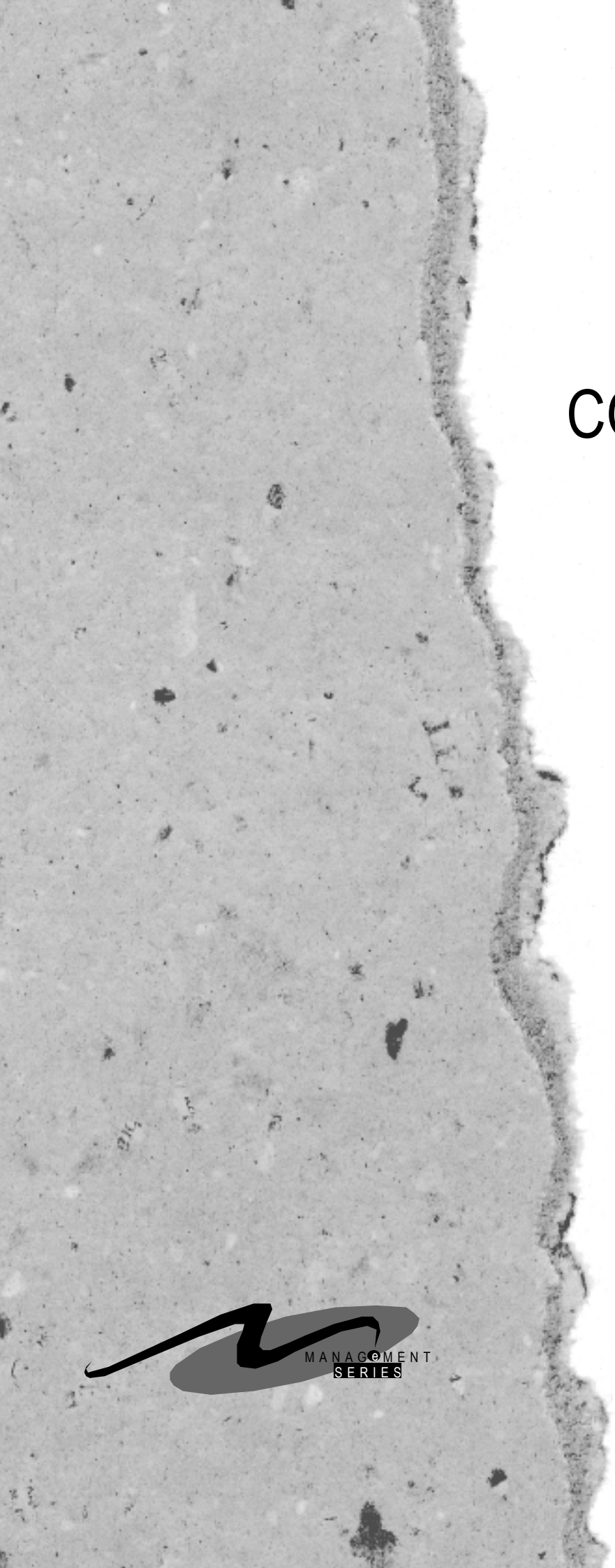


POTENTIALLY CONTAMINATING ACTIVITIES, INDUSTRIES, AND LANDUSES

MANAGEMENT SERIES

Contaminated Sites Management Series

POTENTIALLY CONTAMINATING ACTIVITIES, INDUSTRIES AND LANDUSES

October 2004

Department of Environment
Government of Western Australia

PREFACE

The *Potentially Contaminating Activities, Industries and Landuses* guideline has been prepared by the Department of Environment (DoE) to help local government authorities, planners, consultants, industry and the general public to identify potential contaminants associated with specific activities/industries, as part of the assessment of contaminated land and groundwater in Western Australia.

Enquiries may be directed to the Department of Environment:

Contaminated Sites Section
Environmental Management Division
Department of Environment
PO Box K822
Perth WA 6842
Telephone: (08) 9222 7000
Facsimile: (08) 9322 1598

Comments via email should be sent to:
contaminatedsites@environment.wa.gov.au

LIMITATIONS

This guideline should be used as a preliminary reference for the identification of potential contaminants associated with specific industries, activities and/or landuses. However, a Preliminary Site Investigation (PSI) is necessary to determine which contaminants may be present at a site, through the consideration of a number of factors such as current and historical site activities, physical characteristics of the site, and characteristics of any chemicals which are or have been utilised at the site (such as toxicological characteristics, persistence in the environment, environmental mobility, chemical reactivity and degradation).

