



CONSULTING EARTH SCIENTISTS

HAZARDOUS MATERIAL MANAGEMENT PLAN FOR THE EXCAVATION & RELOCATION OF MATERIAL FROM THE FILL MOUND

MANGROVE MOUNTAIN LANDFILL,
HALLARDS ROAD, CENTRAL MANGROVE, NSW.

PREPARED FOR VERDE TERRA PTY LTD
CES DOCUMENT REFERENCED: CES110703-VDT-FG

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Date: 16 June 2015

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Revision Register

Revision Number	Revision Date	Description
1	22/07/2015	Initial Issue to Client
BP	19/08/2015	For submission to EPA
BP Rev B	26/08/2015	Following review by Hunt & Hunt
FG	16/06/2016	Updated document references

The revision register tracks changes to the document.

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**HAZARDOUS MATERIAL MANAGEMENT PLAN
FOR THE EXCAVATION & RELOCATION OF
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1. INTRODUCTION AND PURPOSE

Verde Terra Pty Ltd (Verde Terra) has engaged Consulting Earth Scientists Pty Ltd (CES) to prepare this Hazardous Materials Management Plan (HMMP) that provides the environmental, work health and safety (WHS) and hazardous material management measures and procedures to be implemented during the removal of the upper layers of existing waste from the fill mound on Area B^{Note 1} of the site and subsequent relocation to landfill Cell W^{Note 2}.

This HMMP forms a sub-plan under the Landfill Environmental Management Plan 2014 (LEMP 2014). The objective of this HMMP is to provide controls measures to be implemented during the waste excavation and relocation works in a manner which minimises potential impact to the environment.

Note 1: Refer to Figure C of the Landfill Environmental Management Plan (LEMP 2014).

Note 2: Refer to Figure D of the Landfill Environmental Management Plan (LEMP 2014).

2. HAZARDOUS MATERIAL MANAGEMENT PLAN

2.1. EXCAVATION AND COMPACTION PROCEDURE

In accordance with the Consent Orders and LEMP 2014, the existing fill mound at the site is to be reduced in height by six metres with the volume of waste exhumed to be sufficient to reduce the height of the final landform to 341.4mAHD. The excavated waste is to be relocated into the new landfill Cell W.

The overriding principle with regard the waste excavation and relocation is to keep to the minimum practicable amount of waste exposed and to cover both the exhumed and newly exposed material as soon as practicable and in a timely manner. The works will be carefully managed and controlled in a progressive, logical and staged manner.

2.2. ENVIRONMENTAL CONTROLS

By adopting the following environmental controls, the exhumation and relocation of landfill waste will be completed in a responsible manner.

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2.2.1. Excavation Extent

The main environmental control will be to restrict excavation works to the minimum practicable extent of waste exposed at any one time which is approximately 50 metres (m) wide by 75 m long. The work will be completed in a timely manner and any exposed waste appropriately covered as described below.

2.2.2. Waste Cover

Appropriate covering of waste will allow surface water control, reduce leachate production, reduce landfill gas emissions, control site odour, reduce insect and rodent attraction and control dust and litter generation. Cover material used shall be as is currently approved and used for landfilling activities.

- Daily cover is to be applied to a minimum depth of 15cm to waste deposited in the landfill cell, prior to ceasing operations at the end of each day; and
- Intermediate cover will be applied to any stockpiles or surfaces potentially exposed for more than 90 days. Intermediate cover will be applied to a minimum 30cm depth.

2.2.3. Surface Water Management

Surface water will be managed in accordance with EPA Benchmark Technique (EPA, 1996). Within the area of exhumation works, attempts to minimise the amount of surface water entering the works area will be made to ensure that surface water does not come into contact with leachate or waste. This will include construction of earth bunds and / or the use of surface water control measures such as sedimentation fences, straw, bales etc.

These control measures will be constructed around the perimeter of the exhumation works area to prevent surface water entering the excavation and coming into contact with waste, leachate or from entering any open excavations. All surface water that comes into contact with waste leachate will be treated in the same manner as leachate.

2.2.4. Leachate Management

Leachate will be controlled and managed using the existing leachate management infrastructure at the site, that is to say, transferred (pumped) to the lined areas of Cell W or transferred directly to the leachate holding pond. Significant volumes of leachate are not anticipated within the extent requiring exhumation, however, if leachate is encountered such as perched leachate or as pockets of leachate within the waste, it will be retained and controlled within the exhumation area.

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2.2.5. Landfill Gas Management

Surface gas monitoring will be undertaken at the site of the exhumation works and deposition areas on a daily basis and prior to the commencement of work after breaks of longer than an hour. This will include monitoring for methane, oxygen, carbon monoxide, carbon dioxide, sulphur dioxide and hydrogen sulphide. Monitoring for Volatile Organic Compounds (VOCs) will be carried out using a photoionisation detector (PID).

