GUIDANCE DOCUMENT FOR THE PREPARATION OF THE DOCUMENT ON LAND-DISTURBING POLLUTION PREVENTION AND MITIGATION MEASURES (LD-P2M2)

PREFACE

This paper provides guidance for the preparation of LD-P2M2 document which is to be included as a part of the Environmental Management Plan (EMP) to be submitted to the Department of Environment (DOE) for approval.

LD-P2M2 refers to the use of construction methods, processes, materials, and practices that is intended to prevent, reduce, or eliminate the generation of pollutants at the source (development site) during any land-disturbing activity through the protection of natural resources by preservation and conservation, reduction of waste generation and releases or discharges of pollutants to land, air, and water, and incorporation of best management practices (BMPs) and techniques to attain compliance with the conditions stipulated in the EIA approval conditions (Conditions of approval-COA).

The focus of the LD-P2M2 document (or simply LD-P2M2) is on the prevention, mitigation and control of the discharge from the development area containing the major pollutant (suspended solids) resulting from land disturbing activities.

This Guidance Document is organized into 8 sections as follows:

Section 1 discusses the following introductory topics: mainstreaming of environmental agenda, definitions, rationale for the establishment of LD-P2M2, purposes of the Guidance Document, overall objective of LD-P2M2, and scope of the Guidance Document.

Section 2.0 explains the legal basis for LD-P2M2.

Section 3.0 lists out the references for LD-P2M2.

Section 4.0 specifies who is eligible to prepare LD-P2M2.

Section 5.0 specifies who is responsible for LD-P2M2 implementation.

Section 6.0 outlines the basic principles to be adopted to reduce impacts from land-disturbing activities.

Section 7.0 specifies the minimum standards** requirements of pollution prevention and mitigation measures.

(Note ** The term “minimum standards” refers to the minimum P2M2 to be adopted, implemented and installed which are capable to achieve the required level of quality or attainment).

Section 8.0 gives a list of the information, documents, maps and drawings required for LD-P2M2 submission.

ACKNOWLEDGEMENT

The Department of Environment, Malaysia would like to acknowledge the contributions made by the DOE staff in the preparation of this Guidance Document.

Special thanks and credit are due to Mr Don Lee from the Roadside Environmental Unit of the North Carolina Department of Transportation of the United States of America for granting permission to DOE, Malaysia for the use of the 'BMPs For Construction And Maintenance Activities Manual' issued by the North Carolina Department of Transportation. Similarly, thanks and credit are also due to Mr Mell Nevils from the North Carolina Sedimentation Control Council for granting permission to the DOE for the use of the 'Erosion and Sediment Control Planning and Design Manual' issued by the North Carolina Department of Environment and Natural Resources.

1.0 INTRODUCTION

1.1 Mainstreaming of environmental agenda

In concert with the effort of the Department of Environment (DOE) to inculcate self-regulation culture within the regulated sectors, mainstreaming of environmental agenda has been made an integral part and parcel of all the procedures implemented by the DOE, including the EIA procedure. In the EIA perspective, environmental mainstreaming shall be embraced and implemented in all areas related to the EIA project development such as: at all levels of the project developer organizational structure; at all levels of project development decision making process; and at all levels of project development phases (planning, construction, and operation). The considerations, specifications, and details specified in this Guidance Document are in line with the mainstreaming spirit outlined in the EIA Guideline.

1.2 Definitions

For the purpose of this Guidance Document:

a. Land disturbing activity means any project development that is subject to Section 34A EQA 1974 that involves activities such as clearing of trees or vegetation, excavating, raising or sloping of ground, trenching, grading and blasting.

b. Pollution Prevention and Mitigation Measures (P2M2) refer to Best Management Practices (BMPs) that include activities, facilities, measures, planning or procedures used to minimize accelerated erosion and sedimentation as well as other pollutants resulting from land disturbing activities and to manage runoff water to protect and maintain the quality of

soil or inland or Malaysian waters and the existing and designated uses of waters before, during, and after land disturbing activities.

1.3 Objective and purpose of guidance document

The overall objective of the Guidance Document is to ensure good quality LD-P2M2s are prepared by competent professionals and the LD-P2M2s are effectively implemented to mitigate and minimize environmental and pollution impact of land disturbing activities.