This guideline should be used in conjunction with the texts referenced herein, and any other appropriate references.

DISCLAIMER

The information provided in this document is made available in good faith and is believed accurate at the time of publication (or at the time of release on the internet). However, the document is intended to be a guide only and should not be seen as a substitute for obtaining appropriate advice or making prudent inquiries. The information is provided solely on the basis that readers will be responsible for making their own assessment of the matters discussed therein and that they should verify all relevant representations, statements and information. Changes in legislation, or other circumstances, after the document has been published may impact on the accuracy of any information or advice contained in the

document and readers should not rely on the accuracy of information presented in this document.

Information presented in this document does not constitute, and is not intended to be used as legal advice nor used as an interpretive instrument. In the event of any inconsistency between this document and relevant legislation, provisions of the relevant legislation will prevail.

Neither the State of Western Australia ("State"), nor any employee or agent of the State or any agency or instrumentality of the State, nor any authors or contributors to this document shall be liable for any loss, damage, personal injury or death however caused (whether caused by any negligent or other unlawful act or omission of, by or on the part of the State or otherwise) arising from the use of or reliance on any information, data or advice) expressed or implied in this document.

CONTAMINATED SITES MANAGEMENT SERIES

This guideline forms part of a management series developed by the DoE to provide guidance on the assessment and management of contaminated sites in Western Australia.

The Contaminated Sites Management Series contains the following documents:

Technical guidelines

- Assessment Levels for Soil, Sediment and Water
- Bioremediation of Hydrocarbon Contaminated Soils in WA
- Community Consultation
- Development of Sampling and Analysis Programs
- Potentially Contaminating Activities, Industries, and Landuses
- Reporting on Site Assessments
- Use of Monitored Natural Attenuation for Groundwater Remediation

Administrative Guidelines

- Certificate of Contamination Audit Scheme
- Contaminated Site Auditor Accreditation Scheme
- Contaminated Sites and the Landuse Planning Process
- Disclosure Statements
- Reporting of Known or Suspected Contaminated Sites
- Site Classification Scheme
- Use of Risk Assessment in Contaminated Site Management

