



ENVIRONMENT PROTECTION DEPARTMENT
MINISTRY OF TOURISM, CULTURE AND
ENVIRONMENT, SABAH

**STANDARD OPERATING PROCEDURES
(SOPs) FOR COMPLIANCE WITH
ENVIRONMENTAL CONDITIONS OF
HOUSING AND COMMERCIAL
DEVELOPMENT IN SABAH**

**Standard Operating Procedures (SOPs) for
Compliance with Environmental Conditions of
Housing and Commercial Development in Sabah**

EPD SABAH



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Message

I wish to congratulate the Environment Protection Department (EPD) for their accomplishment in publishing this Standard Operating Procedures (SOPs) for Housing and Commercial Development document.

Maintaining a balance between development and a healthy environment is challenging. As emphasised in the Sabah State Policy on the Environment, the State Government “recognises that the environment is an integral part of, as well as a strategic pillar of, sustainable development, which requires the adoption of appropriate policies incorporating environmental factors and standards into all development activities in order to maintain environmental and social sustainability”.

Hence, proper planning, effective strategies, and practical actions should be in place to control the impacts of development activities on the environment. One of the major development activities in Sabah is housing and commercial development. Therefore, the establishment of this Standard Operating Procedures for Housing and Commercial Development (SOPs) document as well as the Environmental Self-Regulation (ESR) guideline, which is published separately from this document, is timely and provides the mechanism to guide project proponents in enhancing compliance to environmental conditions.

I look forward for Sabah to achieve a higher level of environmental achievements and sustainable development to meet the aspiration of the Sabah State Policy on the Environment that is “to maintain a healthy environment based on clean air, healthy rivers, vibrant forests, productive land, bountiful seas and cohesive communities contributing to the prosperity of the State and its people”.

JAMILI NAIS, Ph.D

PERMANENT SECRETARY

MINISTRY OF TOURISM, CULTURE AND ENVIRONMENT

Foreword

As part of the Environment Protection Department's continuous efforts to enhance environmental management in Sabah, this document is published to minimise impacts of development activities for housing and commercial development. For any approved Environmental Impact Assessment (EIA) or Proposal for Mitigation Measures (PMM), the project proponent is required to sign an Agreement of Environmental Conditions (AEC) or Mitigation Declaration (MD). The Standard Operating Procedures (SOPs) outline environmental conditions in the AEC or MD to be complied with by the project proponent.

These SOPs for housing and commercial development provide practical step-by-step instructions and best management practices to guide project proponents towards enhancing compliance to the conditions stated in the AEC or MD. Published in a separate handbook, the Environmental Self-Regulation (ESR) guideline complements these SOPs in managing the environmental aspects of the project thus further enhancing compliance to environmental conditions.

I greatly acknowledge all government agencies, organisations and individuals who provided valuable comments, feedback and inputs into the preparation of these SOPs. I sincerely hope this document is utilised meaningfully by relevant stakeholders for a more sustainable environment in Sabah.

VITALIS J. MODUYING

DIRECTOR

ENVIRONMENT PROTECTION DEPARTMENT, SABAH

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ABBREVIATIONS AND ACRONYMS

3R	Reduce, Re-use and Recycle
AEC	Agreement of Environmental Conditions
DOE	Department of Environment
ECR	Environmental Compliance Report
EIA	Environmental Impact Assessment
EO	Environment Officer
EPD	Environment Protection Department
ESCP	Erosion and Sediment Control Plan
eSWIS	Electronic Scheduled Waste Information System
GPS	Global Positioning System
JKR	Jabatan Kerja Raya
JMG	Jabatan Mineral dan Geosains
JPDS	Jabatan Pelabuhan Dan Dermaga Sabah
JPPS	Jabatan Perkhidmatan Pembentungan Sabah
MD	Mitigation Declaration
MTRA	Marine Traffic Risk Assessment
PDRM	Polis Diraja Malaysia
PMM	Proposal for Mitigation Measures
PPs	Project Proponents
RC	Reinforced Concrete
RSO	Rectified Skew Orthomorphic
SOPs	Standard Operating Procedures

INTRODUCTION

Housing and commercial development involves many stages of development activities. Common activities include site clearing, earthwork, hill-cutting, reclamation, blasting, etc. All these activities may cause significant environmental pollution if proper controls are not in place. Apart from that, location of project development could also create significant adverse impacts to the environment, such as seashore, sea and hillside developments, as well as developments next to the sensitive areas e.g., adjacent to populated areas.

Under the Environment Protection Enactment 2002, housing and commercial developments in Sabah are categorised “prescribed activities” under the First and Second Schedule of the Environment Protection (Prescribed Activities) (Environmental Impact Assessment) Order 2005.

This requirement obliges Project Proponents (PPs) to appoint an environmental consultant registered under the Environment Protection Department (EPD) to prepare and submit a Proposal for Mitigation Measures (PMM) (for prescribed activities under the First Schedule) or an Environmental Impact Assessment (EIA) (for prescribed activities under the Second Schedule) for approval, prior to project commencement.

The EIA or PMM report will describe all potential environmental impacts derived from project activities such as water pollution, soil erosion, waste handling, etc. and will propose mitigation measures to minimise impacts. Once the EIA / PMM is accepted or approved by the EPD, the department will then produce the Agreement of Environmental Conditions (AEC – in the case of an EIA) or Mitigation Declaration (MD – in the case of a PMM), which is to be agreed upon between the PPs and the EPD. Throughout housing and commercial developments, project proponents must continuously comply with all environmental conditions stated in the AEC / MD.

These Standard Operating Procedures (SOPs) are prepared to provide clear guidance to PPs for implementing environmental conditions commonly imposed for housing and commercial development by the EPD in the AEC/MD. In addition, the SOPs will indirectly guide PPs to comply with the AEC/MD while minimising impacts to the environment. The SOPs shall be used together with the EIA/PMM since some of the requirements in the SOPs are already contained in the report.

1 ENVIRONMENTAL CONDITION: CONTROL OF SITE DEVELOPMENT

Over-development or encroachment into non-consented land or areas without proper legal documentation by activities i.e., clearing, earthwork or building construction, causes physical environmental issues i.e., soil erosion, dust, and noise disturbance, as well as social conflicts with neighbouring landowners.

Apart from the project boundary, setback or buffers for sensitive and protected areas identified during the EIA/PMM study i.e., forest reserves, hill sites, private lands and properties, must be allocated to exclude the area from the development based on the width mentioned in the EIA/PMM/AEC/MD to protect these areas.

Target Housing and commercial development within the approved Project boundary.

Standard 1.1 BOUNDARY DEMARCATION AND MAINTENANCE

Operating

Procedures 1.1.1 Demarcate every corner of the site boundary throughout the development phase as per the mitigating measure plan in the approved EIA/PMM and survey plan.

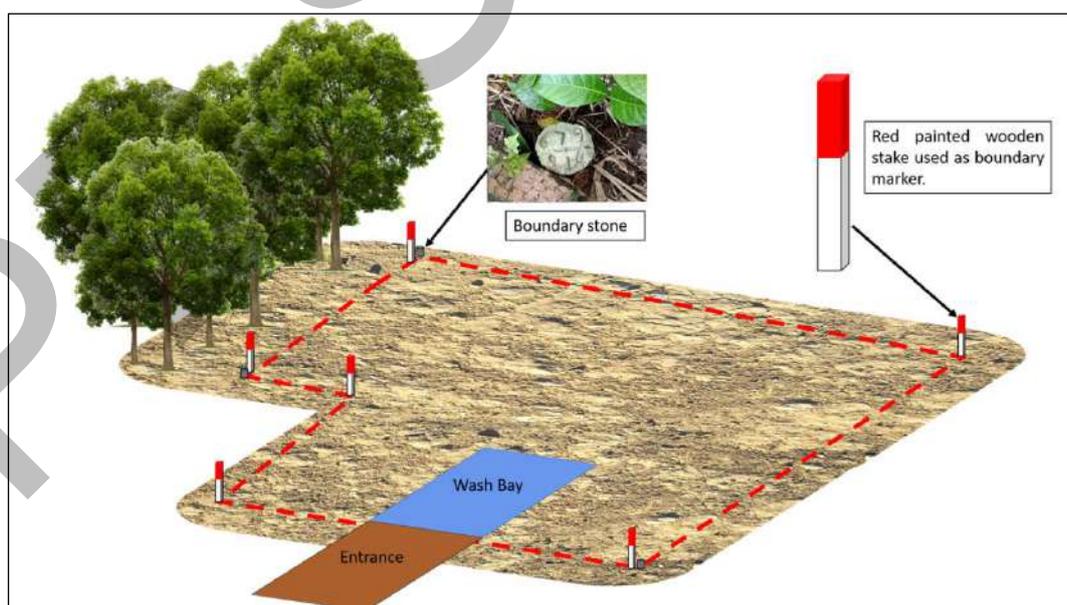


Figure 1: Illustration of site boundary marking.

1.1.2 Notify all workers, including contractors, agents or individual personnel that were appointed in carrying out the Project activities on the boundary marker used on the site, to avoid damaging, tampering, relocating them. Examples of notification methods are:

- a) Clearly state boundary marker tools in the contract.
- b) Erect signboards at site boundaries.
- c) Conduct periodic awareness training on boundary markers used on-site.
- d) Display boundary marker tools used on-site, on the notice board.

1.1.3 EO to inspect and monitor marking tools at the site to ensure markers remain in its initial position. Conduct maintenance or repair where necessary.

1.1.4 Prohibit development activity outside the Project boundary.

1.1.5 Land

1.1.5.1 Use visible boundary marker tools made from sturdy materials. Among the boundary marking tools that can be used are painted wooden stakes, signboards, PVC pipes and hoarding. Refer to **Plates 1-5**.

1.1.5.2 Consider site topography conditions when selecting the marking tools used to mark site boundaries.



Plate 1: Example of boundary marking using hoarding.



Plate 2: Example of boundary marking using hoarding.



Plate 3: Example of boundary marking using painted wooden stakes.



Plate 4: Example of boundary marking at a hilly area with painted wooden stakes.



Plate 5: Boundary stone used as a boundary marker.

1.1.6 Sea

1.1.6.1 Submit boundary survey plan (with RSO coordinate system) done by a licensed surveyor (registered surveyor licensed under Surveyor Ordinance, 1960) to the EPD in either soft copy (compulsory and in Shapefile format) or hard copy (optional) format before any physical work commences at the site.

1.1.6.2 Install marker buoys at location specified in the AEC/MD. Use marker buoy:

- i. With colour that is easily visible.
- ii. Lighted during night-time.



Plate 6: Example of buoys installed to mark the marine working area.

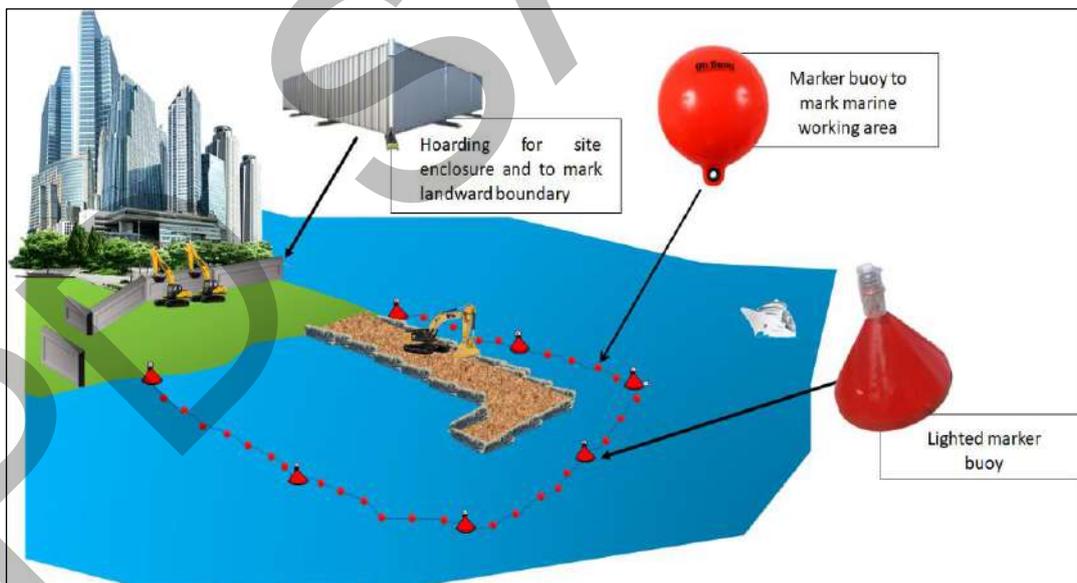


Figure 2: Illustration of sea boundary marking.

1.2 SETBACK OR BUFFER (SENSITIVE AND PROTECTED AREAS)

- 1.2.1 Demarcate every corner of the setback/buffer for sensitive or protected areas throughout the development as per the mitigating measure plan in the approved EIA/PMM.