This Guidance Document has the following purposes:

i. To assist the project proponents and EIA Consultants in the preparation of LD-P2M2 (Land-disturbing Pollution Prevention and Mitigation Measures) Document.

ii. To standardize the format of LD-P2M2 which includes maps, plans and drawings, information required and procedures for LD-P2M2 submission.

iii. To assist the Project Proponent (PP) personnel, especially the Environment Officer in supervising the overall implementation of the significant and site specific ingredients of the LD-P2M2 that include the installation, inspection and maintenance (2I's1M)***** of pollution prevention and mitigation measures (P2M2s) as well as in preparing the required documentation and reports (photographs, data collections and corrective actions) on 2I's1M.

***(Note: 2I's1M refers to Installation, Inspection and Maintenance)**

1.4 Scope of the guidance document

This Guidance Document covers the following scope:

i. It specifies the requirements and procedure for LD-P2M2s preparation and submission for EIA projects.

ii. LD-P2M2s will be used for future site inspections either by the regulatory agencies or designated project site inspectors and managers for desktop tasks and ground inspections.

iii. LD-P2M2s will assist inspectors to have better understanding of the significant information, documents, maps, drawings related to project implementation which are included in this checklist.

1.5 What is the LD-P2M2 document?

The LD-P2M2 document (or simply LD-P2M2):

a) Is a legal pledge made by the PP to take efforts, measures, actions or due diligence in accomplishing the overarching goal of protecting the environment and in mitigating the environmental impact in the process of implementation of the proposed development.

b) Is a complementary document that provides to the relevant information required for developing and preparing the Erosion And Sediment Control Plan (ESCP).

c) Is to be used as a reference document especially for the Environment Officer (EO) to understand and identify site constraints, areas of concern, problem areas, designated and potential discharge points of runoffs, and to develop

early planning on how, who, what, where, why, and when to effectively implement the pollution prevention and mitigation measures at the development site.

(Note: Environment Officer here and throughout this Guidance Document refers to the person who has been certified by the Department of Environment and officially appointed or engaged by the project proponent to be responsible for environmental performance of the project. The responsibilities of the Environmental Officer are described in other documents issued by the DOE).

The LD-P2M2s prepared shall identify, cover and address the following:

i. The locations of potential discharge point(s) of pollutants
ii. The locations of designated discharge point(s) of pollutants
iii. The locations of the P2M2s to be installed

The LD-P2M2 shall incorporate the P2M2s identified to be installed at the land disturbing development areas into the design, construction and operation stage of the development project as stipulated in Section 34A (7) of the EQA. The P2M2s shall be effective in preventing, reducing and controlling pollution as well as preventing non-compliant pollution discharges from reaching any water bodies.

2.0 LEGAL FRAMEWORK

All activities subject to EIA Order, 2015 which involve land disturbing or site preparation activities are required to prepare a LD-P2M2 as part of the EMP submission requirement. Non-compliance with the specifications stipulated in this Guidance Document may be a cause for the rejection of the EMP or will cause a delay in the EMP processing.

3.0 REFERENCES FOR PREPARATION OF LAND-DISTURBING POLLUTION PREVENTION AND MITIGATION MEASURES (LD-P2M2s)

The LD-P2M2 prepared for EIA projects shall be prepared based on the project concept, components and minimum mitigating measures approved in the EIA Conditions of Approval (COA).

For the preparation of LD-P2M2, the preparer can make reference to the following documents:

(a) Department of Irrigation and Drainage – DID. 2010. Guideline for Erosion and Sediment Control in Malaysia

(b) Department of Irrigation and Drainage – DID. 2000. Urban Storm Water Management Manual for Malaysia

(c) Erosion and Sediment Control Planning and Design Manual issued by North Carolina Department of Environment and Natural Resources

(d) Best Management Practices for Construction and Maintenance Activities issued by North Carolina Department of Transportation

(e) Other useful references on the design of BMPs for soil erosion and sediment control:

(i) CESSWI, LLC. 2008. Certified Erosion, Sediment and Storm Water Inspector Exam Review Study Guide. Marion, NC

(ii) CPESC, Inc. 2010. Certified Professional in Erosion and Sediment Control Exam Review Course Workbook. Marion, NC

(iii) Douglas County Department of Public Works. 2004. Grading, Erosion and Sediment Control (GESC) Manual. Douglas County, CO

(iv) Fifield, J. S. 2004. Designing for Effective Sediment and Erosion Control on Construction Sites. Forester Press. Santa Barbara, CA

(v) Fifield, J. S. 2004. Field Manual on ESC. Best Management Practices for Contractors and Inspectors. Forester Press. Santa Barbara, CA

(vi) Sacramento Storm Water Quality Partnership and the City of Roseville 2007. Storm Water Quality Design Manual for the Sacramento and South Placer Regions. Sacramento County, CA

(vii) Virginia Department of Conservation and Recreation. 1992. Virginia Erosion and Sediment Control Handbook, 3rd Ed. Richmond, VA

(viii) Virginia Department of Conservation and Recreation. 1995. Virginia ESC Field Manual. Richmond, VA

4.0 WHO SHALL PREPARE LD-P2M2s?

The LD-P2M2 shall be prepared and signed by a DOE registered consultant who holds a certification as a professional in erosion and sediment control issued by the Department of Environment.