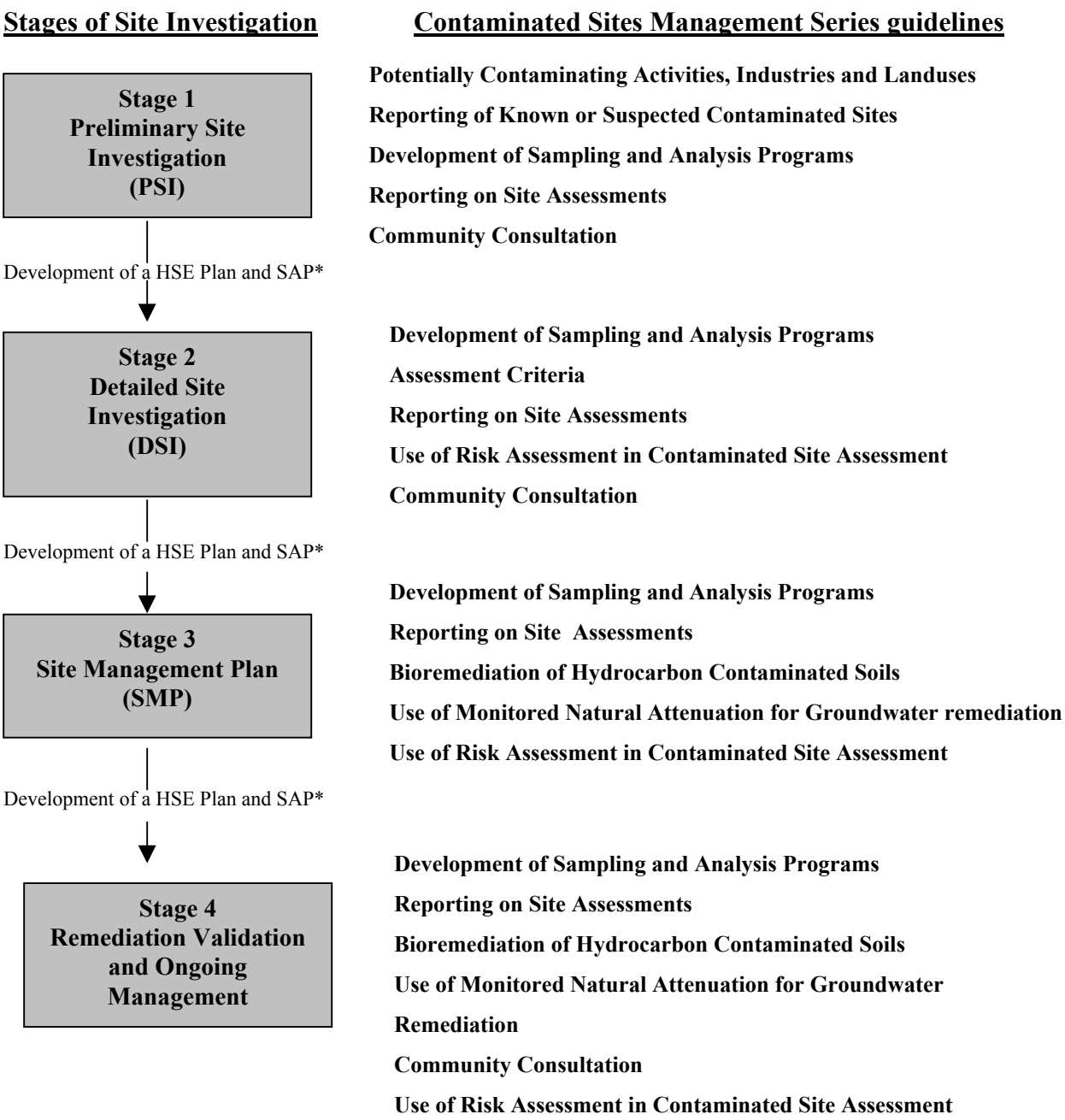
Reference and compliance with these guidelines should ensure that the minimum requirements of the DoE are satisfied.

Copies of these guidelines are available from the DoE's library located at Westralia Square, Level 8, 141 St Georges Terrace, Perth, or from the DoE's website at <www.environment.wa.gov.au>.

STAGED APPROACH TO SITE INVESTIGATIONS

The Contaminated Sites Management Series has been developed by the DoE to encourage a consistent approach to contaminated site assessment and management. One of the main focuses of the series is the **staged approach to site investigation.**

The purpose of this flow-chart, which appears in the preface of each of the Contaminated Sites Management Series guidelines is to highlight the appropriate reference guideline(s) during each of stages of site investigation.



*Where samples are to be collected a Health, Safety & Environment Plan (HSEP), and Sampling & Analysis Plan (SAP) should be prepared

TABLE OF CONTENTS

1 INTRODUCTION

The principal causes of environmental contamination are generally poor or inadequate operational practices associated with the manufacture, use and disposal of chemicals by past or current industrial, agricultural or commercial activities. Contamination may be caused by point sources such as accidental spillage of chemicals, leakage of chemicals from drums, tanks, pipe-work and drains, or from diffuse sources such as leaching of contaminants from inappropriate landfills, and regional contamination of groundwater by pesticide and fertiliser application. Often, the extent and degree of contamination at a site is dependent upon its physical characteristics such as soil type, depth to groundwater, or proximity to sensitive environments such as wetlands and rivers. Each contaminated site is unique.

Experience has shown that some industrial activities and landuses, such as oil production, fuel storage and chemical manufacturing, have a higher potential for contaminating a site, however many other activities may contaminate a site.

It is often the operation and general housekeeping practices at a site rather than the actual industrial activity and the associated chemical(s) which result in contamination. For example, a vehicle repair workshop may have an above-ground waste oil storage tank situated in a concrete bund of appropriate capacity (e.g. 110% of volume of the storage tank). If the tank leaks, the waste oil will be contained within the bund and therefore not enter the environment. However, poor housekeeping practices, such as leaving the outlet valve of the bund open, may allow the waste oil to discharge into the surrounding soil and possibly into the groundwater, potentially resulting in contamination.