- 1.2.2 Mark the setback or buffer boundary with visible boundary markers made from sturdy materials. Boundary markers that can be used include painted wooden stakes, signboards or PVC pipes.
- 1.2.3 Use different setback or buffer boundary markers from the site boundary marker. For example, use red painted wooden stakes to mark the site boundary and yellow painted wooden stakes to mark the setback or buffer areas boundary. Refer to **Figures 3 and 4**.
- 1.2.4 Provide setback or buffer width as stated in an EIA/PMM and AEC/MD.
- 1.2.5 Erect a prohibition signboard at the buffer boundary to remind workers not to enter or conduct any activity within the setback or buffer zone area.
- 1.2.6 Notify all workers, including contractors, agents or individual personnel that were appointed to carry out Project activities, on buffer or setback boundary markers used on-site, to avoid damaging, tampering, or relocating the markers. Examples of notification methods include:
 - a) Clearly state buffer or setback boundary markers in the contract.
 - b) Erect signboards at setback/buffer boundaries.
 - c) Conduct periodic awareness training on buffer or setback boundary markers used on-site.
 - d) Display buffer or setback boundary markers used on-site, on the notice board.
- 1.2.7 EO to inspect and monitor buffer or setback boundary markers at the site to ensure markers remain in its initial position. Conduct maintenance or repair where necessary.

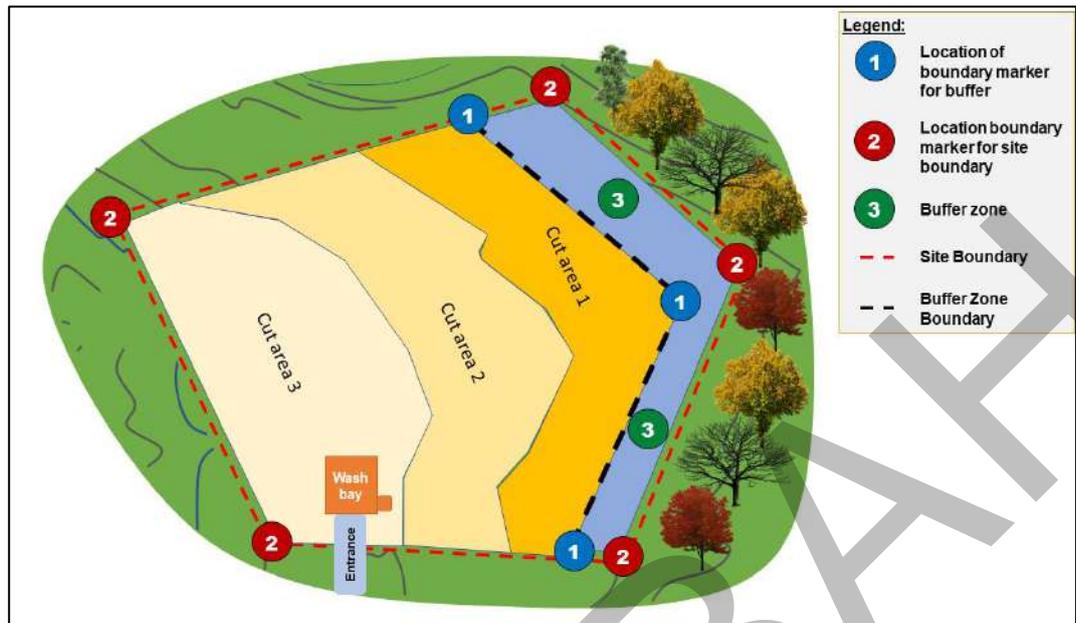


Figure 3: Illustration showing site boundary marking and buffer for a hill site.

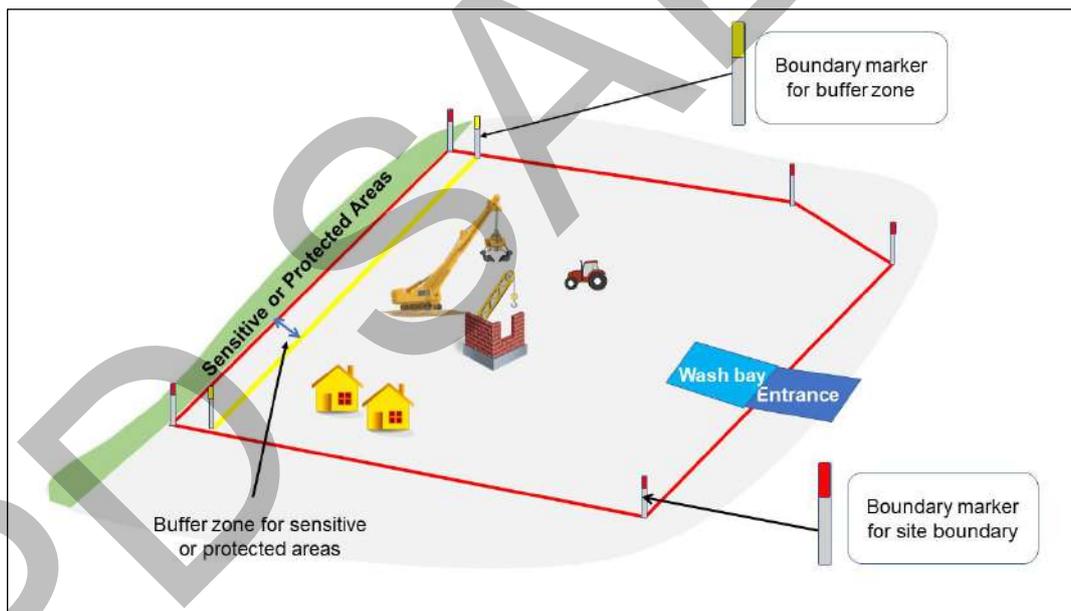


Figure 4: Illustration showing site boundary marking and buffer for sensitive or protected areas.

2 ENVIRONMENTAL CONDITION: CONTROL OF SURFACE RUNOFF AND WATER QUALITY POLLUTION

Development activities lead to soil erosion, which degrades water quality by increasing turbidity levels and total suspended solids. Temporary drainage systems as well as erosion and sediment control structures shall be provided to control and provide effective retention and discharge of sediment runoff.

Target Protection of water quality by minimising erosion and sedimentation impact.

Standard 2.1 LAND

Operating

- Procedures**
- 2.1.1 Refer to the EIA/PMM, AEC/MD and latest mitigation measures map approved by the EPD. Check and identify:
- i. Runoff management and sediment control facilities i.e., temporary earth drains, check dams, silt fences, silt traps and sediment basins etc., to be provided at the site.
 - ii. Specifications, locations and sequences in the provision of runoff management and sediment control facilities.
- 2.1.2 Construct runoff management and sediment control facilities at the site prior to carrying out earthwork activities. Below are general sequences for providing the facilities.
- i. Mark site and/or buffer boundaries based on SOPs detailed in **Environmental Condition: Control of Site Development**.
 - ii. Construct temporary perimeter earth drains and sediment basins prior to carrying out earthwork activities. Refer to **Figure 5**.
 - iii. Connect temporary earth drains to the sediment basin to divert all surface runoff into it.

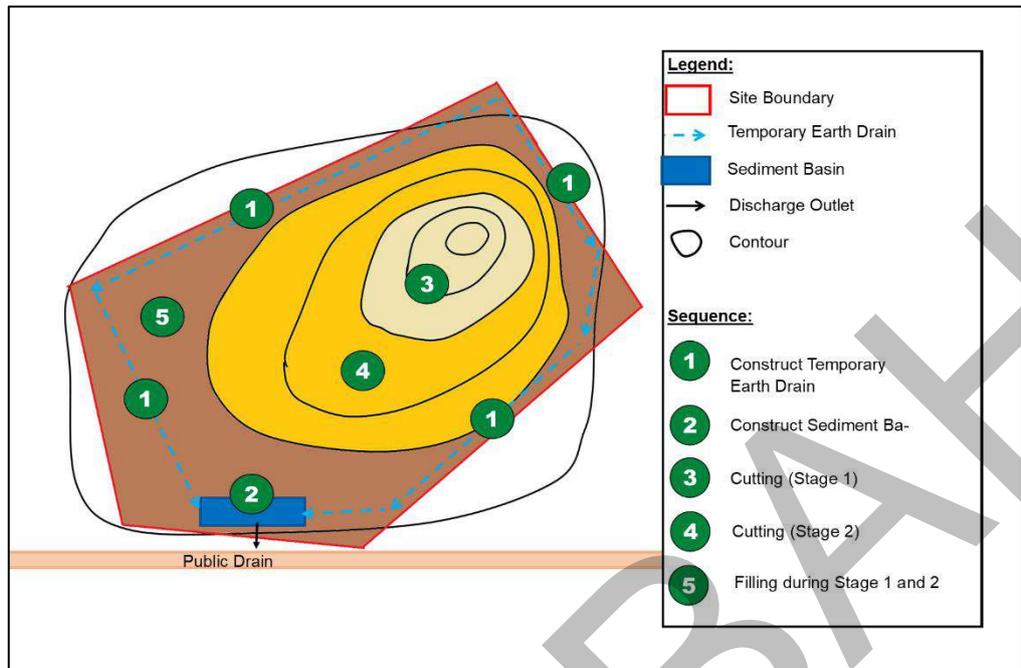


Figure 5: Illustration of earthwork activity by stages.

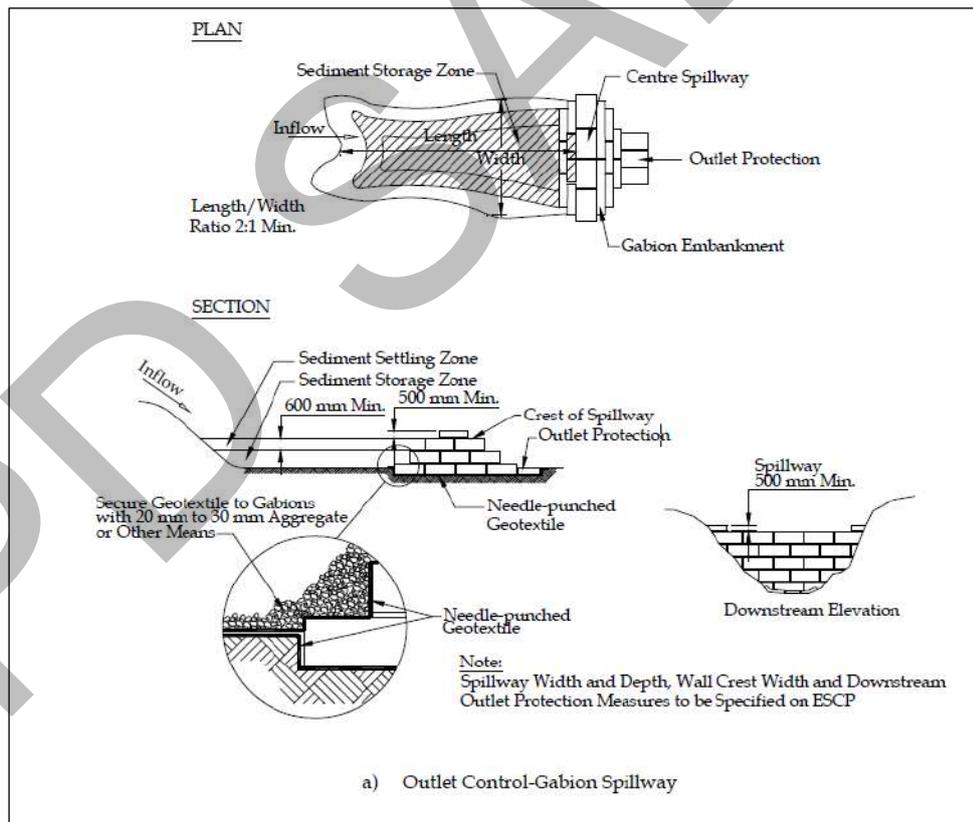


Figure 6: Typical design of a Sediment Basin (1).

Source: Urban Stormwater Management Manual for Malaysia, 2nd Edition, DID 2012.

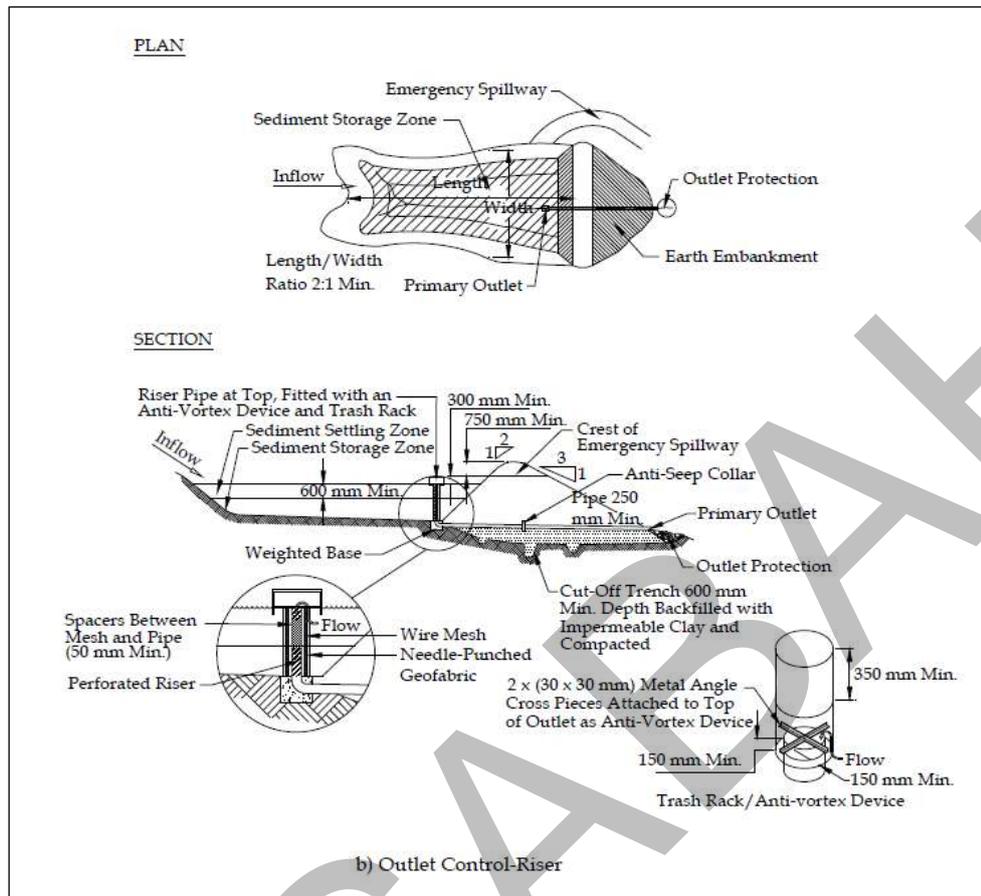


Figure 7: Typical design of a Sediment Basin (2).