5.0 WHO SHALL BE RESPONSIBLE FOR LD-P2M2 IMPLEMENTATION?

In principle, the Project Proponent (PP) shall be responsible for the implementation of the LD-P2M2.

6.0 MAKE THE MOST OF THE POLLUTION PREVENTION AND MITIGATION MEASURES WHEN IMPLEMENTING THE LAND-DISTURBING ACTIVITY

The focus of the LD-P2M2 is on the prevention, mitigation and control of the discharge from the development area containing the major pollutant (suspended solids) resulting from land disturbing activities. Controlling the sediment-laden runoffs means in some way to control the discharge of other pollutants too that may contain in the sediment strains such as nutrients, bacteria, oxygen demanding materials, heavy metals, petroleum hydrocarbons and synthetic organics. Everyone involved with land disturbing activity shall make the most of the following basic principles in every stage of development when implementing the pollution prevention and mitigation measures:

a) Integrate project design with site constraints.
b) Preserve and stabilize drainage ways.
c) Minimize the extent and duration of disturbance.
d) Control runoff flows onto, through and from the site in stable drainage structures.
e) Install perimeter controls.
f) Stabilize disturbed areas promptly in a timely manner.
g) Protect steep slopes.
h) Use sediment controls to prevent off-site damage.
i) Protect inlets, storm drain outfalls, and culverts.

j) Provide access and general construction controls.

k) Inspect and maintain best management practices and control measures.

l) Employ experienced and competent personnel and consistently conduct relevant training.

7.0 MINIMUM STANDARDS REQUIREMENTS OF POLLUTION PREVENTION AND MITIGATION MEASURES

The minimum standards requirements outlined in the following section 7.0 shall be implemented and complied with wherever relevant by the Project Proponent. These minimum standards requirements shall be attached or inserted in the LD-P2M2 document and shall be the minimum P2M2s that will be adopted, applied, and implemented in the process of carrying out land disturbing activities at the development site.

(Note: The term "standards requirements" here refers to the physical or non-physical measures to be taken to prevent, reduce and control the discharge of suspended solids and other pollutants from the development site. The standards requirements are meant to achieve a certain quality or attainment)

7.1 Pollution Prevention and Mitigation Measures (P2M2s)

The Project Proponent shall ensure that:

(i) All relevant parties including project consultant, contractors, and Environmental Officer (EO) understand LD-P2M2 in order to facilitate compliance with the minimum standards requirements.

(ii) All relevant pollution prevention and mitigation measures (P2M2s) especially temporary BMPs at the constructional phase are installed and

maintained to mitigate the potential pollution due to land disturbing activities.

The following paragraphs detail out the P2M2s (which include BMPs) to be installed:

(a) Schedule of Phasing, Staging and Sequencing

A project schedule shall be prepared in advance to ensure the jobs involved in project implementation are properly scheduled in order to effectively address and manage the environmental pollution. The schedule shall include the following:

i. Project construction scheduling for all major land-disturbing activities which include work zone(s), phasing of construction within the work zone(s), staging and sequencing within the phases of construction that coincides with the installation of P2M2s.

ii. Critical Path Method (CPM) may be adopted in establishing work program that shall fit in the elements of pollution prevention and mitigation measures for each phase, stage and sequence of project development.

(b) Scheduled Site Meeting

i. Conduct site meeting prior to start of any construction activity or land-disturbing activity to be attended by PP, project EO, project contractors and/or sub-contractors to discuss in detail all of the relevant scopes of work that have relevance to pollution prevention and mitigating measures.

(c) **Construction Markers**

i. Physically mark on site to show the limit of the following:-

- Land disturbing from any drainage way or waterway or watercourse within project site;
- Areas not to be worked or disturbed, and
- Buffer area or/and existing vegetation meant for temporary or permanent preservation and for protection.

ii. The construction markers are fences, signs, tapes, flags or other similar marking device.