In addition to the above, all personnel undertaking the works or entering the work areas will be required at all times to wear a personal gas monitor to check for the presence of hazardous levels of noxious gases.

If hazardous gas concentrations are detected, the exhumation works area will immediately have daily cover applied to the exposed waste and the works area will be evacuated. In the event that consistently elevated hazardous gas levels are monitored, the exhumation and relocation works shall be suspended and a detailed, site-specific landfill gas management plan will be prepared prior to recommencement of the exhumation and relocation works.

2.2.6. Odour Control

Odour will be controlled in accordance with the Odour Management Plan (refer to CES Document Referenced: CES110703-VDT-FF), a summary of the management principles prescribed in the Odour Management Plan is as follows:

- Exposed waste to be restricted at any one time to the minimum practicable during the exhumation works;
- As much waste as practicable to be sorted, screened, placed and compacted inside the confines of the excavation and excavated material to be sorted, screened, placed and compacted in a timely manner;
- Adequate daily cover to be applied to exposed waste;
- Assignment of responsible person to maintain Daily Odour Diary, this will record any malodours detected as the site boundary and any complaints about malodours from neighbours or members of the general public. Should excessive malodours be detected at the site boundary or complaints received from neighbours, the exhumation and relocation works shall be suspended until the malodour dissipates and / or further odour control measures implemented such as:-

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- Application of commercially available odour control and odour suppressant products such as Zeolite and / or odour suppressing foams.

2.2.7. Site Security, Restricted Access and Signage

Access to the landfill is restricted by means of a perimeter fence and locked gates outside operating hours. Any repairs required to the boundary fence will be undertaken prior to the commencement of exhumation and relocation works.

Warning signs will be posted to notify persons not to enter the section of the site affected by the exhumation and relocation works. Contact information regarding site security including the details of the responsible person for the works will be displayed on all access gates.

During the exhumation and relocation works, the site will be designated a construction area. Consequently, access to the exhumation area will be restricted to authorised staff and persons undertaking the exhumation works and who are equipped with appropriate personal protective equipment (PPE).

Access to the site of the exhumation works area will be controlled by the site supervisor and all visitors will report to the site supervisor prior to entering the area of the excavation and exhumation works. All personnel undertaking the exhumation and relocation works will be required to undertake work specific safety induction.

2.2.8. Noise Control

Noise will be restricted to acceptable levels. All plant and machinery will be fitted with mufflers to reduce noise. All machinery is to be operated in a manner that minimises noise emissions. Work shall comply with the NSW EPA (1994) *Environmental Noise Control Manual* for the control of construction site noise which must not exceed:

- An LA₁₀ (15 minute) noise emission criterion of 55 dB(A) (7am to 6pm) Monday to Friday and 7am to 1pm Saturday, and
- An LA₁₀ (15 minute) noise emission criterion of 45 dB(A) during the evening (6pm to 10pm) Monday to Friday, and
- At all other times, an LA₁₀ (15 minutes) noise emission criterion of 40 dB(A), except as expressly provided by the Environmental Protection License licence.

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2.2.9. Working Hours

The waste exhumation and relocation works will be restricted to:

- Mondays to Fridays: 7.00am to 5.00pm,
- Saturdays: 8.00am to 12.00pm.
- No work will be undertaken on Sundays or Public Holidays.

2.2.10. Dust Controls

The landfill has existing controls in place for monitoring and managing dust. These controls will be applicable to the exhumation and relocation works. In addition, an additional depositional dust monitoring gauge will be installed at the exhumation works area. The location of this depositional dust gauge which will be agreed by the Environmental Consultant.

Should the dust monitoring results indicate that the insoluble solid dust deposition rate at any of the dust gauges is greater than $4 \text{ g m}^{-2} \text{ month}^{-1}$, additional dust suppression measures will be implemented. Notwithstanding this, the following procedures will be followed to manage and reduce the potential for dust generation;

- Dry materials will be kept damp (not wet) during excavation, sorting, screening, and placement;
- Excavation works shall be restricted to the minimum practicable extent at any one time;
- Placement of visual screening material, such as hessian on perimeter fences surrounding the exhumation area;
- Adequate daily cover or geofabric material to be applied to act as a dust suppressant; and
- Where visual inspection indicates that dust levels may be unacceptable, cease work until measures are taken to reduce dust emissions or until weather conditions improve.

2.2.11. Litter Control

The landfill has existing controls in place for managing litter, including applying daily cover to waste material. These procedures are based on Benchmark Technique 31 of the EPA Guidelines and include the following:

- Continuous compaction;
- Provision of litter fences; and
- Retrieving windblown litters that leave the site.

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These controls will be applicable to the exhumation and relocation works.

2.2.12. Environmental Monitoring

Monitoring of dust, surface gas, subsurface gas, leachate and groundwater will be carried out in accordance with the current monitoring requirements for the site and as described above.