Source: Urban Stormwater Management Manual for Malaysia, 2nd Edition, DID 2012.

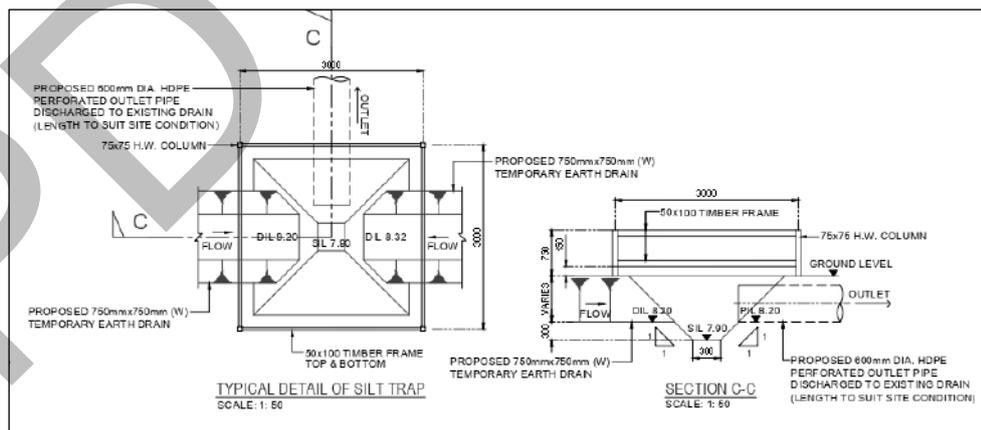


Figure 8: Typical design of a Silt Trap.

2.1.3 No direct discharge of surface runoff from disturbed area into public drains, rivers or watercourses.

- 2.1.4 No construction of runoff management and sediment control facilities in rivers or watercourses.
- 2.1.5 Conduct site clearing at the targeted phase of the development site based on the development schedule.
- 2.1.6 Conduct earthwork activities in stages at the targeted phase of the development site and avoid conducting activities during rainy days.
- 2.1.7 Compact exposed surfaces i.e., backfill areas, construct slope embankments, road base, etc., to reduce soil erosion.
- 2.1.8 Conduct maintenance (sediment removal or desiltation by excavation) on sediment control facilities i.e., temporary earth drains, check dam, and sediment basin, periodically with increasing frequency after each rain event.
- 2.1.9 Start applying temporary soil stabilisation methods to exposed areas after reaching final formation level on any portion of the site. Install plastic sheet covers or geotextile mats as temporary soil stabilisation measures.



Plate 7: Example of plastic sheet cover.



Plate 8: Example of geotextile mat.

Source: Urban Stormwater Management Manual for Malaysia, 2nd Edition, DID 2012.

- 2.1.10 Plant cover crops on exposed surfaces e.g., *Mucuna bracteata*, *Brachiaria ruziziensis*, etc. to reduce soil erosion.



Plate 9: Example of cover crops, *Brachiaria ruziziensis*, on an exposed area.

- 2.1.11 Refer to SOPs contained in **Environmental Condition: Slope Stabilisation** if cover crops are not suitable due to slope surface type, such as rocky slopes.
- 2.1.12 Place any earth materials stockpile (either imported from borrow pit or excavated at the site) at a minimum distance of 30 metres from any watercourse to avoid potential soil migration or the distance specified in the AEC / MD.
- 2.1.13 Provide temporary perimeter controls at the earth materials stockpile, such as berms, and cover the materials with canvas sheets.



Plate 10: Example of loose earth materials covered with canvas sheets.

Source: Guidelines on Land Disturbing Pollution Prevention and Mitigation Measures, 2017

- 2.1.14 No disposal of earth, biomass waste, sediment, solid waste, sewage or scheduled waste into the drainage, river or waterway.
- 2.1.15 Refer to the Malaysian Standard listed in **Appendix 1** for additional reference on erosion and sediment control system.

2.2 SEA

- 2.2.1 Install/construct sediment plume control systems, such as silt curtains and/or embankments, prior to reclamation/ dredging/excavation and cofferdam construction activities.
- 2.2.2 For Projects involving the construction of a cofferdam, install sheet piles for the construction of the cofferdam before commencing reclamation work.

2.2.3 Perform visual inspections regularly to determine whether maintenance is required. The following are recommendations for inspection and maintenance activities:

- i. Check whether the silt curtain is twisted.
- ii. Replace worn or broken anchor lines.
- iii. Remove any solid waste/dirt caught on the silt curtain.
- iv. Check for any signs of bund breaching.



Plate 11: Maintenance of installed silt curtain.

2.2.4 Construct runoff management and sediment control facilities i.e., temporary earth drains, sediment basin or silt traps, after backfilling works within the cofferdam area has reached desired levels.

3 ENVIRONMENTAL CONDITION: CONSTRUCTION OF SITE FACILITY

Site facilities i.e., workers' quarters, site office and workshop, are examples of facilities established on-site to ensure the smooth development of the project. Development of these facilities require site preparation activities such as site clearing and earthwork that could trigger soil erosion if there is no proper planning. Selecting the location of facilities should also be carried out before commencing construction of facilities, to prevent any disturbance to nearby sensitive areas.

Target Well-planned site facilities to minimise impacts on the environment.

Standard Operating Procedures **3.1 PREPARATION OF SITE FACILITIES (WORKERS' QUARTERS, WORKSHOP AND SITE OFFICE)**

3.1.1 Identify the location of facilities based on the mitigation measures map in the AEC.

3.1.2 Conduct minimal site clearing and earthwork on areas designated for the establishment of site facilities.

3.2 DRAINAGE SYSTEM

3.2.1 Workers' Quarters

3.2.1.1 Provide an effective drainage system at the workers' quarters.

3.2.1.2 Conduct weekly maintenance to ensure no blockages in the drainage system.

3.2.2 Workshop

3.2.2.1 Construct workshop with an effective drainage system.

3.2.2.2 Conduct weekly maintenance to ensure no blockages in the drainage system.



Plate 12: Example of drainage system at workers' quarters.



Plate 13: Example of earth drain for site facility.

3.3 LOCATION OF SITE FACILITIES

3.3.1 Workers' Quarters

3.3.1.1 Establish workers' quarters at a minimum horizontal distance of 30 metres away from the top of the bank (of the nearest river or watercourse) or distance specified in the AEC / MD.

3.3.2 Workshop

3.3.2.1 Establish workshop at a minimum horizontal distance of 50 metres away from the top of the bank (of the nearest river or watercourse) or distance specified in the AEC / MD.

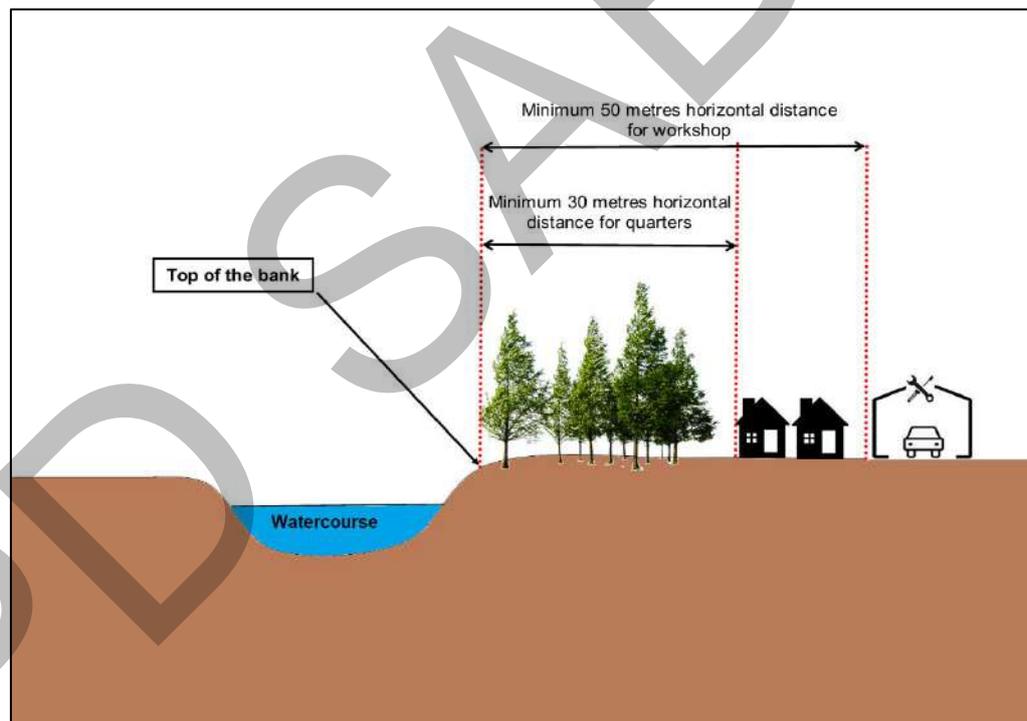


Figure 9: Illustration showing the measurement of the horizontal distance between the workers' quarters and workshop and the top of the bank.

4 ENVIRONMENTAL CONDITION: SLOPE STABILISATION

Slope alteration by cutting or filling embankments can trigger slope failures, especially in the event of a major rainfall and/or without applying proper slope protection measures and slope drainage. Unplanned or improper slope construction methods may cause slope failures or landslides to occur within the site or in neighbouring areas.

Target	Control of slope cutting activities to mitigate erosion and landslides.
Standard	4.1 Refer to the EIA/PMM and AEC/MD for slope stabilisation measures.
Operating Procedures	Check and identify: <ul style="list-style-type: none">i. Buffer requirements.ii. The best engineering practices for slope stabilisation approved by relevant Local Authorities (examples shown in Plates 14 – 16).iii. Location, method and sequence for implementing slope protection measures such as slope cutting sequence, runoff management and sediment control facilities i.e., cascade drain, toe drain, berm drain, etc.
	4.2 Implement slope stabilisation measures as per the EIA/PMM and AEC/MD.
	4.3 Minimise removal of existing vegetation to aid slope and soil zone stabilisation.
	4.4 Commence slope cutting immediately after the area is cleared.
	4.5 Conduct slope cutting in stages and in a controlled manner.



Plate 14: Example of soil nail wall for slope stabilisation.



Plate 15: Example of Nehemiah retaining wall for slope stabilisation.



Plate 16: Example of terracing and cover crops for slope stabilisation.

- 4.6 Apply rock dissipater at the end point or at the toe end of the incomplete adjoining permanent drainage lines constructed along sloping areas.



Plate 17: Example of rock dissipater at the end point of drainage.

Source: Guidelines on Land Disturbing Pollution Prevention and Mitigation Measures, 2017 (Appendix B)

- 4.7 No stockpiling materials on slopes, slope crests or any probable locations susceptible to landslides or endangerment of the public or adjacent properties.

- 4.8 Appoint a geotechnical engineer and professional geologist to jointly draw up the slope rehabilitation and stability monitoring plan (if such requirement is stated in the AEC/MD), even after the project has commenced. Refer to **Appendix 2** for the general content of the slope rehabilitation and stability monitoring plan.
- 4.9 Submit slope rehabilitation and stability monitoring plan to JMG for approval.
- 4.10 Submit approved slope rehabilitation and stability monitoring plan to the EPD.
- 4.11 In addition, conduct the following steps for stabilised slopes.
 - i. Refer to the slope maintenance programme and slope maintenance manual prepared by the Submitting Engineer.
 - ii. Conduct visual inspection of all stabilisation structures. Record any defects in the stabilisation structures or any undeveloped slopes adjacent to the cut slope. These include special structures, such as drains, to ensure slopes are stable.
 - iii. Install instruments, such as inclinometers and ground/building settlement markers, to monitor slope movement, **if specified** in the slope maintenance programme.
 - iv. If there are signs of slope movement on RC stabilised structures, engage a geotechnical engineer and professional geologist to study the causes in detail, and take immediate action.

5 ENVIRONMENTAL CONDITION: MANAGEMENT AND DISPOSAL OF OVERBURDEN

Soil erosion, water pollution, and dust dispersal are expected to occur at overburden dumping sites if earthwork management and demarcation controls are not implemented properly. Impacts on traffic and transportation, such as damage to public roads, contamination of roads with dirt, road congestion, etc., can be anticipated during the transport of earth materials from the development site to the overburden disposal area.

Target To control overburden dumping activities to minimise air and water pollution, traffic, and transportation impacts, as well as impacts to the neighbouring land.

