

## COMPLIANCE OF EIA APPROVAL CONDITIONS FOR KUALA LUMPUR-PUTRAJAYA-KLIA HIGHWAY PROJECT

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### ABSTRACT

The study was to identify the compliance of Environmental Impact Assessment (EIA) Approval Conditions in terms of total suspended solids (TSS) discharges from the silt trap and in the rivers for Kuala Lumpur-Putrajaya-KLIA highway construction project, Malaysia. The data from August 2005 to May 2007 was obtained from Department of Environment, Kuala Lumpur. This project was chosen for the study because this project was among the early projects after the implementation of Erosion and Sediment Control Plan (ESCP). The highway cut across several rivers where a total of suspended solids (TSS) were measured at upstreams and downstreams with a total of twelve (12) stations. In addition, twelve (12) sampling stations for the silt trap discharges located along the rivers were also measured. The results have shown that fifteen (15) out of one hundred and thirty two (132) samplings for river stations recorded noncompliance of about 11.4% and seven (7) out of fifty two (52) samplings for silt trap discharge stations recorded noncompliance of about 13.5%.

**Keywords :** Kuala Lumpur-Putrajaya, Highway project, total suspended solid, silt trap, EIA

### INTRODUCTION

Soil erosion and sedimentation arising out of construction activities has posed a persistent threat to the environment, and cases of prolonged and uncontrolled erosion would lead to untoward incidences such as landslides and mudslides. It has also led to the cumulative effects of siltation and sedimentation as well as the shallowing of riverbeds and water courseways, thus prompting flash and regular floods in low-lying areas. Fully aware of the impact of soil erosion, the Government of Malaysia has initiated a number of measures to minimise and control soil erosion resulting from road construction and land development projects. The mandatory requirements of the EIA, EMP and ESCP have now been formally documented as guidelines for construction activities (Hui, 1999). The effects of highway construction can be substantial even though the area involved may cover only a small portion of a watershed. Studies by Vice *et. al.* (1969) have shown that highway construction areas, varying from < 1 to > 10 percent of the basin at any one time, contributed 85 percent of the sediment

load. A limnological investigation was carried out by Barton (1977) to document the effects of highway construction on a small stream in southern Ontario. The suspended solids concentrations increased to as high as 1390 mg/l during construction but later returned to pre-construction levels of <5 mg/l.

The construction of highway posted significant environmental impacts such as erosion and siltation, increased runoff and flooding, destruction of habitat and degradation of biodiversity, air pollution, water pollution and noise pollution (Ismail, 2006). There are many methods to control sediment in the river due to the construction of highway such as construct a silt trap, silt fence, road side drain, plastic sheet cover on cutting slope, turf, etc. but silt trap is a famous method. The effectiveness of silt trap for sediment and siltation control are still in doubt especially in highway construction. Very few studies were carried out to investigate an effectiveness of silt trap in controlling sediment and siltation. Works by Zainuddin and Nur Syahiza (2007) have shown that the efficiency of sediment basin and silt trap to eliminate siltation and sediment within 37.5% to 80%, while Ferreira and Waygood (2009) stated that sediment traps and basins provide a cost effective means to reduce the amount of suspended solids in surface runoff.

The proposed Kuala Lumpur-Putrajaya-KLIA dedicated highway starts at the north of Jalan Tun Razak in Kuala Lumpur. It is approximately 42 km in length and passes through the Federal Territory and the State of Selangor in the Mukim of Petaling, District of Petaling Mukim of Dengkil in the District of Sepang and Mukim of Tanjung Dua Belas in the District of Kuala Langat. The proposed route traverses central Kuala Lumpur, the Kuala Lumpur conurbation, southern Selangor, the Putrajaya and Cyberjaya development before ending at the new Kuala Lumpur International Airport (KLIA) at Sepang (Konsortium Lapangan Terjaya Sdn. Bhd., 1997). The construction project started in August 2005, took two (2) years to develop and was completed in June 2007. The construction of highway is one of the activities fall under Environmental Impact Assessment (EIA) requirement where the project proponent have to get EIA report approved before project can be implemented and Erosion and Sediment Control Plan (ESCP) is one of the component under it. The project was among the earliest which was follow the requirement of the Environmental Friendly Drainage Manual or "Manual Saliran Mesra Alam Malaysia (MASMA)" where all the project proponent who deal with land clearing will have to submit Erosion and Sediment Control Plan (ESCP) to Department of Irrigation and Drainage (DID) for approval before project can be approve by Approval Authority. The principles of ESC are prevention of erosion and control of sediments from leaving the construction site. This plan will be addressed at the Environmental Impact Assessment stage.

