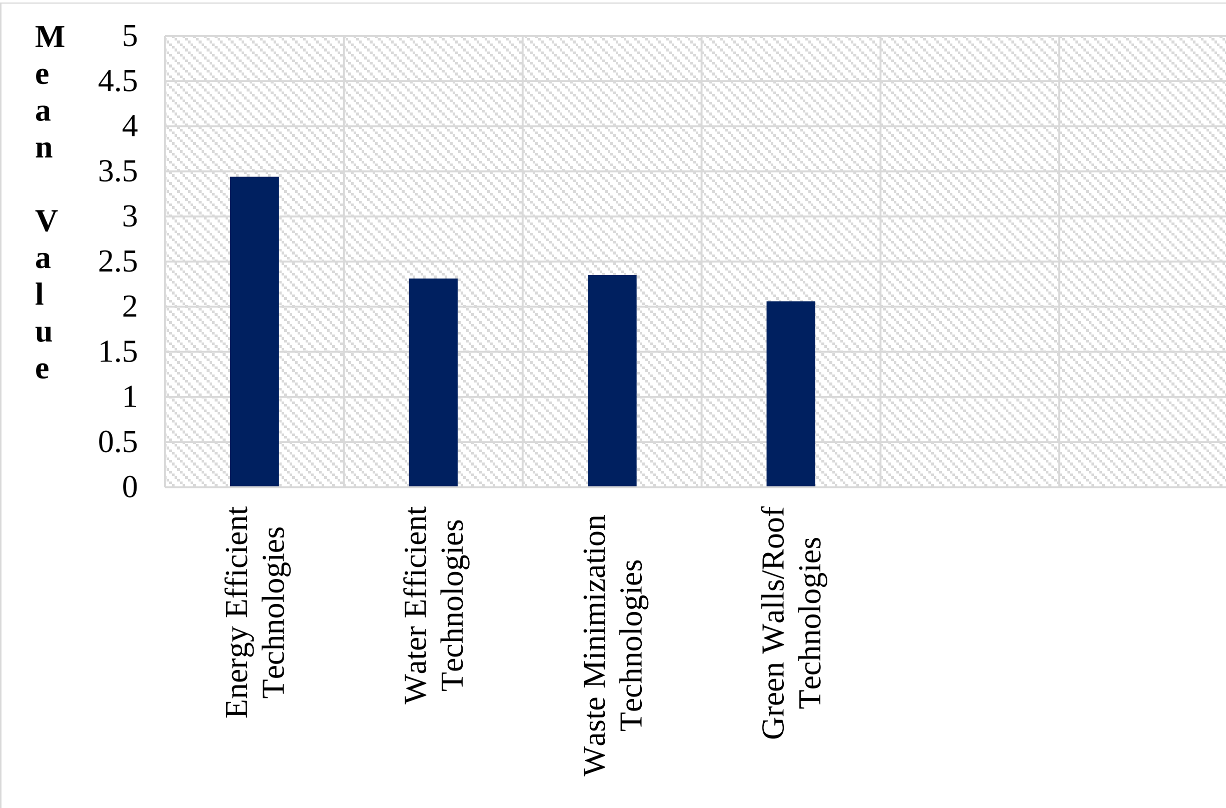

Figure 4.3: Level of Awareness for the Green Building Technologies

4.5 Level of Adoption of Green Technologies in the Construction of Building in Nakuru City, Kenya

The difference in the results between the levels of awareness and the levels of adoption is very minimal as evident in this study. This is also evident in the levels of adoption of the specific technologies where the most widely adopted technology was that of energy efficiency with a mean score of 3.47 while the least in this category was water efficiency technologies (2.05). Plate 4.1 shows a household in Naka Estate, Nakuru City that harvests rainwater and stores it in tanks.

Plate 4.1: A Household in Naka Estate, Nakuru City, Harvesting Rain Water

Source: Field Survey (2024).

The study attributes this variation to other socio-economic aspects such as age, gender, household income levels, as well as levels of education.

The level of adoption of the various green building technologies as well as their consequent concepts were measured using a 5-point Likert scale ranging from 1(no extent) to 5 (very high extent). In this study, the means from the Likert scale were interpreted as follows: No extent in the point range of 1.00-1.80, little extent 1.81-2.60, moderate extent 2.61-3.40, high extent 3.41-4.20, and very high extent 4.21-5.00. The results in Table 4.4 indicate that households had adopted at least one or more green building concepts in their buildings where the lowest adopted concepts were those in the Green walls/rooftop technologies with a mean score of 2.09. Plates 2.2 and 2.3 show households that have replaced large portions of the concrete wall with glass and another that's growing crops on the walls in Naka and Milimani Estates, Nakuru City respectively.

Plate 4.2 Household that Replaced Concrete Wall with Glass in Naka Estate, Nakuru City

Plate 4.3 A Household Growing Crops on the Walls in Milimani Estate, Nakuru City

Source: Field Survey (2024).

Results in Table 4.4 show that;- use of leak proof plumbing and pressure reducing valves, on-site composting of waste, planting of vegetation on the walls and roof top, use of glass walls instead of concrete walls, utilisation of renewable energy sources, reusing/recycling of grey water, use of water-saving fixtures, use of bio-degradable materials, recycling of some waste products, separation of waste products at the point of disposal, and planting of vegetation in containers had little to no extent levels of adoption (below a mean value of 2.60 on Likert Scale). Concepts with a moderate extent (2.61-3.40) level of adoption included;- harvesting rainwater, use of re-usable materials, use of energy-efficient fixtures, and kitchen gardening. Those with high to very high extent (3.41-5.00) levels of adoption were; - natural lighting/day lighting, use of natural ventilations instead of air conditioners, and switching off power when not in use. These results depicted low adoption levels of green building technologies. This was attributed to factors such as high initial construction costs, few personnel's to install the green technologies, insufficient knowledge/awareness amongst the population, low market demand, lack of enforcement of government policies and regulations. Another attribute was that most of the households earn an average monthly income of Kes 80,000 which might not be enough to adopt all concepts of green building technologies. High costs of green building materials accompanied by lack of government incentives are also some of the major barriers to the adoption of the technologies under study. The findings are consistent with other studies carried out in Ghana where the researcher found out that the most dominant barrier to green building technologies were government-related barriers, which highlights the government's role in promoting green building technologies adoption (Chan et al., 2018).

Table 4.4: Level of Adoption of Green Building Concepts

	Mean	**Std. Dev.**
Utilisation of renewable energy sources such as solar energy	2.58	1.32
Natural lighting/daylighting	3.82	1.07
Use of energy-efficient fixtures	2.94	1.28
Use of natural ventilation instead of Air Conditioners	3.56	1.15
Switching off power when not in use	4.43	0.78
Average	**3.47**	
Harvesting rainwater	3.20	1.39
Reusing or recycling greywater	2.41	1.36
Use of leak-proof plumbing and pressure-reducing valves	1.69	1.07
Use of water-saving fixtures	2.05	1.19
Average	**2.34**	
Use of bio-degradable materials	2.31	1.25
Recycling of some waste products	2.59	1.29
Use of reusable materials	2.99	1.25
Separation of waste products at the point of disposal	2.23	1.17
On-site composting of waste	1.77	1.26
Average	**2.38**	
Planting of vegetation on the walls and rooftop	1.26	0.58
Planting of vegetation in containers	2.50	1.20
Use of glass walls instead of concrete walls	1.50	0.84
Kitchen gardening	3.10	1.43
Average	**2.09**	

4.6 Methods of Disseminating Information about Green Building Technologies

This study also obtained data on the most appropriate methods for disseminating information about green technologies. Household heads were asked to give their opinion on the most appropriate method for disseminating information about green building technologies. These methods include; - seminars/Conferences/Workshops, internet, television, radio, newspapers/magazines/publications as well as billboards/banners (Figure 4.4).

Results in Figure 4.4 show that, the use of radio (81%), television (75%), and internet (57%) were the leading methods identified for disseminating information about green building technologies. Radio, television and the internet are innovations in science that shape communication in all spheres of human existence (Das et al., 2022). They transform communications in the best way for effectively transferring information on technologies. Modern technological information is disseminated to a wider range of audiences over a short time which increases levels of awareness as well as adoption. The Internet is also ranked as the most dominant channel for disseminating information about green building technologies in the 21st century (Oduho et al., 2022).

The use of newspapers/magazines/publications (9%), as well as billboards/banners (5%), were ranked poorly in terms of information dissemination. This however does not complement the famous quote by Malcolm X who once said "If you want to hide something from black people, put it in a book." The researcher attributes this low rating to the opinion that very few people are willing to spend that extra cash and time in purchasing and reading printed media such as newspapers (Goschnick, 2018). Those who can purchase these printed media might as well still be unable to find some of this crucial information as it might be embedded together with other information in the platform. In the case of billboards/banners, the targeted population is less as well and there is limited time for the viewers to absorb the message conveyed by these platforms. Due to limited space on these boards, the message is shallowly explained and therefore not everyone can conceptualise the meaning (Takran, 2015).

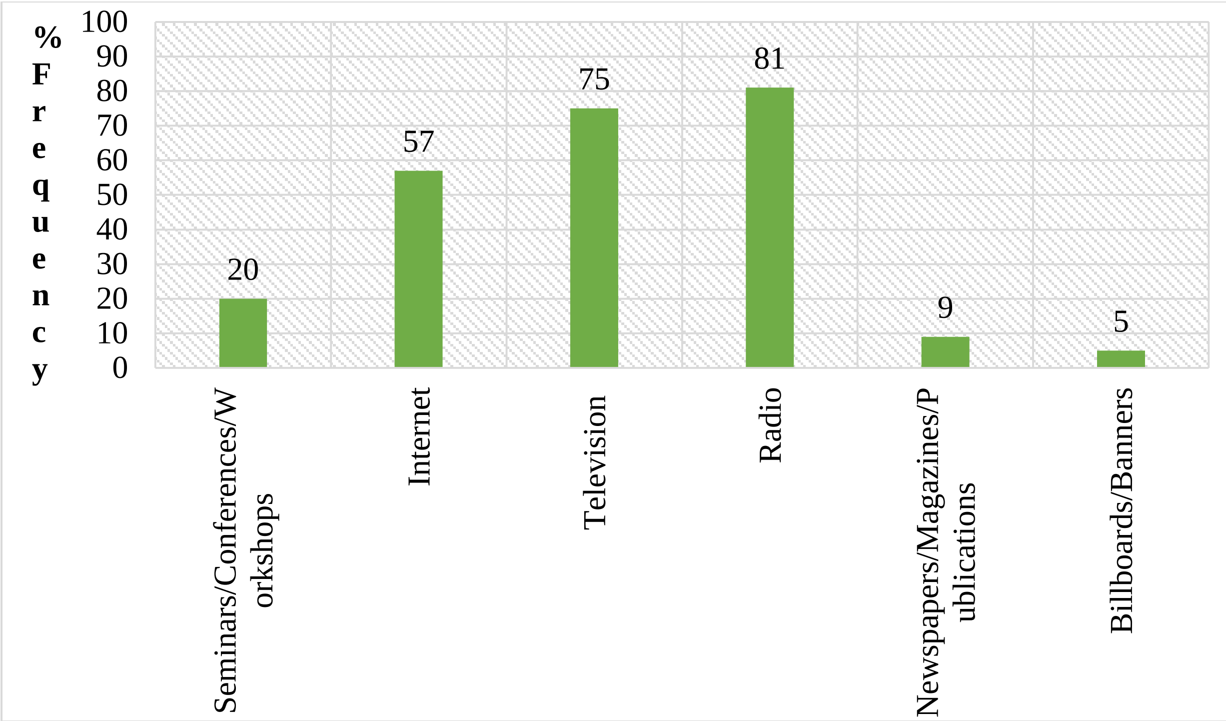

Figure 4.4: Methods of Disseminating Information about Green Building Technologies

4.7 Benefits of the Adoption of Green Technologies in the Construction of Buildings

This part described the socio-economic and environmental benefits of the adoption of green building technologies in the construction of buildings in Nakuru City, Kenya.

4.7.1 Socio-Economic Benefits of the Adoption of Green Building Technologies

The extent as to which the respondents agreed or disagreed with the identified socio-economic benefits was measured using a Likert scale (5-point). The scale value ranged from 1 (Strongly disagree) to 5 (Strongly agree). In this study, the means from the Likert scale were interpreted as follows: Strongly disagree in the point range of 1.00-1.80, Disagree 1.81-2.60, Neutral 2.61-3.40, Agree 3.41-4.20, and strongly agree 4.21-5.00 (Roy, 2020). The results in Table 4.5 show that the most perceived socio-economic benefit of the adoption of green building technologies was its ability to save on energy consumption (Mean value of 4.16), therefore fewer energy bills (4.14). This was followed closely by increased property value (4.06), improved quality of life (3.98), and finally the ability to create job opportunities (3.71). The top rankings of saving on energy consumption and less energy bills imply that stakeholders place significant value on the immediate financial benefits of green buildings. This indicates a strong preference for technologies and practices that lead to direct cost savings for homeowners or tenants. There is also a clear recognition that green buildings can enhance real estate value. This implies that homebuyers and investors might be willing to pay a premium for green buildings, driving demand for such properties in the real estate market.

These results correspond with those of Jacksohn et al. (2019) where it was found that one of the most influencing factors towards the adoption of green building technologies is the socio-economic benefits brought about by the implementation of green technologies in the construction of buildings. Similarly, Franco et al. (2021), found out that apart from paving the way for a low-carbon country, the development of green building technologies provided many socio-economic benefits to the residents through employment opportunities, partnerships, as well as the development of resilient and energy-efficient technologies. This therefore could also form an incentive towards enticing more and more people towards the adoption of green building technologies (Franco et al., 2021).

Table 4.5: Socio-Economic Benefits of the Adoption of Green Building Technologies

	Mean	**Std. Dev.**	**Std. error.**	**Var.**
Saves on energy	4.16	.854	.069	.730
Fewer energy bills	4.14	.956	.077	.913
Creation of Job opportunities	3.71	.964	.078	.930
Improved quality of life	3.98	.914	.074	.835
Increased property value	4.06	.919	.074	845
Average	4.01			

4.7.2 Environmental Benefits of the Adoption of Green Building Technologies

The building sector has harmful impacts on the environment, society, and the economy. According to the United Nations Environment Programme (2012), the construction industry at the global level, consumes up to 40% of the total energy and accounts for up to 30% of the total annual greenhouse gas emissions. However, the numerous advantages brought about by the incorporation of green technologies in the construction of buildings are a force to be reckoned. A 5-point Likert scale was used to identify the levels at which the people perceived the postulated environmental benefits with the influence they have on the adoption of green building technologies. The researcher opted to use the Likert scale as it allows one to obtain quantitative data from qualitative notions (Roy, 2020).

Results in Table 4.6 show that the most perceived environmental benefit of the adoption of green building technologies was its ability to mitigate climate change (Mean value of 4.52). This was followed closely by efficient use of energy (4.24), reduced waste production (4.20), and sustainable consumption of raw materials (4.18), biodiversity conservation (4.16), improved indoor air quality (4.10), and finally water conservation (4.08). The top ranking of climate change mitigation indicates a strong public recognition of the importance of reducing greenhouse gas emissions. The ranking of environmental benefits implies the public priorities and awareness levels regarding different aspects of green building technologies The emphasis on different benefits also highlights the perceived environmental and health impacts of green buildings. Improved indoor air quality and water conservation, though ranked lower, are critical for occupant health and resource sustainability, indicating areas for increased focus and improvement.

The researcher correlated this with the urgent needs of the global societies to combat climate changes which have proven to negatively impact the life of both the biotic and the abiotic resources on the planet (Letcher, 2021). Similar studies by Getu and Mulinge (2013) in Africa observed that climate change and variability impacted sub-Saharan Africa, especially the pastoralist women to overwhelming levels leading to loss of lives and properties. Due to the rising public concerns, much attention has been paid to implementing sustainability in the construction of buildings. However, oblivious to the numerous advantages attributed to these technological advancements, the conception of these technologies in developing countries such as Kenya is well below average as was evident in this study. Therefore, the respondents strongly agreed that the mentioned environmental benefits (Table 4.6) could also sound as an alarm to push people to adopt green building technologies.

Table 4.6: Environmental Benefits of the Adoption of Green Building Technologies

	Mean	Std. error.	Std. Dev.	Var.
Reduced waste production	4.20	.062	.764	.584
Water conservation	4.08	.059	.734	.539
Efficient use of energy	4.24	.053	.657	.431
Improved indoor air quality	4.10	.071	.882	.778
Climate change mitigation	4.52	.058	.717	.515
Sustainable consumption of raw materials	4.18	.059	.729	.532
Biodiversity conservation	4.16	.064	.787	.620
Average	4.21			

4.8 Factors Influencing the Adoption of Green Technologies in the Construction of Buildings

The socioeconomic characteristics of a population are said to influence the adoption of any given technology to a high degree (Lee et al., 2013). They included the gender of the household head, age, monthly household income, education as well as the employment status of the household heads. Multiple Linear Regression was used to show their influence on the adoption of green building technologies. The general formula of the model is as follows:

$Y=\beta0+\beta1X1+\beta2X2+\beta3X3+\beta4X4+\beta45X45+\epsilon$

Where:

- **Y** is the dependent variable (the adoption of green technologies in building construction).
- **β0** is the intercept, representing the baseline adoption level when all independent variables are zero.
- **β1, β2, β3, β4** and **β5** are the regression coefficients, which represent the change in Y for a one-unit change in the independent variables (Gender, Age, Monthly household income, Education and Employment Status respectively).
- **X1, X2, X3, X4**, and **X5** are the independent variables (Gender, Age, Monthly household income, Education and Employment Status).
- **ϵ** is the error term, capturing the variability in Y that is not explained by the independent variables.

The model summary is shown in Table 4.7.

Table 4.7: Model Summary of the Multiple Linear Regression

Model	R	R Squared	Adjusted R-Squared	Std. Error of the Estimate	Durbin-Watson
1	.608[a]	.369	.257	2.74976	1.726

The R-squared indicates the proportion of variance in the dependent variable that's explained by the independent variables. R-squared of 0.369 (Table 4.7) meant that 36.9% of the variance in the adoption of green technologies is explained by the factors mentioned above. This suggests that other variables not included in the model may also play a significant role in influencing the adoption of green technologies. An adjusted R-squared of 0.257 indicates that after accounting for the number of predictors, the model still explains about 25.7% of the variance in the dependent variable. This is slightly lower than the unadjusted R-squared, meaning that adding some of the predictors might not have improved the model's explanatory power significantly. A Durbin-Watson statistic was used to test for the presence of autocorrelation. A value of 2 means no autocorrelation and therefore, a value of 1.726 (Table 4.7) is relatively close to 2, which suggests that no serious issue of autocorrelation in the residuals. This was good, as it meant that the model's residuals were independent of each other, fulfilling a key assumption of regression analysis.

Thereafter, the regression analysis was conducted and the coefficients were shown in Table 4.8. From the Table, the coefficient of age (-0.2761*) had a significant influence on the adoption of green building technologies. At a 5% significance level, it indicated that as individuals grow older; they are less likely to adopt green building technologies. The possible reason could be resistance to change by the elderly where the old are more resistant to change and less likely to embrace new technologies, limited awareness or knowledge about green building technologies as well as the different lifestyle preferences and priorities that do not align with the principles of sustainability. These findings are in line with those of Rokanta (2017) who found out that in South Africa, older individuals are more financially conservative and less willing to invest in expensive technologies. They therefore prioritise immediate cost savings over long-term benefits, particularly if they perceive the technology as expensive or unaffordable.