Standard Operating Procedures 5.1 Refer to the EIA/PMM and AEC/MD for the establishment of the overburden dumping site. Check and identify:

- i. Runoff management and sediment control facilities to be provided at the dumping site i.e., temporary earth drains, check dam, silt fences, silt traps or sediment basin, etc.
- ii. Specification, location, and sequence in providing runoff management and sediment control facilities based on the EIA/PMM and AEC/MD.

5.2 Construct runoff management and sediment control facilities at the dumping site. Below are the general sequences in providing the facilities.

- i. Mark dumping site boundaries based on the SOPs contained in **Environmental Condition: Control of Site Development**.
- ii. Construct the temporary perimeter earth drains and sediment basin prior to carrying out site clearing and dumping activities. Refer to **Figure 10**.
- iii. Connect temporary earth drains to the sediment basin to divert all surface runoff into it.

5.3 No direct discharge of surface runoff from the disturbed area into public drains, rivers, or watercourses.

5.4 No construction of runoff management and sediment control facilities in rivers or watercourses.

- 5.5 Conduct site clearing within the active working area only.
- 5.6 Conduct disposal activities by stages and avoid activities during rainy days.
- 5.7 Compact overburden materials at least twice per week to reduce soil erosion.

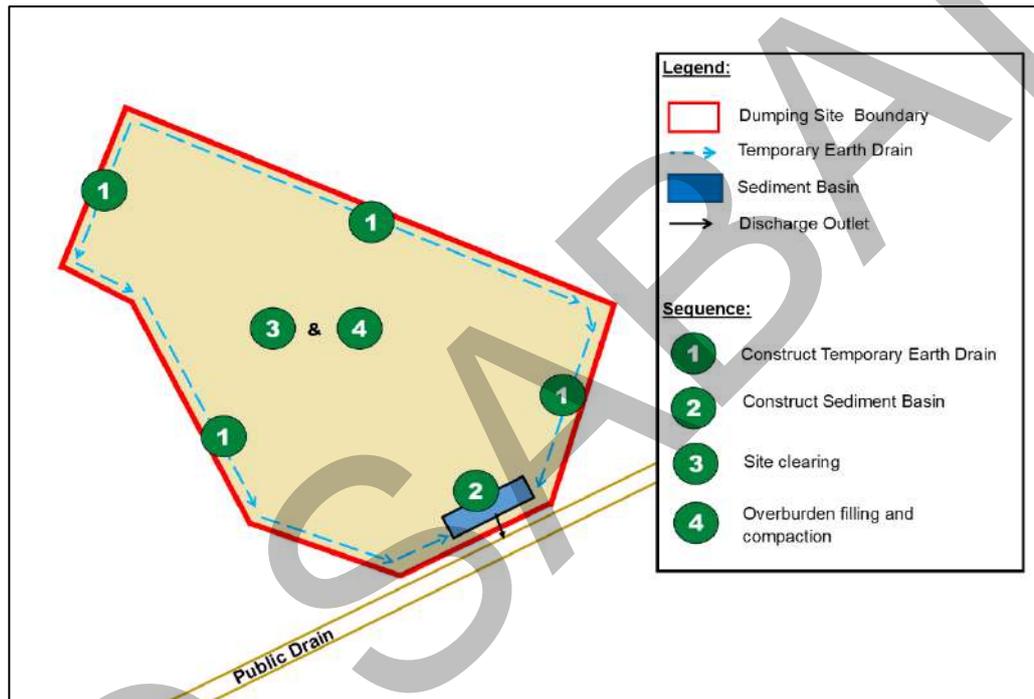


Figure 10: Illustration of overburden dumping stages.



Plate 18: Example of compacted overburden materials.



Plate 19: Example of compacted overburden materials.

- 5.8 Locate overburden dumping site in an area more than 30 meters away from any riverbank or waterway.

- 5.9 Prohibit dumping of overburden outside the dumping site boundary.
- 5.10 No disposal of overburden into any river, waterway, or within the riparian buffer.
- 5.11 Erect suitable speed limit and safety signs at the dumping site entrance to notify public road users.
- 5.12 Construct a wash bay / wash through with a silt trap of not less than 1m x 1m x 1.2m (depth) in size (based on Drawing design) at the location shown in the approved EIA/PMM and AEC/MD.
- 5.13 Clean tyres and undercarriage of transportation vehicles at the wash bay / wash through before leaving the dumping site to avoid formation of bulky deposited dirt and earth on public road surfaces.
- 5.14 Refer to requirements from the Local Authorities for transportation routes and/or JKR for access involving road reserves (application of wayleave).
- 5.15 Obtain consent from private landowners if access through their land is required.
- 5.16 Cover transported overburden materials with canvas or tarpaulin sheets.
- 5.17 Avoid off-site transportation activities during peak traffic hours stated in the AEC/MD.

6 ENVIRONMENTAL CONDITION: MANAGEMENT AND EXTRACTION OF BORROW PIT AREA

Soil erosion, water pollution, dust dispersal and slope failure are expected to occur at borrow pits if no proper earthwork management and demarcation controls are implemented. Impacts on traffic and transportation such as damage to public roads, contamination of roads with dirt, road congestion, etc., can be anticipated during transportation of earth materials from the borrow pit to the development site.

Target Control of earth extraction activity at the borrow pits to control soil erosion, water pollution, dust dispersal, and slope failure as well as traffic and transportation impacts.

- Standard Operating Procedures**
- 6.1 Refer to the EIA/PMM and AEC/MD for establishing the borrow pit site. Check and identify:
- i. Runoff management and sediment control facilities i.e., temporary earth drains, check dam, silt fences, silt traps or sediment basin, etc., buffer and slope protection measures to be provided at the borrow pit.
 - ii. Specification, location and sequence in providing runoff management and sediment control facilities, buffer and slope protection measures.
- 6.2 Construct runoff management and sediment control facilities at the borrow pit. Below are general sequences for providing facilities:
- i. Mark the borrow pit and/or buffer boundaries based on the SOPs detailed in **Environmental Condition: Control of Site Development**.
 - ii. Construct temporary perimeter earth drains and sediment basin prior to carrying out extraction activities.
 - iii. Connect temporary earth drains to the sediment basin to divert all surface runoff into it.
- 6.3 No direct discharge of surface runoff from the disturbed area into public drains, rivers or watercourses.

- 6.4 No construction of runoff management and sediment control facilities in rivers or watercourses.
- 6.5 Conduct site clearing at the active working area only.
- 6.6 Conduct extraction activities by phases and avoid activities during rainy days.
- 6.7 Prohibit extraction of earth outside the borrow pit boundary.
- 6.8 Establish slope protection measures as per the earthwork plan and/or slope protection plan approved by the relevant local authorities.
- 6.9 Erect suitable speed limit and safety signs at the borrow pit entrance to notify public road users.
- 6.10 Construct a wash bay / wash through with a silt trap of not less than 1m x 1m x 1.2m (depth) in size (based on Drawing design) at the location shown in the approved EIA/PMM and AEC/MD.
- 6.11 Clean tyres and undercarriage of transportation vehicles at the wash bay / wash through before leaving the borrow pit to avoid formation of bulky deposited dirt and earth on public road surfaces.
- 6.12 Refer to requirements from the Local Authorities for transportation routes and/or JKR for access involving road reserves (application of wayleave).
- 6.13 Obtain consent from private landowners if access through their land is required.
- 6.14 Cover transported earth materials with canvas or tarpaulin sheets.
- 6.15 Avoid off-site transportation activities during peak traffic hours as stated in the AEC/MD.

7 ENVIRONMENTAL CONDITION: CONTROL OF NOISE AND OPERATION TIMES

It is expected that housing and commercial development activities generate high noise levels. Increments of surrounding noise levels due to project activities may cause nuisance and discomfort to the surrounding community. It is therefore crucial for the project proponent to take action to minimise noise generated (to prevent any public conflicts from arising).

- Target**
- Minimise noise generation from development activities.
 - Protect the surrounding community from exposure to high noise levels.
- Standard Operating Procedures**
- 7.1 Refer to the EIA/PMM and AEC/MD for the piling method and/or any other mitigation to be installed or provided to reduce noise pollution.
- 7.2 Conduct development activities within the specified time frame of 8:00 am to 5:00 pm and prohibit activities on Sundays and public holidays.
- 7.3 Carry out maintenance on vehicles and machinery and keep records of such maintenance as evidence for the environmental auditor.
- 7.4 Erect physical noise barriers with height and at locations specified in the AEC/MD. Material commonly used to erect the physical noise barrier are sheet metal panels (zinc hoarding). Other than that, composite panels can also be considered for constructing the noise barrier. Please refer to **Plates 20 and 21** for examples of noise barriers.
- 7.5 When probable, place high noise-emitting machinery at the furthest point from the receptor (Please refer to **Figure 11** for an illustration of noise source allocation within a project site).
- 7.6 Consider installing movable noise barriers when it is anticipated that high noise-emitting machinery such as piling machines are used on-site. Install the movable noise barrier as close as possible to either the noise source or the receiver, with no gaps or openings at the barrier joints to minimise noise disturbance to adjacent land users. Refer to **Plate 22** for an example of a removable noise barrier.

- 7.7 Refer to **Appendix 1** for additional references on controlling noise from sites.



Plate 20: Example of temporary noise barrier using zinc hoarding.



Plate 21: Example of temporary noise barrier using composite panels.

Source: Guidelines for Environmental Noise Limits and Control, Third Edition, 2019 (p. 103), DOE



Plate 22: Example of movable barrier used for mitigating noise from piling.

Source: Guidelines for Environmental Noise Limits and Control, Third Edition, 2019 (p. 104), DOE

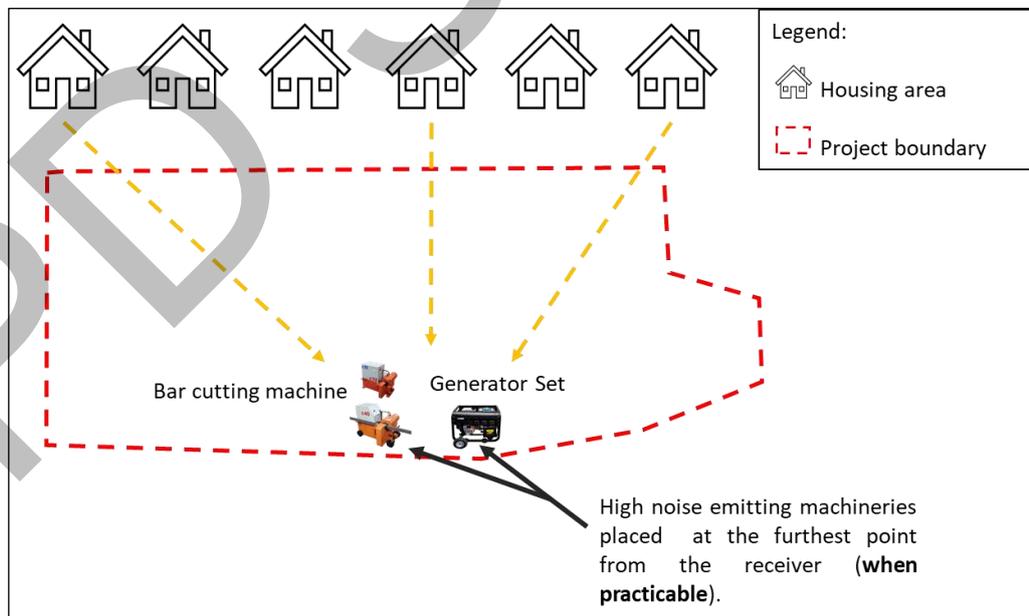


Figure 11: Illustration showing the allocation of the noise source from probable receivers.

8 ENVIRONMENTAL CONDITION: CONTROL OF AIR QUALITY

Construction dust poses a health risk to construction workers as well as the surrounding community as it may potentially lead to pulmonary diseases. A less severe effect of construction dust may cause one's vision to be limited. Nonetheless, proper precautions should be taken to minimise the formation of airborne dust.

Target	<ul style="list-style-type: none">• Hinder open burning on-site.• Minimise generation or release of airborne dust to protect workers and the surrounding community.
Standard Operating Procedures	<ol style="list-style-type: none">8.1 Brief workers on the concept of “open burning” and prohibit open burning activities on-site.8.2 Maintain original vegetation cover at non-working areas instead of clearing the entire site to minimise exposed soil surfaces.8.3 Restrict public access to the site, to limit movement of vehicles within the site thus reducing generation of airborne dust.8.4 Restrict the speed of moving vehicles to the speed limit specified in the approved EIA/MD.8.5 Erect speed limit signages at easily visible locations within the site to remind workers to adhere to speed limits.8.6 Provide water storage and water spraying facilities such as water browser trucks (Refer to Plate 23), handheld hoses, or sprinklers at site.8.7 Conduct water spraying activities on dry and exposed soil. Increase frequency of water spraying during dry and windy weather.8.8 Avoid over-spraying to the extent that sediment-laden water is formed.8.9 Cover all transportation carrying loads with canvas or tarpaulin sheets.

8.10 Always uphold proper road courtesy and safe driving practices.

8.11 Refer to guidelines listed in **Appendix 1** for additional references on controlling dust formation on-site.



Plate 23: Example of water browser facility.



Plate 24: Transportation vehicle carrying load covered with canvas.

9 ENVIRONMENTAL CONDITION: CONTROL OF OIL AND SCHEDULED WASTE

Improper handling or storage of oil materials and scheduled waste may cause pollution to soil and nearby water bodies. In addition, improper management of such materials may also lead to safety hazards. To prevent these unwanted scenarios, the following SOPs should be strictly adhered to.