The purpose of the environmental monitoring is to ensure that there are no adverse impacts on the surrounding environment attributable to the exhumation and relocation works. Should the monitoring results indicate significant or unexpected changes to the quality of landfill gas, leachate or groundwater, the cause shall be investigated and mitigation measures proposed.

2.3. POTENTIAL HAZARDOUS MATERIALS

Potential hazardous materials that may be encountered during the exhumation of waste typically include:

- Heavy metals.
- Organic compounds such as Polycyclic Aromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPHs), Organochlorine Pesticides (OCPs); Polychlorinated Biphenyls PCBs) and Volatile Organic Compounds (VOCs).
- Asbestos and Asbestos Containing Materials (ACM).
- Synthetic mineral fibres.
- Crystalline silica dust (potentially released during disturbance of silica-containing products such as concrete and masonry).
- Contaminated soil.
- Dusts or aerosols containing contaminants.
- Chemicals such as herbicides, pesticides, fibre-reinforcing resins, glues, paints (including lead based paints), polymers and inks.
- Leachate; and
- Noxious gases.

If these materials are present on site, the following potential risks to personnel on the site include:

- Ingestion of hazardous material;
- Dermal contact (skin) contact with hazardous materials;

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- Skin, eye and upper respiratory tract irritation;
- Inhalation of dust, gas or aerosols containing contaminants. Including exposure to asbestos containing substances;
- Asphyxiation;
- Anaphylaxis; and
- Burns due to ignition of flammable gases and / or materials.

To mitigate against the above described potential hazards, the following safe work site practices shall be implemented. All activities undertaken in the exhumation and relocation works area should be appropriately considered by Verde Terra under the Safety Management System for the site and appropriate safe work method statements should be prepared for activities associated with the exhumation and relocation works.

2.3.1. Potential Hazards and Suspicious Materials

Staff undertaking the exhumation and relocation works will be specifically trained to identify hazards and a strong culture of awareness and risk management will be fostered and enforced.

All personnel undertaking the exhumation works will be formally trained in asbestos identification and removal of both friable and bonded asbestos. The site foreman overseeing the works will also possess the qualifications of a Friable and Bonded Asbestos Nominated Supervisor. All asbestos or asbestos containing material (ACM), if any, will be handled and replaced within the landfill using appropriate procedures.

2.3.2. Personal Protective Equipment

The following PPE shall be worn by the personnel when undertaking the exhumation and relocation works:

- Hardhat (with detachable sun visor);
- Ear defenders (compliant with Australian Standard AS 1269);
- Safety glasses;
- Heavy duty leather gloves to be worn over latex or nitrile disposal gloves;
- Metal toe capped boots with metal protected soles;
- Long pants, long sleeve shirts and disposable overalls;
- High visibility rain jacket and vest;

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- Personal gas monitors;
- Respirators (compliant with Australian Standard AS 1716) with appropriate air filters for particulates, gas and vapours; and
- Sun cream (minimum SF 30+).

In addition to the above, the following will be readily available at the site of the exhumation and relocation works:

- First aid kit;
- Eye wash; and
- Antiseptic hand wash tissues and lotion.

2.3.3. Decontamination

A Decontamination Unit (Decon Unit) will be provided at the site of the exhumation and relocation works. Personnel who have come into direct contact with exhumed waste will be required to pass through the Decon Unit when leaving the works area.

The Decon Unit shall be self-contained with regards to electricity and hot and cold potable water and shall have separate Dirty Room, Shower Area and Clean Room. The Decon Unit shall be configured so that personnel enter the dirty room from the exhumation works area and exit via the clean room following decontamination and disposal of dirty and contaminated materials and clothing.

The dirty room shall be equipped with a negative pressure air extraction and filtration system (AEFS). The AEFS should comprise a two-stage filtration system consisting of a primary filter that removes non-asbestos contaminants and a secondary high-efficiency particulate air (HEPA) filter to remove airborne contaminants (including asbestos), down to a minimum particle size of 0.3 microns. The AEFS should operate such that airflow is drawn from the clean room end to the dirty room end of the Decon Unit and out through the AEFS.

2.3.4. Personal Hygiene

Strict personal hygiene protocols shall be adhered to at the site. No eating, drinking or smoking shall be permitted in the exhumation and relocation areas.

A designated clean area outside of the exhumation and relocation areas will be established for the consumption of food and drink. These areas should be equipped with hand washing facilities

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which must be used prior to engaging in these activities. Personnel will be made aware of the location of these facilities.

2.3.5. Emergency Response Plan

An Emergency Response Plan (ERP) shall be prepared prior to the commencement of the exhumation and relocation works. This shall detail procedures to be followed in an emergency and provide the location and contact details of the nearest hospital, council offices and utility service providers.

The ERP shall also detail the responsibilities of site personnel and provide contact names and numbers for nominated personnel. The name and contract details of the responsible personnel will also be displayed on the site access gates during the works.

All personnel undertaking the works shall have formal first aid training.

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