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FACULTY OF ENGINEERING

DEPARTMENT OF MINING AND WATER RESOURCES ENGINEERING

WATER RESOURCES ENGINEERING PROGRAMME

FINAL YEAR PROJECT REPORT

Design of a medical waste water recycling system.

(Case study; Iganga Main Hospital)

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A final year project proposal submitted to the Department of Mining and Water Resources Engineering as a partial fulfillment of the requirements for the award of a degree for Bachelor of Science in Water Resources Engineering

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ABSTRACT

Hospital waste water is water generated from all activities both medical and non- medical from the operating, emergency & first aid, diagnosis, radiology, kitchen and laundry activities.

Hospital wastewaters are loaded with pathogenic microorganisms, laboratory and pharmaceutical residuals, pharmaceutical partially metabolized, radioactive elements and other toxic chemical substances.

Iganga main hospitals' waste water is discharged to the NWSC lagoon for the municipality and finally into the wetland. This has led to wastage hence posing stress on the current water sources and also high expenditure incurred in extracting this water from underground. Basing also on the discharge from the hospital, it poses a threat of pollution pay principle.

The waste water from the hospital was quantified and characterized to aid in designing the appropriate treatment system. Design and sizing of various components of the medical waste water recycling system: facultative lagoon, rectangular slow sand filter, clear water tank, storage tank, pump, pipes and chlorination unit was done using the given relevant formulas and equations. From the research (field visits), medical waste water being generated was averaged at 73965 liters per day. The waste water being discharged showed poor physical chemical and biological characteristics hence need for treatment before reuse. An economic evaluation of the system was done using benefit cost ratio which was 1.28 and the Net present value approach were it was greater than zero. This meant the project was feasible and thus should be implemented to reduce on the costs incurred.

DECLARATION

I **MWANJA SAMUEL** hereby declare that, this report is work of my hands and research and has never been presented by any person or institution for an academic award.

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Main Supervisor

Ms. NAKABUYE HOPE NJUKI

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Date.....

Co-supervisor

Mr. SSEMBATYA MARTIN

Signature.....

Date.....

DEDICATION

This project is dedicated to my brother Ivan, my sisters; Jackie and Maureen.

ACKNOWLEDGEMENT

I am very grateful to the Almighty God for the protection, guidance and good health He provided to me throughout the entire time of my research.

Sincere appreciations go to my Supervisors Ms. Nakabuye Njuki Hope and Mr. Ssembatya Martin who ensured that I acquire full knowledge and assistance where I needed.

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I appreciate my brother and sisters for their guidance and financial support they rendered to me. May the Almighty God bless the works of their hands!

Finally, I give credit to my fellow finalists for their inspiring words of counsel and wisdom. May the good Lord bless and reward them with success.

LIST OF TABLES

LIST OF ACRONYMS

COD	Chemical Oxygen Demand
NTU	Nephlometric Turbidity Unit
BOD	Biochemical Oxygen Demand
m	meter
m/ s	meters per second
mg/ l	milligrams per liter
ml	milliliter
mm	millimeters
NWSC	National Water and Sewerage Corporation
pH	Power of Hydrogen ion.
EDTA	Ethylene Diamine Tetra Acetic acid
APHA	American Public Health Association
CRI	Cruz Roja International
EPA	Environmental Impact Agency
NPV	Net Present Value
MDG	Millennium Development Goal

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CHAPTER ONE

1.0 INTRODUCTION

This chapter entails relevant information about the project, problem statement, and justification, objectives of the study, purpose of the study and the scope of the study.

1.1 Back ground

Water resources. These are sources of water that are useful or potentially useful.

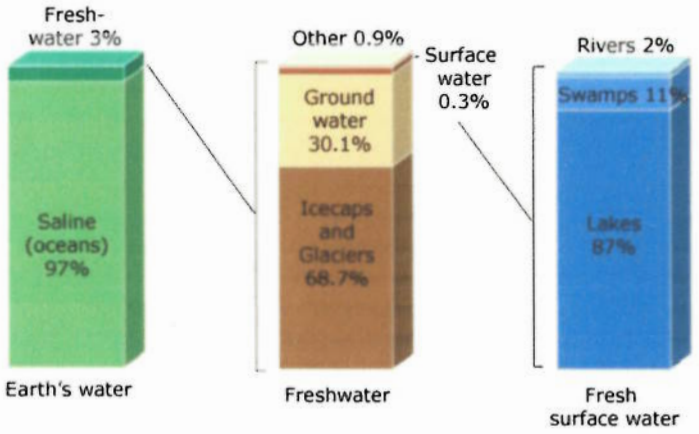
From the beginning of the 21st century, the world 's freshwater resources are under increasing pressure (UN-Water, 2011). Growth in population, increased economic activity from industry, urbanization, and improved standards of living have led to increased competition for and conflicts over the limited freshwater resource.

Wastewater management clearly plays a role in achieving future water security in a world where water stress will increase (OECD, 2012).

According to the fourth MDG report, presently only 20% of globally produced wastewater receives proper treatment (UNESCO, 2012).

In the future, it is envisaged that even more water will be needed to produce food because the Earth's population is forecast to rise to 9.5+ billion by 2050. (UN, Dept. of Economic & Social Affairs).

The UN estimates that 97% of the water on the Earth is salt/Saline water and only 3% is fresh water as shown below.



Source: ***(UN, Dept. of Economic & Social Affairs, 2011).***

Reuse of wastewater already happens although, currently, in many locations this is largely on an unplanned/ indirect basis, resulting from the use of water (e.g. for irrigation) that has been

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