- Target**
- Proper handling and storage of oil materials and scheduled waste.
 - Prevention of soil and water bodies pollution.
 - Minimisation of hazards at the project site.

Standard 9.1 OIL MATERIAL MANAGEMENT

Operating

Procedures 9.1.1 Store oil and fuel in rigid containers and tanks. Label containers and tanks with information on volume, contents, and safety instructions.

9.1.2 Construct the storage area with the following specifications:

9.1.2.1 Cover the floor of the storage area with concrete or any other suitable lining material, free of cracks and gaps.

9.1.2.2 Construct an impervious dike/bund (secondary containment system) to contain spillages. This should enclose a volume, which is at least 110% of the capacity of the largest container.

9.1.2.3 Provide a roof for the oil storage area to protect the oil material from sun and rain.

9.1.2.4 Provide an oil trap for the storage area.



Figure 12: Illustration of an oil materials storage area.

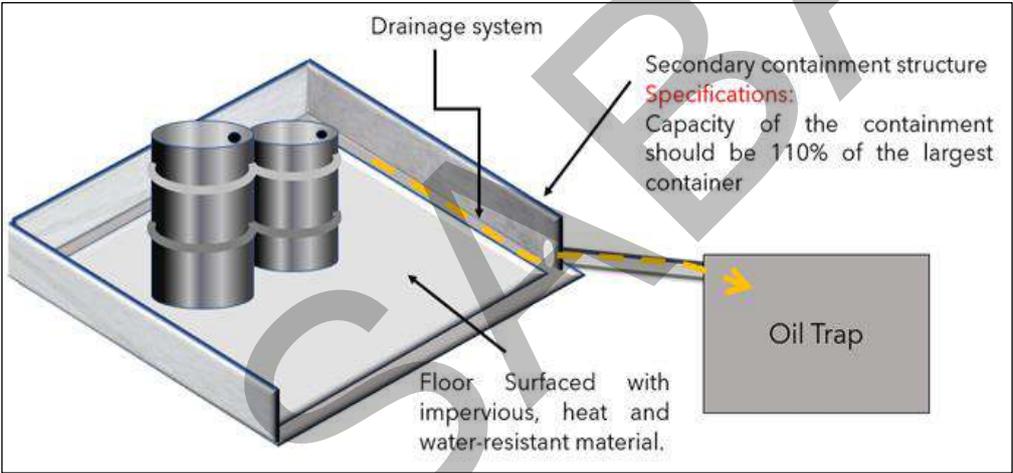


Figure 13: Illustration of a secondary containment structure and its specifications.

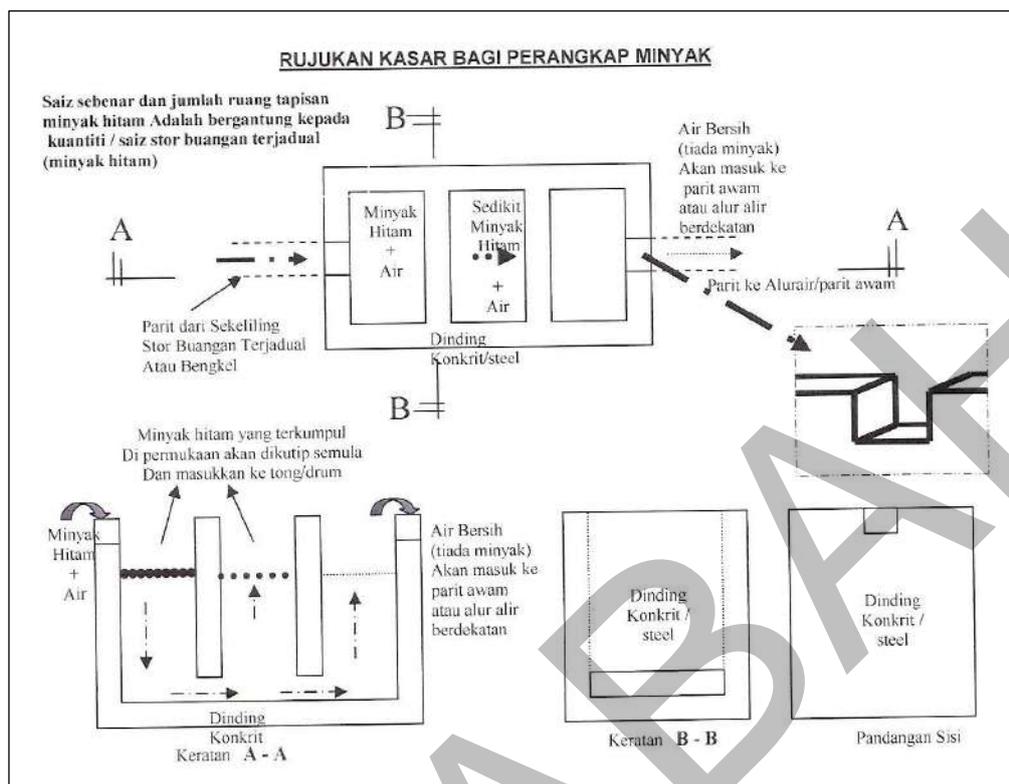


Figure 14: Typical design of an oil trap.

Source: Panduan Pengendalian Buangan Terjadual Mengikut Peraturan – Peraturan Kualiti Alam Sekeliling (Buangan Terjadual), 2005 (p. 19), DOE

- 9.1.3 Conduct maintenance for the dike/bund and oil trap at regular intervals. Maintenance dates must be recorded. Dispose oil and grease confined within the bund or oil trap as scheduled waste.
- 9.1.4 Place mobile and non-permanent oil and fuel containers on firm and dry spill trays.
- 9.1.5 Locate oil and fuel storage at a minimum distance of 50 meters away from any watercourse or water body. Refer to **Figure 15**.
- 9.1.6 Refer to guidelines listed in **Appendix 1** for additional references on managing oil materials on-site.

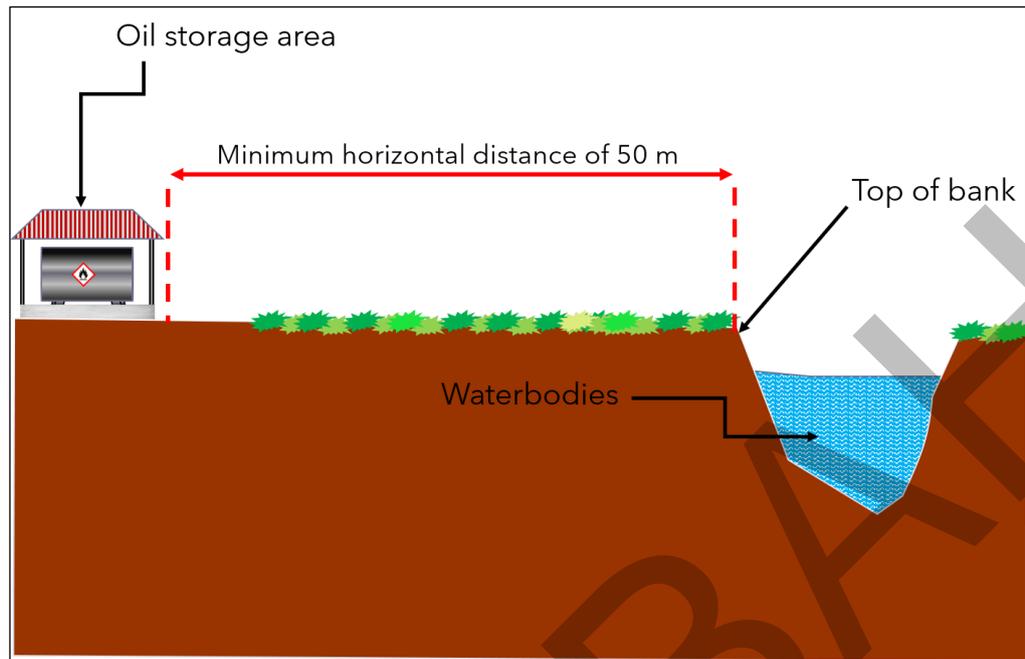


Figure 15: Illustration showing measurement of the horizontal distance between the oil storage area and the top of the bank.

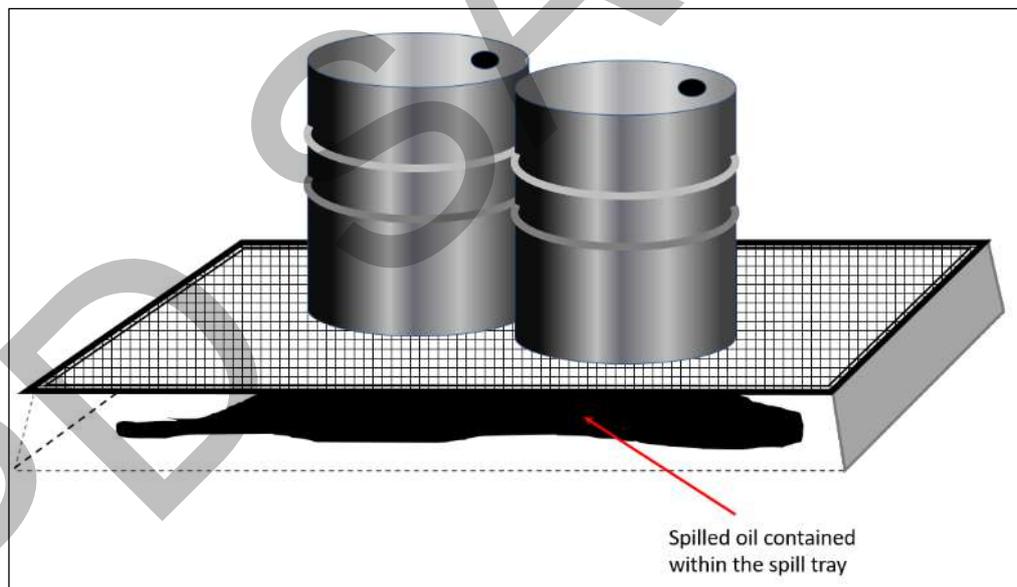


Figure 16: Illustration of a spill tray for non-permanent oil containers.

9.2 SCHEDULED WASTE MANAGEMENT

- 9.2.1 Store all scheduled waste (e.g., spent oil and grease) in containers that are durable and able to prevent spillage or leakage into the environment. Label containers clearly in accordance with the Third Schedule of the Environmental Quality Scheduled Wastes Regulations 2005.
- 9.2.2 Refer to **SOP 9.1.2** for the construction of the storage area.
- 9.2.3 Locate scheduled waste storage areas at least 50 meters away from any watercourse or water body. Refer to **Figure 15**.
- 9.2.4 Prohibit the disposal of scheduled waste in drains, ditches, and/or watercourses.
- 9.2.5 The scheduled waste generated on-site, regardless of its volume or quantity, must be collected by a contractor licensed by the Department of Environment.
- 9.2.6 Submit a written application to the Department of Environment (DOE) for re-using scheduled waste on-site when applicable.
- 9.2.7 Submit volume of scheduled waste generated on-site to DOE via the Electronic Scheduled Waste Information System (eSWIS) on a monthly basis. Refer to the eSWIS Hands-on Guideline from the DOE website for instructions on how to use the system.
- 9.2.8 Clean up spilled scheduled waste material when spotted. When materials are spilled on soil, use a shovel or scoop to transfer the contaminated soil into appropriate containers such as metal drums or polyethylene bags, to be eventually disposed as scheduled waste.
- 9.2.9 Refer to guidelines listed in **Appendix 1** for additional references on managing scheduled waste.

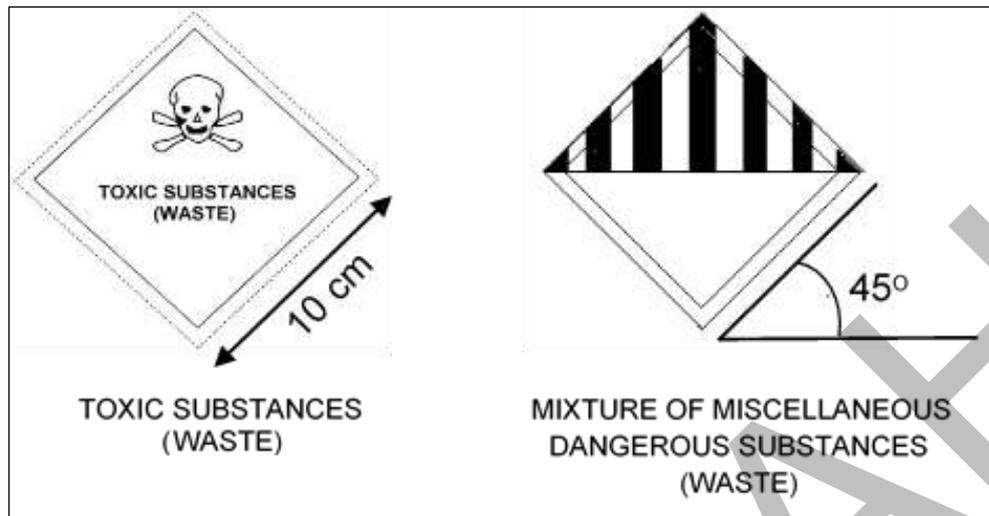


Plate 25: Examples of waste characteristic labels.