(d) **Stabilized Construction Entrance**

i. All entrance/exit roads to the site shall be stabilized and paved for a suitable distance from where these access roads join the existing paved roads or public road where Stabilized Construction Entrance P2M2 and/or Tires Washing Facility shall be constructed from this point inward to the subjected construction site.

ii. Any swept soil or sediment accumulated on pavement or other impervious surfaces from within Stabilized Construction Entrance P2M2 and sediment-laden washed water from Tires Washing Facility are not allowed to be hosed downed and discharged respectively into any off-site drainage way, storm drain inlet or watercourse unless connected to a sediment basin or sediment trap.

(e) **Stream/drainage way/waterway/watercourse buffers**

i. Retain a 20 metres natural buffer between on-site land disturbance and any watercourse (intermittent or permanent) unless otherwise specified by the relevant authority; or

ii. Provide a vegetated buffer that is less than 20 metres between on-site land disturbance and any watercourse (intermittent or permanent) in combination with additional erosion and sediment controls; or

iii. If not feasible to provide a natural or vegetated buffer of any size between on-site land disturbance and any watercourse (intermittent or permanent), install suitable erosion and sediment controls in combination with all possible perimeter controls.

(f) **Perimeter Control**

i. Before land-disturbing activities are executed, perimeter control shall be first constructed and made operational. The perimeter control shall include but is not limited to filter or perimeter berms, silt fences, sediment traps, sediment basins, construction entrance, temporary diversion dikes or earth bunds and diversion drains that control discharges from the site.

(Notes: A certain amount of initial land disturbance may be required to provide access for equipment to install the perimeter controls, but site clearing and grading should be kept to a minimum until the perimeter controls are in place).

(g) **Sediment Basin/Trap**

i. Before land-disturbing activities are executed, principal sediment basin/trap shall be first constructed and made operational. Any constructed sediment basin/trap shall install vertical silt marker for the purpose of measuring the depth of accumulated sediment to facilitate maintenance program.

(h) **Runoff Management**

i. Before land-disturbing activities are executed, key runoff control measures shall be first constructed and made operational. The runoff control measures shall include but is not limited to temporary earth drain, diversion channel and conveyance system that control flows and discharges from and within the site and to be combined with installation of interval check dams along the channel to reduce the runoff velocity.

ii. Slope drains, flexible pipe slope drains or downpipe, rock lined drainage chutes or flume, cascade drain shall be applied to convey upslope runoff down slope without affecting the slope surface.

iii. In-slope or out-slope diversion runoff control P2M2s shall be applied in combination with water bars to divert runoff towards stabilized area or sediment treatment P2M2 prior to discharge.

iv. Any incomplete permanent drainage lines constructed along sloping area, shall not be left unattended without first applying rocks dissipater at the end points or at the toe end of the incomplete adjoining conveyance structure. The anticipated runoff discharge from this point should be diverted using temporary earth drain combined with check dam towards stabilized area or into sediment treatment P2M2s. It is highly recommended that pipe slope drains are used to convey runoff directly into sediment containment system.

(i) Temporary or permanent watercourse diversion

i. Temporary or permanent diversion channel of any watercourse or off-site run-on water shall be protected either by using rock lined channel bed with protected side slope using Turf Reinforcement Mat (TRM) or plastic sheeting or by installing plastic sheeting canvas along the channel with extend across the side slope in combination with constructed check dams or sump slot checks. This has to be done to minimize erosive forces flow velocity along the channel bed and channel side slope surface to prevent it from eroding.

(j) Temporary or permanent watercourse crossing

i. Construction of culvert or bridge for any watercourse crossing, the surface of the filling material (if earth is used) on the inlet and outlet end of the culvert or abutment of the both sides of the bridge shall be covered with appropriate materials such as rocks, Rolled Erosion Control Products (RECPs) and plastic sheeting or turf.

ii. The approach distance of 10 metres or any suitable distance from both sides of the watercourse crossing shall be installed with sediment fence or equivalent along the sides, together with gravels or stone pad and water bar to prevent sediment traction onto the crossing that may potentially enter the stream.

(k) Temporary or permanent roadways

i. Runoff conveyance system such as road ditch, temporary earth drain, catch drains, berm drains, toe drains, slope drains and in-slope or out-slope

diversion shall be constructed and conveyed runoff to stabilized area or into sediment treatment P2M2s prior to discharge.