In this study, the level of education (0.0304**) was significant at 5% and had a significant influence on the adoption of green building technologies. This shows that household heads that had higher levels of education were more likely to adopt green building technologies than those with lower levels of education. This is because education and outreach initiatives focus on increasing awareness, sharing knowledge, offering technical support, and highlighting the social, environmental, and economic advantages of green building technologies. This result reflects observations made by Quazi and Talukder (2011) who revealed that most people in Australia who had attained tertiary levels of education were more likely to adopt a technology. He further observed that Educational attainment can also help develop a favourable attitude towards technology.

The positive coefficient of employment status (0.0121**) (Table 4.8) at 5% significance level on the adoption of green building technologies indicated that individuals who were employed or self-employed were more likely to adopt green building technologies. This is because employed individuals typically have a more stable source of income as compared to those who are unemployed. This financial stability enables them to invest in green building technologies, which may initially require higher upfront costs but offer long-term savings through energy efficiency and sustainability. These results reflect the observations made by Ugur and Mitra (2017) who found out that in less developed countries, being employed often means having access to financial resources, credit facilities, and support networks that can facilitate the adoption of green building technologies. Therefore, employed individuals have greater access to financing options, such as green loans or energy efficiency mortgages, which in turn help cover the initial costs of installing green technologies.

The positive coefficient of monthly household income (0.0312**) (Table 4.8) on the adoption of green building technologies at 5% significance level suggests that higher household incomes are strongly associated with a greater likelihood of adopting green building technologies. This is because Individuals with higher incomes are more likely to afford the initial costs associated with installing green technologies, such as solar panels, energy-efficient appliances, or green building materials. Higher-income households also prioritise sustainability and environmental stewardship as part of their lifestyle preferences. They value the environmental benefits, energy savings, and health outcomes associated with green building technologies and therefore are willing to allocate resources towards adopting green technologies.

Sustainability aligns with their values therefore contributing to their overall quality of life, motivating them to invest in green technologies for their homes. These results are in line with the findings of Koebel et al. (2015) who found out that higher-income households in the United States as well as in Africa, had easier access to financing options for green building projects. This was because they qualify for preferential loan terms, lower interest rates, and specialised financing programmes designed to promote energy efficiency and sustainability in housing. Access to financing reduces the financial barriers to adopting green technologies and makes sustainable building practices more accessible to affluent households.

Table 4.8: Regression Coefficients of Factors Influencing Adoption of Green Technologies

Variables	**Coefficient**	**Std. Error**
Gender	0.0252	0.0398
Age	-0.2761**	0.0611
Level of Education	0.0304**	0.0413
Employment Status	0.0121**	0.0428
Monthly Household Income	0.0312**	0.0590

** denote 5% statistical significance level.

This study also assessed some other factors which had a significant influence on the adoption of green building technologies. The findings showed that the most dominant factor influencing the adoption of green building technologies in the construction of buildings was the low levels of awareness/knowledge about green building technologies. The data indicates that 79.1% of the respondents suggested that the deficiency in enough information about green building technologies impaired their adoption levels. This is because a lack of adequate knowledge regarding these technologies could prevent adoption by limiting access to resources and information, fostering misconceptions that these technologies are prohibitively expensive, and therefore impeding the ability to make well-informed decisions (Darko et al., 2019). Figure 4.5 outlines the results of some of the significant influencers in the adoption of green building technologies.

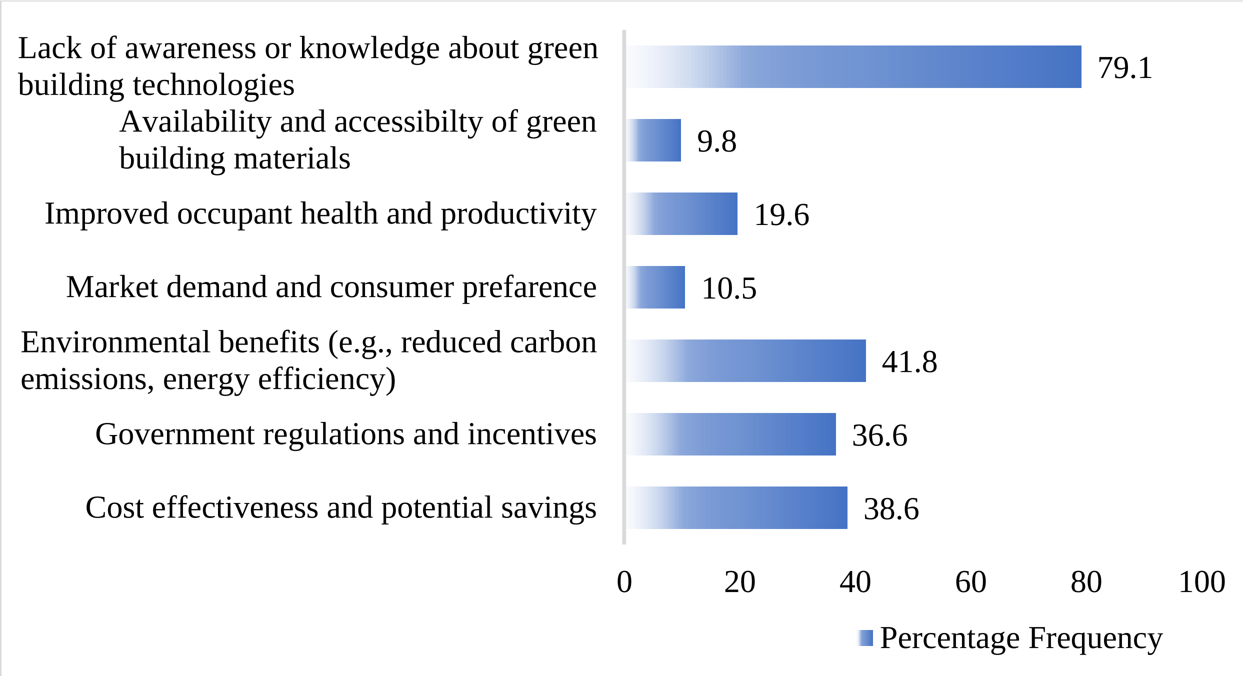

Figure 4.5: Factors Influencing the Adoption of Green Building Technologies

Similarly, this study assessed the influence of market demand for green buildings and sustainable practices in encouraging the adoption of green building technologies. This factor was purposely chosen because the corporate demand for sustainable buildings in sub-Saharan Africa is growing, but research shows that the supply is struggling to keep pace (Walker, 2019). Across 20 major global markets of the world, only 34% of the projected future demand for low-carbon workspaces will be met by 2050 (Arnell, 2022). A section of the key informants argued that market demand for green buildings is on the rise in Kenya due to the introduction of councils such as KGBS. Results obtained in this research showed that the market demand was highly influential (58.2%) in encouraging the adoption of green building technologies. Moderately influential was ranked at 39.9% while no influence at all was ranked at only 2%. The study also found out that 97.4% of the total respondents believed that the long-term benefits of green building technologies outweigh the initial cost of implementation.

Despite the rising need for sustainable cities and communities (SDG 11), developing countries such as Kenya are still experiencing challenges in adopting green building technologies (Mureya et al., 2020). From the results in Table 4.9, the main challenges facing the adoption of green building technologies were; insufficient knowledge/awareness about green building technologies (76.5%), high initial construction costs and lack of affordability (39.9%)as well as lack of enforcement of government policies and regulations respectively (39.2%). The researcher attributed these results to the lack of training, workshops and seminars among other platforms where the general public can be enlightened about green building technologies.

Key informants interviewed suggested that there is a need for the national government to take the initiative and create awareness to allow more people to adopt the technologies under study. This included tax reliefs, and material incentives among many others. The low monthly income levels for households in Kenya were another factor that the researcher attributed to the low adoption levels (Mwangi & Kariuki, 2015). Most households in Kenya are earning an average monthly income that is below KES. 80,000 (KNBS, 2019). This, therefore, makes it difficult for the population to save some of their income and use it to adopt a technology (Mwangi & Kariuki, 2015). The lack of enforcement of government policies and regulations ranked third as per the findings of this study. These are generally shaped by both logic and peoples' perceptions about the real world. Through the synthesis of literature, the researcher anticipated that if the government together with other stakeholders, organisations and institutions can work closely, a solution towards a better method for promoting the use of green building technologies could be found. Howe (2010) found that for countries to address the challenges influencing the adoption of green building technologies, there is a need for governments, organisations as well as institutions to work hand in hand for the long-term sustainability of the entire planet.

Table 4.9: Challenges Facing the Adoption of Green Building Technologies

Challenges	**% Freq.**	**Rank**
Insufficient knowledge/awareness about green building technologies	**76.5**	**1**
High construction costs and lack of affordability	39.9	2
Lack of enforcement of government policies and regulations	39.2	3
Limited access to financing or funding options	15.0	4
Few personnel to install green building technologies	13.7	5
Resistance from construction industries to adopt green technologies	7.2	6

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions and recommendations based on the analysed responses of the determinants of the adoption of green technologies in the construction of buildings in Nakuru City, Kenya.

5.2 Summary of Findings

The summary of findings has been discussed as per the study objectives. A 5-point Likert scale ranging from 1(no extent) to 5 (very high extent) was used for the first objective. Mean values from the Likert scale were interpreted as follows: No extent in the point range of 1.00-1.80, little extent (1.81-2.60), moderate extent (2.61-3.40), high extent (3.41-4.20), and very high extent (4.21-5.00). Thematic analysis was used in the second objective while multiple linear regression was used in the third objective.

5.2.1 Level of Adoption of Green Technologies in the Construction of Buildings

The level of adoption of green building technologies in the construction of buildings in Nakuru City was as follows: use of leak-proof plumbing and pressure-reducing valves, on-site composting of waste, planting of vegetation on the walls and rooftop, use of glass walls instead of concrete walls, utilisation of renewable energy sources, reusing/recycling of grey water, use of water-saving fixtures, use of bio-degradable materials, recycling of some waste products, separation of waste products at the point of disposal, and planting of vegetation in containers had little to no extent levels of adoption (below a mean value of 2.60 on Likert Scale). Concepts with a moderate extent (2.61-3.40) level of adoption included;- harvesting rainwater, use of reusable materials, use of energy-efficient fixtures, and kitchen gardening. Those with high to a very high extent (3.41-5.00) levels of adoption were; - natural lighting/daylighting, use of natural ventilation instead of air conditioners, and switching off power when not in use. These results (Table 4.4) depicted low adoption levels of green building technologies.

5.2.2 Socio-Economic and Environmental Benefits of the Adoption of Green Technologies in the Construction of Buildings

The results (Table 4.5) show that socio-economic benefits such as the creation of job opportunities, and improved quality of life had a high extent level of adoption (3.41-4.20), while benefits such as saving on energy, less energy bills and increased property value brought about by the use of green building technologies had a very high extent level of adoption. Therefore, all the aforementioned benefits had a significant influence on the adoption of green technologies in the construction of buildings.

The results (Table 4.6) showed that environmental benefits such as reduced waste production, water conservation, improved indoor air quality, sustainable consumption of raw materials and biodiversity conservation had a high extent level of adoption (3.41-4.20), while efficient use of energy and climate change mitigation had a very high extent level of adoption (4.21-5.00).

5.2.3 Factors Influencing the Adoption of Green Technologies in the Construction of Buildings

Several factors were identified to have a significant influence on the adoption of green technologies in the construction of buildings (Table 4.7). Their coefficient values were used to show their significance and they included: the age of the household head (-0.2761*), education level (0.0304**), income levels (0.0312**), and employment status of the household head (0.0121**). Other factors were also said to influence the adoption of green technologies in the construction of buildings. From the household survey, 79.1% of the households observed that the most significant factor was lack of awareness/knowledge about green building technologies, followed by cost-effectiveness and potential savings (38.6%), government regulations and incentives (36.6%), improved occupant health and productivity (19.6%), market demand and consumer preferences (10.5%), availability and accessibility of green building materials (9.8%). The main challenges facing the adoption of green building technologies were; insufficient knowledge/awareness about green building technologies as observed by 76.5% of the households, high initial construction costs and lack of affordability (39.9%)as well as lack of enforcement of government policies and regulations respectively (39.2%).

5.3 Conclusions

Several factors play a role in the adoption of green building. In this context, the study makes the following conclusions.

The examination of the level of adoption of green technologies applied in the construction of buildings in Nakuru City reveals both promising advancements and persistent challenges. Through comprehensive analysis, the study found that Nakuru City has made significant strides towards embracing sustainable construction practices, with a notable uptake of certain green technologies. These include energy-efficient systems; vertical farms on the walls and rooftops of buildings; and kitchen gardening, as well as, rainwater harvesting systems, which have been increasingly integrated into building projects in the city. However, despite these advancements, the overall level of adoption remains varied, with certain green technologies facing slower uptake compared to others. Factors such as cost considerations, regulatory constraints, limited awareness, and technological barriers continue to influence adoption rates and pose challenges to the widespread adoption of green technologies in the construction of buildings. By prioritising sustainability and fostering a conducive environment for innovation and investment, Nakuru City can position itself as a leading example of environmentally responsible urban development.

The evaluation of the socio-economic and environmental benefits of implementing green technologies in the construction of buildings in Nakuru City, Kenya, highlights the significant potential of sustainable construction practices to drive positive outcomes across multiple dimensions. This study found that the adoption of green technologies not only offers tangible socio-economic advantages but also contributes significantly to environmental conservation and resilient-building initiatives. The socio-economic benefits include improved energy efficiency, reduced energy bills, enhanced occupant health and productivity and job creation opportunities within the green technology sector. However, the realisation of these benefits is subject to the resolution of several challenges including cost considerations, regulatory constraints, and insufficient knowledge/awareness about green building technologies among others. Despite the challenges, Nakuru City stands in a good position to capitalise on the socio-economic and environmental benefits of green technologies through targeted interventions and strategic collaborations. By harnessing the transformative potential of sustainable construction practices, Nakuru City can position itself as a leader in sustainable urban development, driving inclusive growth, and environmental stewardship.

The evaluation of the factors influencing the adoption of green technologies in the construction of buildings in Nakuru City highlights the complex relationship between these factors and green building technologies. The study observed that factors such as gender, age, income levels, education, and employment status exert different degrees of influence on the adoption of green building technologies. While certain regions may exhibit a greater affinity towards embracing sustainability, others may face barriers or exhibit resistance due to socioeconomic differences, cultural norms, or lack of awareness. Despite the disparities in the influence of these factors on green technology adoption, there exists significant potential for targeted interventions and deliberate efforts to promote inclusivity and equitable access to sustainable construction practices in Nakuru City. By understanding the unique needs, preferences, and constraints of diverse demographic groups, stakeholders can develop tailored approaches to encourage adoption and address the barriers effectively.

5.4 Recommendations

i. The study found that the level of adoption of green building technologies in the construction of buildings is low. Therefore, the study recommends that there is a need for comprehensive awareness campaigns and educational programmes to increase knowledge so that people can prioritise green technologies, public-private partnerships to develop and implement joint initiatives that promote sustainability in the construction sector, the establishment of mechanisms for monitoring and evaluation of the adoption of green technologies in the construction of buildings as well as provision of financial incentives by the government to encourage investments in green building technologies.

ii. Building upon the findings of the study, the researcher also recommends that to maximise the socio-economic and environmental benefits of the adoption of green technologies in the construction of buildings in Nakuru City, there is a need to promote an exchange of knowledge and collaboration between stakeholders to: accelerate the development and deployment of sustainable solutions, collect and analyse data on key performance indicators, including energy consumption, greenhouse gas emissions, cost savings, and occupant satisfaction.

iii. To promote inclusive and widespread adoption of green technologies in the construction of buildings in Nakuru City, the study recommends that the government and other stakeholders should educate (long-term)/ sensitise (short-term) the population as it plays a pivotal role in shaping attitudes and behaviours towards green technologies where individuals with higher levels of education/awareness on green technologies are inclined to adopt the green building technologies. By implementing these recommendations in an organised and collaborative manner, Nakuru City can harness the diversity and richness of its landscape to drive inclusive and sustainable development.

5.5 Suggestions for Further Research

The following recommended areas of study would help enrich the understanding of green building technologies.

i. This study focused on the adoption of green technologies by homeowners and therefore, further studies can be conducted to assess adoption by the construction industries.
ii. This study focused on the residential buildings only. Therefore, further research could be done on the institutions and industrial/commercial buildings.
iii. A study is recommended to find out other factors that could influence the adoption of green technologies in the construction of buildings, other than the ones identified in this study.

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APPENDICES

Appendix I: Household Questionnaire

I am Charles Mwangi Macharia, a student at Egerton University, pursuing a Master of Science Degree in Geography, in the Faculty of Environmental and Resource Development. I'm conducting a study on the factors influencing the adoption of green technologies in the construction of buildings in Nakuru City, Kenya. I seek your consent in the participation of this study as a respondent. The purpose of this questionnaire is to help me acquire the required data to meet the study objectives. Your participation is voluntary and all the information collected will be handled with utmost confidentiality and will be used for the study purpose only.

Please answer the questions to the best of your ability.

SERIAL NO ………………. ESTATE……………………. DATE …………………

SECTION A: DEMOGRAPHIC DETAILS (tick your response on the table provided)

i. **Gender**

Male	
Female	

ii. **Age**

18-35	
36-55	
56 and above	

iii. **Household income (monthly/KES)**

10,000 and below	
10,001 – 50,000	
50,001 – 100,000	
100,001 and above	

iv. Education level

No School Attended	
Primary Education	
Secondary Education	
Tertiary Education	

v. Employment Status

Unemployed	
Self-employed	
Employed	

SECTION B: LEVEL OF ADOPTION OF GREEN TECHNOLOGIES APPLIED IN THE CONSTRUCTION OF BUILDINGS

a) Are you aware of the following green technologies applied in the construction of buildings?

	DESCRIPTION	**YES**	**NO**
Energy Efficient Technologies	1. Utilisation of renewable energy sources such as solar energy		
	2. Natural lighting/day lighting		
	3. Use of energy-efficient fixtures e.g. motion sensors/LED bulbs		
	4. Use of natural ventilation instead of Air Conditioners.		
	5. Switching off power when not in use		
Water Efficient Technologies	1. Harvesting rainwater		
	2. Reusing or recycling greywater		
	3. Use of leak-proof plumbing/pressure-reducing valves		
	4. Use of water-saving fixtures e.g., low-pressure flush toilets, shower heads and sinks, dual-flush toilets etc.		
Waste Minimisation Technologies	1. On-site composting of waste		
	2. Recycling of some waste products		
	3. Use of reusable materials		
	4. Separation of waste products at the point of disposal		

	5. Use of bio-degradable materials		
Green walls/roofs Technologies	1. Planting of vegetation on the walls and rooftop		
	2. Planting of vegetation in containers		
	3. Use of glass walls instead of concrete walls		
	4. Kitchen gardening		

b) The table below shows the green building technologies used in the construction of buildings. Using a scale range of 5, rate your level of awareness of the stated technologies where **1** (Not Aware);**2** (Less Aware);**3** (Moderately Aware);**4** (Much aware);**5** (Very Much Aware)

GREEN BUILDING TECHNOLOGIES		**1**	**2**	**3**	**4**	**5**
i.	Energy Efficient Technologies					
ii.	Water Efficient Technologies					
iii.	Waste Minimisation Technologies					
iv.	Green Walls/Roofs Technologies					

c) Have any of the technologies in (a) above been incorporated into your building?