Source: Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia, 2014 (p. 16), DOE

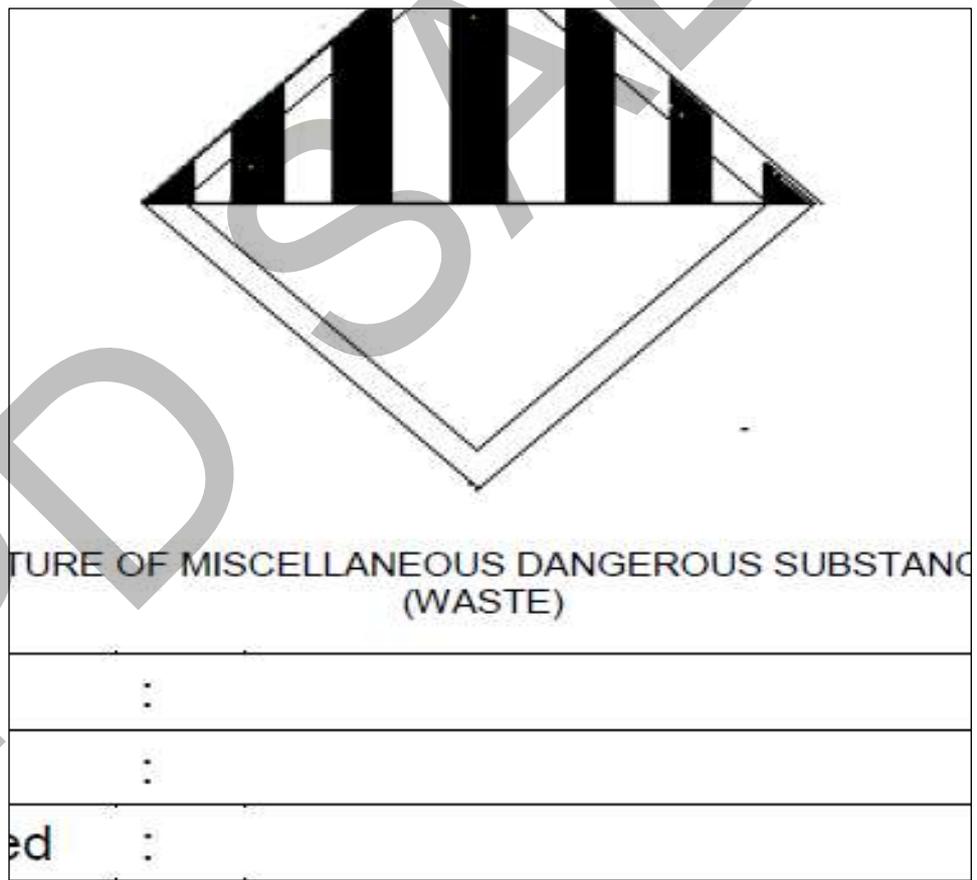


Plate 26: Example of label for scheduled waste containers

Source: Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia, 2014 (p. 17), DOE

10 ENVIRONMENTAL CONDITION: CONTROL OF SOLID WASTE AND BIOMASS

High generation of biomass waste is expected during the site preparation phase. Solid waste consisting of domestic waste and construction debris is generated throughout project development. Improper management of solid and biomass waste causes the project site to look unsightly and may lead to deterioration of water quality if waste or leachate ends up in water bodies. In addition, solid waste and biomass in water bodies affect water flow, which eventually leads to flooding.

Target

- Proper management of solid and biomass waste.
- Ensure good housekeeping within the project site.
- Protect the water quality of nearby water bodies.

Standard 10.1 SOLID WASTE MANAGEMENT

Operating

Procedures

- 10.1.1 Prohibit burning and indiscriminate dumping of solid waste.
- 10.1.2 Continuous awareness and practice of the 3R concept (Reduce, Re-use, and Recycle).
- 10.1.3 After adopting waste minimisation and 3R concepts, manage the remaining bio-degradable waste (organic waste) by composting. Refer to Ministry of Local Government and Housing Sabah for the suitable composting method.
- 10.1.4 Provide adequate waste collection facilities, including facilities for collecting recyclable waste at strategic locations around the site. Label all recycle bins to ensure wastes are collected separately.
- 10.1.5 Ensure all waste collection facilities are covered or sheltered to avoid generation of leachate and hinder wind-blown waste.
- 10.1.6 Provide a centralised waste collection facility on-site. Locate the centralised waste collection facility at an area that can be accessed easily by waste collection / haul truck.

- 10.1.7 Conduct waste collection activities at both the workers' quarters and construction areas in a systematic manner by assigning a person responsible for collecting and transferring all waste to a centralised waste collection facility within the site.
- 10.1.8 Appoint a contractor licensed by Local Authorities to collect waste produced from the project site and disposed of at an approved dumping ground.
- 10.1.9 Conduct regular inspection on workers' quarters and construction areas to maintain good housekeeping practices by workers.
- 10.1.10 Locate all waste collection facilities at a minimum distance of 30 meters from the top of the bank (of the nearest river or watercourse) or distance specified in the AEC / MD.

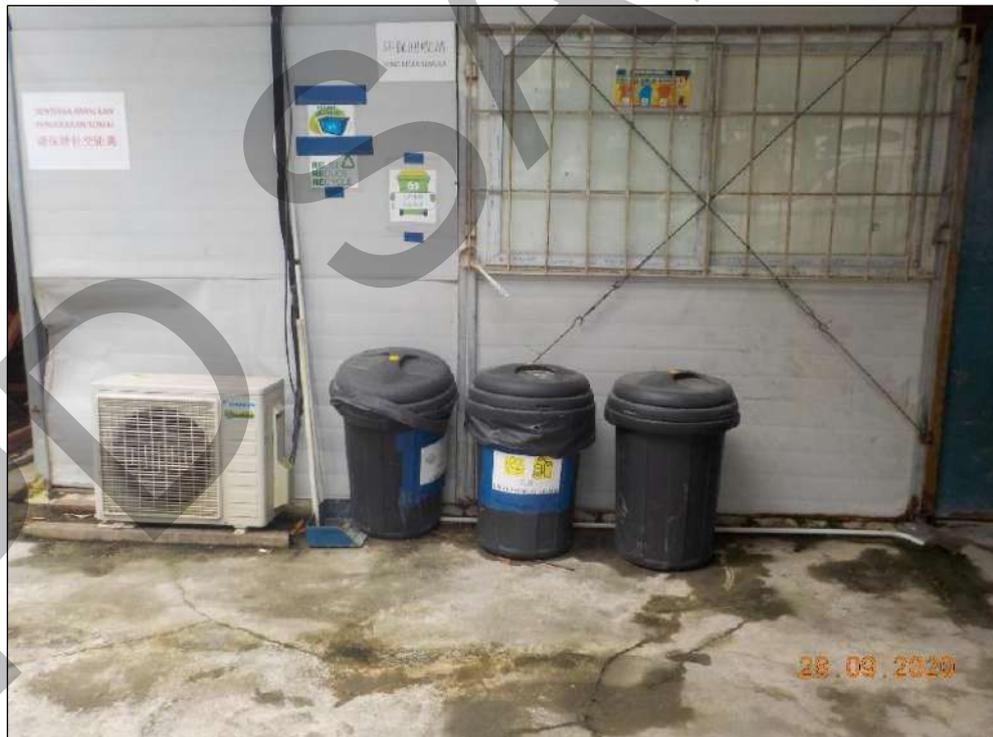


Plate 27: Example of waste bins with lids.



Plate 28: Example of a centralised waste collection facility with roofing.



Plate 29: Example of waste segregation on-site.

10.2 BIOMASS WASTE MANAGEMENT

10.2.1 Prohibit the burning of biomass.

10.2.2 Locate all biomass at a minimum distance of 30 meters from the top of the bank (of the nearest river or watercourse) or distance specified in the AEC / MD. Refer to **Figure 17**.

10.2.3 Appoint a contractor to collect biomass accumulated on-site and dispose biomass at an approved dumping area.

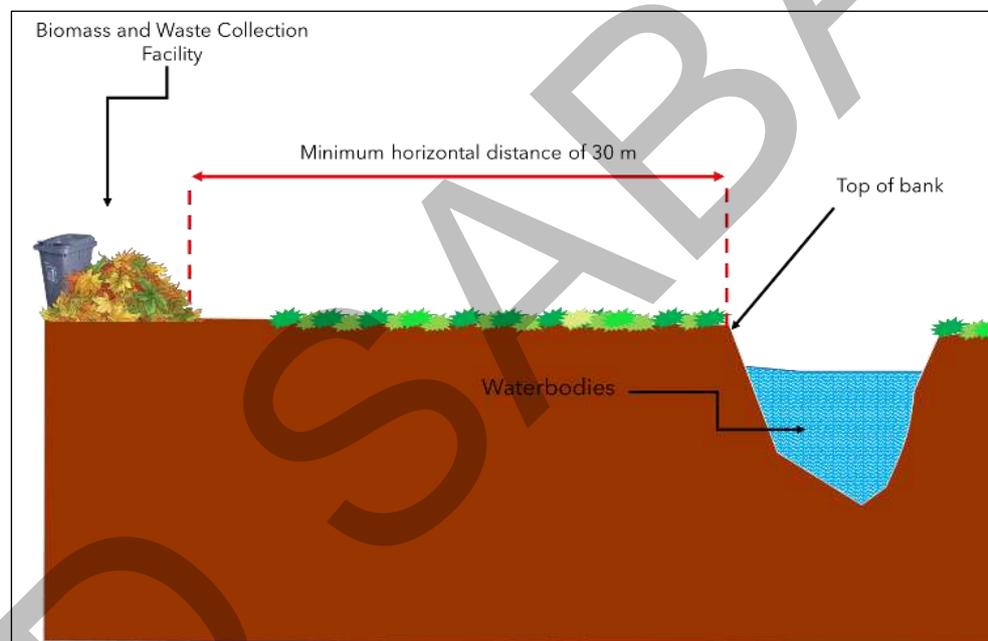


Figure 17: Illustration showing measurement of horizontal distance between the waste collection facility and the top of the bank.



Plate 30: Biomass piled up within the project site.

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11 ENVIRONMENTAL CONDITION: CONTROL OF SEWAGE / LIQUID WASTE

Sewage or liquid waste is expected to be generated from the workers' quarters. Indiscriminate dumping or improper handling of this waste could cause the project site to be aesthetically unpleasant and result in other possible disease-causing vectors.

Target Protect water sources from sewage or liquid waste pollution.

Standard 11.1 Provide toilets with sewage treatment systems such as septic tanks at the site office and workers' quarters.
Operating Procedures

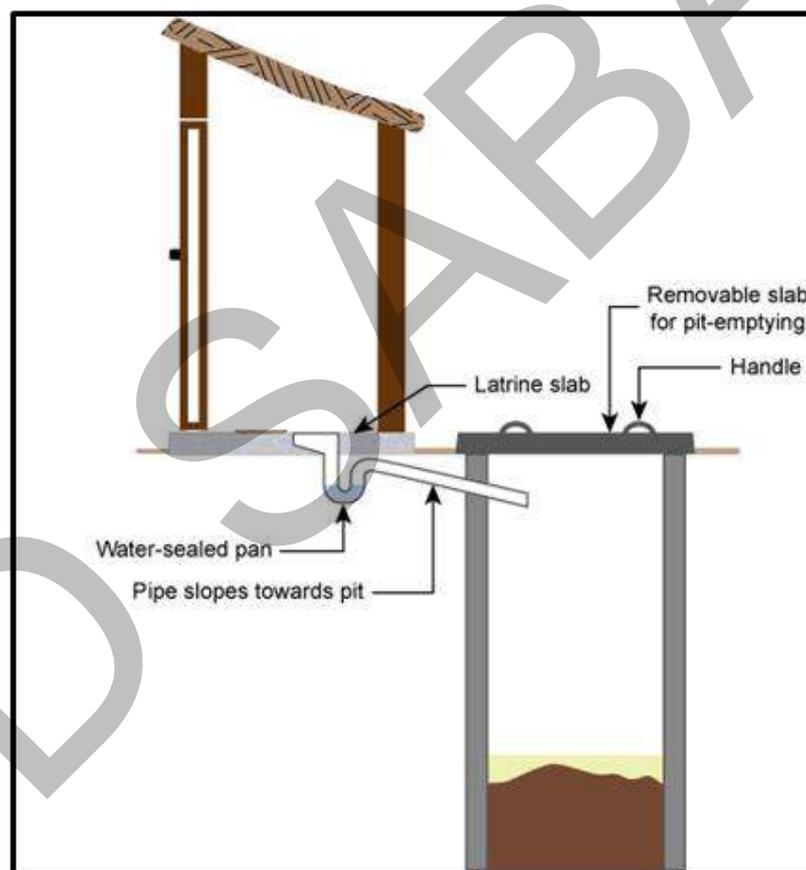


Plate 31: Example of toilet with septic tank.

- 11.2 Use prefabricated septic tanks from polyethylene, glass fibre-reinforced plastic or pre-cast concrete. Get approval on the materials to be used from JPPS and SIRIM/ IKRAM.