The purpose of this study was to investigate whether or not the Environmental Impact Assessment (EIA) Approval Conditions in terms of water quality (total suspended solid) for Kuala Lumpur-Putrajaya-KLIA dedicated highway construction in Kuala Lumpur, Malaysia was complied with.

#### SAMPLING METHODS

The study area was situated in Wilayah Persekutuan Kuala Lumpur, Malaysia. The sampling station was located in the Sungai Kerayong, Sungai Kuyoh, Sungai Rekah, Sungai Bohol and Sungai Gajah with two(2) stations for each river (upstream and downstream) and two (2) silt traps located along each river except Sungai Kerayong which has four (4) stations (Figure 1). The river sampling stations was selected based on the area where the highway cross over the rivers and for silt trap the sampling point is at the final discharge before entering the rivers. In addition, the selected stations were also based on runoff directions.

Fifteen (15) grab samplings were made from August 2005 to June 2007 from a total of twenty four (24) sampling stations; twelve (12) stations for river water quality and twelve (12) for silt trap final discharge. River water quality and discharge from the silt trap sampling stations was selected at Sungai Kerayong (2), Sungai Kuyoh, Sungai Rekah, Sungai Bohol and Sungai Gajah. Each river comprises of four (4) sampling stations: two (2) for river water and the other two for silt trap final discharge). The sampling was performed every month and it was covered monsoon, pre-monsoon and dry seasons but final discharge from the silt trap sampling can not be done during the dry season because there was no discharge. Only the total suspended solid parameter was measured because the purpose was to identify the impact of earthworks to the rivers as a result of the highway construction. The samples were collected as single surface grab samples from highway bridges and a few stations

are sampled from the bank. The samples were collected using a rope and weighted containers (Washington State Department of Ecology, 2007). Meanwhile, silt trap final discharge samples were collected by catch up with the sample bottle. Water samples were taken in 1 litre plastic bottles before preserved by storing in cool box filled with ice cubes. The temperature in a cool box was retained at 4°C to avoid the changes of sample quality and compositions before reaching laboratory and the holding time must not more than 22 hours. In the laboratory the sample was analyzed using spectrophotometer model DR 2800 and was based on the Standard Methods for the Examination of Water and Wastewater (19<sup>th</sup> Edition Publish by APHA).