Section 3 of this guideline provides a quick reference list of a range of potentially contaminating activities, industries and landuses.

The list of activities presented in this guideline is not exhaustive and is provided as a guide only. Consideration may need to be given to other activities not listed when determining the potential for a site to be contaminated. Consideration should also be made of surrounding landuses, including historical landuses which may have resulted in contamination at a site. It should be noted that where an activity listed in this guideline has been undertaken at a site, the site is not necessarily contaminated but there is an increased risk of contamination being present.

A Preliminary Site Investigation, completed in accordance with the guidance provided in *Reporting on Site Assessments* document (DEP, 2001) should be undertaken to identify any current or historical potentially contaminating activities.

1.1 OBJECTIVES OF THE GUIDELINE

The objectives of this guideline are to:

- provide a quick reference indication of the type of activities which may contaminate the environment;

- identify some of the potential contaminants for those specific industries, activities and landuses; and

- assist consideration of contaminated site issues prior to land transfer and redevelopment, and during planning processes.

2 WHO SHOULD USE THIS GUIDELINE AND WHEN

Table 1 provides examples of how and when the quick reference list provided in Section 3 could be used:

TABLE 1. USE OF THE POTENTIALLY CONTAMINATING ACTIVITIES, INDUSTRIES AND LANDUSES LIST – WHO, WHEN AND WHY

WHO	WHEN	WHY
Local and State Government Authorities	• During planning approval process (Refer to DoE *Contaminated Sites and the Landuse Planning Process*)	• The identification of a potentially contaminating activity may trigger the need for further information and/or investigation to enable informed decisions to be made regarding the suitability of rezoning and/or development proposals. • Early consideration of contaminated site issues can help avoid inappropriate restrictions on land uses.
Current landowners	• Identifying the potential for contamination. • Determining whether the submission of a Disclosure Statement is warranted pursuant to the *Contaminated Sites Act 2003* (*CS Act*). (Refer to DoE *Disclosure Statements* guideline)	• To identify potential liability issues. • To determine whether investigation is warranted. • To identify the need to submit a Disclosure Statement pursuant to the *CS Act 2003.* • To assist in the preparation of a Disclosure Statement.
Prospective purchasers/developers	• Identify the potential for contamination prior to purchasing/developing a site.	• To identify potential liability issues. • To determine the potential for site restrictions (e.g. groundwater abstraction not recommended, disturbance of soil at depth not recommended) due to contamination.
General public	• Reporting known or suspected contaminated sites. (Refer to DoE *Reporting Known or Suspected Contaminated Sites* guideline)	• Reporting of known or suspected contaminated sites pursuant to the *CS Act 2003.*
Environmental Practitioners	• Undertaking site investigations. (Refer to DoE *Reporting on Site Assessments* guideline)	• Assist in identifying past and present potentially contaminating activities, landuses and industries as part of developing a history of a site, as per the requirements of the *Contaminated Sites Management Series* of guidelines.

3 LIST OF POTENTIALLY CONTAMINATING ACTIVITIES, INDUSTRIES AND LANDUSES

The following list is by no means exhaustive and is provided as a guide only. Consideration may need to be given to other activities not listed when determining the potential for a site to be contaminated. Consideration should also be made of surrounding landuses, including historical landuses, which may have resulted in contamination at a site. Where one or more of the activities on the list has been undertaken at the site, the site is not necessarily contaminated but there is an increased risk of contamination being present.

INDUSTRY, ACTIVITY & LANDUSE	COMMON CONTAMINANT TYPES
Abattoirs *	• Nutrients (e.g. nitrogen, phosphorus) • Biological Oxygen Demand (BOD) • Total Suspended Solids (TSS) • Oil and grease
Abrasive blasting *	Dependent on material being removed • Heavy metals, iron • Lead from lead based paints • Tributyltin from boat maintenance
Acid/alkali plant, formulation and bulk storage	• Mercury, sulphuric, hydrochloric and nitric acids, sodium and calcium hydroxide
Airports	• Total petroleum hydrocarbons • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • Metals (e.g. aluminium, chromium, lead, magnesium) • Solvents
Analysts, commercial analytical laboratory sites	• Solvents, acids, metals,
Asbestos production or disposal	• Asbestos
Asphalt or bitumen manufacture or bulk storage *	• Total petroleum hydrocarbons • Polycyclic aromatic hydrocarbons (e.g. creosote) • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • Metals (e.g. chromium, lead)