☐ Yes

☐ No

d) If yes, which technologies have been applied **(tick all that applies)**

	DESCRIPTION	**YES**	**NO**
Energy Efficient Technologies	1. Utilisation of renewable energy sources such as solar energy		
	2. Natural lighting/daylighting		
	3. Use of energy-efficient fixtures e.g. motion sensors/LED bulbs		
	4. Use of natural ventilation instead of Air Conditioners.		
	5. Switching off power when not in use		
Water Efficient Technologies	1. Harvesting rainwater		
	2. Reusing or recycling greywater		
	3. Use of leak-proof plumbing and pressure-reducing valves		
	4. Use of water-saving fixtures e.g., low-pressure flush toilets, shower heads and sinks, dual-flush toilets etc.		

Waste Minimisation Technologies	1. Use of bio-degradable materials		
	2. Recycling of some waste products		
	3. Use of reusable materials		
	4. Separation of waste products at the point of disposal		
	5. On-site composting of waste		
Green walls/roofs Technologies	1. Planting of vegetation on the walls and rooftop		
	2. Planting of vegetation in containers		
	3. Use of glass walls instead of concrete walls		
	4. Kitchen gardening		

e) The table below shows specific green technologies used in the construction of buildings, using a scale range of 5, rate the level to which they've been applied/adopted in your building where **1** (no extent);**2** (little extent);**3** (moderate extent);**4** (high extent);**5** (Very high extent)}

WATER EFFICIENT TECHNOLOGIES	**1**	**2**	**3**	**4**	**5**
v. Harvesting rainwater					
vi. Reusing or recycling greywater					
vii. Use of leak-proof plumbing and pressure-reducing valves					
viii. Use of water-saving fixtures e.g., low-pressure flush toilets, shower heads and sinks, dual-flush toilets etc.					
ENERGY-EFFICIENT TECHNOLOGIES	**1**	**2**	**3**	**4**	**5**
i. Utilisation of renewable energy sources such as solar energy					
ii. Natural lighting/daylighting					
iii. Use of energy-efficient fixtures such as LED bulbs, motion sensor bulbs etc.					
iv. Use of natural ventilation instead of Air Conditioners.					
v. Switching off power when not in use					
WASTE MINIMISATION TECHNOLOGIES	**1**	**2**	**3**	**4**	**5**

i.	Use of bio-degradable materials					
ii.	Recycling of some waste products					
iii.	Use of reusable materials					
iv.	Separation of waste products at the point of disposal					
v.	On-site composting of waste					
GREEN WALLS/ROOF TECHNOLOGIES		**1**	**2**	**3**	**4**	**5**
i.	Planting of vegetation on the walls and rooftop					
ii.	Planting of vegetation in containers					
iii.	Use of glass walls instead of concrete walls					
iv.	Kitchen gardening					

f) Choose the three most appropriate methods for disseminating information regarding green building technologies, to enhance the level of adoption of this technology.

Seminars/Conferences/Workshops	
Internet	
Television	
Radio	
Newspapers/magazines/publications	
Billboards/banners	

SECTION C: FACTORS INFLUENCING THE ADOPTION OF GREEN TECHNOLOGIES IN THE CONSTRUCTION OF BUILDINGS

1. Which of the following factors do you consider as significant influencers in the adoption of green building technologies?
    a) Cost-effectiveness and potential savings ☐
    b) Government regulations and incentives ☐
    c) Environmental benefits (e.g., reduced carbon emissions, energy efficiency) ☐
    d) Market demand and consumer preferences ☐
    e) Improved occupant health and productivity ☐
    f) Availability and accessibility of green building materials ☐
    g) Lack of awareness or knowledge about green building technologies ☐

2. The following are the socio-economic benefits of the adoption of green technologies in the construction of buildings. To what level do you perceive these benefits? Tick your response on a scale from; - **Strongly Disagree (**denoted as 1), **Disagree (**2**)**, **Neutral** (3), **Agree** (4), **Strongly Agree** (5)

Socio-economic Benefits		**1**	**2**	**3**	**4**	**5**
i.	Saves on energy					
ii.	Fewer energy bills					
iii.	Creation of Job opportunities					
iv.	Improved quality of life					
v.	Increased property value					

3. The following are the environmental benefits of the adoption of green technologies in the construction of buildings. To what level do you perceive these benefits? Tick your response on a scale from; - **Strongly Disagree (**denoted as 1), **Disagree (**2**)**, **Neutral** (3), **Agree** (4), **Strongly Agree** (5)

Environmental Benefits		**1**	**2**	**3**	**4**	**5**
i.	Reduced waste production					
ii.	Water conservation					
iii.	Efficient use of energy					
iv.	Improved indoor air quality					
v.	Climate change mitigation					
vi.	Sustainable consumption of raw materials					
vii.	Biodiversity conservation					

4. Identify **THREE MAIN** challenges that you have faced while trying to adopt green building technologies.

   i. High construction costs and lack of affordability [ ]

   ii. Few personnel to install green building technologies [ ]

   iii. Resistance from the construction industry to adopt green technologies [ ]

   iv. Lack of enforcement of government policies and regulations [ ]

v. Insufficient knowledge/awareness about green building technologies [ ]

vi. Limited access to financing or funding options [ ]

5. How influential is the market demand for green buildings and sustainable practices in encouraging the adoption of green building technologies?

   a) Highly influential [ ]

   b) Moderately influential [ ]

   c) Not influential at all [ ]

6. Do you believe that the long-term benefits of green building technologies outweigh the initial cost of implementation?

☐ Yes

☐ No

Appendix II: Key Informants Interview Schedule

ORG ……..…………………. DATE …………………

FACTORS INFLUENCING THE ADOPTION OF GREEN TECHNOLOGIES IN THE CONSTRUCTION OF BUILDINGS

1. What do you perceive as the primary drivers for adopting green technologies in building construction?
2. How do you assess the role of financial considerations, such as upfront costs and return on investment, in the adoption of green technologies?
3. To what extent do regulatory policies, building codes, and certification programmes influence the adoption of green building practices?
4. How do you perceive the influence of consumer preferences and market demand for sustainable buildings on technology adoption?
5. What challenges do you encounter in promoting the adoption of green technologies, and how do you address them?
6. How important are educational initiatives and awareness campaigns in promoting the adoption of green building technologies?
7. In your opinion, what role do technological innovation and advancements play in driving the adoption of green technologies?
8. How do cultural, social, and behavioural factors influence the adoption of green technologies in different communities or regions?
9. What are some successful strategies or best practices you have observed in promoting the adoption of green technologies in building construction?
10. Are there any emerging trends or developments in the field of green building technologies that you believe will impact adoption in the future?
11. Are there any legal considerations or restrictions related to the sourcing of materials for green building technologies, such as sustainable timber or recycled materials?
12. Have you encountered any legal barriers or challenges that hinder the widespread adoption of green building technologies? If yes, please mention them

Appendix III: Ethical Clearance

EGERTON UNIVERSITY

TEL: (051) 2217808 P. O. BOX 536 FAX: 051-2217942 EGERTON

EGERTON UNIVERSITY INSTITUTIONAL SCIENTIFIC AND ETHICS REVIEW COMMITTEE

EU/RE/DIR/009
Approval No. EUISERC/APP/339/2024 ***6th June*** **2024**

Charles Mwangi Macharia
Address: 536-20115
Egerton-NJORO
Telephone: +254700139583
E-mail: charlesmwangi360@yahoo.com

Dear Charles,

RE: ETHICAL APPROVAL: FACTORS INFLUENCING THE ADOPTION OF GREEN BUILDING TECHNOLOGIES IN THE CONSTRUCTION INDUSTRY IN NAKURU CITY, KENYA

This is to inform you that the ***Egerton University Institutional Scientific and Ethics Review Committee*** has reviewed and approved your above research proposal. Your application approval number is ***EUISERC/APP/339/2024.*** The approval period is 6***th June 2024 – 7th June 2025***

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consent, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by ***Egerton University Institutional Scientific and Ethics Review Committee***.
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to ***Egerton University Institutional Scientific and Ethics Review Committee*** within 72 hours of notification

iv. Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to ***Egerton University Institutional Scientific and Ethics Review Committee*** within 72 hours.

v. Clearance for Material Transfer of biological specimens must be obtained from relevant institutions.

"Transforming Lives through Quality Education"

vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.

vii. Submission of an executive summary report within 90 days upon completion of the study to ***Egerton University Institutional Scientific and Ethics Review Committee***.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

EGERTON UNIVERSITY RESEARCH ETHICS Date. 06/06/2024

Yours sincerely.

Prof. Raphael M. Ngure

CHAIRMAN, EGERTON UNIVERSITY INSTITUTIONAL SCIENTIFIC AND ETHICS REVIEW CTTEE

RMN/BK/

Appendix IV: Nacosti Research Permit

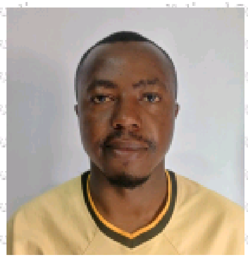
REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **841543**

Date of Issue: **21/June/2024**

RESEARCH LICENSE



This is to Certify that Mr.. Charles Mwangi of Egerton University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nakuru on the topic: FACTORS INFLUENCING THE ADOPTION OF GREEN BUILDING TECHNOLOGIES IN THE CONSTRUCTION INDUSTRY IN NAKURU CITY, KENYA for the period ending : 21/June/2025.

License No: **NACOSTI/P/24/36830**

841543

Applicant Identification Number

Director General

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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Appendix V: Journal Article Published in Refereed Journal

Open Access Research Journal of
Science and Technology
Journals home page: https://oarjst.com/
ISSN: 2782-9960 (Online)

OARJ OPEN ACCESS RESEARCH JOURNALS

(RESEARCH ARTICLE)

Determinants of adoption of green technologies in the construction of buildings in Nakuru city, Kenya

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Open Access Research Journal of Science and Technology, 2024, 11(01), 125–134

Publication history: Received on 14 May 2024; revised on 24 JUn 2024; accepted on 27 June 2024

Article DOI: https://doi.org/10.53022/oarjst.2024.11.1.0078

Abstract

Adoption of green technologies in construction of buildings is one of the strategies of climate change mitigation and reducing the negative effects of urbanization to the environment. The adoption of green technologies is critical for achieving low carbon development. However, it is not clear what factors determine the uptake of different types of green technologies in the construction of buildings in the study area, an issue that this study sought to investigate. The study adopted a mixed research design. The target population was 1191 households, with a sample study size of 153 (13%) households obtained from Milimani, Section 58 and Naka Estates in Nakuru City. Primary data was collected using structured household questionnaires and key informant interviews. The data obtained was analyzed using descriptive and inferential statistics, where: percentages, frequencies and multiple linear regression analysis test were computed. The study observed that education level, employment status, and monthly household income had a significant influence in adoption of green building technologies. The results of the study provide a basis that can be used for the formulation of policies that can enhance the adoption of green building technologies in Nakuru City.

Keywords: Green Building Technologies; Buildings Construction; Low Carbon Development; Urbanization; Sustainability

1. Introduction

Severe droughts, rising sea levels, and depletion of natural resources, have posed significant challenges to global development [1]. The industrial revolutions of the 18th to 20th Centuries, fuelled by fossil fuel combustion, laid the groundwork for current environmental and climatic challenges. These challenges, evidenced by changes in weather patterns since the 1800s, underscore the urgent need for action to address environmental degradation and climate change [2].

The depletion of natural resources, particularly water and fossil fuels, has surpassed sustainable levels, leading to ecosystem degradation and deteriorating human health conditions [3]. Pollution, arising largely from conventional building practices in major cities worldwide, partly contributes to environmental degradation. The resulting environmental risks pose a threat to densely populated urban areas, necessitating a shift towards sustainable development practices [4].

Recognizing the critical link between environmental sustainability and economic growth, initiatives such as the European Union Green Bonds Standard aim to mobilize investment in green projects and sustainable initiatives [5]. While developed countries have made strides in environmental and climate action, developing nations, particularly in Africa, face challenges in transitioning to sustainable development. United Nation [5] report further clarifies that despite many challenges, African countries are increasingly prioritizing environmental and climate considerations in

* Corresponding author: Charles Mwangi Macharia

Appendix VI: Household Data

Milimani Estate

No #	longitude	latitude	Type of premise	Location	Ownership	Type of residence
686	36.06777	-0.27378	Residential	Milimani	Own/Self-Occupant	Single
716	36.08166	-0.27163	Residential	Milimani	Own/Self-Occupant	Single
424	36.07173	-0.26962	Residential	Milimani	Own/Self-Occupant	Single
709	36.0845	-0.27651	Residential	Milimani	Own/Self-Occupant	Single
677	36.06118	-0.27324	Residential	Milimani	Own/Self-Occupant	Multi
686	36.07062	-0.2736	Residential	Milimani	Own/Self-Occupant	Multi
702	36.07452	-0.27259	Residential	Milimani	Own/Self-Occupant	Multi
717	36.07708	-0.27053	Residential	Milimani	Own/Self-Occupant	Multi
720	36.07509	-0.27695	Residential	Milimani	Own/Self-Occupant	Multi
726	36.08016	-0.27853	Residential	Milimani	Own/Self-Occupant	Multi
123	36.07635	-0.27509	Residential	Milimani	Own/Self-Occupant	Multi
123	36.07688	-0.27551	Residential	Milimani	Own/Self-Occupant	Multi
440	36.07488	-0.27141	Residential	Milimani	Own/Self-Occupant	Multi
441	36.07499	-0.27188	Residential	Milimani	Own/Self-Occupant	Multi
441	36.07503	-0.26907	Residential	Milimani	Own/Self-Occupant	Multi
442	36.07511	-0.27321	Residential	Milimani	Own/Self-Occupant	Multi
442	36.07516	-0.27067	Residential	Milimani	Own/Self-Occupant	Multi
444	36.07558	-0.27475	Residential	Milimani	Own/Self-Occupant	Multi
446	36.0758	-0.27675	Residential	Milimani	Own/Self-Occupant	Multi
452	36.07699	-0.27551	Residential	Milimani	Own/Self-Occupant	Multi
452	36.07699	-0.27552	Residential	Milimani	Own/Self-Occupant	Multi
453	36.07716	-0.27752	Residential	Milimani	Own/Self-Occupant	Multi
722	36.07789	-0.27714	Residential	Milimani	Own/Self-Occupant	null
670	36.06155	-0.27264	Residential	Milimani	Own/Self-Occupant	Single
670	36.06206	-0.27264	Residential	Milimani	Own/Self-Occupant	Single
673	36.06155	-0.27265	Residential	Milimani	Own/Self-Occupant	Single
674	36.06135	-0.27292	Residential	Milimani	Own/Self-Occupant	Single
674	36.06136	-0.27247	Residential	Milimani	Own/Self-Occupant	Single
679	36.07033	-0.2722	Residential	Milimani	Own/Self-Occupant	Single
679	36.06878	-0.27173	Residential	Milimani	Own/Self-Occupant	Single
679	36.06878	-0.27177	Residential	Milimani	Own/Self-Occupant	Single
679	36.0682	-0.27219	Residential	Milimani	Own/Self-Occupant	Single
680	36.06833	-0.2723	Residential	Milimani	Own/Self-Occupant	Single
680	36.07041	-0.27149	Residential	Milimani	Own/Self-Occupant	Single
680	36.06723	-0.27307	Residential	Milimani	Own/Self-Occupant	Single
680	36.06658	-0.27322	Residential	Milimani	Own/Self-Occupant	Single
680	36.06841	-0.27265	Residential	Milimani	Own/Self-Occupant	Single
680	36.06567	-0.27275	Residential	Milimani	Own/Self-Occupant	Single

680	36.06598	-0.27409	Residential	Milimani	Own/Self-Occupant	Single
680	36.06943	-0.27201	Residential	Milimani	Own/Self-Occupant	Single
680	36.06692	-0.27318	Residential	Milimani	Own/Self-Occupant	Single
680	36.06704	-0.27258	Residential	Milimani	Own/Self-Occupant	Single
681	36.06861	-0.27212	Residential	Milimani	Own/Self-Occupant	Single
681	36.06455	-0.27441	Residential	Milimani	Own/Self-Occupant	Single
681	36.06626	-0.27257	Residential	Milimani	Own/Self-Occupant	Single
681	36.06744	-0.27324	Residential	Milimani	Own/Self-Occupant	Single
681	36.06664	-0.27269	Residential	Milimani	Own/Self-Occupant	Single
681	36.07076	-0.27206	Residential	Milimani	Own/Self-Occupant	Single
681	36.0674	-0.27288	Residential	Milimani	Own/Self-Occupant	Single
681	36.06812	-0.27266	Residential	Milimani	Own/Self-Occupant	Single
681	36.07031	-0.2717	Residential	Milimani	Own/Self-Occupant	Single
681	36.07006	-0.27218	Residential	Milimani	Own/Self-Occupant	Single
682	36.06487	-0.27406	Residential	Milimani	Own/Self-Occupant	Single
682	36.06597	-0.27273	Residential	Milimani	Own/Self-Occupant	Single
682	36.06626	-0.27245	Residential	Milimani	Own/Self-Occupant	Single
682	36.06517	-0.27305	Residential	Milimani	Own/Self-Occupant	Single
682	36.06755	-0.27198	Residential	Milimani	Own/Self-Occupant	Single
682	36.06717	-0.27252	Residential	Milimani	Own/Self-Occupant	Single
682	36.07949	-0.27523	Residential	Milimani	Own/Self-Occupant	Single
683	36.06535	-0.27342	Residential	Milimani	Own/Self-Occupant	Single
683	36.06447	-0.27337	Residential	Milimani	Own/Self-Occupant	Single
683	36.06503	-0.27354	Residential	Milimani	Own/Self-Occupant	Single
683	36.07967	-0.27403	Residential	Milimani	Own/Self-Occupant	Single
683	36.06563	-0.27335	Residential	Milimani	Own/Self-Occupant	Single
683	36.06982	-0.27253	Residential	Milimani	Own/Self-Occupant	Single
683	36.07068	-0.27151	Residential	Milimani	Own/Self-Occupant	Single
683	36.07159	-0.27344	Residential	Milimani	Own/Self-Occupant	Single
683	36.06802	-0.27228	Residential	Milimani	Own/Self-Occupant	Single
684	36.06773	-0.27242	Residential	Milimani	Own/Self-Occupant	Single
684	36.06557	-0.2733	Residential	Milimani	Own/Self-Occupant	Single
684	36.06436	-0.27333	Residential	Milimani	Own/Self-Occupant	Single
684	36.06592	-0.27348	Residential	Milimani	Own/Self-Occupant	Single
684	36.0688	-0.2725	Residential	Milimani	Own/Self-Occupant	Single
684	36.06906	-0.27249	Residential	Milimani	Own/Self-Occupant	Single
684	36.07053	-0.2721	Residential	Milimani	Own/Self-Occupant	Single
684	36.06552	-0.27277	Residential	Milimani	Own/Self-Occupant	Single
685	36.065	-0.27495	Residential	Milimani	Own/Self-Occupant	Single
685	36.06555	-0.27484	Residential	Milimani	Own/Self-Occupant	Single
686	36.06831	-0.27369	Residential	Milimani	Own/Self-Occupant	Single
686	36.07026	-0.27316	Residential	Milimani	Own/Self-Occupant	Single
687	36.07069	-0.27342	Residential	Milimani	Own/Self-Occupant	Single