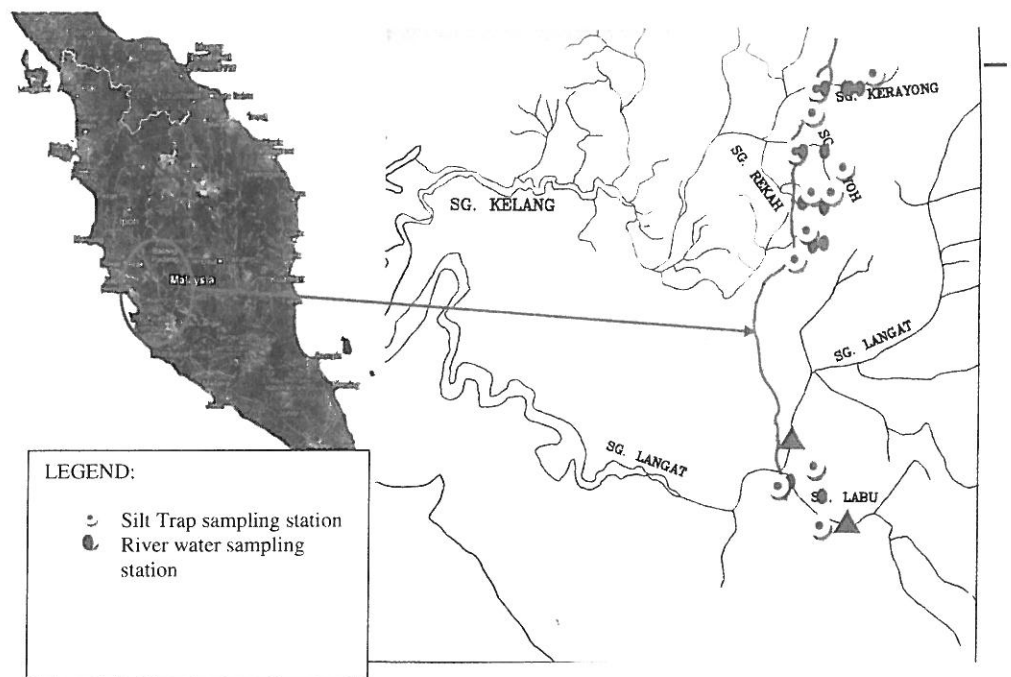


Figure 1: Sampling Site and Stations

The sampling was performed by Konsortium Lapangan Terjaya Sdn. Bhd. (2005; 2006 and 2007) and the results were sent to the Department of Environment Wilayah Persekutuan, Kuala Lumpur in order to comply with the requirements of the Environmental Impact Assessment approval condition.

## RESULTS

One of the requirements in the Environmental Impact Assessment approval conditions for this project was that the concentrations of total suspended solid (TSS) at the receiving rivers should not exceed 100 mg/l at all time. The different of TSS concentrations between upstream and downstream were determined. The results (Figure 2) shows that no significant difference of TSS concentrations between up streams and down streams was found for all the samplings except in August 2005 for W2-Sungai Kerayong station (320 mg/l), May 2007 for W1-Sungai Kerayong station (118 mg/l) and June 2007 for W2-Sungai Kerayong (116 mg/l) and W3-Sungai Kuyoh (169 mg/l). Fifteen (15) samplings out of one hundred and thirty two (132) for TSS concentrations did not comply with EIA approval

condition of about 11.4%. The results also revealed that monsoonal season (October, November & December) has no marked effect on TSS concentration in the rivers. The highest concentration of TSS was recorded in August 2005, September 2006, May 2007 and June 2007.

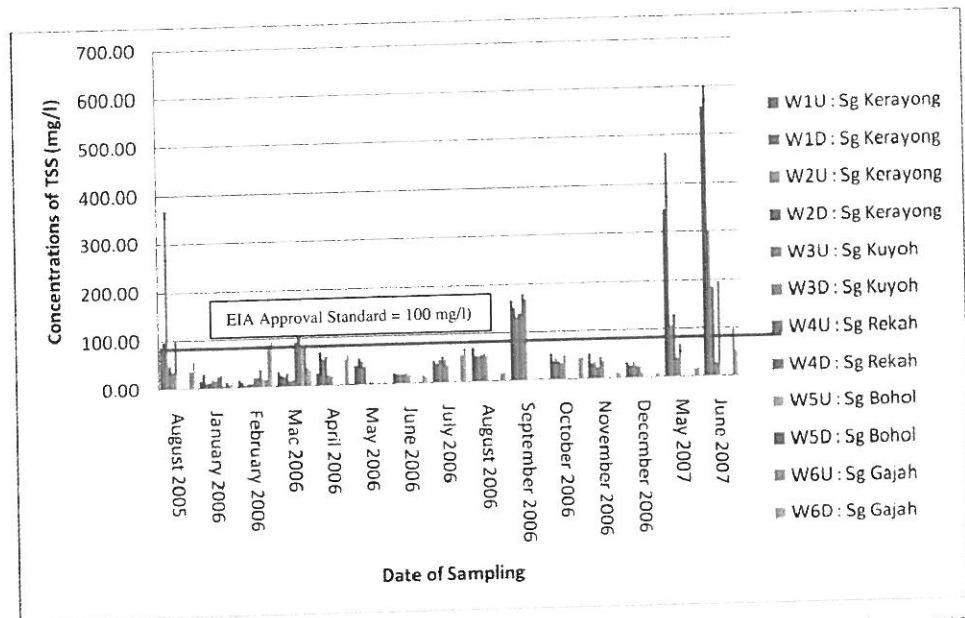


Figure 2: Total suspended solid for all the sampling stations and all the sampling events (August 2005 to June 2007) in five rivers.