(l) Temporary Stabilization

i. Temporary soil stabilization shall be applied to exposed areas within fourteen (14) days after final formation level is reached on any portion of the site.

ii. Temporary soil stabilization shall be applied within seven (7) days to exposed areas that may not be at final grade but will remain unattended for longer than fourteen (14) days.

iii. Temporary stabilization means a condition where exposed soils or disturbed areas are provided a temporary vegetative and/or non-vegetative protective cover to prevent erosion and sediment loss. Temporary stabilization may include temporary seeding, geotextiles, mulches, and other techniques to reduce or eliminate erosion until further construction activities take place to re-disturb this area.

(m) Stockpile Soil Management

i. Location of the stockpiles area shall be away at a minimum distance of 20 metres from any watercourse.

ii. The stockpiled soil shall be protected from contact with runoff water (including run-on) using a temporary perimeter control such as berms, dikes, fiber rolls, silt fences, sandbag and gravel bags.

(n) Spoil Management Area (Disposal Area)

i. Location of any disposal area shall be away at a minimum distance of 20 metres from any watercourse

ii. All disposal area shall be protected from contact with runoff water (including run-on) using a temporary perimeter sediment barrier such as berms, dikes, fiber rolls, silt fences, sandbags and gravel bags.

iii. All anticipated runoff flowing from any disposal area shall be drained into a sediment trap/basin prior to discharge.

(o) Dewatering practices

i. Accumulated runoff water from excavations, trenches, foundations, vaults, or other similar points of accumulation shall be treated effectively using appropriate controls such as but are not limited to sediment basins / traps, dewatering tank treatment system, active treatment system, bag or sand filters prior to discharge.

(p) Active Treatment System (ATS)

i. Whenever recommended by the consultant, Active Treatment System (ATS) shall be implemented. The installation and operation of the ATS

shall be in accordance with good engineering practices, and with design and specifications recommended by the provider of the treatment system.

ii. The Director General of DOE reserves the right to instruct any PP to install ATS system whenever:-

(a) The project site has been found to have violated the total suspended solids discharge standard stipulated in the EIA approval conditions (COAs); or

(b) Analysis of soil investigation in the project site shows that the dispersible fine-grained clays contain more than 10% of dispersible material.

(Note: Active Treatment System (ATS) refers to the treatment of runoffs using a mechanical system with the application of coagulants and flocculants to promote the settling of suspended solids out of the aqueous phase. Only coagulants and flocculants which have been approved for use by environmental agencies such as USEPA or similar authorities are allowed to be used.)

(q) Discharge

i. All discharge runoff water from any land-disturbing activities shall be made through a sediment control P2M2 such as sediment basin or trap or any other erosion and sediment controls which is regarded as the designated final discharge(s).

ii. All disturbed areas shall drain to sediment control measures at all times during land-disturbing activities and during site development until stabilized,

after which, the sediment controls shall be removed. Any trapped sediment and the disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.

iii. The discharge point of the treated runoff shall be released by using a dissipater or other means of outlet protection.

iv. All discharge run off water to offsite area shall only be allowed through a sediment basin or trap or other specified control measures.

(r) Corrective Actions

i. In a case where a required P2M2 was installed incorrectly, or is not effective enough to produce a discharge that complies with the discharge standards, the PP shall install a new or modified P2M2 or additional P2M2 and make it operational by no later than 7 calendar days from the time of discovery.

ii. The PP shall within 7 calendar days of discovering the occurrence of one of the triggering conditions above complete a report as described in the Performance Monitoring Document (PMD) and which shall be reported in the Performance Monitoring Report (PMR). The report details which shall also be recorded in the logbook include the following:

1. Any follow-up actions taken to review the design, installation, and maintenance of P2M2s , including the dates such actions occurred; and

2. A summary of P2M2 modifications taken or to be taken, including a schedule of activities necessary to implement changes, and the date the modifications are completed or expected to be completed; and

3. The PP shall send a report with photographic evidence as soon as practicable whenever corrective actions or measures have been taken or scheduled to be taken, using an online communication medium to the DOE.

iii. In all circumstances, the PP shall immediately take all reasonable steps to minimize or prevent the discharge of pollutants until a permanent solution is taken and an appropriate P2M2 is installed or applied and made operational, including cleaning up any contaminated surfaces so that the material will not be discharged in subsequent storm events.