687	36.0702	-0.27363	Residential	Milimani	Own/Self-Occupant	Single
687	36.0693	-0.27408	Residential	Milimani	Own/Self-Occupant	Single
687	36.06895	-0.27396	Residential	Milimani	Own/Self-Occupant	Single
687	36.06963	-0.27318	Residential	Milimani	Own/Self-Occupant	Single
688	36.06749	-0.27375	Residential	Milimani	Own/Self-Occupant	Single
689	36.0679	-0.27179	Residential	Milimani	Own/Self-Occupant	Single
690	36.06675	-0.27366	Residential	Milimani	Own/Self-Occupant	Single
694	36.07625	-0.27791	Residential	Milimani	Own/Self-Occupant	Single
695	36.0785	-0.27316	Residential	Milimani	Own/Self-Occupant	Single
697	36.06618	-0.2751	Residential	Milimani	Own/Self-Occupant	Single
698	36.07701	-0.2769	Residential	Milimani	Own/Self-Occupant	Single
698	36.07707	-0.27397	Residential	Milimani	Own/Self-Occupant	Single
698	36.06859	-0.274	Residential	Milimani	Own/Self-Occupant	Single
699	36.06694	-0.27367	Residential	Milimani	Own/Self-Occupant	Single
699	36.06701	-0.2736	Residential	Milimani	Own/Self-Occupant	Single
699	36.06998	-0.27309	Residential	Milimani	Own/Self-Occupant	Single
700	36.06792	-0.27383	Residential	Milimani	Own/Self-Occupant	Single
700	36.07087	-0.27309	Residential	Milimani	Own/Self-Occupant	Single
700	36.07043	-0.27287	Residential	Milimani	Own/Self-Occupant	Single
700	36.07895	-0.278	Residential	Milimani	Own/Self-Occupant	Single
700	36.0666	-0.27499	Residential	Milimani	Own/Self-Occupant	Single
701	36.07184	-0.27385	Residential	Milimani	Own/Self-Occupant	Single
701	36.06578	-0.27476	Residential	Milimani	Own/Self-Occupant	Single
702	36.07204	-0.27095	Residential	Milimani	Own/Self-Occupant	Single
702	36.07362	-0.26902	Residential	Milimani	Own/Self-Occupant	Single
702	36.07269	-0.2705	Residential	Milimani	Own/Self-Occupant	Single
702	36.07421	-0.2733	Residential	Milimani	Own/Self-Occupant	Single
703	36.07474	-0.27326	Residential	Milimani	Own/Self-Occupant	Single
703	36.07236	-0.27175	Residential	Milimani	Own/Self-Occupant	Single
703	36.07341	-0.27126	Residential	Milimani	Own/Self-Occupant	Single
703	36.07385	-0.27102	Residential	Milimani	Own/Self-Occupant	Single
703	36.0742	-0.27187	Residential	Milimani	Own/Self-Occupant	Single
703	36.07258	-0.27209	Residential	Milimani	Own/Self-Occupant	Single
703	36.07376	-0.27297	Residential	Milimani	Own/Self-Occupant	Single
704	36.0739	-0.27381	Residential	Milimani	Own/Self-Occupant	Single
704	36.07354	-0.27428	Residential	Milimani	Own/Self-Occupant	Single
704	36.07326	-0.27239	Residential	Milimani	Own/Self-Occupant	Single
704	36.07461	-0.27026	Residential	Milimani	Own/Self-Occupant	Single
704	36.07848	-0.27435	Residential	Milimani	Own/Self-Occupant	Single
704	36.07977	-0.27559	Residential	Milimani	Own/Self-Occupant	Single
704	36.07585	-0.27383	Residential	Milimani	Own/Self-Occupant	Single
704	36.0737	-0.26976	Residential	Milimani	Own/Self-Occupant	Single
705	36.0746	-0.27167	Residential	Milimani	Own/Self-Occupant	Single

705	36.07464	-0.27175	Residential	Milimani	Own/Self-Occupant	Single
705	36.07457	-0.27164	Residential	Milimani	Own/Self-Occupant	Single
705	36.07455	-0.27157	Residential	Milimani	Own/Self-Occupant	Single
705	36.07461	-0.27167	Residential	Milimani	Own/Self-Occupant	Single
705	36.07512	-0.27274	Residential	Milimani	Own/Self-Occupant	Single
705	36.06475	-0.2747	Residential	Milimani	Own/Self-Occupant	Single
705	36.07467	-0.27179	Residential	Milimani	Own/Self-Occupant	Single
705	36.06905	-0.27187	Residential	Milimani	Own/Self-Occupant	Single
706	36.07457	-0.27346	Residential	Milimani	Own/Self-Occupant	Single
706	36.07327	-0.27329	Residential	Milimani	Own/Self-Occupant	Single
706	36.07392	-0.27084	Residential	Milimani	Own/Self-Occupant	Single
706	36.07517	-0.27069	Residential	Milimani	Own/Self-Occupant	Single
706	36.07528	-0.26966	Residential	Milimani	Own/Self-Occupant	Single
706	36.07538	-0.26972	Residential	Milimani	Own/Self-Occupant	Single
706	36.07208	-0.27019	Residential	Milimani	Own/Self-Occupant	Single
706	36.0724	-0.27064	Residential	Milimani	Own/Self-Occupant	Single
706	36.07501	-0.27333	Residential	Milimani	Own/Self-Occupant	Single
707	36.07445	-0.27124	Residential	Milimani	Own/Self-Occupant	Single
707	36.07367	-0.27548	Residential	Milimani	Own/Self-Occupant	Single
707	36.07477	-0.2715	Residential	Milimani	Own/Self-Occupant	Single
707	36.07318	-0.26993	Residential	Milimani	Own/Self-Occupant	Single
707	36.07287	-0.27139	Residential	Milimani	Own/Self-Occupant	Single
707	36.0812	-0.27437	Residential	Milimani	Own/Self-Occupant	Single
707	36.07681	-0.27214	Residential	Milimani	Own/Self-Occupant	Single
707	36.07701	-0.27142	Residential	Milimani	Own/Self-Occupant	Single
708	36.08066	-0.275	Residential	Milimani	Own/Self-Occupant	Single
708	36.08106	-0.27463	Residential	Milimani	Own/Self-Occupant	Single
708	36.08173	-0.27454	Residential	Milimani	Own/Self-Occupant	Single
708	36.08226	-0.27473	Residential	Milimani	Own/Self-Occupant	Single
708	36.08314	-0.2748	Residential	Milimani	Own/Self-Occupant	Single
708	36.08328	-0.27414	Residential	Milimani	Own/Self-Occupant	Single
708	36.0811	-0.27357	Residential	Milimani	Own/Self-Occupant	Single
708	36.08112	-0.27356	Residential	Milimani	Own/Self-Occupant	Single
708	36.08411	-0.2757	Residential	Milimani	Own/Self-Occupant	Single
709	36.08453	-0.27655	Residential	Milimani	Own/Self-Occupant	Single
709	36.08075	-0.27414	Residential	Milimani	Own/Self-Occupant	Single
709	36.07718	-0.27078	Residential	Milimani	Own/Self-Occupant	Single
709	36.08447	-0.27658	Residential	Milimani	Own/Self-Occupant	Single
709	36.08475	-0.27652	Residential	Milimani	Own/Self-Occupant	Single
709	36.08449	-0.27658	Residential	Milimani	Own/Self-Occupant	Single
709	36.08447	-0.27655	Residential	Milimani	Own/Self-Occupant	Single
709	36.08444	-0.27652	Residential	Milimani	Own/Self-Occupant	Single
709	36.08446	-0.27655	Residential	Milimani	Own/Self-Occupant	Single

710	36.08451	-0.27653	Residential	Milimani	Own/Self-Occupant	Single
710	36.08449	-0.27665	Residential	Milimani	Own/Self-Occupant	Single
710	36.08448	-0.27655	Residential	Milimani	Own/Self-Occupant	Single
710	36.08453	-0.27662	Residential	Milimani	Own/Self-Occupant	Single
710	36.08455	-0.27666	Residential	Milimani	Own/Self-Occupant	Single
710	36.0845	-0.27658	Residential	Milimani	Own/Self-Occupant	Single
710	36.08445	-0.27662	Residential	Milimani	Own/Self-Occupant	Single
710	36.08474	-0.27668	Residential	Milimani	Own/Self-Occupant	Single
710	36.08475	-0.27654	Residential	Milimani	Own/Self-Occupant	Single
710	36.08474	-0.27658	Residential	Milimani	Own/Self-Occupant	Single
711	36.08475	-0.27647	Residential	Milimani	Own/Self-Occupant	Single
711	36.08474	-0.27656	Residential	Milimani	Own/Self-Occupant	Single
711	36.0848	-0.27655	Residential	Milimani	Own/Self-Occupant	Single
711	36.08475	-0.27642	Residential	Milimani	Own/Self-Occupant	Single
711	36.08478	-0.27657	Residential	Milimani	Own/Self-Occupant	Single
711	36.08475	-0.27658	Residential	Milimani	Own/Self-Occupant	Single
711	36.08469	-0.27654	Residential	Milimani	Own/Self-Occupant	Single
711	36.08473	-0.2765	Residential	Milimani	Own/Self-Occupant	Single
711	36.07734	-0.27397	Residential	Milimani	Own/Self-Occupant	Single
712	36.07642	-0.27066	Residential	Milimani	Own/Self-Occupant	Single
712	36.07984	-0.27339	Residential	Milimani	Own/Self-Occupant	Single
712	36.07709	-0.27228	Residential	Milimani	Own/Self-Occupant	Single
712	36.07558	-0.27181	Residential	Milimani	Own/Self-Occupant	Single
712	36.07493	-0.27261	Residential	Milimani	Own/Self-Occupant	Single
712	36.07932	-0.2732	Residential	Milimani	Own/Self-Occupant	Single
712	36.07824	-0.27193	Residential	Milimani	Own/Self-Occupant	Single
713	36.07619	-0.27372	Residential	Milimani	Own/Self-Occupant	Single
713	36.07659	-0.27293	Residential	Milimani	Own/Self-Occupant	Single
713	36.08016	-0.27466	Residential	Milimani	Own/Self-Occupant	Single
713	36.07959	-0.27266	Residential	Milimani	Own/Self-Occupant	Single
713	36.07986	-0.27278	Residential	Milimani	Own/Self-Occupant	Single
713	36.07907	-0.27313	Residential	Milimani	Own/Self-Occupant	Single
713	36.07869	-0.27406	Residential	Milimani	Own/Self-Occupant	Single
713	36.07932	-0.27281	Residential	Milimani	Own/Self-Occupant	Single
713	36.07895	-0.27231	Residential	Milimani	Own/Self-Occupant	Single
714	36.07993	-0.27417	Residential	Milimani	Own/Self-Occupant	Single
714	36.07832	-0.27261	Residential	Milimani	Own/Self-Occupant	Single
714	36.07649	-0.27366	Residential	Milimani	Own/Self-Occupant	Single
714	36.07845	-0.27396	Residential	Milimani	Own/Self-Occupant	Single
714	36.08115	-0.27411	Residential	Milimani	Own/Self-Occupant	Single
714	36.07797	-0.27462	Residential	Milimani	Own/Self-Occupant	Single
714	36.07985	-0.27339	Residential	Milimani	Own/Self-Occupant	Single
714	36.07786	-0.27337	Residential	Milimani	Own/Self-Occupant	Single

714	36.08179	-0.27357	Residential	Milimani	Own/Self-Occupant	Single
714	36.07912	-0.27093	Residential	Milimani	Own/Self-Occupant	Single
715	36.07927	-0.27093	Residential	Milimani	Own/Self-Occupant	Single
715	36.07789	-0.27027	Residential	Milimani	Own/Self-Occupant	Single
715	36.08356	-0.27219	Residential	Milimani	Own/Self-Occupant	Single
715	36.08312	-0.27218	Residential	Milimani	Own/Self-Occupant	Single
715	36.08265	-0.27206	Residential	Milimani	Own/Self-Occupant	Single
715	36.08201	-0.27177	Residential	Milimani	Own/Self-Occupant	Single
715	36.08164	-0.27166	Residential	Milimani	Own/Self-Occupant	Single
715	36.08139	-0.27161	Residential	Milimani	Own/Self-Occupant	Single
715	36.08055	-0.27141	Residential	Milimani	Own/Self-Occupant	Single
716	36.07932	-0.27058	Residential	Milimani	Own/Self-Occupant	Single
716	36.08016	-0.27199	Residential	Milimani	Own/Self-Occupant	Single
716	36.07767	-0.27109	Residential	Milimani	Own/Self-Occupant	Single
716	36.07928	-0.27095	Residential	Milimani	Own/Self-Occupant	Single
716	36.0798	-0.27187	Residential	Milimani	Own/Self-Occupant	Single
716	36.07927	-0.27167	Residential	Milimani	Own/Self-Occupant	Single
716	36.08061	-0.27221	Residential	Milimani	Own/Self-Occupant	Single
717	36.0827	-0.27275	Residential	Milimani	Own/Self-Occupant	Single
717	36.07997	-0.27096	Residential	Milimani	Own/Self-Occupant	Single
717	36.07662	-0.26959	Residential	Milimani	Own/Self-Occupant	Single
717	36.08299	-0.27298	Residential	Milimani	Own/Self-Occupant	Single
717	36.07647	-0.26911	Residential	Milimani	Own/Self-Occupant	Single
717	36.08022	-0.27116	Residential	Milimani	Own/Self-Occupant	Single
718	36.08254	-0.27282	Residential	Milimani	Own/Self-Occupant	Single
718	36.07683	-0.27045	Residential	Milimani	Own/Self-Occupant	Single
718	36.07873	-0.27536	Residential	Milimani	Own/Self-Occupant	Single
718	36.07532	-0.27605	Residential	Milimani	Own/Self-Occupant	Single
718	36.0784	-0.27464	Residential	Milimani	Own/Self-Occupant	Single
718	36.0742	-0.27716	Residential	Milimani	Own/Self-Occupant	Single
718	36.07605	-0.27669	Residential	Milimani	Own/Self-Occupant	Single
718	36.07513	-0.27512	Residential	Milimani	Own/Self-Occupant	Single
718	36.07474	-0.27519	Residential	Milimani	Own/Self-Occupant	Single
719	36.07621	-0.27581	Residential	Milimani	Own/Self-Occupant	Single
719	36.07655	-0.27579	Residential	Milimani	Own/Self-Occupant	Single
719	36.07764	-0.27563	Residential	Milimani	Own/Self-Occupant	Single
719	36.07909	-0.27523	Residential	Milimani	Own/Self-Occupant	Single
719	36.08042	-0.27569	Residential	Milimani	Own/Self-Occupant	Single
719	36.08109	-0.2758	Residential	Milimani	Own/Self-Occupant	Single
719	36.07852	-0.27457	Residential	Milimani	Own/Self-Occupant	Single
719	36.08068	-0.27574	Residential	Milimani	Own/Self-Occupant	Single
720	36.08192	-0.2762	Residential	Milimani	Own/Self-Occupant	Single
720	36.08225	-0.27631	Residential	Milimani	Own/Self-Occupant	Single

720	36.08263	-0.27626	Residential	Milimani	Own/Self-Occupant	Single
720	36.07462	-0.27707	Residential	Milimani	Own/Self-Occupant	Single
720	36.0785	-0.27527	Residential	Milimani	Own/Self-Occupant	Single
720	36.07486	-0.27498	Residential	Milimani	Own/Self-Occupant	Single
720	36.07724	-0.27562	Residential	Milimani	Own/Self-Occupant	Single
720	36.07761	-0.27487	Residential	Milimani	Own/Self-Occupant	Single
721	36.07878	-0.27466	Residential	Milimani	Own/Self-Occupant	Single
721	36.07588	-0.27493	Residential	Milimani	Own/Self-Occupant	Single
721	36.0793	-0.27522	Residential	Milimani	Own/Self-Occupant	Single
721	36.07795	-0.2746	Residential	Milimani	Own/Self-Occupant	Single
721	36.07932	-0.27464	Residential	Milimani	Own/Self-Occupant	Single
721	36.07905	-0.27461	Residential	Milimani	Own/Self-Occupant	Single
722	36.07626	-0.27788	Residential	Milimani	Own/Self-Occupant	Single
722	36.07892	-0.27794	Residential	Milimani	Own/Self-Occupant	Single
722	36.0779	-0.27711	Residential	Milimani	Own/Self-Occupant	Single
722	36.07658	-0.27669	Residential	Milimani	Own/Self-Occupant	Single
722	36.08105	-0.27911	Residential	Milimani	Own/Self-Occupant	Single
722	36.07632	-0.27716	Residential	Milimani	Own/Self-Occupant	Single
723	36.07701	-0.27863	Residential	Milimani	Own/Self-Occupant	Single
723	36.07708	-0.27948	Residential	Milimani	Own/Self-Occupant	Single
723	36.07661	-0.2794	Residential	Milimani	Own/Self-Occupant	Single
723	36.07685	-0.27712	Residential	Milimani	Own/Self-Occupant	Single
723	36.0818	-0.27965	Residential	Milimani	Own/Self-Occupant	Single
724	36.08094	-0.27879	Residential	Milimani	Own/Self-Occupant	Single
724	36.08016	-0.27749	Residential	Milimani	Own/Self-Occupant	Single
724	36.07943	-0.27933	Residential	Milimani	Own/Self-Occupant	Single
724	36.0788	-0.27858	Residential	Milimani	Own/Self-Occupant	Single
724	36.07798	-0.27852	Residential	Milimani	Own/Self-Occupant	Single
724	36.07933	-0.27653	Residential	Milimani	Own/Self-Occupant	Single
724	36.08038	-0.27896	Residential	Milimani	Own/Self-Occupant	Single
724	36.08104	-0.27695	Residential	Milimani	Own/Self-Occupant	Single
724	36.07991	-0.27886	Residential	Milimani	Own/Self-Occupant	Single
724	36.07955	-0.2781	Residential	Milimani	Own/Self-Occupant	Single
725	36.07686	-0.27638	Residential	Milimani	Own/Self-Occupant	Single
725	36.07689	-0.27644	Residential	Milimani	Own/Self-Occupant	Single
725	36.07716	-0.27637	Residential	Milimani	Own/Self-Occupant	Single
725	36.0771	-0.27639	Residential	Milimani	Own/Self-Occupant	Single
725	36.0772	-0.27628	Residential	Milimani	Own/Self-Occupant	Single
725	36.07711	-0.27641	Residential	Milimani	Own/Self-Occupant	Single
725	36.07702	-0.27629	Residential	Milimani	Own/Self-Occupant	Single
725	36.07707	-0.27627	Residential	Milimani	Own/Self-Occupant	Single
725	36.07716	-0.27636	Residential	Milimani	Own/Self-Occupant	Single
726	36.07718	-0.27624	Residential	Milimani	Own/Self-Occupant	Single