In addition, twelve (12) sampling stations for the silt trap discharges located along the rivers were also measured. The results have shown that fifteen (15) out of one hundred and thirty two (132) samplings for river stations recorded non-compliance of about 11.4% and seven (7) out of fifty two (52) samplings for silt trap discharge stations recorded non-compliance of about 13.5%.

Furthermore, the results (Figure 3) for silt trap final discharge have shown that seven (7) out of fifty two (52) samplings for silt trap discharge stations recorded non-compliance of EIA approval conditions of about 13.5%. The sampling stations were ST1-Sungai Kerayong (183 mg/l) sampling in January 2005, ST9-Sungai Bohol sampling in Mac (171 mg/l) and July (181 mg/l) 2006, ST4-Sungai Kerayong (164 mg/l), ST10-Sungai Bohol sampling in April 2006 (155 mg/l) June 2007 (106 mg/l) and ST11-Sungai Gajah sampling in April 2006 (130 mg/l). The results also revealed that rains during the monsoon season (October, November & December) did not have an effect on TSS concentration at the final discharge of the silt trap. The highest concentration of TSS recorded was in January 2006, May 2006, April 2006, July 2006 and June 2007.

#### DISCUSSION

The results showed that compliance to the Environmental Impact Assessment approval conditions for earthworks, especially in highway construction has increased after the implementation of Erosion and Sediment Control Plan (ESCP) under the Environmental Friendly Drainage Manual or "Manual Saliran Mesra Alam Malaysia (MASMA)" in 2001. The percentage of compliance based on river water quality and final discharge from the silt trap respectively 88.6% and 86.5%. Generally, the control measures employed on this project were effective in reducing the amount of sediment leaving the construction zone, but some deficiencies were observed. The most probable reason of deficiencies is believed due to temporary erosion control such as silt fence and silt trap were not as effective as designed. Insufficient siltation control measures especially the number and size of silt traps, thus

allowing siltation to escape and flow directly to the rivers was also believed as one of the reasons. The third most probable reason is believed to be due to cumulative discharge of suspended solids into the river carried over from several silt traps which gave similar load as to the standard concentration of TSS in the river. This ambiguity could be overcome by enforcing a more stringent concentration standard for final discharge of silt trap over that of the concentration in the river which will then allow the standard TSS concentration of 100 mg/l in the river to be achieved.

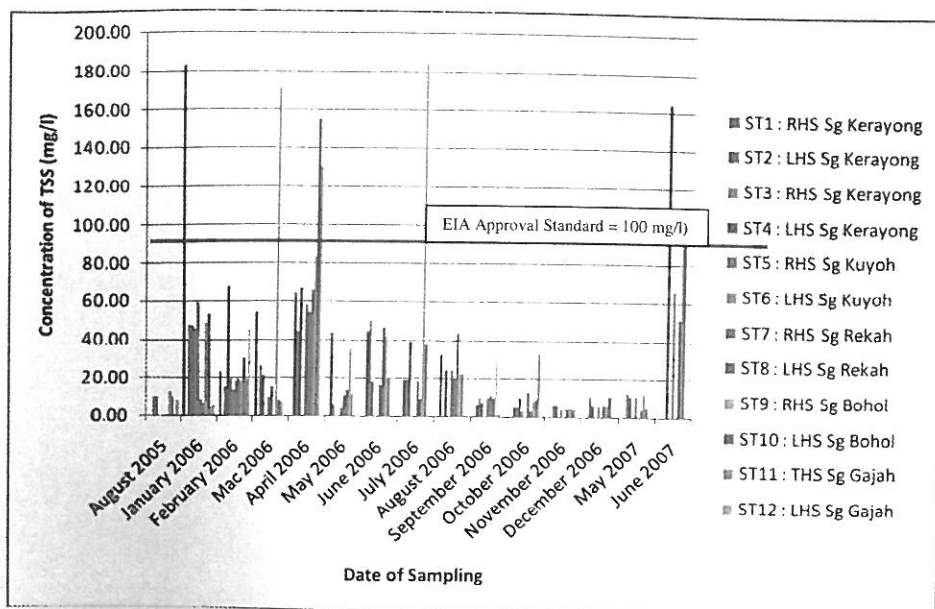


Figure 3: Total suspended solid for all the sampling stations and all the sampling events ( August 2005 to June 2007) at the silt trap final discharge.

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