

Determination of water quality in Universiti Malaysia Sabah (UMS), Kota Kinabalu: The effectiveness of stormwater management system

ABSTRACT

Universiti Malaysia Sabah (UMS) campus in Kota Kinabalu consists of a large detention pond that stores the stormwater and limits the outflow rate into Likas' estuary. It is no doubt the detention pond has been designed per the Urban Stormwater Management Manual (USMM) requirement in terms of quantity control, however rapid development and changes in surrounding landscapes may affect the water quality. This study investigates the stormwater quality from the UMS detention pond and drainages within the campus. Water sampling was primarily taken during the dry period to justify worst-case scenarios without dilution from the rainfall season. Then the water quality parameters were tested using standard laboratory procedures mainly for Biochemical Oxygen Demand (BOD), Ammoniacal Nitrogen (AN), and Total Suspended Solids (TSS) with a minimum of a triplicate experimental run at the Environmental Laboratory, Faculty of Engineering, UMS. The determined water quality was compared with the National Water Quality Standards (NWQS) from the Department of Environment Malaysia. Overall the stormwater quality obtained for Dissolved Oxygen (DO), Chemical Oxygen Demand (COD), AN and pH is within Class II to III, which is slightly polluted. However, the TSS from ponds near to main road and construction areas exceeds Class IV, indicating polluted conditions. There is a slight increase for BOD and AN parameters when comparing samples between June 2020 (post-MCO) and January 2017, which was suspected briefly due to fertilizing work for the campus landscapes. Although the TSS value is low, the TSS volume would increase over a period, raising the temperature while reducing the DO concentration and endanger the aquatic species and the ecosystem. Hence, it is recommended for a future study to emphasize TSS value as it would contribute significantly in designing sustainable stormwater management, particularly for the stormwater treatment, such as when optimizing for the utilization of alternative filter media, which reduces the maintenance and increasing the lifespan of the system.