726	36.07691	-0.27647	Residential	Milimani	Own/Self-Occupant	Single
726	36.07713	-0.27634	Residential	Milimani	Own/Self-Occupant	Single
726	36.07697	-0.27645	Residential	Milimani	Own/Self-Occupant	Single
726	36.08052	-0.27661	Residential	Milimani	Own/Self-Occupant	Single
726	36.07712	-0.27827	Residential	Milimani	Own/Self-Occupant	Single
726	36.07706	-0.27718	Residential	Milimani	Own/Self-Occupant	Single
727	36.08097	-0.27944	Residential	Milimani	Own/Self-Occupant	Single
727	36.07955	-0.27841	Residential	Milimani	Own/Self-Occupant	Single
727	36.07868	-0.27929	Residential	Milimani	Own/Self-Occupant	Single
727	36.08201	-0.27731	Residential	Milimani	Own/Self-Occupant	Single
727	36.07472	-0.27755	Residential	Milimani	Own/Self-Occupant	Single
727	36.08164	-0.27893	Residential	Milimani	Own/Self-Occupant	Single
727	36.08191	-0.27905	Residential	Milimani	Own/Self-Occupant	Single
728	36.08212	-0.27904	Residential	Milimani	Own/Self-Occupant	Single
728	36.07722	-0.27625	Residential	Milimani	Own/Self-Occupant	Single
728	36.07705	-0.27644	Residential	Milimani	Own/Self-Occupant	Single
728	36.07704	-0.2763	Residential	Milimani	Own/Self-Occupant	Single
728	36.07693	-0.27641	Residential	Milimani	Own/Self-Occupant	Single
729	36.08263	-0.27971	Residential	Milimani	Own/Self-Occupant	Single
730	36.08308	-0.27602	Residential	Milimani	Own/Self-Occupant	Single
730	36.08333	-0.27368	Residential	Milimani	Own/Self-Occupant	Single
730	36.07632	-0.27868	Residential	Milimani	Own/Self-Occupant	Single
730	36.08302	-0.27669	Residential	Milimani	Own/Self-Occupant	Single
730	36.0828	-0.27782	Residential	Milimani	Own/Self-Occupant	Single
730	36.08274	-0.27843	Residential	Milimani	Own/Self-Occupant	Single
731	36.0763	-0.27869	Residential	Milimani	Own/Self-Occupant	Single
731	36.07634	-0.27868	Residential	Milimani	Own/Self-Occupant	Single
731	36.07629	-0.27862	Residential	Milimani	Own/Self-Occupant	Single
731	36.07633	-0.27877	Residential	Milimani	Own/Self-Occupant	Single
731	36.07636	-0.27876	Residential	Milimani	Own/Self-Occupant	Single
732	36.08136	-0.27357	Residential	Milimani	Own/Self-Occupant	Single
732	36.0788	-0.27567	Residential	Milimani	Own/Self-Occupant	Single
733	36.0865	-0.27836	Residential	Milimani	Own/Self-Occupant	Single
733	36.09287	-0.27207	Residential	Milimani	Own/Self-Occupant	Single
733	36.0896	-0.27467	Residential	Milimani	Own/Self-Occupant	Single
734	36.07934	-0.26942	Residential	Milimani	Own/Self-Occupant	Single
734	36.07972	-0.26956	Residential	Milimani	Own/Self-Occupant	Single
734	36.07682	-0.26906	Residential	Milimani	Own/Self-Occupant	Single
734	36.08829	-0.27224	Residential	Milimani	Own/Self-Occupant	Single
734	36.07801	-0.26964	Residential	Milimani	Own/Self-Occupant	Single
734	36.08164	-0.27078	Residential	Milimani	Own/Self-Occupant	Single
734	36.08676	-0.27188	Residential	Milimani	Own/Self-Occupant	Single
734	36.07872	-0.26993	Residential	Milimani	Own/Self-Occupant	Single

734	36.08193	-0.27092	Residential	Milimani	Own/Self-Occupant	Single
734	36.08422	-0.2714	Residential	Milimani	Own/Self-Occupant	Single
735	36.08329	-0.27126	Residential	Milimani	Own/Self-Occupant	Single
735	36.08081	-0.27049	Residential	Milimani	Own/Self-Occupant	Single
735	36.08043	-0.27042	Residential	Milimani	Own/Self-Occupant	Single
735	36.08002	-0.27037	Residential	Milimani	Own/Self-Occupant	Single
735	36.07965	-0.27017	Residential	Milimani	Own/Self-Occupant	Single
735	36.0803	-0.2697	Residential	Milimani	Own/Self-Occupant	Single
735	36.08068	-0.2699	Residential	Milimani	Own/Self-Occupant	Single
735	36.08027	-0.2697	Residential	Milimani	Own/Self-Occupant	Single
736	36.08217	-0.27024	Residential	Milimani	Own/Self-Occupant	Single
736	36.08273	-0.27041	Residential	Milimani	Own/Self-Occupant	Single
736	36.08304	-0.27034	Residential	Milimani	Own/Self-Occupant	Single
736	36.0834	-0.2704	Residential	Milimani	Own/Self-Occupant	Single
736	36.08788	-0.27147	Residential	Milimani	Own/Self-Occupant	Single
736	36.08632	-0.27117	Residential	Milimani	Own/Self-Occupant	Single
736	36.08667	-0.27195	Residential	Milimani	Own/Self-Occupant	Single
737	36.07711	-0.27177	Residential	Milimani	Own/Self-Occupant	Single
737	36.08677	-0.27192	Residential	Milimani	Own/Self-Occupant	Single
737	36.08751	-0.27209	Residential	Milimani	Own/Self-Occupant	Single
737	36.06854	-0.27346	Residential	Milimani	Own/Self-Occupant	Single
737	36.08753	-0.27206	Residential	Milimani	Own/Self-Occupant	Single
737	36.08576	-0.2711	Residential	Milimani	Own/Self-Occupant	Single
737	36.08259	-0.27107	Residential	Milimani	Own/Self-Occupant	Single
737	36.08427	-0.27069	Residential	Milimani	Own/Self-Occupant	Single
738	36.08181	-0.27021	Residential	Milimani	Own/Self-Occupant	Single
738	36.08143	-0.27001	Residential	Milimani	Own/Self-Occupant	Single
738	36.07879	-0.26991	Residential	Milimani	Own/Self-Occupant	Single
738	36.08408	-0.27057	Residential	Milimani	Own/Self-Occupant	Single
738	36.08385	-0.2706	Residential	Milimani	Own/Self-Occupant	Single
738	36.08372	-0.27055	Residential	Milimani	Own/Self-Occupant	Single
106	36.07697	-0.27635	Residential	Milimani	Own/Self-Occupant	Single
122	36.07875	-0.27325	Residential	Milimani	Own/Self-Occupant	Single
123	36.07439	-0.27621	Residential	Milimani	Own/Self-Occupant	Single
123	36.07477	-0.27203	Residential	Milimani	Own/Self-Occupant	Single
123	36.07545	-0.27147	Residential	Milimani	Own/Self-Occupant	Single
123	36.0762	-0.27246	Residential	Milimani	Own/Self-Occupant	Single
123	36.07695	-0.27531	Residential	Milimani	Own/Self-Occupant	Single
123	36.07763	-0.27392	Residential	Milimani	Own/Self-Occupant	Single
123	36.07828	-0.27741	Residential	Milimani	Own/Self-Occupant	Single
123	36.07945	-0.27935	Residential	Milimani	Own/Self-Occupant	Single
123	36.08182	-0.2785	Residential	Milimani	Own/Self-Occupant	Single
123	36.08218	-0.27375	Residential	Milimani	Own/Self-Occupant	Single

123	36.08242	-0.27043	Residential	Milimani	Own/Self-Occupant	Single
123	36.08333	-0.27299	Residential	Milimani	Own/Self-Occupant	Single
176	36.07759	-0.27458	Residential	Milimani	Own/Self-Occupant	Single
403	36.06702	-0.2736	Residential	Milimani	Own/Self-Occupant	Single
411	36.06843	-0.27389	Residential	Milimani	Own/Self-Occupant	Single
415	36.06936	-0.27427	Residential	Milimani	Own/Self-Occupant	Single
416	36.0697	-0.27165	Residential	Milimani	Own/Self-Occupant	Single
416	36.0697	-0.27186	Residential	Milimani	Own/Self-Occupant	Single
419	36.07063	-0.2721	Residential	Milimani	Own/Self-Occupant	Single
420	36.07088	-0.27131	Residential	Milimani	Own/Self-Occupant	Single
422	36.07142	-0.2684	Residential	Milimani	Own/Self-Occupant	Single
423	36.07157	-0.27038	Residential	Milimani	Own/Self-Occupant	Single
423	36.07166	-0.26931	Residential	Milimani	Own/Self-Occupant	Single
424	36.07175	-0.26952	Residential	Milimani	Own/Self-Occupant	Single
424	36.07176	-0.27162	Residential	Milimani	Own/Self-Occupant	Single
424	36.07188	-0.26757	Residential	Milimani	Own/Self-Occupant	Single
425	36.0719	-0.2689	Residential	Milimani	Own/Self-Occupant	Single
425	36.07195	-0.26969	Residential	Milimani	Own/Self-Occupant	Single
425	36.07211	-0.26772	Residential	Milimani	Own/Self-Occupant	Single
426	36.07217	-0.26839	Residential	Milimani	Own/Self-Occupant	Single
426	36.07227	-0.27378	Residential	Milimani	Own/Self-Occupant	Single
427	36.07248	-0.26768	Residential	Milimani	Own/Self-Occupant	Single
428	36.07258	-0.26933	Residential	Milimani	Own/Self-Occupant	Single
428	36.07268	-0.26957	Residential	Milimani	Own/Self-Occupant	Single
430	36.07301	-0.26909	Residential	Milimani	Own/Self-Occupant	Single
431	36.07321	-0.27217	Residential	Milimani	Own/Self-Occupant	Single
432	36.07338	-0.26894	Residential	Milimani	Own/Self-Occupant	Single
435	36.07392	-0.27212	Residential	Milimani	Own/Self-Occupant	Single
436	36.07397	-0.27198	Residential	Milimani	Own/Self-Occupant	Single
436	36.07398	-0.27199	Residential	Milimani	Own/Self-Occupant	Single
437	36.07414	-0.26997	Residential	Milimani	Own/Self-Occupant	Single
437	36.07423	-0.26914	Residential	Milimani	Own/Self-Occupant	Single
437	36.07427	-0.26915	Residential	Milimani	Own/Self-Occupant	Single
438	36.0743	-0.27776	Residential	Milimani	Own/Self-Occupant	Single
440	36.07474	-0.27381	Residential	Milimani	Own/Self-Occupant	Single
441	36.07495	-0.26964	Residential	Milimani	Own/Self-Occupant	Single
442	36.07512	-0.26856	Residential	Milimani	Own/Self-Occupant	Single
442	36.07512	-0.26914	Residential	Milimani	Own/Self-Occupant	Single
442	36.07519	-0.26854	Residential	Milimani	Own/Self-Occupant	Single
442	36.0752	-0.27342	Residential	Milimani	Own/Self-Occupant	Single
442	36.07521	-0.27406	Residential	Milimani	Own/Self-Occupant	Single
444	36.07551	-0.26861	Residential	Milimani	Own/Self-Occupant	Single
444	36.07552	-0.27313	Residential	Milimani	Own/Self-Occupant	Single

444	36.07558	-0.27684	Residential	Milimani	Own/Self-Occupant	Single
445	36.07559	-0.27292	Residential	Milimani	Own/Self-Occupant	Single
447	36.07603	-0.27843	Residential	Milimani	Own/Self-Occupant	Single
448	36.07619	-0.27248	Residential	Milimani	Own/Self-Occupant	Single
449	36.07641	-0.27392	Residential	Milimani	Own/Self-Occupant	Single
450	36.0765	-0.27226	Residential	Milimani	Own/Self-Occupant	Single
451	36.07668	-0.27267	Residential	Milimani	Own/Self-Occupant	Single
451	36.07677	-0.27929	Residential	Milimani	Own/Self-Occupant	Single
452	36.07687	-0.27634	Residential	Milimani	Own/Self-Occupant	Single
453	36.07705	-0.27552	Residential	Milimani	Own/Self-Occupant	Single
453	36.07708	-0.27715	Residential	Milimani	Own/Self-Occupant	Single
453	36.07709	-0.27294	Residential	Milimani	Own/Self-Occupant	Single
453	36.07717	-0.2775	Residential	Milimani	Own/Self-Occupant	Single
454	36.07732	-0.27226	Residential	Milimani	Own/Self-Occupant	Single
454	36.07736	-0.27397	Residential	Milimani	Own/Self-Occupant	Single
455	36.07746	-0.26948	Residential	Milimani	Own/Self-Occupant	Single
455	36.07763	-0.2776	Residential	Milimani	Own/Self-Occupant	Single
456	36.07783	-0.27463	Residential	Milimani	Own/Self-Occupant	Single
456	36.07784	-0.27814	Residential	Milimani	Own/Self-Occupant	Single
456	36.07801	-0.27212	Residential	Milimani	Own/Self-Occupant	Single
456	36.07809	-0.2752	Residential	Milimani	Own/Self-Occupant	Single
456	36.0781	-0.27112	Residential	Milimani	Own/Self-Occupant	Single
456	36.0781	-0.27114	Residential	Milimani	Own/Self-Occupant	Single
456	36.07811	-0.27521	Residential	Milimani	Own/Self-Occupant	Single
457	36.07822	-0.27831	Residential	Milimani	Own/Self-Occupant	Single
457	36.07829	-0.27668	Residential	Milimani	Own/Self-Occupant	Single
457	36.07838	-0.2726	Residential	Milimani	Own/Self-Occupant	Single
457	36.07838	-0.27206	Residential	Milimani	Own/Self-Occupant	Single
457	36.07842	-0.27566	Residential	Milimani	Own/Self-Occupant	Single
458	36.07846	-0.27434	Residential	Milimani	Own/Self-Occupant	Single
458	36.0785	-0.27133	Residential	Milimani	Own/Self-Occupant	Single
458	36.07859	-0.27039	Residential	Milimani	Own/Self-Occupant	Single
458	36.07868	-0.27308	Residential	Milimani	Own/Self-Occupant	Single
458	36.07868	-0.27454	Residential	Milimani	Own/Self-Occupant	Single
459	36.07883	-0.27309	Residential	Milimani	Own/Self-Occupant	Single
459	36.07885	-0.27398	Residential	Milimani	Own/Self-Occupant	Single
459	36.0789	-0.278	Residential	Milimani	Own/Self-Occupant	Single
459	36.07894	-0.27048	Residential	Milimani	Own/Self-Occupant	Single
459	36.07898	-0.2763	Residential	Milimani	Own/Self-Occupant	Single
460	36.07926	-0.27833	Residential	Milimani	Own/Self-Occupant	Single
460	36.07929	-0.27523	Residential	Milimani	Own/Self-Occupant	Single
460	36.07939	-0.27859	Residential	Milimani	Own/Self-Occupant	Single
460	36.07939	-0.27052	Residential	Milimani	Own/Self-Occupant	Single

460	36.0794	-0.27476	Residential	Milimani	Own/Self-Occupant	Single
460	36.07945	-0.27918	Residential	Milimani	Own/Self-Occupant	Single
461	36.07949	-0.27529	Residential	Milimani	Own/Self-Occupant	Single
461	36.0796	-0.26949	Residential	Milimani	Own/Self-Occupant	Single
461	36.07969	-0.27905	Residential	Milimani	Own/Self-Occupant	Single
461	36.0797	-0.27906	Residential	Milimani	Own/Self-Occupant	Single
462	36.07978	-0.27847	Residential	Milimani	Own/Self-Occupant	Single
462	36.0798	-0.27511	Residential	Milimani	Own/Self-Occupant	Single
462	36.0798	-0.27021	Residential	Milimani	Own/Self-Occupant	Single
462	36.07993	-0.27096	Residential	Milimani	Own/Self-Occupant	Single
462	36.07996	-0.27883	Residential	Milimani	Own/Self-Occupant	Single
462	36.08002	-0.26953	Residential	Milimani	Own/Self-Occupant	Single
462	36.08002	-0.27732	Residential	Milimani	Own/Self-Occupant	Single
463	36.0801	-0.27137	Residential	Milimani	Own/Self-Occupant	Single
463	36.08014	-0.27399	Residential	Milimani	Own/Self-Occupant	Single
463	36.08023	-0.27733	Residential	Milimani	Own/Self-Occupant	Single
463	36.08025	-0.27328	Residential	Milimani	Own/Self-Occupant	Single
464	36.08047	-0.27728	Residential	Milimani	Own/Self-Occupant	Single
464	36.08048	-0.27708	Residential	Milimani	Own/Self-Occupant	Single
464	36.08049	-0.27848	Residential	Milimani	Own/Self-Occupant	Single
464	36.08066	-0.27987	Residential	Milimani	Own/Self-Occupant	Single
464	36.08067	-0.27548	Residential	Milimani	Own/Self-Occupant	Single
464	36.08069	-0.27443	Residential	Milimani	Own/Self-Occupant	Single
465	36.0808	-0.26969	Residential	Milimani	Own/Self-Occupant	Single
465	36.08081	-0.26985	Residential	Milimani	Own/Self-Occupant	Single
465	36.08083	-0.279	Residential	Milimani	Own/Self-Occupant	Single
465	36.08086	-0.27141	Residential	Milimani	Own/Self-Occupant	Single
465	36.08092	-0.27436	Residential	Milimani	Own/Self-Occupant	Single
465	36.08094	-0.2735	Residential	Milimani	Own/Self-Occupant	Single
465	36.08096	-0.27327	Residential	Milimani	Own/Self-Occupant	Single
465	36.08099	-0.27303	Residential	Milimani	Own/Self-Occupant	Single
465	36.081	-0.27245	Residential	Milimani	Own/Self-Occupant	Single
466	36.08109	-0.27671	Residential	Milimani	Own/Self-Occupant	Single
466	36.08109	-0.27888	Residential	Milimani	Own/Self-Occupant	Single
466	36.0811	-0.27671	Residential	Milimani	Own/Self-Occupant	Single
466	36.08114	-0.27086	Residential	Milimani	Own/Self-Occupant	Single
466	36.08119	-0.27752	Residential	Milimani	Own/Self-Occupant	Single
466	36.0812	-0.27752	Residential	Milimani	Own/Self-Occupant	Single
466	36.08134	-0.27569	Residential	Milimani	Own/Self-Occupant	Single
467	36.08153	-0.27132	Residential	Milimani	Own/Self-Occupant	Single
468	36.08167	-0.27273	Residential	Milimani	Own/Self-Occupant	Single
468	36.08168	-0.27947	Residential	Milimani	Own/Self-Occupant	Single
468	36.08168	-0.27596	Residential	Milimani	Own/Self-Occupant	Single