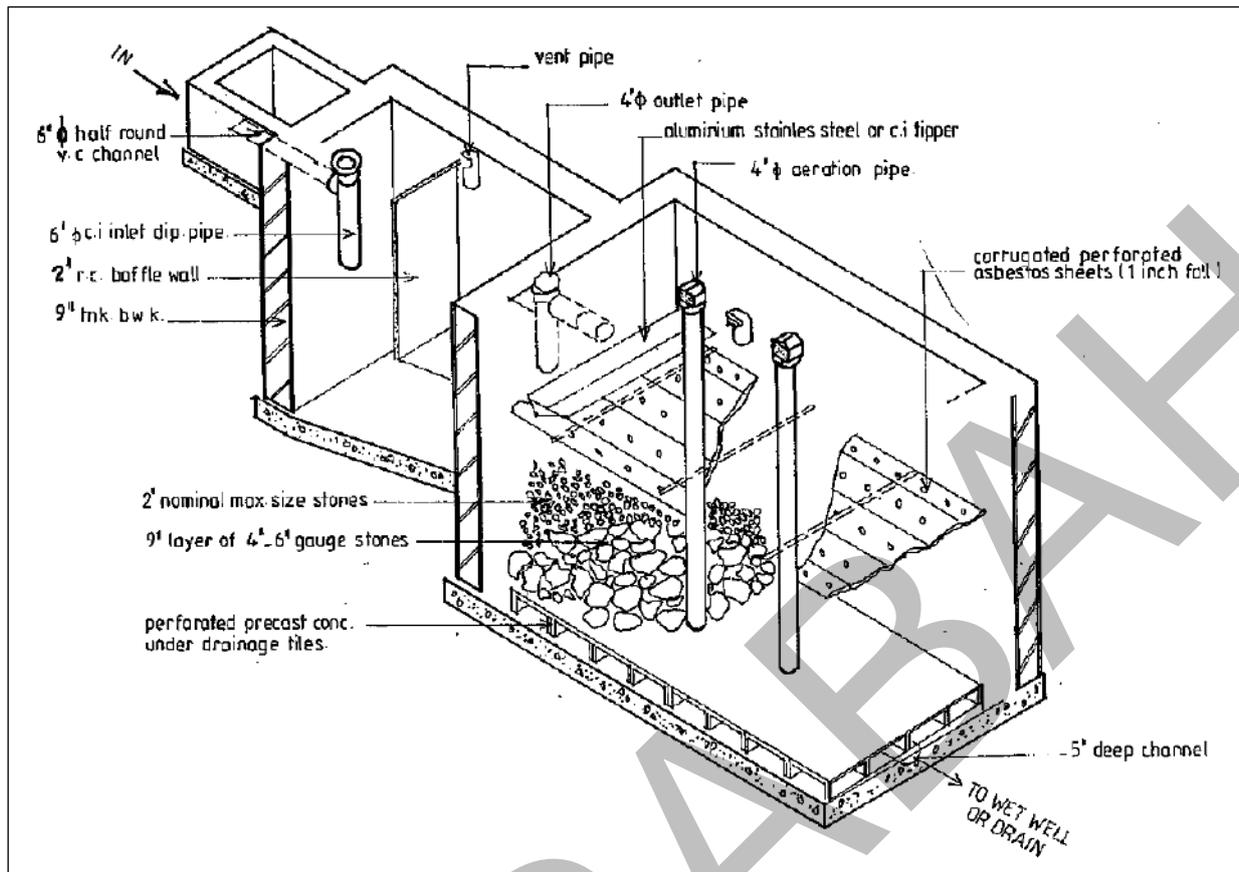


Figure 18: Typical diagram for a Septic Tank.

Source: In Code of Practice for Design and Installation of Sewerage Systems MS 1228, 1991 (p. 76), SIRIM



Plate 32: Typical Prefabricated Septic Tank for < 600 mm depth.

Source: National Water Services Commission Malaysia

- 11.3 Inspect and monitor the sewage treatment system regularly at a minimum of once every six (6) months and keep maintenance/desludging records. De-sludging work must be conducted by an appointed contractor licensed under the Local Authorities. Upon enforcement of the Sewerage Services Enactment 2017, the contractor, who is appointed to carry out the operation, maintenance and desludging of sewage treatment system (septic tank and small sewage treatment system), is required to be licensed by JPPS.



Plate 33: Example of desludging work.

- 11.4 Prohibit direct discharge of untreated sewage into existing waterways or marine waters.
- 11.5 Locate all facilities equipped with treatment systems at a minimum distance of 30 metres away from the top of the bank (of the nearest river or watercourse) or distance specified in the AEC / MD. Refer to **Figure 19**.

11.6 Locate the septic tank at:

11.6.1 Area that allows desludging work to be carried out without posing hazards to building occupants, as well as maintenance and desludging operators.

11.6.2 Area not subjected to heavy vehicles, foundations, or other imposed loadings.

11.6.3 Area away from flood prone area.

11.6.4 Area with access for the desludging vehicle.

11.7 No establishment of toilet facilities or sewage treatment systems allowed within the setback or buffer zone areas stipulated in the AEC. Refer to SOPs for **Environmental Condition: Control of Site Development**.

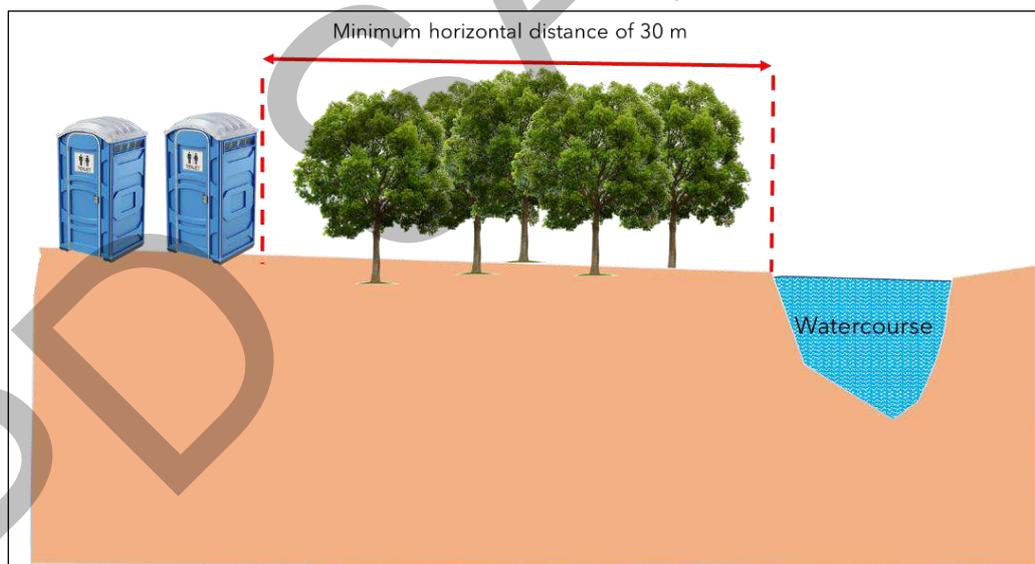


Figure 19: Illustration showing measurement of horizontal distance between toilet facilities and watercourses.

12 ENVIRONMENTAL CONDITION: CONTROL OF TRAFFIC AND TRANSPORTATION

Increased traffic volume is expected during implementation of the Project. The presence of heavy and slow-moving vehicles may obstruct the movement of other vehicles plying the transportation route. One of the principal challenges in traffic control is accommodating traffic in a safe and efficient way. Efficiency can be viewed as a measure of movement levels relative to the objectives for a particular transportation system as well as the finances required for its operation.

Target Conduct traffic and transportation activities in a safe and efficient way.

Standard 12.1 TRAFFIC AND TRANSPORTATION (LAND)

Operating

Procedures 12.1.1 Erect suitable speed limit and safety signs at the project entrance (i.e. development site, overburden dumping ground and borrow pit) to notify public road users.



Plate 34: Examples of speed limit and safety signs.

12.1.2 Strictly obey speed limits and other traffic laws.

12.1.3 Stabilise and pave all entrance/exit roads to the site for a suitable distance from where these access roads join existing paved or public roads.

12.1.4 Construct a wash bay / wash through with a silt trap of not less than 1m x 1m x 1.2m (depth) in size (based on Drawing design) at the

location shown in the approved EIA/AEC. In addition, construct the washing facility with grating / rumble surface and silt trap.



Plate 35: Example of a wash bay.



Plate 36: Example of a washing facility with grating / rumble surface and silt trap (pointed).

Source: Guidelines on Land Disturbing Pollution Prevention and Mitigation Measures, 2017 (Appendix E), DOE

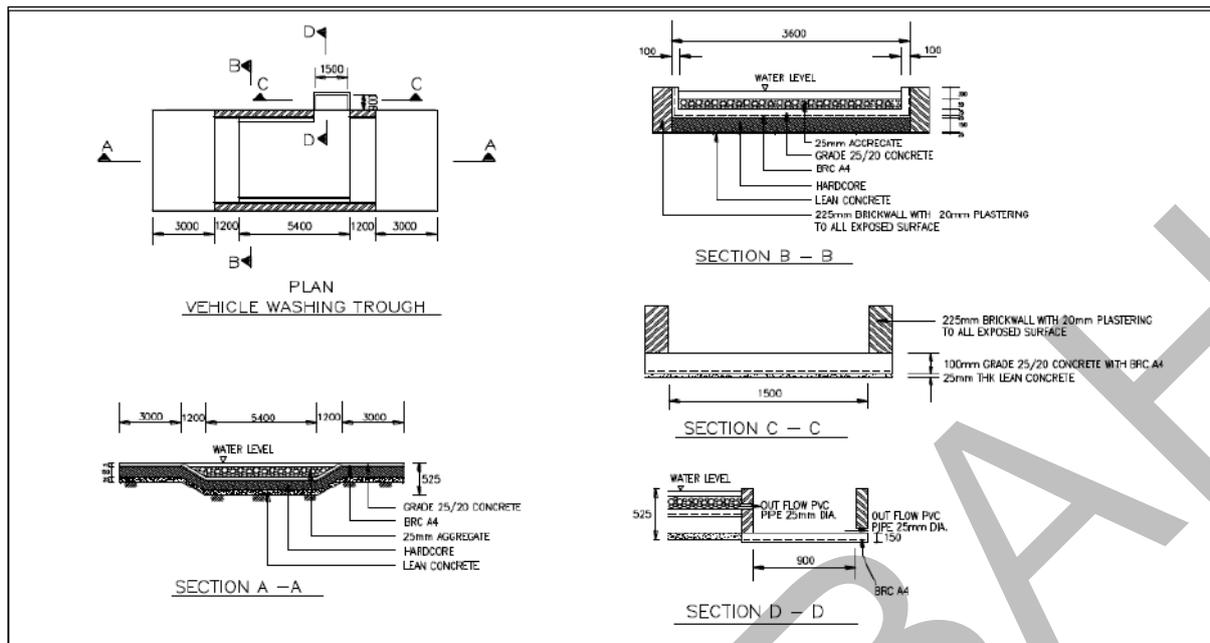


Figure 20: Typical design of a wash through (rural area).

Source: A Practical Guide for Environmental Protection & Enhancement Works, 2008 (p.96),

JKR

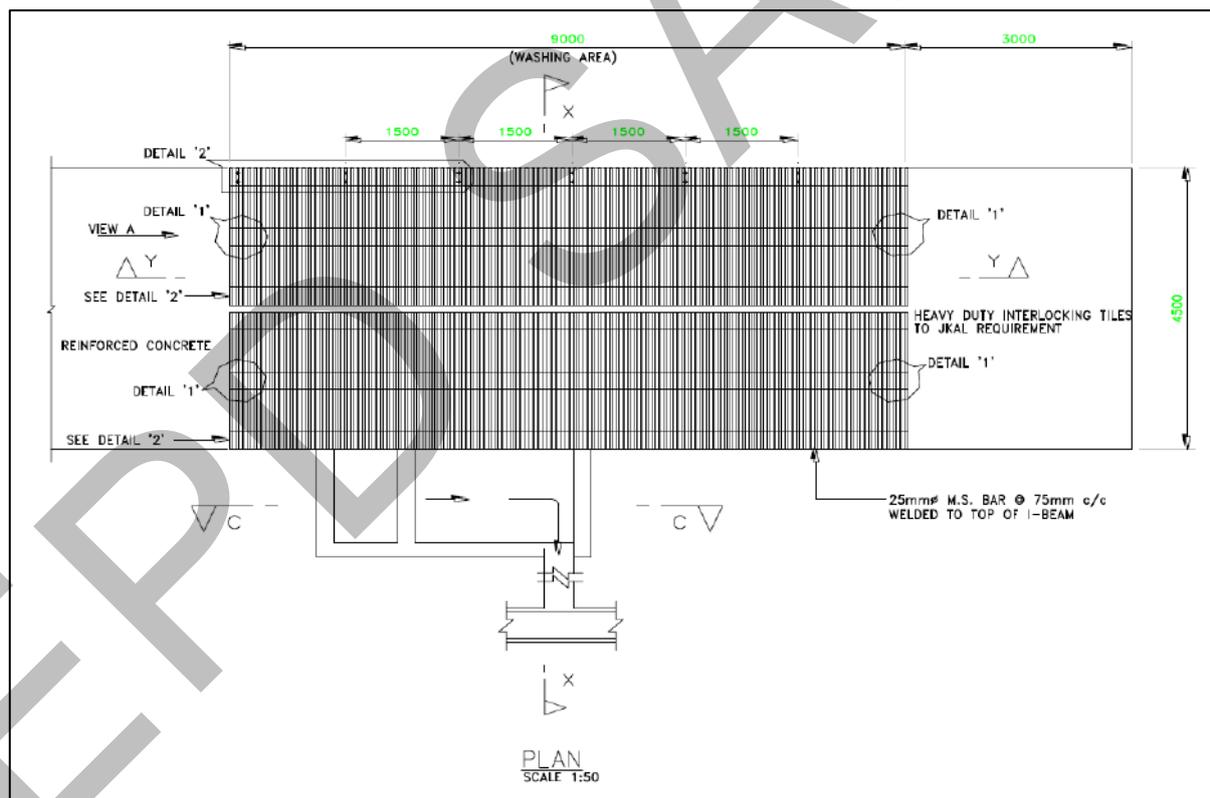


Figure 21: Typical design of a wash through (urban area).