(s) Site Inspections

i. Site inspections shall be conducted to check and to ascertain that all P2M2s specified in the EIA Report and this document have been properly installed and maintained as well as to determine whether any controls that is clearly not operating as intended or any P2M2s requires replacement, or additional P2M2s are required. The site inspections shall also assess if pollution is effectively being controlled and off-site discharge is being prevented in compliance with the EIA conditions of approval (COAs).

ii. All inspection activities shall be recorded in the PM logbook.

iii. At a minimum, inspections shall be conducted at the site prior to commencement of land clearing activities and after every storm event during construction and as specified in the established inspection schedule.

iv. At a minimum, the following areas shall be inspected:

a) All areas that have been cleared, graded, or excavated and that have not yet completed stabilization;

b) Construction entrances/exits ;
c) Roadways;
d) All P2M2s installed or applied at the site;
e) Material storage areas, spoil area, borrow area, or equipment storage and maintenance areas;
f) All areas where runoff water typically flows within the site, including drainage ways designed to divert, convey, and/or treat runoff water;
g) All points of discharge from the site;
h) All locations where stabilization measures have been implemented at least once every seven (7) days and within 24 hours after the end of a storm event of 12.5 mm or greater.

v. A rain gauge shall be properly maintained at the site so as to determine if a storm event of 12.5 mm or greater has occurred on the site. In a circumstance that a rain gauge is faulty, the storm event information shall be obtained from a weather station that is representative of the project site.

vi. Major observations and incidents of non-compliance shall be recorded in the inspection report, as well as corrective actions and maintenance and shall be recorded in the PM log book.

(t) Maintenance

The PP shall maintain the P2M2s in accordance with the following requirements:

i. Maintenance shall begin as soon as the first P2M2 is installed or applied and shall continue through all the succeeding activities until the permanent

erosion control measures are established and functioning. Maintenance method shall be in accordance to design specification.

ii. Unless advised otherwise, maintenance shall occur within seven (7) calendar days of the inspection noted/reported. All maintenance activities shall be recorded in the PM logbook

iii. Sediment Basin/Trap shall be kept in effective operating condition and remove accumulated sediment to maintain at least ½ of the design capacity of the sediment basin/trap at all times.

iv. Sediment shall be removed before it accumulates to one-half of the above-ground height of any perimeter control such as by cleaning out the silt fences when they are 1/2 full of sediment and/or by replacing them when they are torn or lifted, to retain their functionality.

v. Stabilized Construction Entrance or wash trough or Tires Washing Facility shall be maintained so as not to track-out sediment or mud onto any adjacent public roads. In any occasion where sediment has been tracked-out from the project site onto the off-site streets, the deposited sediment shall be removed the end of the same work day by sweeping, shoveling, or vacuuming the surfaces, or by using other similarly effective means of sediment removal. Hosing or sweeping tracked-out sediments into any drainage is prohibited unless it is connected to a sediment basin, sediment trap, or similarly effective control.

(u) **Standards and Specifications for P2M2s**

i. All P2M2s shall be designed, constructed, installed, and maintained in accordance with good engineering practices and applicable design specifications.

ii. Application of all P2M2s onsite shall be in accordance with standards and specifications indicated, specified, stated, depicted and set forth in:

a. Department of Irrigation and Drainage – DID. 2010. Guideline for Erosion and Sediment Control in Malaysia

b. Department of Irrigation and Drainage – DID. 2000. Urban Storm Water Management Manual for Malaysia

c. Erosion and Sediment Control Planning and Design Manual issued by North Carolina Department of Environment and Natural Resources*

Note: This manual can be accessed at https://enviro.doe.gov.my/

d. Best Management Practices for Construction and Maintenance Activities issued by North Carolina Department of Transportation**

Note: This manual can be accessed at https://enviro.doe.gov.my/

[Note: For the use of the manuals mentioned in (c) and (d), credit is hereby given to the Sedimentation Control Commission for granting permission for its use in Malaysia- See the acknowledgement page of this Guidance Document]

7.2 Self-Regulation

(v) Establishment of Environmental Performance Monitoring Committee (EPMC) and Performance Monitoring Documentation

(i) The PP shall establish a project Environmental Performance Monitoring Committee (EPMC) to monitor the environmental performance and effectiveness of P2M2s, and status of regulatory compliance of the project.

(ii) The EPMC shall be represented by all relevant parties involved in project implementation and chaired by a senior member representing the PP. The chairman shall be responsible for ensuring the decisions of the meeting are responsibly executed. The EPMC shall meet at a minimum, once in a quarter and the minutes of the meeting be maintained.

(iii) The PP through the Environment Officer (EO) shall prepare a Performance Monitoring Document (PMD) that describes in detail how EIA approval conditions (COAs) are going to be complied and how performance monitoring of the P2M2s will be conducted to ensure the optimal functionality of the P2M2s is maintained. The details in the PMD shall include, among others: performance monitoring equipment/instruments, sampling protocols and analysis, monitoring parameters, sampling frequency, preventive and corrective maintenance procedure for the P2M2s, discharge compliance, record keeping, etc.