468	36.08188	-0.27716	Residential	Milimani	Own/Self-Occupant	Single
469	36.08191	-0.27248	Residential	Milimani	Own/Self-Occupant	Single
470	36.08218	-0.27163	Residential	Milimani	Own/Self-Occupant	Single
470	36.08224	-0.27381	Residential	Milimani	Own/Self-Occupant	Single
470	36.08236	-0.2711	Residential	Milimani	Own/Self-Occupant	Single
470	36.08236	-0.27186	Residential	Milimani	Own/Self-Occupant	Single
470	36.08238	-0.27847	Residential	Milimani	Own/Self-Occupant	Single
470	36.08238	-0.27946	Residential	Milimani	Own/Self-Occupant	Single
470	36.08239	-0.279	Residential	Milimani	Own/Self-Occupant	Single
471	36.08243	-0.27944	Residential	Milimani	Own/Self-Occupant	Single
471	36.08243	-0.27743	Residential	Milimani	Own/Self-Occupant	Single
471	36.08246	-0.27122	Residential	Milimani	Own/Self-Occupant	Single
471	36.08261	-0.27463	Residential	Milimani	Own/Self-Occupant	Single
471	36.08262	-0.27628	Residential	Milimani	Own/Self-Occupant	Single
471	36.08265	-0.27774	Residential	Milimani	Own/Self-Occupant	Single
472	36.08272	-0.27066	Residential	Milimani	Own/Self-Occupant	Single
472	36.08274	-0.27591	Residential	Milimani	Own/Self-Occupant	Single
472	36.08283	-0.272	Residential	Milimani	Own/Self-Occupant	Single
472	36.08286	-0.27131	Residential	Milimani	Own/Self-Occupant	Single
472	36.08288	-0.27132	Residential	Milimani	Own/Self-Occupant	Single
473	36.08301	-0.27659	Residential	Milimani	Own/Self-Occupant	Single
473	36.08308	-0.27213	Residential	Milimani	Own/Self-Occupant	Single
473	36.08322	-0.27111	Residential	Milimani	Own/Self-Occupant	Single
473	36.08323	-0.27202	Residential	Milimani	Own/Self-Occupant	Single
473	36.08325	-0.27039	Residential	Milimani	Own/Self-Occupant	Single
474	36.08335	-0.27304	Residential	Milimani	Own/Self-Occupant	Single
474	36.08344	-0.27177	Residential	Milimani	Own/Self-Occupant	Single
475	36.08365	-0.27046	Residential	Milimani	Own/Self-Occupant	Single
476	36.08374	-0.27196	Residential	Milimani	Own/Self-Occupant	Single
476	36.08381	-0.27851	Residential	Milimani	Own/Self-Occupant	Single
477	36.08403	-0.2706	Residential	Milimani	Own/Self-Occupant	Single
479	36.08445	-0.2767	Residential	Milimani	Own/Self-Occupant	Single
479	36.08446	-0.27063	Residential	Milimani	Own/Self-Occupant	Single
485	36.08605	-0.271	Residential	Milimani	Own/Self-Occupant	Single
504	36.09244	-0.27338	Residential	Milimani	Own/Self-Occupant	Single
458	36.07855	-0.27228	Residential	Milimani	Own/Self-Occupant	Single
735	36.08256	-0.27108	Residential	Milimani	Own/Self-Occupant	Single
711	36.08471	-0.2765	Residential	Milimani	Own/Self-Occupant	Single
665	36.06072	-0.27348	Residential	Milimani	Own/Self-Occupant	Multi
669	36.05968	-0.2736	Residential	Milimani	Own/Self-Occupant	Multi
409	36.06812	-0.27401	Residential	Milimani	Own/Self-Occupant	Single
726	36.08104	-0.27773	Residential	Milimani	Own/Self-Occupant	Single
429	36.07289	-0.2746	Residential	Milimani	Own/Self-Occupant	Single

429	36.07289	-0.27459	Residential	Milimani	Own/Self-Occupant	Single
683	36.06979	-0.27252	Residential,	Milimani	Own/Self-Occupant	Single
707	36.07187	-0.26912	Residential,	Milimani	Own/Self-Occupant	Single
712	36.07569	-0.27256	Residential,	Milimani	Own/Self-Occupant	Single
719	36.08143	-0.27583	Residential,	Milimani	Own/Self-Occupant	Single
723	36.08013	-0.27958	Residential,	Milimani	Own/Self-Occupant	Single
736	36.08721	-0.27139	Residential,	Milimani	Own/Self-Occupant	Single
738	36.08373	-0.27129	Residential,	Milimani	Own/Self-Occupant	Single
429	36.07282	-0.27138	Residential,	Milimani	Own/Self-Occupant	Single
464	36.08052	-0.27137	Residential,	Milimani	Own/Self-Occupant	Single

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568	36.11643	-0.29521	Residential	Own/Self-Occupant	Naka	Multi
572	36.11751	-0.29512	Residential	Own/Self-Occupant	Naka	Multi
572	36.11751	-0.29496	Residential	Own/Self-Occupant	Naka	Multi
571	36.11728	-0.29493	Residential	Own/Self-Occupant	Naka	Multi
953	36.1174	-0.2949	Residential	Own/Self-Occupant	Naka	Multi
571	36.11731	-0.2949	Residential	Own/Self-Occupant	Naka	Multi
570	36.11698	-0.29488	Residential	Own/Self-Occupant	Naka	Multi
570	36.11722	-0.29485	Residential	Own/Self-Occupant	Naka	Multi
572	36.11775	-0.29439	Residential	Own/Self-Occupant	Naka	Multi
566	36.11551	-0.29421	Residential	Own/Self-Occupant	Naka	Multi
570	36.11701	-0.29411	Residential	Own/Self-Occupant	Naka	Multi
560	36.1134	-0.29398	Residential	Own/Self-Occupant	Naka	Multi
571	36.11723	-0.29398	Residential	Own/Self-Occupant	Naka	Multi
966	36.11342	-0.29396	Residential	Own/Self-Occupant	Naka	Multi
561	36.11346	-0.29392	Residential	Own/Self-Occupant	Naka	Multi
131	36.11777	-0.29391	Residential	Own/Self-Occupant	Naka	Multi
561	36.11348	-0.29389	Residential	Own/Self-Occupant	Naka	Multi
967	36.11348	-0.29389	Residential	Own/Self-Occupant	Naka	Multi
967	36.11579	-0.29386	Residential	Own/Self-Occupant	Naka	Multi
967	36.1135	-0.29385	Residential	Own/Self-Occupant	Naka	Multi
566	36.11562	-0.29382	Residential	Own/Self-Occupant	Naka	Multi
566	36.11567	-0.2938	Residential	Own/Self-Occupant	Naka	Multi
572	36.11752	-0.29379	Residential	Own/Self-Occupant	Naka	Multi
973	36.11571	-0.29376	Residential	Own/Self-Occupant	Naka	Multi
972	36.11559	-0.29375	Residential	Own/Self-Occupant	Naka	Multi
566	36.11562	-0.29374	Residential	Own/Self-Occupant	Naka	Multi
567	36.11611	-0.29372	Residential	Own/Self-Occupant	Naka	Multi
973	36.11571	-0.2937	Residential	Own/Self-Occupant	Naka	Multi
568	36.11613	-0.29369	Residential	Own/Self-Occupant	Naka	Multi
971	36.1157	-0.29368	Residential	Own/Self-Occupant	Naka	Multi
969	36.11608	-0.29362	Residential	Own/Self-Occupant	Naka	Multi

568	36.11619	-0.29359	Residential	Own/Self-Occupant	Naka	Multi
971	36.11618	-0.29358	Residential	Own/Self-Occupant	Naka	Multi
568	36.11616	-0.29357	Residential	Own/Self-Occupant	Naka	Multi
568	36.11617	-0.29357	Residential	Own/Self-Occupant	Naka	Multi
968	36.11617	-0.29357	Residential	Own/Self-Occupant	Naka	Multi
561	36.11357	-0.29353	Residential	Own/Self-Occupant	Naka	Multi
567	36.11611	-0.29353	Residential	Own/Self-Occupant	Naka	Multi
571	36.11748	-0.29352	Residential	Own/Self-Occupant	Naka	Multi
568	36.11616	-0.29351	Residential	Own/Self-Occupant	Naka	Multi
561	36.1136	-0.29351	Residential	Own/Self-Occupant	Naka	Multi
568	36.1162	-0.29349	Residential	Own/Self-Occupant	Naka	Multi
965	36.11342	-0.29348	Residential	Own/Self-Occupant	Naka	Multi
560	36.11329	-0.29348	Residential	Own/Self-Occupant	Naka	Multi
568	36.11614	-0.29347	Residential	Own/Self-Occupant	Naka	Multi
968	36.11468	-0.29346	Residential	Own/Self-Occupant	Naka	Multi
568	36.11618	-0.29346	Residential	Own/Self-Occupant	Naka	Multi
568	36.1162	-0.29345	Residential	Own/Self-Occupant	Naka	Multi
568	36.11619	-0.29344	Residential	Own/Self-Occupant	Naka	Multi
568	36.11618	-0.29343	Residential	Own/Self-Occupant	Naka	Multi
568	36.11616	-0.29343	Residential	Own/Self-Occupant	Naka	Multi
969	36.11621	-0.29342	Residential	Own/Self-Occupant	Naka	Multi
568	36.11621	-0.29342	Residential	Own/Self-Occupant	Naka	Multi
564	36.11482	-0.29341	Residential	Own/Self-Occupant	Naka	Multi
969	36.11316	-0.29329	Residential	Own/Self-Occupant	Naka	Multi
970	36.11326	-0.29327	Residential	Own/Self-Occupant	Naka	Multi
969	36.11325	-0.29324	Residential	Own/Self-Occupant	Naka	Multi
569	36.11678	-0.29321	Residential	Own/Self-Occupant	Naka	Multi
972	36.11635	-0.2932	Residential	Own/Self-Occupant	Naka	Multi
564	36.11474	-0.29319	Residential	Own/Self-Occupant	Naka	Multi
973	36.11522	-0.29318	Residential	Own/Self-Occupant	Naka	Multi
972	36.11624	-0.29317	Residential	Own/Self-Occupant	Naka	Multi
972	36.11628	-0.29316	Residential	Own/Self-Occupant	Naka	Multi
972	36.11631	-0.29311	Residential	Own/Self-Occupant	Naka	Multi
968	36.11473	-0.29309	Residential	Own/Self-Occupant	Naka	Multi
569	36.11686	-0.29297	Residential	Own/Self-Occupant	Naka	Multi
568	36.11648	-0.29287	Residential	Own/Self-Occupant	Naka	Multi
566	36.11558	-0.29254	Residential	Own/Self-Occupant	Naka	Multi
566	36.11562	-0.29251	Residential	Own/Self-Occupant	Naka	Multi
566	36.11559	-0.2925	Residential	Own/Self-Occupant	Naka	Multi
566	36.11559	-0.29247	Residential	Own/Self-Occupant	Naka	Multi
966	36.11636	-0.29243	Residential	Own/Self-Occupant	Naka	Multi
973	36.11652	-0.29238	Residential	Own/Self-Occupant	Naka	Multi
567	36.11598	-0.29223	Residential	Own/Self-Occupant	Naka	Multi

965	36.11602	-0.2922	Residential	Own/Self-Occupant	Naka	Multi
961	36.11617	-0.2922	Residential	Own/Self-Occupant	Naka	Multi
547	36.10805	-0.29217	Residential	Own/Self-Occupant	Naka	Multi
566	36.11561	-0.29216	Residential	Own/Self-Occupant	Naka	Multi
547	36.10809	-0.29215	Residential	Own/Self-Occupant	Naka	Multi
547	36.10802	-0.29213	Residential	Own/Self-Occupant	Naka	Multi
567	36.11577	-0.29212	Residential	Own/Self-Occupant	Naka	Multi
567	36.11585	-0.29212	Residential	Own/Self-Occupant	Naka	Multi
567	36.11583	-0.29212	Residential	Own/Self-Occupant	Naka	Multi
965	36.11585	-0.29209	Residential	Own/Self-Occupant	Naka	Multi
965	36.11464	-0.29208	Residential	Own/Self-Occupant	Naka	Multi
567	36.11576	-0.29208	Residential	Own/Self-Occupant	Naka	Multi
567	36.11578	-0.29206	Residential	Own/Self-Occupant	Naka	Multi
567	36.11578	-0.29206	Residential	Own/Self-Occupant	Naka	Multi
965	36.11575	-0.29205	Residential	Own/Self-Occupant	Naka	Multi
965	36.1159	-0.29204	Residential	Own/Self-Occupant	Naka	Multi
566	36.11536	-0.29194	Residential	Own/Self-Occupant	Naka	Multi
964	36.11575	-0.2919	Residential	Own/Self-Occupant	Naka	Multi
964	36.11539	-0.29189	Residential	Own/Self-Occupant	Naka	Multi
963	36.11547	-0.29189	Residential	Own/Self-Occupant	Naka	Multi
561	36.11372	-0.29186	Residential	Own/Self-Occupant	Naka	Multi
963	36.11541	-0.29185	Residential	Own/Self-Occupant	Naka	Multi
548	36.10842	-0.29183	Residential	Own/Self-Occupant	Naka	Multi
960	36.11378	-0.29181	Residential	Own/Self-Occupant	Naka	Multi
562	36.11381	-0.29179	Residential	Own/Self-Occupant	Naka	Multi
564	36.11484	-0.29176	Residential	Own/Self-Occupant	Naka	Multi
953	36.10845	-0.29175	Residential	Own/Self-Occupant	Naka	Multi
564	36.11485	-0.29174	Residential	Own/Self-Occupant	Naka	Multi
959	36.11491	-0.29164	Residential	Own/Self-Occupant	Naka	Multi
959	36.11446	-0.29163	Residential	Own/Self-Occupant	Naka	Multi
960	36.1138	-0.29159	Residential	Own/Self-Occupant	Naka	Multi
960	36.11381	-0.29159	Residential	Own/Self-Occupant	Naka	Multi
560	36.11332	-0.29158	Residential	Own/Self-Occupant	Naka	Multi
564	36.11453	-0.29158	Residential	Own/Self-Occupant	Naka	Multi
560	36.11331	-0.29158	Residential	Own/Self-Occupant	Naka	Multi
560	36.11335	-0.29155	Residential	Own/Self-Occupant	Naka	Multi
561	36.11358	-0.29154	Residential	Own/Self-Occupant	Naka	Multi
962	36.11332	-0.29153	Residential	Own/Self-Occupant	Naka	Multi
560	36.11321	-0.29151	Residential	Own/Self-Occupant	Naka	Multi
958	36.11456	-0.2915	Residential	Own/Self-Occupant	Naka	Multi
551	36.10985	-0.29142	Residential	Own/Self-Occupant	Naka	Multi
564	36.11483	-0.2914	Residential	Own/Self-Occupant	Naka	Multi
559	36.11297	-0.29138	Residential	Own/Self-Occupant	Naka	Multi

962	36.1134	-0.29138	Residential	Own/Self-Occupant	Naka	Multi
551	36.10974	-0.29136	Residential	Own/Self-Occupant	Naka	Multi
962	36.11338	-0.29136	Residential	Own/Self-Occupant	Naka	Multi
959	36.11495	-0.29133	Residential	Own/Self-Occupant	Naka	Multi
559	36.11282	-0.29132	Residential	Own/Self-Occupant	Naka	Multi
565	36.11499	-0.29132	Residential	Own/Self-Occupant	Naka	Multi
958	36.1148	-0.29122	Residential	Own/Self-Occupant	Naka	Multi
954	36.10998	-0.29108	Residential	Own/Self-Occupant	Naka	Multi
957	36.11323	-0.29099	Residential	Own/Self-Occupant	Naka	Multi
954	36.11005	-0.29098	Residential	Own/Self-Occupant	Naka	Multi
562	36.11382	-0.29087	Residential	Own/Self-Occupant	Naka	Multi
562	36.11389	-0.29084	Residential	Own/Self-Occupant	Naka	Multi
561	36.11371	-0.2908	Residential	Own/Self-Occupant	Naka	Multi
961	36.11397	-0.29074	Residential	Own/Self-Occupant	Naka	Multi
960	36.11396	-0.29071	Residential	Own/Self-Occupant	Naka	Multi
958	36.11157	-0.29058	Residential	Own/Self-Occupant	Naka	Multi
556	36.11164	-0.29057	Residential	Own/Self-Occupant	Naka	Multi
958	36.11164	-0.2905	Residential	Own/Self-Occupant	Naka	Multi
953	36.10959	-0.29038	Residential	Own/Self-Occupant	Naka	Multi
561	36.11359	-0.29035	Residential	Own/Self-Occupant	Naka	Multi
953	36.10966	-0.29017	Residential	Own/Self-Occupant	Naka	Multi
947	36.11019	-0.29009	Residential	Own/Self-Occupant	Naka	Multi
551	36.10957	-0.29006	Residential	Own/Self-Occupant	Naka	Multi
550	36.1095	-0.29004	Residential	Own/Self-Occupant	Naka	Multi
551	36.10961	-0.29003	Residential	Own/Self-Occupant	Naka	Multi
953	36.10956	-0.29002	Residential	Own/Self-Occupant	Naka	Multi
934	36.10954	-0.28996	Residential	Own/Self-Occupant	Naka	Multi
547	36.10828	-0.28993	Residential	Own/Self-Occupant	Naka	Multi
559	36.11271	-0.28992	Residential	Own/Self-Occupant	Naka	Multi
559	36.1127	-0.28992	Residential	Own/Self-Occupant	Naka	Multi
547	36.10833	-0.28991	Residential	Own/Self-Occupant	Naka	Multi
547	36.10829	-0.2899	Residential	Own/Self-Occupant	Naka	Multi
934	36.10965	-0.28988	Residential	Own/Self-Occupant	Naka	Multi
558	36.11265	-0.28988	Residential	Own/Self-Occupant	Naka	Multi
957	36.11289	-0.28987	Residential	Own/Self-Occupant	Naka	Multi
957	36.11289	-0.28987	Residential	Own/Self-Occupant	Naka	Multi
559	36.11271	-0.28987	Residential	Own/Self-Occupant	Naka	Multi
559	36.1127	-0.28986	Residential	Own/Self-Occupant	Naka	Multi
957	36.11284	-0.28985	Residential	Own/Self-Occupant	Naka	Multi
957	36.11291	-0.28984	Residential	Own/Self-Occupant	Naka	Multi
559	36.11268	-0.28983	Residential	Own/Self-Occupant	Naka	Multi
547	36.10836	-0.28983	Residential	Own/Self-Occupant	Naka	Multi
957	36.11277	-0.28982	Residential	Own/Self-Occupant	Naka	Multi

