THE STUDY OF PHYSICAL AND BIO-CHEMICAL POLLUTANT TRANSPORT IN URBAN DRAINAGE NETWORK



RESEARCH MANAGEMENT INSTITUTE (RMI) UNIVERSITI TEKNOLOGI MARA 40450 SHAH ALAM, SELANGOR MALAYSIA

BY:

JUNAIDAH ARIFFIN
SUHAIMI ABDUL TALIB
ZUHAIDA MOHD ZAKI
YAMIN YASIN
MOHD IZANI MOHAMED RAWI
NURASHIKIN AHMAD KAMAL

MAY 2010

ACKNOWLEDGEMENT

There are many individuals who have contributed significantly to this project and who deserve a public statement of our gratitude. They are the final year students of the Faculty of Civil Engineering UiTM for their assistance in the sampling operations and Rokiah Deraman for helping out in the printing of the report. Our gratitude also goes to the Ministry of Science & Technology for the funding of this project. Last but not least the Research Management Institute for the management of funds.

EXECUTIVE SUMMARY

This report describes the study on physical and bio-chemical pollutants in three (3) separate sections. The sections are independent and comprised of table of contents for the respective section, research methodology, results and analysis and followed by the conclusion and references. The first section reports the study on physical pollutants that are also termed as soil and sediment in both dry and wet weather flows. Three study areas were chosen and experimented for the computation of sediment characteristics and losses. They are at a construction site in Section 7, Shah Alam, Puncak Alam construction site that houses the UiTM Second Campus and at a palm oil plantation at Puncak Alam. All study areas are located in Selangor, which is known to be the most urbanized state in Malaysia.

While the second and third sections report the study on the bio-chemical pollutants that are organic and in-organic in both dry and wet weather flows. The studies reported in these two sections focused on catchments that are urban catchment in Section 2 and undergoing development catchment in section 7, Shah Alam.

TABLE OF CONTENT

SEC	TION ONE	Page		
СНА	APTER ONE INTRODUCTION			
1.1	Background	1		
1.2	Problem Statement	2		
1.3	Objective	3		
1.4	Scope of work	3		
1.5	Significance of study	4		
СНА	APTER TWO LITERATURE REVIEW			
2.1	Introduction	5		
2.2	Weathered Materials with Respect to the Factors	5		
	Degree of Erosivity			
2.3	Different Approaches of Soil Loss Measurement	6		
	2.3.1 Universal Soil Loss Equation (USLE)	6		
	2.3.2 Pins Method	6		
	2.3.3 Soil Loss Measurement using MLP Model	9		
2.4	Erosion Potentials – The Governing Factors			
2.5	Adverse Effects of Sedimentation			
2.6	Effect of Vegetation Cover to Rate of Transport of			
	Weathered Materials			
2.7	Different Approaches of Sediment Measurement	14		
2.8	Sediment Traps	15		
СНА	APTER THREE METHODOLOGY			
3.1	Introduction	17		
3.2	Study Area at a Construction Site Section 7, Shah Alam			
	3.2.1 Fieldwork - Installation of the Erosion Pins	18		
	3.2.2 Trapping of Sediment/Pollutant at the Outlet Point	20		
	3.2.3 Rainfall and Wind Speed Data Collection3.2.4 Laboratory Measurements	21 21		

3.3	Study	Area at a Construction Site in Uitm Campus in	22		
	Punca	k Alam Selangor			
	3.3.1	Field Measurements	23		
	3.3.2	Laboratory Measurements	24		
	3.3.3	Rainfall Data Collection	24		
3.4	Study	Area at an Oil Palm Plantation in Puncak Alam Selangor	24		
CHA	APTER I	FOUR RESULT AND DISCUSSION			
4.1	Introd	uction	26		
4.2	Typic	al Sediment Characteristics at the	26		
	Const	ruction Site in Section 7, Shah Alam			
	4.2.1	Soil Surface Elevation	27		
	4.2.2	Soil Surface Elevation for Individual Erosion Pin	27		
	4.2.3	Effect of Rainfall and Wind Speed to	34		
		Soil Surface Elevation			
	4.2.4	Soil Loss Estimation Using the Universal Soil Loss Equation	35		
	4.2.5	Profile of Sediment Yield	35		
	4.2.6	Sediment Yield and Erosivity Index	38		
4.3	Physic	cal Characteristics of Sediment at the Construction	39		
	Site in	Uitm Campus, Puncak Alam			
	4.3.1	Profile of Upstream and Downstream Sediment Yield	40		
4.4	Physic	al Characteristics of Sediment at an Oil Palm Plantation in	41		
	Puncak	c Alam			
	4.4.1	Profile of Sediment Yield	42		
	4.4.2	Suspended Sediment Concentration With Respect To Rainfall	43		
CHA	APTER I	FIVE CONCLUSIONS & RECOMMENDATIONS			
5.1	Concl	usions and Recommendation for	45		
	Study Area 1 – Construction Site at Section 7 Shah Alam				
	5.1.1	Recommendation	46		
5.2	Concl	usions for Study Area 2 – Construction Site at	46		
	Uitm 1	New Campus at Puncak Alam			
5.3	Concl	Conclusions and Recommendation for 40			