

## IR 4

# Construction of Demonstration Constructed Wetland (CW) Unit at Iringa Girls Secondary School, Iringa, Tanzania

WWS  
Design and Development Co. Ltd



VLIR UOS South Initiatives 2011-2013

Promoter: Thomas More Kempen University College

Local Partner: University of Dar Es Salaam, WSP and CW Research Group





# VLIR RESEARCH PROJECT



## Dissemination of the Sustainable Wastewater Technology of Constructed Wetland in Tanzania

### Construction of Demonstration Constructed Wetland (CW) Unit at Iringa Girls Secondary School, Iringa, Tanzania (IR4)

*Progress Report (July – September, 2013)*

Prepared and shared 4<sup>th</sup> October, 2013



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## 1.0 INTRODUCTION

### 1.1 General Background

The College of Engineering and Technology of the University of Dar Es Salaam in Collaboration with Katholieke Hogeschool Kempen (Departement Agro- en Biotechniek) of Belgium, WWS Design and Development Company Limited as well as the Non-governmental organizations of AGENDA and ENVICON are implementing a research based project (under the financial support from Vlaamse Interuniversitaire Road - VLIR) which intends to disseminate Constructed Wetland (CW) Technology for wastewater treatment in Tanzania. This research project is part of the continued efforts to disseminate constructed CW technology for wastewater treatment in low income countries. Besides, the present project intends to formulate evidence based holistic sanitation service chains that will be easy to understand and use.

Among other activities, the project was designed to establish a demonstration CW for wastewater treatment which was later decided to take place at Iringa Girls Secondary School, Iringa Region, Tanzania. Project proponent in the construction of CW facility were WWS Design and Development Company Limited, WSP & CW Research and Development Group of COET UDSM and the Management at Iringa Girls Secondary School. This document presents construction progress for the period of July – September, 2013.

### 1.2 Scope of Work

This assignment was designed to cover the establishment of demonstration CW Unit at Iringa Girls Secondary School, Iringa, Tanzania. Specifically the assignment was intended to:

- ≈ Supply construction materials for the proposed CW units at Iringa Girls Secondary School as specified in the design report and engineering drawings in collaboration with school management
- ≈ Mobilize and supply labour force for the construction of the proposed CW unit at Iringa Girls Secondary School in collaboration with school management
- ≈ Provide skilled experts for the construction and supervision works to ensure that the built facilities comply with approved design, drawings, specifications and sound engineering practice
- ≈ Review the design (upon approval of the Principal Investigator) to suit situation on the ground where necessary
- ≈ Ensure the construction works comply with all safety requirements in particular to protect the workers and members of the public in collaboration with school management
- ≈ Ensure that the scope, quality, timeframes and costs are in compliance with the design report, BOQ and cost estimates.
- ≈ Prepare progress and the final completion reports and as-built drawings of all completed works.

### 1.3 General Information about the Project

Table 1.1 below summarizes the general and specific information about the project including the project title, commencement date, etc.

Table 1.1: Project Information

Project Title	Proposed Demonstration Constructed Wetland for Treatment of Wastewater at Iringa Girls Secondary School
Commencement Date	Mid July 2013 (construction works started)
Project Location	Kichangani Street, Gangilonga Ward, about 3 Km from the Municipal centre
Collaborators	(1) WSP & CW Research and Development Group, College of Engineering and Technology, P.O. Box 35131, University of Dar Es Salaam, Tanzania (Lead Institute) (2) Katholieke Hogeschool Kempen (Departement Agro- en Biotechniek) of Belgium (3) Iringa Girls Secondary School, Iringa Region, Tanzania (4) WWS Design and Development Company Limited, P. O. Box 32312, Dar Es Salaam, Tanzania (5) AGENDA for Environment and Responsible Development, P. O. Box 77266, Dar Es Salaam (6) ENVICON, P. O. Box 68727, Dar Es Salaam, Tanzania
Financier	Vlaamse Interuniversitaire Road - VLIR of Belgium

### 1.4 Method, Approach and Activities

In executing the construction works at Iringa Girls Secondary School, our general method did base on detailed review and perusal of the objectives provided. The following considerations have been taken into account to achieve the assignment objectives:

- ≈ Clear understanding of assignment thereby perusing the project appraisal documents, drawings and discussing with the partners.
- ≈ Development of an appropriate and well considered work plan based on the collective experience gained on similar projects and on the awareness of constraints that can affect implementation, and the time frames applicable for deliverables, ensuring a sequential finalization of review.
- ≈ Establishment of proficient monitoring and control systems for ensuring completion of work within the required time frame, without delays and disputes and in the most cost effective manner.

### 1.5 Organization and Staffing

During the three month of construction activities, the construction and supervision team involved researchers from UDSM, Engineers from WWS and coordinators from Iringa Girls Secondary School. Local craftsmen were mobilized and involved in the construction works.