957	36.11279	-0.28982	Residential	Own/Self-Occupant	Naka	Multi
956	36.11279	-0.28982	Residential	Own/Self-Occupant	Naka	Multi
957	36.11276	-0.28981	Residential	Own/Self-Occupant	Naka	Multi
961	36.11218	-0.28978	Residential	Own/Self-Occupant	Naka	Multi
957	36.11266	-0.28976	Residential	Own/Self-Occupant	Naka	Multi
553	36.11038	-0.28949	Residential	Own/Self-Occupant	Naka	Multi
552	36.1103	-0.28947	Residential	Own/Self-Occupant	Naka	Multi
553	36.11058	-0.28946	Residential	Own/Self-Occupant	Naka	Multi
553	36.11047	-0.28944	Residential	Own/Self-Occupant	Naka	Multi
550	36.10927	-0.28943	Residential	Own/Self-Occupant	Naka	Multi
553	36.11048	-0.28943	Residential	Own/Self-Occupant	Naka	Multi
943	36.11018	-0.28942	Residential	Own/Self-Occupant	Naka	Multi
550	36.10927	-0.28941	Residential	Own/Self-Occupant	Naka	Multi
951	36.10731	-0.2894	Residential	Own/Self-Occupant	Naka	Multi
550	36.10928	-0.28939	Residential	Own/Self-Occupant	Naka	Multi
550	36.10931	-0.28939	Residential	Own/Self-Occupant	Naka	Multi
943	36.11023	-0.28938	Residential	Own/Self-Occupant	Naka	Multi
943	36.11014	-0.28938	Residential	Own/Self-Occupant	Naka	Multi
544	36.1072	-0.28936	Residential	Own/Self-Occupant	Naka	Multi
954	36.10833	-0.28936	Residential	Own/Self-Occupant	Naka	Multi
943	36.11021	-0.28936	Residential	Own/Self-Occupant	Naka	Multi
858	36.10747	-0.28935	Residential	Own/Self-Occupant	Naka	Multi
540	36.10564	-0.28935	Residential	Own/Self-Occupant	Naka	Multi
540	36.10565	-0.28934	Residential	Own/Self-Occupant	Naka	Multi
943	36.11021	-0.28934	Residential	Own/Self-Occupant	Naka	Multi
545	36.10737	-0.28934	Residential	Own/Self-Occupant	Naka	Multi
942	36.11024	-0.28933	Residential	Own/Self-Occupant	Naka	Multi
942	36.11022	-0.28933	Residential	Own/Self-Occupant	Naka	Multi
943	36.11019	-0.28932	Residential	Own/Self-Occupant	Naka	Multi
549	36.10893	-0.28932	Residential	Own/Self-Occupant	Naka	Multi
956	36.10726	-0.28932	Residential	Own/Self-Occupant	Naka	Multi
942	36.11016	-0.2893	Residential	Own/Self-Occupant	Naka	Multi
943	36.11028	-0.2893	Residential	Own/Self-Occupant	Naka	Multi
942	36.11019	-0.2893	Residential	Own/Self-Occupant	Naka	Multi
544	36.10693	-0.2893	Residential	Own/Self-Occupant	Naka	Multi
955	36.10728	-0.2893	Residential	Own/Self-Occupant	Naka	Multi
944	36.11021	-0.2893	Residential	Own/Self-Occupant	Naka	Multi
552	36.11024	-0.28929	Residential	Own/Self-Occupant	Naka	Multi
941	36.11022	-0.28929	Residential	Own/Self-Occupant	Naka	Multi
549	36.10889	-0.28929	Residential	Own/Self-Occupant	Naka	Multi
549	36.10892	-0.28929	Residential	Own/Self-Occupant	Naka	Multi
549	36.10893	-0.28928	Residential	Own/Self-Occupant	Naka	Multi
943	36.11024	-0.28923	Residential	Own/Self-Occupant	Naka	Multi

543	36.1069	-0.28923	Residential	Own/Self-Occupant	Naka	Multi
954	36.10569	-0.28922	Residential	Own/Self-Occupant	Naka	Multi
938	36.10884	-0.2892	Residential	Own/Self-Occupant	Naka	Multi
540	36.1057	-0.2892	Residential	Own/Self-Occupant	Naka	Multi
956	36.10575	-0.2892	Residential	Own/Self-Occupant	Naka	Multi
942	36.11023	-0.28919	Residential	Own/Self-Occupant	Naka	Multi
954	36.10576	-0.28917	Residential	Own/Self-Occupant	Naka	Multi
939	36.10876	-0.28916	Residential	Own/Self-Occupant	Naka	Multi
939	36.10875	-0.28915	Residential	Own/Self-Occupant	Naka	Multi
939	36.10873	-0.28915	Residential	Own/Self-Occupant	Naka	Multi
939	36.1088	-0.28915	Residential	Own/Self-Occupant	Naka	Multi
938	36.10888	-0.28914	Residential	Own/Self-Occupant	Naka	Multi
942	36.1103	-0.28913	Residential	Own/Self-Occupant	Naka	Multi
938	36.10873	-0.28913	Residential	Own/Self-Occupant	Naka	Multi
944	36.10874	-0.28912	Residential	Own/Self-Occupant	Naka	Multi
939	36.10941	-0.28894	Residential	Own/Self-Occupant	Naka	Multi
946	36.10858	-0.28867	Residential	Own/Self-Occupant	Naka	Multi
947	36.10856	-0.28867	Residential	Own/Self-Occupant	Naka	Multi
946	36.1086	-0.2886	Residential	Own/Self-Occupant	Naka	Multi
946	36.10856	-0.28856	Residential	Own/Self-Occupant	Naka	Multi
946	36.10863	-0.28855	Residential	Own/Self-Occupant	Naka	Multi
946	36.10866	-0.28853	Residential	Own/Self-Occupant	Naka	Multi
944	36.10777	-0.28832	Residential	Own/Self-Occupant	Naka	Multi
941	36.10762	-0.28827	Residential	Own/Self-Occupant	Naka	Multi
546	36.1077	-0.28827	Residential	Own/Self-Occupant	Naka	Multi
546	36.10767	-0.28826	Residential	Own/Self-Occupant	Naka	Multi
546	36.1077	-0.28826	Residential	Own/Self-Occupant	Naka	Multi
944	36.10762	-0.28825	Residential	Own/Self-Occupant	Naka	Multi
545	36.10764	-0.28824	Residential	Own/Self-Occupant	Naka	Multi
941	36.10762	-0.28824	Residential	Own/Self-Occupant	Naka	Multi
941	36.10769	-0.28824	Residential	Own/Self-Occupant	Naka	Multi
545	36.1076	-0.28823	Residential	Own/Self-Occupant	Naka	Multi
546	36.10765	-0.28823	Residential	Own/Self-Occupant	Naka	Multi
545	36.10764	-0.28823	Residential	Own/Self-Occupant	Naka	Multi
546	36.10769	-0.28823	Residential	Own/Self-Occupant	Naka	Multi
545	36.10765	-0.28822	Residential	Own/Self-Occupant	Naka	Multi
546	36.10767	-0.28821	Residential	Own/Self-Occupant	Naka	Multi
545	36.10763	-0.28818	Residential	Own/Self-Occupant	Naka	Multi
546	36.10767	-0.28818	Residential	Own/Self-Occupant	Naka	Multi
546	36.10767	-0.28817	Residential	Own/Self-Occupant	Naka	Multi
545	36.10764	-0.28817	Residential	Own/Self-Occupant	Naka	Multi
546	36.10765	-0.28817	Residential	Own/Self-Occupant	Naka	Multi
546	36.10769	-0.28816	Residential	Own/Self-Occupant	Naka	Multi

545	36.10763	-0.28815	Residential	Own/Self-Occupant	Naka	Multi
546	36.10765	-0.28812	Residential	Own/Self-Occupant	Naka	Multi
546	36.1077	-0.28809	Residential	Own/Self-Occupant	Naka	Multi
954	36.10579	-0.28922	Residential	Own/Self-Occupant	Naka	null
226	36.11727	-0.29487	Residential	Own/Self-Occupant	Naka	Single
131	36.11725	-0.29479	Residential	Own/Self-Occupant	Naka	Single
569	36.11665	-0.29478	Residential	Own/Self-Occupant	Naka	Single
570	36.11695	-0.29414	Residential	Own/Self-Occupant	Naka	Single
566	36.1156	-0.29414	Residential	Own/Self-Occupant	Naka	Single
131	36.11657	-0.29412	Residential	Own/Self-Occupant	Naka	Single
131	36.11656	-0.29411	Residential	Own/Self-Occupant	Naka	Single
968	36.11531	-0.2941	Residential	Own/Self-Occupant	Naka	Single
561	36.11348	-0.29394	Residential	Own/Self-Occupant	Naka	Single
967	36.11585	-0.2939	Residential	Own/Self-Occupant	Naka	Single
567	36.11574	-0.2939	Residential	Own/Self-Occupant	Naka	Single
967	36.11344	-0.29385	Residential	Own/Self-Occupant	Naka	Single
560	36.11342	-0.29385	Residential	Own/Self-Occupant	Naka	Single
566	36.11556	-0.29382	Residential	Own/Self-Occupant	Naka	Single
967	36.11336	-0.29381	Residential	Own/Self-Occupant	Naka	Single
971	36.11571	-0.29379	Residential	Own/Self-Occupant	Naka	Single
971	36.11556	-0.29378	Residential	Own/Self-Occupant	Naka	Single
971	36.11569	-0.29375	Residential	Own/Self-Occupant	Naka	Single
967	36.1134	-0.29375	Residential	Own/Self-Occupant	Naka	Single
566	36.11564	-0.29375	Residential	Own/Self-Occupant	Naka	Single
566	36.11566	-0.29372	Residential	Own/Self-Occupant	Naka	Single
971	36.11572	-0.29369	Residential	Own/Self-Occupant	Naka	Single
971	36.11574	-0.29366	Residential	Own/Self-Occupant	Naka	Single
971	36.11619	-0.29365	Residential	Own/Self-Occupant	Naka	Single
971	36.11572	-0.29365	Residential	Own/Self-Occupant	Naka	Single
551	36.1099	-0.29331	Residential	Own/Self-Occupant	Naka	Single
970	36.11327	-0.29331	Residential	Own/Self-Occupant	Naka	Single
970	36.11323	-0.2933	Residential	Own/Self-Occupant	Naka	Single
970	36.11322	-0.2933	Residential	Own/Self-Occupant	Naka	Single
970	36.11325	-0.2933	Residential	Own/Self-Occupant	Naka	Single
970	36.11329	-0.29326	Residential	Own/Self-Occupant	Naka	Single
968	36.11484	-0.29311	Residential	Own/Self-Occupant	Naka	Single
968	36.11481	-0.29309	Residential	Own/Self-Occupant	Naka	Single
972	36.1148	-0.29309	Residential	Own/Self-Occupant	Naka	Single
972	36.11592	-0.29303	Residential	Own/Self-Occupant	Naka	Single
972	36.116	-0.29293	Residential	Own/Self-Occupant	Naka	Single
972	36.11603	-0.29286	Residential	Own/Self-Occupant	Naka	Single
566	36.11549	-0.29255	Residential	Own/Self-Occupant	Naka	Single
566	36.11558	-0.29252	Residential	Own/Self-Occupant	Naka	Single

968	36.11553	-0.29248	Residential	Own/Self-Occupant	Naka	Single
566	36.11561	-0.29246	Residential	Own/Self-Occupant	Naka	Single
566	36.11549	-0.29243	Residential	Own/Self-Occupant	Naka	Single
966	36.11644	-0.29243	Residential	Own/Self-Occupant	Naka	Single
953	36.11089	-0.29237	Residential	Own/Self-Occupant	Naka	Single
966	36.11641	-0.29233	Residential	Own/Self-Occupant	Naka	Single
966	36.11641	-0.29231	Residential	Own/Self-Occupant	Naka	Single
966	36.11639	-0.29229	Residential	Own/Self-Occupant	Naka	Single
966	36.11643	-0.29225	Residential	Own/Self-Occupant	Naka	Single
958	36.11567	-0.29217	Residential	Own/Self-Occupant	Naka	Single
961	36.116	-0.29215	Residential	Own/Self-Occupant	Naka	Single
546	36.10781	-0.29215	Residential	Own/Self-Occupant	Naka	Single
951	36.11041	-0.29211	Residential	Own/Self-Occupant	Naka	Single
964	36.11569	-0.2921	Residential	Own/Self-Occupant	Naka	Single
567	36.11592	-0.29209	Residential	Own/Self-Occupant	Naka	Single
965	36.11588	-0.29209	Residential	Own/Self-Occupant	Naka	Single
952	36.10811	-0.29206	Residential	Own/Self-Occupant	Naka	Single
952	36.10807	-0.29204	Residential	Own/Self-Occupant	Naka	Single
952	36.1081	-0.29203	Residential	Own/Self-Occupant	Naka	Single
952	36.1081	-0.29202	Residential	Own/Self-Occupant	Naka	Single
964	36.11573	-0.29201	Residential	Own/Self-Occupant	Naka	Single
952	36.10816	-0.29201	Residential	Own/Self-Occupant	Naka	Single
964	36.11573	-0.29198	Residential	Own/Self-Occupant	Naka	Single
952	36.10821	-0.29196	Residential	Own/Self-Occupant	Naka	Single
933	36.11027	-0.2919	Residential	Own/Self-Occupant	Naka	Single
960	36.1138	-0.29172	Residential	Own/Self-Occupant	Naka	Single
960	36.11375	-0.29169	Residential	Own/Self-Occupant	Naka	Single
963	36.11486	-0.29167	Residential	Own/Self-Occupant	Naka	Single
963	36.11487	-0.29167	Residential	Own/Self-Occupant	Naka	Single
964	36.11485	-0.29166	Residential	Own/Self-Occupant	Naka	Single
963	36.11487	-0.29162	Residential	Own/Self-Occupant	Naka	Single
964	36.11494	-0.29162	Residential	Own/Self-Occupant	Naka	Single
963	36.1149	-0.2916	Residential	Own/Self-Occupant	Naka	Single
959	36.11376	-0.29159	Residential	Own/Self-Occupant	Naka	Single
962	36.11342	-0.29159	Residential	Own/Self-Occupant	Naka	Single
951	36.10951	-0.29156	Residential	Own/Self-Occupant	Naka	Single
960	36.11386	-0.29156	Residential	Own/Self-Occupant	Naka	Single
959	36.11376	-0.29156	Residential	Own/Self-Occupant	Naka	Single
960	36.11386	-0.29156	Residential	Own/Self-Occupant	Naka	Single
966	36.11475	-0.29155	Residential	Own/Self-Occupant	Naka	Single
962	36.11355	-0.29154	Residential	Own/Self-Occupant	Naka	Single
564	36.11471	-0.29153	Residential	Own/Self-Occupant	Naka	Single
105	36.11443	-0.29149	Residential	Own/Self-Occupant	Naka	Single

959	36.11445	-0.29144	Residential	Own/Self-Occupant	Naka	Single
962	36.11326	-0.29135	Residential	Own/Self-Occupant	Naka	Single
961	36.11316	-0.29134	Residential	Own/Self-Occupant	Naka	Single
963	36.11291	-0.29134	Residential	Own/Self-Occupant	Naka	Single
962	36.11294	-0.29134	Residential	Own/Self-Occupant	Naka	Single
962	36.11332	-0.29133	Residential	Own/Self-Occupant	Naka	Single
113	36.11477	-0.29132	Residential	Own/Self-Occupant	Naka	Single
959	36.11482	-0.2913	Residential	Own/Self-Occupant	Naka	Single
959	36.11484	-0.2913	Residential	Own/Self-Occupant	Naka	Single
961	36.11315	-0.29129	Residential	Own/Self-Occupant	Naka	Single
551	36.10984	-0.29127	Residential	Own/Self-Occupant	Naka	Single
928	36.10984	-0.29124	Residential	Own/Self-Occupant	Naka	Single
961	36.11298	-0.29123	Residential	Own/Self-Occupant	Naka	Single
962	36.11302	-0.29121	Residential	Own/Self-Occupant	Naka	Single
551	36.10988	-0.2912	Residential	Own/Self-Occupant	Naka	Single
962	36.11283	-0.29119	Residential	Own/Self-Occupant	Naka	Single
547	36.10825	-0.29119	Residential	Own/Self-Occupant	Naka	Single
954	36.10988	-0.29117	Residential	Own/Self-Occupant	Naka	Single
963	36.11294	-0.29115	Residential	Own/Self-Occupant	Naka	Single
560	36.11337	-0.29114	Residential	Own/Self-Occupant	Naka	Single
959	36.11487	-0.29112	Residential	Own/Self-Occupant	Naka	Single
958	36.11491	-0.29103	Residential	Own/Self-Occupant	Naka	Single
551	36.10995	-0.29096	Residential	Own/Self-Occupant	Naka	Single
958	36.11115	-0.29096	Residential	Own/Self-Occupant	Naka	Single
952	36.11005	-0.29086	Residential	Own/Self-Occupant	Naka	Single
959	36.11033	-0.29085	Residential	Own/Self-Occupant	Naka	Single
561	36.11371	-0.29084	Residential	Own/Self-Occupant	Naka	Single
961	36.11402	-0.29083	Residential	Own/Self-Occupant	Naka	Single
544	36.10729	-0.29083	Residential	Own/Self-Occupant	Naka	Single
965	36.11391	-0.29079	Residential	Own/Self-Occupant	Naka	Single
952	36.10709	-0.29071	Residential	Own/Self-Occupant	Naka	Single
961	36.11373	-0.29069	Residential	Own/Self-Occupant	Naka	Single
965	36.11392	-0.29068	Residential	Own/Self-Occupant	Naka	Single
560	36.11313	-0.29067	Residential	Own/Self-Occupant	Naka	Single
960	36.11377	-0.29065	Residential	Own/Self-Occupant	Naka	Single
952	36.11001	-0.29056	Residential	Own/Self-Occupant	Naka	Single
964	36.11157	-0.29053	Residential	Own/Self-Occupant	Naka	Single
954	36.11246	-0.29036	Residential	Own/Self-Occupant	Naka	Single
956	36.10827	-0.29026	Residential	Own/Self-Occupant	Naka	Single
934	36.10952	-0.29006	Residential	Own/Self-Occupant	Naka	Single
948	36.10764	-0.29005	Residential	Own/Self-Occupant	Naka	Single
935	36.10952	-0.29003	Residential	Own/Self-Occupant	Naka	Single
551	36.10958	-0.28994	Residential	Own/Self-Occupant	Naka	Single

934	36.10955	-0.28993	Residential	Own/Self-Occupant	Naka	Single
559	36.11266	-0.28993	Residential	Own/Self-Occupant	Naka	Single
551	36.10958	-0.28992	Residential	Own/Self-Occupant	Naka	Single
550	36.10953	-0.28991	Residential	Own/Self-Occupant	Naka	Single
551	36.1096	-0.28989	Residential	Own/Self-Occupant	Naka	Single
551	36.10959	-0.28989	Residential	Own/Self-Occupant	Naka	Single
935	36.10959	-0.28988	Residential	Own/Self-Occupant	Naka	Single
956	36.10813	-0.28987	Residential	Own/Self-Occupant	Naka	Single
956	36.11266	-0.28987	Residential	Own/Self-Occupant	Naka	Single
553	36.11038	-0.28986	Residential	Own/Self-Occupant	Naka	Single
935	36.10952	-0.28981	Residential	Own/Self-Occupant	Naka	Single
547	36.10833	-0.28979	Residential	Own/Self-Occupant	Naka	Single
957	36.1127	-0.28977	Residential	Own/Self-Occupant	Naka	Single
547	36.10833	-0.28975	Residential	Own/Self-Occupant	Naka	Single
547	36.10828	-0.28975	Residential	Own/Self-Occupant	Naka	Single
956	36.10835	-0.2897	Residential	Own/Self-Occupant	Naka	Single
951	36.10782	-0.2897	Residential	Own/Self-Occupant	Naka	Single
939	36.11022	-0.2897	Residential	Own/Self-Occupant	Naka	Single
547	36.10835	-0.2897	Residential	Own/Self-Occupant	Naka	Single
953	36.10831	-0.28969	Residential	Own/Self-Occupant	Naka	Single
956	36.10805	-0.28968	Residential	Own/Self-Occupant	Naka	Single
940	36.11023	-0.28964	Residential	Own/Self-Occupant	Naka	Single
953	36.1079	-0.28963	Residential	Own/Self-Occupant	Naka	Single
551	36.10973	-0.28959	Residential	Own/Self-Occupant	Naka	Single
955	36.10739	-0.28952	Residential	Own/Self-Occupant	Naka	Single
955	36.10743	-0.28946	Residential	Own/Self-Occupant	Naka	Single
955	36.1074	-0.28945	Residential	Own/Self-Occupant	Naka	Single
955	36.10745	-0.28945	Residential	Own/Self-Occupant	Naka	Single
545	36.10741	-0.28944	Residential	Own/Self-Occupant	Naka	Single
947	36.10875	-0.28943	Residential	Own/Self-Occupant	Naka	Single
955	36.10748	-0.28942	Residential	Own/Self-Occupant	Naka	Single
124	36.11055	-0.28942	Residential	Own/Self-Occupant	Naka	Single
954	36.10747	-0.28942	Residential	Own/Self-Occupant	Naka	Single
545	36.10746	-0.28942	Residential	Own/Self-Occupant	Naka	Single
955	36.10744	-0.28942	Residential	Own/Self-Occupant	Naka	Single
550	36.10951	-0.28942	Residential	Own/Self-Occupant	Naka	Single
955	36.10745	-0.2894	Residential	Own/Self-Occupant	Naka	Single
550	36.10925	-0.28939	Residential	Own/Self-Occupant	Naka	Single
955	36.10745	-0.28939	Residential	Own/Self-Occupant	Naka	Single
947	36.10886	-0.28936	Residential	Own/Self-Occupant	Naka	Single
948	36.10926	-0.28935	Residential	Own/Self-Occupant	Naka	Single
544	36.10728	-0.28934	Residential	Own/Self-Occupant	Naka	Single
948	36.10928	-0.28933	Residential	Own/Self-Occupant	Naka	Single