(iv) The PP through the EO shall establish and execute an environmental performance monitoring (PM) program to monitor and evaluate the effectiveness of the P2M2s, inspect, maintain, take corrective actions on

the P2M2s to ensure their functionality and effectiveness throughout the entire process of the land disturbing activities.

(v) The PP shall set up a “mini laboratory” to facilitate the implementation of environmental performance monitoring program. This mini laboratory shall be adequately equipped with relevant resources including portable analytical testing equipment such as in-situ total suspended solids meter, turbidity meter, etc.

(vi) The PP through the EO shall establish and maintain proper records using a log book (called the Performance Monitoring logbook) that contains among others, Checklist of P2M2s List Sheet, Installation Sheet, Maintenance Sheet, Site and P2M2 Inspection Sheet, Photograph Folder Sheet, Corrective Action Sheet, Performance Monitoring Sheet, etc. The PMD and PMR shall be maintained for five years upon completion of project development. For a reference, see **Appendix I and Appendix II** for the samples of the PMD conducted at two different development project sites.

(vii) The PP is required to keep a current copy of the PMD and PM log book at the site or at an easily accessible location, so that it can be made available at the time of an onsite inspection or upon request by the Department of Environment inspector. This log book shall be maintained or updated by weekly/event-based inspections.

(viii) The PP through the EO shall prepare a Performance Monitoring Report (PMR) that discusses the results of the performance monitoring conducted as described in the PMD. Wherever relevant, PMR shall include data interpretation and assessment of the effectiveness of the P2M2s by making comparison of the performance monitoring parameters with their recommended ranges (or standards). Statistical

techniques and graphical presentation of the performance monitoring parameters shall be used wherever appropriate. PMR shall also make some definitive conclusions on the overall performance of the P2M2s and suggest improvement measures to be taken if necessary. PMR shall be submitted to the EPMC as established by the PP for the EIA project.

8.0 LD-P2M2 SUBMISSION CHECKLIST

INSTRUCTIONS

(i) All relevant items cited in Section 8.1, 8.2, 8.3 and 8.4 checklist are required to be identified, addressed, discussed, assessed, evaluated and presented in the LD-P2M2 document according to appropriate chapters.

(ii) All relevant items cited in Section 8.3 and 8.4 checklist are required to be illustrated or depicted in a minimum of three (3) sheets of plan or map or drawing to be referred to as LD-P2M2 Plan which contains the following:

(a) Map of site plan with the existing site conditions (pre-development),

(b) Map of site development plan (during development) and

(c) Overlaid map of (a) and (b).

(iii) Maps shall be clear and legible where they may be provided with more than one sheet to commensurate with the size and complexity of the drainage areas as well as the terrain of the project site.

(iv) The LD-P2M2 document shall include a legal pledge by the Project Proponent (PP) to comply with the Minimum Standards requirement of P2M2s as outlined in Section 7 of this Guidance Document (PP).

ITEM	PAGE	MARK √ - Yes X - No NA - Non Applicable	REMARKS
8.1 PROJECT ACTIVITY AND IMPLEMENTATION			
(a) Phasing plan if relevant			
(b) Project implementation schedule			
(c) Description of the construction activity			
(d) Construction schedule for each major land disturbance complete with timeline or chart for the installations of P2M2s			

(e) Typical method statement for site clearing, cut and fill, excavation of foundation, drilling of borehole, in-stream works and construction of temporary / permanent stream / river crossing and diversion that incorporate the significance elements of pollution prevention and mitigation measures.			
(f) Estimated start date, completion date and stabilization schedule for each major land-disturbing activities or construction activities phases, stages and sequences.			

ITEM	PAGE	MARK √ - Yes X - No NA - Not Applicable	REMARKS
8.2. Information and Analysis on Project Development			
These information and analysis shall contain the following:			
(a) Weather and rainfall data.			
(b) Site runoff velocity and flow rate, both pre and during development			
(c) Description of site soil characteristics: i. Soil types			