## 2.0 CONSTRUCTION PROGRESS

Table 2.1 below presents the physical civil work done for the period of July – September 2013. The progress entails that most of civil works i.e. mobilization of construction materials and personnel, setting out, excavation works and the construction activities, are at the final stage. Table 2.1 below summarizes the construction progress for the various components of the project.

Table 2.1: Physical Work Done-Analysis Sheet

S/No.	Activities Done	Percentage (%)
<b>A</b>	<p><b>Mobilization of personnel, working tools and materials</b></p> <p><b>I) Personnel</b></p> <p>a) 3 Researchers from UDSM took part in the supervision</p> <p>b) 1 Geotechnical Engineer took part in the supervision</p> <p>c) 2 Engineers from WWS took part in the supervision</p> <p>d) 2 teachers at Iringa Girls Secondary School coordinated activities</p> <p>e) 1 school builder lead the building team</p> <p>f) 9 local unskilled laborers did build</p> <p>g) School students</p> <p><b>II) Tools, Plants and Safety Gear on Site</b></p> <p>a) 1 Leveling machine (complete package)</p> <p>b) 3 Wheel barrows</p> <p>c) 6 Spade</p> <p>d) 6 Sururu</p> <p>e) 2 Panga</p> <p>f) 1 Masonry hammer</p> <p>g) 1 Rato</p> <p>h) Assortment of setting out tools i.e. tape, peg etc</p> <p>i) 5 buckets</p> <p><b>III) Construction materials on site</b></p> <p>j) Cement, sand, water and aggregates</p> <p>k) Stones and burnt bricks</p>	<b>100</b>
<b>B</b>	<p><b>Setting Out</b></p> <p>The setting out of the project area for the Constructed Wetland has been completely accomplished.</p>	<b>100</b>
<b>C</b>	<b>Earth work</b>	
<b>C.1</b>	<p><b>General site clearance</b></p> <p>The cleared land is estimated to be 200m<sup>2</sup></p>	100
<b>C.2</b>	<b>Excavation of the Constructed Wetland Unit</b>	100

S/No.	Activities Done	Percentage (%)
	The dimensions of excavated Constructed Wetland are: Length = 8.5m, width = 3 baffled cells @5.5m, and depth = 1.2m. The volume of excavated soil materials is approximated to be 168m <sup>3</sup> .	
<b>C.3</b>	<b>Excavation of the pipe trench from the pond to the CW</b> The dimensions of excavated trench are: Length = 330m, width = 0.5m, and depth ≈ 1.0m. The volume of excavated soil materials is approximated to be 165m <sup>3</sup> .	100
<b>D</b>	<b>Construction Works (Stone Works)</b>	
D.1	Construction of the Constructed Wetland	100
<b>E</b>	<b>Pipe Work</b>	
E.1	Pipe Laying from existing septic tanks to the CW	100
E.2	Pipe works to the CW (Inlet and outlet zones)	20
<b>F</b>	<b>Substrate Work</b>	
F.1	Supply and packing of substrates	5
<b>G</b>	<b>Macrophytes Work</b>	
G.1	Supply and planting of macrophytes	0

### 3.0 PLANS FOR ACCOMPLISHING CONSTRUCTION ACTIVITIES

We have developed a well coordinated, workable and practicable plan to finalize construction works in the next one month to come. The plan has been designed in a way that any unforeseen delay may be accommodated. To ensure this, in addition to effective and efficient planning of the project as whole, each and every activity to be performed will be minutely implemented immediately. The plan covers the substrates and macrophytes works as well as the pipe works as provided in Table 3.1.

Table 3.1 Roadmap for accomplishing construction activities

Milestone	Target
Milestone 1	Accomplish substrate works by 20 <sup>th</sup> October, 2013
Milestone 4	Accomplish macrophytes works in the CW unit by 31 <sup>st</sup> October 2013
Milestone 4	Decommission the facilities and initiate monitoring programme by 10 <sup>th</sup> November 2013



#### 4.0 PROGRESS IN PHOTOS

Plates 1: Resources Mobilization at Iringa Girls Secondary School



Plate 2: Setting of the CW at Iringa Girls Secondary School



Plate 3: Earth/Excavation Work at Iringa Girls Secondary School



Plates 4: Pipe works at Iringa Girls Secondary School



Plate 5: Construction Works at Iringa Girls Secondary School



Plates 6: Potential sources of substrates in Iringa



Manual produced aggregates at Zizi la Ng'ombe area



Crashed aggregates owned by TANROADS at Ismila Village

Plates 7: Potential Sources of Macrophytes (Milulu)  
Plenty available at Unyangwila Hamlet, Tosamaganga Village, Iringa Region.



Milulu Seedlings





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Programme: **South Initiatives**

**Dissemination of the sustainable wastewater technology of constructed wetlands in Tanzania**

ZEIN2011Z097

2011-12-01 - 2013-11-30

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