553	36.11042	-0.28932	Residential	Own/Self-Occupant	Naka	Single
550	36.10924	-0.28931	Residential	Own/Self-Occupant	Naka	Single
935	36.10825	-0.28931	Residential	Own/Self-Occupant	Naka	Single
550	36.10927	-0.2893	Residential	Own/Self-Occupant	Naka	Single
937	36.11037	-0.2893	Residential	Own/Self-Occupant	Naka	Single
945	36.10891	-0.28919	Residential	Own/Self-Occupant	Naka	Single
949	36.1093	-0.28917	Residential	Own/Self-Occupant	Naka	Single
947	36.10671	-0.28874	Residential	Own/Self-Occupant	Naka	Single
949	36.10875	-0.28872	Residential	Own/Self-Occupant	Naka	Single
542	36.10656	-0.28869	Residential	Own/Self-Occupant	Naka	Single
946	36.10851	-0.28864	Residential	Own/Self-Occupant	Naka	Single
542	36.1064	-0.28863	Residential	Own/Self-Occupant	Naka	Single
550	36.10953	-0.28858	Residential	Own/Self-Occupant	Naka	Single
946	36.10856	-0.28855	Residential	Own/Self-Occupant	Naka	Single
947	36.10857	-0.28855	Residential	Own/Self-Occupant	Naka	Single
544	36.10711	-0.28853	Residential	Own/Self-Occupant	Naka	Single
946	36.10857	-0.28852	Residential	Own/Self-Occupant	Naka	Single
946	36.10863	-0.28848	Residential	Own/Self-Occupant	Naka	Single
550	36.10938	-0.28839	Residential	Own/Self-Occupant	Naka	Single
936	36.10937	-0.28837	Residential	Own/Self-Occupant	Naka	Single
544	36.107	-0.28835	Residential	Own/Self-Occupant	Naka	Single
545	36.10762	-0.28821	Residential	Own/Self-Occupant	Naka	Single
548	36.10855	-0.28817	Residential	Own/Self-Occupant	Naka	Single
935	36.10688	-0.28798	Residential	Own/Self-Occupant	Naka	Single
936	36.10809	-0.28788	Residential	Own/Self-Occupant	Naka	Single

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101	36.08839	-0.28895	Residential	Own/Self-Occupant	Section 58	Single
102	36.09315	-0.28985	Residential	Own/Self-Occupant	Section 58	Single
509	36.09464	-0.28443	Residential	Own/Self-Occupant	Section 58	Single
637	36.08608	-0.28749	Residential	Own/Self-Occupant	Section 58	Single
891	36.0832	-0.28788	Residential	Own/Self-Occupant	Section 58	Single
892	36.08355	-0.28794	Residential	Own/Self-Occupant	Section 58	Single
893	36.08624	-0.28761	Residential	Own/Self-Occupant	Section 58	Single
893	36.08614	-0.28751	Residential	Own/Self-Occupant	Section 58	Single
894	36.08482	-0.2874	Residential	Own/Self-Occupant	Section 58	Single
894	36.08583	-0.28735	Residential	Own/Self-Occupant	Section 58	Single
894	36.08491	-0.28731	Residential	Own/Self-Occupant	Section 58	Single
894	36.08485	-0.2874	Residential	Own/Self-Occupant	Section 58	Single
894	36.08487	-0.28787	Residential	Own/Self-Occupant	Section 58	Single
894	36.0931	-0.28435	Residential	Own/Self-Occupant	Section 58	Single
894	36.08511	-0.28759	Residential	Own/Self-Occupant	Section 58	Single
895	36.08525	-0.28757	Residential	Own/Self-Occupant	Section 58	Single

895	36.08517	-0.2875	Residential	Own/Self-Occupant	Section 58	Single
895	36.09293	-0.28442	Residential	Own/Self-Occupant	Section 58	Single
895	36.08531	-0.28786	Residential	Own/Self-Occupant	Section 58	Single
895	36.08527	-0.28755	Residential	Own/Self-Occupant	Section 58	Single
895	36.08577	-0.28735	Residential	Own/Self-Occupant	Section 58	Single
895	36.08547	-0.2873	Residential	Own/Self-Occupant	Section 58	Single
895	36.08544	-0.28743	Residential	Own/Self-Occupant	Section 58	Single
895	36.08548	-0.28743	Residential	Own/Self-Occupant	Section 58	Single
896	36.08476	-0.28746	Residential	Own/Self-Occupant	Section 58	Single
896	36.0836	-0.28774	Residential	Own/Self-Occupant	Section 58	Single
897	36.08497	-0.28737	Residential	Own/Self-Occupant	Section 58	Single
900	36.09569	-0.28449	Residential	Own/Self-Occupant	Section 58	Single
902	36.0901	-0.28674	Residential	Own/Self-Occupant	Section 58	Single
902	36.09012	-0.28675	Residential	Own/Self-Occupant	Section 58	Single
903	36.08853	-0.28679	Residential	Own/Self-Occupant	Section 58	Single
907	36.09047	-0.2867	Residential	Own/Self-Occupant	Section 58	Single
908	36.09055	-0.28647	Residential	Own/Self-Occupant	Section 58	Single
908	36.09045	-0.28651	Residential	Own/Self-Occupant	Section 58	Single
908	36.09005	-0.28721	Residential	Own/Self-Occupant	Section 58	Single
908	36.09055	-0.2865	Residential	Own/Self-Occupant	Section 58	Single
911	36.09014	-0.28733	Residential	Own/Self-Occupant	Section 58	Single
911	36.08851	-0.28681	Residential	Own/Self-Occupant	Section 58	Single
912	36.08983	-0.28698	Residential	Own/Self-Occupant	Section 58	Multi
912	36.08796	-0.28694	Residential	Own/Self-Occupant	Section 58	Single
912	36.08883	-0.28672	Residential	Own/Self-Occupant	Section 58	Multi
912	36.08984	-0.28691	Residential	Own/Self-Occupant	Section 58	Single
913	36.0898	-0.28702	Residential	Own/Self-Occupant	Section 58	Single
913	36.09055	-0.28669	Residential	Own/Self-Occupant	Section 58	Single
913	36.09035	-0.2865	Residential	Own/Self-Occupant	Section 58	Single
913	36.09058	-0.28667	Residential	Own/Self-Occupant	Section 58	Single
913	36.09047	-0.28658	Residential	Own/Self-Occupant	Section 58	Single
914	36.09037	-0.2865	Residential	Own/Self-Occupant	Section 58	Single
914	36.09007	-0.28672	Residential	Own/Self-Occupant	Section 58	Single
914	36.08686	-0.28707	Residential	Own/Self-Occupant	Section 58	Single
914	36.08689	-0.28707	Residential	Own/Self-Occupant	Section 58	Single
914	36.08696	-0.28736	Residential	Own/Self-Occupant	Section 58	Single
914	36.09041	-0.28644	Residential	Own/Self-Occupant	Section 58	Single
914	36.09007	-0.28674	Residential	Own/Self-Occupant	Section 58	Single
915	36.08925	-0.28677	Residential	Own/Self-Occupant	Section 58	Single
915	36.08853	-0.2869	Residential	Own/Self-Occupant	Section 58	Single
915	36.09054	-0.28673	Residential	Own/Self-Occupant	Section 58	Single
916	36.08942	-0.28665	Residential	Own/Self-Occupant	Section 58	Single
917	36.08944	-0.2869	Residential	Own/Self-Occupant	Section 58	Single

917	36.08936	-0.28683	Residential	Own/Self-Occupant	Section 58	Single
917	36.08934	-0.28797	Residential	Own/Self-Occupant	Section 58	Multi
917	36.08937	-0.28686	Residential	Own/Self-Occupant	Section 58	Single
917	36.08943	-0.28691	Residential	Own/Self-Occupant	Section 58	Multi
917	36.08941	-0.28698	Residential	Own/Self-Occupant	Section 58	Single
917	36.08943	-0.28691	Residential	Own/Self-Occupant	Section 58	Single
917	36.08932	-0.2869	Residential	Own/Self-Occupant	Section 58	Single
917	36.08948	-0.28684	Residential	Own/Self-Occupant	Section 58	Single
917	36.08941	-0.28692	Residential	Own/Self-Occupant	Section 58	Single
918	36.08938	-0.28691	Residential	Own/Self-Occupant	Section 58	Single
918	36.08944	-0.28692	Residential	Own/Self-Occupant	Section 58	Single
918	36.08939	-0.2869	Residential	Own/Self-Occupant	Section 58	Single
918	36.08389	-0.28686	Residential	Own/Self-Occupant	Section 58	Single
918	36.08389	-0.28676	Residential	Own/Self-Occupant	Section 58	Single
918	36.0843	-0.28659	Residential	Own/Self-Occupant	Section 58	Single
918	36.08416	-0.28677	Residential	Own/Self-Occupant	Section 58	Single
919	36.08386	-0.28665	Residential	Own/Self-Occupant	Section 58	Single
919	36.08384	-0.28679	Residential	Own/Self-Occupant	Section 58	Single
919	36.08424	-0.28691	Residential	Own/Self-Occupant	Section 58	Single
919	36.08414	-0.28686	Residential	Own/Self-Occupant	Section 58	Single
919	36.084	-0.28676	Residential	Own/Self-Occupant	Section 58	Single
920	36.084	-0.28672	Residential	Own/Self-Occupant	Section 58	Single
920	36.08412	-0.28681	Residential	Own/Self-Occupant	Section 58	Single
920	36.08409	-0.28674	Residential	Own/Self-Occupant	Section 58	Single
920	36.0841	-0.28674	Residential	Own/Self-Occupant	Section 58	Single
920	36.08406	-0.28675	Residential	Own/Self-Occupant	Section 58	Single
920	36.08402	-0.2868	Residential	Own/Self-Occupant	Section 58	Single
920	36.08413	-0.28671	Residential	Own/Self-Occupant	Section 58	Single
920	36.08409	-0.28681	Residential	Own/Self-Occupant	Section 58	Single
920	36.08412	-0.28718	Residential	Own/Self-Occupant	Section 58	Single
921	36.08423	-0.28705	Residential	Own/Self-Occupant	Section 58	Single
921	36.09023	-0.28526	Residential	Own/Self-Occupant	Section 58	Single
921	36.09048	-0.28586	Residential	Own/Self-Occupant	Section 58	Single
999	36.0902	-0.28814	Residential	Own/Self-Occupant	Section 58	Single
999	36.09022	-0.28817	Residential	Own/Self-Occupant	Section 58	Single
100	36.09019	-0.28816	Residential	Own/Self-Occupant	Section 58	Single
100	36.09016	-0.28816	Residential	Own/Self-Occupant	Section 58	Single
101	36.09624	-0.28548	Residential	Own/Self-Occupant	Section 58	Single
101	36.09507	-0.28531	Residential	Own/Self-Occupant	Section 58	Single
101	36.09377	-0.2843	Residential	Own/Self-Occupant	Section 58	Single
101	36.09642	-0.28436	Residential	Own/Self-Occupant	Section 58	Single
101	36.09634	-0.2844	Residential	Own/Self-Occupant	Section 58	Single
101	36.09218	-0.2847	Residential	Own/Self-Occupant	Section 58	Single

101	36.09235	-0.28451	Residential	Own/Self-Occupant	Section 58	Single
101	36.09553	-0.28452	Residential	Own/Self-Occupant	Section 58	Single
101	36.0924	-0.28453	Residential	Own/Self-Occupant	Section 58	Single
101	36.09257	-0.28452	Residential	Own/Self-Occupant	Section 58	Single
101	36.09372	-0.28425	Residential	Own/Self-Occupant	Section 58	Single
101	36.09668	-0.28464	Residential	Own/Self-Occupant	Section 58	Single
101	36.09531	-0.28538	Residential	Own/Self-Occupant	Section 58	Single
101	36.09488	-0.28559	Residential	Own/Self-Occupant	Section 58	Single
101	36.09644	-0.28555	Residential	Own/Self-Occupant	Section 58	Single
102	36.09623	-0.28548	Residential	Own/Self-Occupant	Section 58	Single
102	36.09511	-0.28561	Residential	Own/Self-Occupant	Section 58	Single
102	36.09659	-0.28486	Residential	Own/Self-Occupant	Section 58	Single
102	36.09514	-0.2869	Residential	Own/Self-Occupant	Section 58	Single
102	36.0952	-0.28709	Residential	Own/Self-Occupant	Section 58	Single
102	36.0951	-0.28684	Residential	Own/Self-Occupant	Section 58	Single
102	36.09536	-0.28711	Residential	Own/Self-Occupant	Section 58	Single
102	36.09666	-0.28729	Residential	Own/Self-Occupant	Section 58	Single
102	36.09434	-0.28693	Residential	Own/Self-Occupant	Section 58	Single
102	36.09432	-0.28755	Residential	Own/Self-Occupant	Section 58	Single
103	36.0924	-0.2897	Residential	Own/Self-Occupant	Section 58	Single
103	36.09202	-0.28933	Residential	Own/Self-Occupant	Section 58	Single
103	36.09402	-0.28836	Residential	Own/Self-Occupant	Section 58	Single
103	36.0932	-0.28806	Residential	Own/Self-Occupant	Section 58	Single
103	36.09301	-0.2877	Residential	Own/Self-Occupant	Section 58	Single
103	36.09564	-0.2875	Residential	Own/Self-Occupant	Section 58	Single
103	36.09223	-0.28782	Residential	Own/Self-Occupant	Section 58	Single
103	36.09295	-0.28824	Residential	Own/Self-Occupant	Section 58	Single
103	36.09552	-0.28741	Residential	Own/Self-Occupant	Section 58	Single
103	36.09549	-0.28753	Residential	Own/Self-Occupant	Section 58	Single
103	36.09547	-0.2875	Residential	Own/Self-Occupant	Section 58	Single
103	36.09542	-0.28749	Residential	Own/Self-Occupant	Section 58	Single
103	36.09412	-0.2878	Residential	Own/Self-Occupant	Section 58	Single
103	36.0943	-0.28762	Residential	Own/Self-Occupant	Section 58	Single
123	36.08845	-0.28876	Residential	Own/Self-Occupant	Section 58	Single
461	36.07953	-0.28715	Residential	Own/Self-Occupant	Section 58	Single
473	36.08321	-0.28769	Residential	Own/Self-Occupant	Section 58	Single
476	36.0838	-0.28771	Residential	Own/Self-Occupant	Section 58	Single
481	36.08518	-0.2874	Residential	Own/Self-Occupant	Section 58	Single
482	36.08536	-0.28742	Residential	Own/Self-Occupant	Section 58	Single
484	36.08581	-0.28731	Residential	Own/Self-Occupant	Section 58	Single
496	36.0893	-0.28669	Residential	Own/Self-Occupant	Section 58	Single
498	36.09	-0.28657	Residential	Own/Self-Occupant	Section 58	Single
499	36.09014	-0.28733	Residential	Own/Self-Occupant	Section 58	Single

499	36.09018	-0.2882	Residential	Own/Self-Occupant	Section 58	Single
501	36.09109	-0.28801	Residential	Own/Self-Occupant	Section 58	Single
502	36.09183	-0.28412	Residential	Own/Self-Occupant	Section 58	Single
505	36.09263	-0.2878	Residential	Own/Self-Occupant	Section 58	Single
505	36.09278	-0.28778	Residential	Own/Self-Occupant	Section 58	Single
505	36.09285	-0.28416	Residential	Own/Self-Occupant	Section 58	Single
506	36.09311	-0.28428	Residential	Own/Self-Occupant	Section 58	Single
506	36.09314	-0.28462	Residential	Own/Self-Occupant	Section 58	Single
506	36.09324	-0.28807	Residential	Own/Self-Occupant	Section 58	Single
506	36.09327	-0.28438	Residential	Own/Self-Occupant	Section 58	Single
506	36.09328	-0.28453	Residential	Own/Self-Occupant	Section 58	Single
506	36.09328	-0.28727	Residential	Own/Self-Occupant	Section 58	Single
506	36.09331	-0.28437	Residential	Own/Self-Occupant	Section 58	Single
506	36.09342	-0.28805	Residential	Own/Self-Occupant	Section 58	Single
507	36.09353	-0.28438	Residential	Own/Self-Occupant	Section 58	Single
507	36.09373	-0.28426	Residential	Own/Self-Occupant	Section 58	Single
507	36.09412	-0.28682	Residential	Own/Self-Occupant	Section 58	Single
508	36.09448	-0.28527	Residential	Own/Self-Occupant	Section 58	Single
509	36.09464	-0.28378	Residential	Own/Self-Occupant	Section 58	Single
510	36.09518	-0.28404	Residential	Own/Self-Occupant	Section 58	Single
510	36.09537	-0.28567	Residential	Own/Self-Occupant	Section 58	Single
511	36.09555	-0.28479	Residential	Own/Self-Occupant	Section 58	Single
511	36.09563	-0.28426	Residential	Own/Self-Occupant	Section 58	Single
511	36.09581	-0.28713	Residential	Own/Self-Occupant	Section 58	Single
513	36.09643	-0.28441	Residential	Own/Self-Occupant	Section 58	Single
513	36.09657	-0.28487	Residential	Own/Self-Occupant	Section 58	Single
520	36.09918	-0.28445	Residential	Own/Self-Occupant	Section 58	Single
990	36.08651	-0.2888	Residential	Own/Self-Occupant	Section 58	Single
915	36.0871	-0.28704	Residential	Own/Self-Occupant	Section 58	Single
894	36.08601	-0.28735	Residential	Own/Self-Occupant	Section 58	Single
897	36.07967	-0.28789	Residential	Own/Self-Occupant	Section 58	Multi
921	36.08429	-0.28714	Residential	Own/Self-Occupant	Section 58	Single
482	36.08533	-0.28576	Residential	Own/Self-Occupant	Section 58	Single
482	36.08538	-0.28583	Residential	Own/Self-Occupant	Section 58	Single
484	36.08591	-0.28733	Residential	Own/Self-Occupant	Section 58	Single
489	36.08689	-0.28501	Residential	Own/Self-Occupant	Section 58	Single
103	36.09323	-0.2881	Residential,	Own/Self-Occupant	Section 58	Single
103	36.09551	-0.28748	Residential,	Own/Self-Occupant	Section 58	Single