ii. Soil test erodibility iii. Soil hydrologic group iv. Dispersible fine clay: Percentage of dispersible material v. Anticipated excavation depth for the proposed land disturbing activity			
(d) Description of adjacent areas, such as streams, lakes, residential areas, and roads that might be affected by the land disturbance.			
(e) List of streams and rivers identified on-site. (Use coding for unnamed streams and rivers).			
(f) List of receiving streams and rivers. (Use coding for unnamed streams and rivers).			
(g) List of existing drainage identified on-site.			
(h) List of P2M2s proposed. Please also make reference to P2M2s Description can be accessed through: https://enviro.doe.gov.my			
(i) Identify access roads and other outsourced components (such as mobile batching or premix plant) that are located outside the proximity of the project boundary.			
(j) Earthworks cut and fill volume.			
(k) Availability of rocks material.			
(l) Biomass management.			
(m) Solid (construction waste) and			

domestic waste management.			
(n) Spill Prevention and Control from fuel and chemical use or storage.			
(o) Hazardous Waste Management.			
(p) S**oil loss** prediction using the Universal Soil Loss Equation (USLE), **sediment yield** calculation using Modified Universal Soil Loss Equation (MUSLE) and **runoff** estimation for pre, during and post development accounted for both with and without the implementation of LDP2M2s. All of the data and parameters used in the calculations shall be measured or rationally determined, and identified. If secondary sources are used, they shall be clearly identified.			
(q) Calculation of proposed sediment trap/basin based on drainage area disturbed and projected runoff flow direction from each disturbed land segment that will drain into the proposed sediment trap/basin.			
	PAGE	**MARK** **√ - Yes** **X - No** **NA - Non Applicable**	**REMARKS**
8.3. Map of site plan with the existing site conditions (pre-development).			

(I) Site map which refers to:			
(a) Topography survey map showing: i. Contours ii. Elevation iii. Slopes			
(b) Geological Terrain Mapping (if relevant).			
(c) Erosion risk map.			
(d) Drainage pattern showing: i. Delineation of watercourses. ii. Delineation of natural drainage depression. iii. Flow path and direction for the different drainage areas. iv. Marks and labels of drainage area(s) or drainage divides.			
(II) Land use showing:			
i. Trees. ii. Vegetation area. iii. Roads and infra-structures (inclusive of drainage system). iv. Buildings. v. Utilities.			
(III) Adjacent within 150 metres			

from project site:			
i. Watercourses (Flowing into or from site). ii. Roads and infra-structures (inclusive of drainage system). iii. Buildings and utilities. iv. Vegetation area.			
(IV) Use map scale and size of: i. 1:500 for area less than 20 hectares; ii. 1: 1000 for area more than 20 hectares iii. Size: A3 or A1.			
ITEMS	**PAGE**	**MARK** **√ - Yes** **X - No** **NA - Non Applicable**	**REMARKS**
8.4. Map of site development plan			
(a)Depict the existing contour and proposed level.			
(b) Indicate the total site area.			
(c) Indicate the total disturbance area with line showing the area to be disturbed.			
(d) Show the cut and fill area.			

(e) Show the direction of the proposed earthwork movement.			
(f) Mark the limit of disturbance of each of the phase construction.			
(g) Identify and mark the temporary or permanent stream or river crossing.			
(h) Identify and mark the temporary or permanent stream or river diversion.			
(i) Identify and mark on-site temporary access or construction or haul road			
(j) Identify and mark site office area.			
(k) Identify and mark stockpile areas.			
(l) Identify and mark temporary preservation of existing vegetation.			
(m) Identify and mark permanent preservation of existing vegetation.			
(n) Identify and mark material staging area or equipment storage area.			
(o) Identify and mark workshop/maintenance or engineering work area.			
(p) Identify and mark generators set and/or motorized equipment area.			
(q) Identify and mark Vehicle and Equipment Washing Facility.			
(r)Identify and mark petroleum-based material/refueling, chemicals			

and skid tank area.			
(s) Identify and mark schedule waste storage area.			
(t) Identify and mark workers camp location.			
(u) Identify and mark sanitary facilities location.			
(v) Identify and mark batching plant location.			
(w) Identify and mark concrete wash P2M2 location.			
(x) Identify and mark spoil (unsuitable material) area or disposal area.			
(y) Identify and mark borrow area.			
(z) Identify and mark the location(s) of all proposed P2M2s application.			
(aa) Identify and mark all of the designated point(s) of water discharge and also any other potential point(s) of water discharge to off-site drainage ways.			
(bb) Provide the GPS location (WGS 84) of the construction ingress/egress and all designated point(s) of water discharge for the site.			
(cc)Use map scale and size of: 1:500 for area less than 20 hectares; 1: 1000 for area more than 20			

hectares Size: A3 or A1.			

DEPARTMENT OF ENVIRONMENT (HEADQUARTERS)

19th JULY, 2016