Source: A Practical Guide for Environmental Protection & Enhancement Works, 2008 (p.98),

JKR

- 12.1.5 Conduct periodic maintenance on the silt trap. Prohibit disposal of sediment removed from the silt trap into drainage or watercourses.
- 12.1.6 Refer to requirements from the Local Authorities for transportation routes and/or JKR for access involving road reserves (application of wayleave).
- 12.1.7 Obtain consent from private landowners if access is required across their land.
- 12.1.8 Clean tyres and undercarriage of transportation vehicles at the wash bay / wash through before leaving the project site to avoid formation of bulky deposited dirt and earth on public road surfaces.
- 12.1.9 Remove sediment or mud tracked out on public roads at the end of the same work day by sweeping, shoveling or hosing.
- 12.1.10 Avoid off-site transportation activities during peak traffic hours as stated in the AEC/MD.

12.2 TRAFFIC AND TRANSPORTATION (SEA)

- 12.2.1 Install and use navigation lighting on vessels.
- 12.2.2 Install navigational lights and beacons at the marine working area.
- 12.2.3 Strictly adhere to the MTRA report as approved by JPDS in relation to vessels/boats/barges passage or marine activity.
- 12.2.4 Comply with navigation restrictions for all construction vessels that are enforced by relevant authorities.
- 12.2.5 Refer to JPDS regarding the navigation area and where the ship should be anchored.

13 ENVIRONMENTAL CONDITION: CONTROL OF BLASTING, FLY ROCK AND VIBRATION

When blasting is opted as one of the methods for rock excavation to achieve the desired platform levels of the development, the use of explosives in rock blasting may generate fly rocks and they tend to travel distances causing fatalities and property damage. In addition, ground vibration and airblast from blasting could also pose hazards to both workers and the public.

Target Well-planned blasting work to minimise safety risks to on-site workers and structures as well as neighbouring occupants and building structures.

Standard Operating Procedures 13.1 Blasting operations shall be conducted by a shotfirer, certified and qualified by JMG, and adhere to the Blasting Design Report prepared by a Professional Engineer.

13.2 Before a blast, the blasting contractor shall ensure all roads and approaches to and from the blasting area are guarded or barricaded sufficiently to prevent any persons from entering the area.

13.3 The blasting contractor must ensure that no charge is fired until sufficient audible and visual warning signals are given to all persons in or near an area where the blast may create a hazard.

13.4 Ensure all persons (employee or public) are outside of the danger zone during blasting work.

13.5 Obtain approval for blasting activities from JMG and explosive permits / licenses from PDRM.

13.6 Carry out blasting activities at noon and prohibit blasting on Sundays and public holidays.

13.7 Restrict blasting operations to within the approved project site.

13.8 Prohibit secondary blasting to break down large boulders to avoid fly rocks hazards to the surroundings.

- 13.9 Use wire mesh, tyre (blasting mat), earth piles and wet sand to prevent fly rock.
- 13.10 Strictly practice and adhere to blasting procedures and instructions.
- 13.11 Erect a signboard to inform nearby residents, inhabitants of workers' quarters and villagers about the blasting activity and schedule.
- 13.12 Submit the air blast and vibration monitoring report to JMG.



Plate 37: Examples of signboards to inform the community of blasting activities.

14 ENVIRONMENTAL CONDITION: PHASED DEVELOPMENT

Developments and operations shall be carefully planned. All earthwork and construction activities shall be carried out in stages to minimise environmental impacts.

Uncontrolled or unplanned earthwork and construction activities may result in environmental degradation, which affects not only communities, but also the overall ecosystem.

Target Planned earthwork and construction activities as well as operations, minimise impacts to the environment.

Standard **14.1 PHASED DEVELOPMENT (LAND AND SEA)**

Operating

Procedures

14.1.1 Conduct earthwork and construction activities in phases.

14.1.2 Mark the working zone to show the limit of active areas.

14.1.3 Use construction markers such as hoarding, signs, tapes, barricade, or other marking devices. Refer to **Plate 38** for an example.

14.1.4 Notify the EPD on any changes to the phasing plan / sequence of phasing.



Plate 38: Marking of the working zone using barricades.

15 ENVIRONMENTAL CONDITION: CLOSURE AND ABANDONMENT

Visual and aesthetic values are subjective to individual receptors and relative to its surrounding landscape. In general, the abandoned area would likely cause unpleasant views against the local landscape. Revegetation and site rehabilitation closest to its original conditions shall be carried out on the abandoned land in the event of possible project abandonment. Any temporarily erected structures shall be dismantled and removed, including machineries, materials, and waste from the project site.

Target Infrastructure and equipment in a closed, abandoned or completed (construction) work area pose no significant impact on the environment and public health.

- Standard Operating Procedures**
- 15.1 Remove all structures or part of structures, which are not degradable and pose environmental risks. This includes septic tanks that need to be emptied by appointed contractors or suppliers.
 - 15.2 Remove all machinery, vehicles and parts used during housing development and commercial construction.
 - 15.3 Extract and clean or dispose of by legal means, all soil that is contaminated by oil, hazardous substances, or scheduled waste. Refer to **SOP 9.2.8**.
 - 15.4 Clear all debris originating from construction activities that may block watercourses.
 - 15.5 Unclog all drainage that may cause water ponding.
 - 15.6 Rehabilitate all exposed areas or cut slopes, which may cause further erosion or landslides, by re-vegetating these areas with cover crops.
 - 15.7 Submit a notification of closure or abandonment of housing and commercial development to the EPD.

- 15.8 Prepare an Environmental Compliance Audit and Monitoring Closing report to the EPD no later than one calendar month after the date of closure or abandonment, indicating how unused infrastructures and exposed sites have been rehabilitated.

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16 COMPLIANCE AND IMPACT MONITORING

Compliance Monitoring

This guideline provides instructions on how to comply with requirements for environmental conditions as agreed with the EPD in the AEC/MD. It is a requirement that compliance to AEC/MD is monitored regularly. A monitoring system has therefore been formulated by the EPD where the project proponent is required to submit an ECR to the EPD at a fixed frequency specified in the AEC/MD. The ECR must be prepared by an appointed environmental consultant. The usual issues to be monitored are included in this handbook while some issues may not be part of the standard monitoring and reporting routine. This, however, does not waive the project proponent's duty to comply. Compliance to environmental conditions as agreed in the AEC/MD shall be audited by the appointed environmental consultant. During audits, the compliance status for each environmental condition shall be stated based on observations made during field visits with representatives from the project proponent, specifically the EO.

Compliance monitoring results submitted to the EPD through ECR shall be used as a performance level indicator for the project proponent and shall be entered into the EPD's database. The database shall also provide government planners with a better understanding of environmental issues surrounding the housing and commercial development sector.

Impact Monitoring

Requirements for impact monitoring i.e., water, air and noise quality, shall be included in the AEC/MD. The AEC/MD will specify several specific monitoring locations and parameters. Sampling of parameters for analysis (for example, water quality) must be conducted by an appointed environmental consultant and analyses must be conducted by an accredited laboratory.

Sampling results shall be used as an indicator of whether mitigation measures implemented by the project proponent are sufficient to control environmental impacts arising from project development. Additional requirements for environmental management may be imposed if impacts are found to exceed related standard limits.

17 PROJECT PROPONENTS' (PPs) RESPONSIBILITIES

Below are the responsibilities of the PPs.

- i. Implement all mitigation and control measures listed in the AEC/MD by referring to these SOPs and the EIA/MD.
- ii. Include the AEC/MD in all contractual agreements made with respect to activities of the project and ensure compliance and implementation by all contractors, agents or individuals appointed or instructed to carry out activities of the project.
- iii. Display copies of AEC/MD at the Operations Office in prominent places.
- iv. Install a signboard containing information on the developer's name, reference to the approval letter of the EIA/PMM Report and date of approval of the EIA/PMM Report, at the project entrance.
- v. In cases where some of the environmental conditions in the AEC/MD are unable to be complied with due to site conditions, changes in work sequences, Project components / concepts, size of the Project area and location as well as mitigation measures that have been agreed in the AEC/MD, inform the EPD and request for written permission through the environmental consultant.

It is PPs' responsibilities to obtain approval or fulfill the requirements from the other relevant government agencies. Among the requirements that might or shall be imposed are:

- i. Dilapidation survey requirement by local authorities.
- ii. Written notification requirement by DOE for genset (temporary or permanent) and Air Pollution Control System (*Alat Kawalan pencemaran Udara (SKPU)*) if a batching plant is constructed within the Project site.

18 GLOSSARY

Biomass Waste: The vegetative waste after harvest, de-barking and in particular, land clearing.

Boundary Marker: A physical marker used to indicate the boundary of an area.

Earth Material Stockpiles: A large accumulation of soil placed within the project site, originating either from the borrow pit area or excavated from the project site to be used for earth filling works.

eSWIS: An online portal, which allows users to file scheduled waste consignments and inventory details, review submitted consignment notes for transfer and receiving in an efficient and secure environment.

Oil Trap: A device or structure designed to intercept most oil, greases, and solids before they enter a wastewater disposal system or is discharged into the environment.

Pollution: Any direct or indirect alteration of the physical, thermal, chemical, or biological properties of any part of the environment by discharging, emitting, or depositing wastes so as to affect any beneficial use adversely, and to cause a condition that is hazardous or potentially hazardous to public health, safety or welfare, or to animals, birds, fish or aquatic life, or to plants.

Physical Noise Barrier: A structure installed or erected to attenuate (reduce) sound propagation.

Runoff Management and Sediment Control Facilities: Structures constructed to control the transport of sediment by runoff from disturbed areas into nearby watercourses.

Wash Bay: A wash station typically constructed at the project site entrance to clean vehicle tyres.

Workers' Quarters: A semi-permanent accommodation for project site workers.

Secondary Containment System: A structure to contain spill or leaks from oil containers (e.g., diesel tank and oil drum), often called bunds or dikes.

Scheduled Waste: Any waste falling within the categories of waste listed in the First Schedule of the Environmental Quality (Scheduled Wastes) Regulations 2005.

Sedimentation Pond: A settling hole or basin that prevents water-borne soil from entering a pond or drainage system.

Sewage: Any liquid waste or wastewater discharge containing human, animal, domestic or putrescible matter in suspension or solution, and includes liquids containing chemicals in solution, either in raw, treated or partially-treated form.

Sewage Treatment System: Any facility designed and constructed for the purpose of reducing the potential of sewage causing pollution.

Silt Trap: A small temporary ponding area, usually with a gravel outlet, formed by excavation and construction of an earthen embankment. The purpose of the trap is to detain runoff from disturbed areas for a long enough period to allow a majority of coarser suspended soil particles in the runoff to settle out.

Solid Waste: Unwanted solid by-products of an operation, which needs to be disposed of by an appointed contractor.

Watercourse: Includes rivers, streams and waterways of any size, width or capacity. The term does not include man-made drains or ponds.

19 REFERENCES

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20 APPENDIX 1

List of additional references

Environmental Condition	List of Guidelines / Regulations
Control of Surface Runoff and Water Quality Pollution	a) Malaysian Standard MS2526-12:2014 Urban Stormwater Management Part Twelve (12).
Control of Noise and Operation Times	b) Guidelines for Environmental Noise Limits and Control, 2019” by DOE.
Control of Air Quality	a) Guidelines for Working at Noisy and Dusty Areas in Construction Site, 2010” by Construction Industry Development Board Malaysia (CIDB). The relevant sections from the guideline for controlling dust formation are covered in Chapter 5.0 and Annex I .
Control of Oil and Scheduled Waste	a) Guidelines on Storage of Hazardous Chemicals: A Guide for Safe Warehousing of Packaged and Hazardous Chemicals, 2005” by DOSH Malaysia. b) Environmental Quality (Scheduled Wastes) Regulations 2005, by DOE. c) Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia, 2014 by DOE.

21 APPENDIX 2

(A) Slope Rehabilitation and Stability Monitoring Plan

The contents of the plan are:

- a) Topographical description
- b) Geological
- c) Cross section
- d) Layout plan
- e) Method
- f) Design
- g) **Slope stability analysis** (from present to final)
 - a. Rock slope – conduct slope stabilisation analysis using method of kinematic analysis and rock mass classification.
 - b. Soil slope - conduct slope stabilisation analysis using method of soil mechanics (factor of safety).
- h) **Slope monitoring** – identify types of hazard / slope instability.
- i) **Slope rehab plan** (if any hazard(s) identified) – methods to stabilize slope (usually not included in geological report).

(B) List of Reference in Preparing the Slope Rehabilitation and Stability Monitoring Plan

- a) *Garis panduan Pembangunan dan Pengurusan di Kawasan Bencana Gempa Bumi* by PLAN Malaysia.
- b) *Planning Guidelines for Development at Earthquake Hazard Area* by Department of Town and Regional Planning, Sabah.