INDUSTRY, ACTIVITY & LANDUSE	COMMON CONTAMINANT TYPES
Automotive repair, engine works and spray painting	• Solvents • Total petroleum hydrocarbons • Monocyclic aromatic hydrocarbons (e.g. toluene, xylene, white spirit) • Phenol • Chlorofluorocarbons • Metals (e.g. copper, chromium, lead, zinc) • Alkalis • Acids (e.g. sulphuric, phosphoric)
Battery manufacturing and recycling	• Metals (e.g. antimony, cadmium, cobalt, lead, manganese, nickel, mercury, silver, zinc) • Acids (e.g. sulphuric, hydrochloric)
Bitumen or asphalt manufacturing or bulk storage *	• Refer to asphalt manufacturing
Boat building and maintenance *	• Metals (e.g. copper, chromium, lead, mercury, zinc) • Antifouling paints (e.g. organotin, tributyltin)
Brake lining manufacturers	• Asbestos, copper
Breweries/distilleries	• Alcohol (e.g. ethanol, methanol) • Nutrients (e.g. nitrogen, phosphorus) • Biological Oxygen Demand (BOD)
Cement or lime manufacturing	• Lime, calcium hydroxide, alkalis • Hydrocarbons • Asbestos
Cemeteries	• Nitrates, • Heavy metals, lead • Formaldehyde • Biological hazards
Chemical manufacturing, blending or mixing *:	Wide range of organic and inorganic compounds – See AS 4482.1 table II
- Acid/alkali	• Metals (e.g. mercury) • Acids (e.g. sulphuric, hydrochloric, nitric) • Sodium and calcium hydroxides
- Adhesive/resins	• Polyvinyl acetate (e.g. adhesives) • Phenol • Formaldehyde (e.g. resins) • Phthalate esters
- Dyes	• Metals (e.g. chromium, titanium, cobalt) • Solvents

INDUSTRY, ACTIVITY & LANDUSE	COMMON CONTAMINANT TYPES
Chemical manufacturing, blending or mixing (cont)*:	
- Fertilisers	• Metals (e.g. boron, cadmium, copper, magnesium, molybdenum) • Calcium phosphate, calcium sulphate, nitrates, ammonium sulphate, carbonates, potassium
- Flocculants	• Metals (e.g. aluminium)
- Foam production	• Formaldehyde • Urethane • Styrene
- Fungicides	• Carbamates • Metals (e.g. copper, chromium, zinc) • Sulphur
- Herbicides	• Ammonium thiocyanate • Carbamates • Organochlorine pesticides • Organophosphate pesticides • Herbicides (e.g. triazine, atrazine) • Metals (e.g. arsenic, mercury)
- Paints	• Metals (e.g. arsenic, barium, cadmium, chromium, cobalt, lead, manganese, mercury, selenium, zinc, titanium) • Solvents (e.g. toluene) • Resins
- Pesticides	• Wide range of insecticides, herbicides and fungicides • Metals (e.g. arsenic, lead, mercury, tin, chromium) • Organochlorine pesticides • Organophosphate pesticides • Carbamates • Solvents (e.g. xylene, kerosene) • Chlorinated hydrocarbons • Synthetic pyrethroids • Acid herbicides
- Pharmaceutical	• Solvents (e.g. acetone, ethyl acetate, butyl acetate, methanol, ethanol, isopropanol, butanol) • Carbamates
- Photography	• Potassium bromide • Metals (e.g. chromium, silver), • Thiocyanate • Ammonium compounds • Sulphur compounds • Phosphate • Ethanol • Formaldehyde
- Plastics	• Metals (e.g. cadmium) • Solvents • Styrene • Sulphates • Phthalate esters

INDUSTRY, ACTIVITY & LANDUSE	COMMON CONTAMINANT TYPES
- Rubber processing	• Metals (e.g. lead, zinc) • Sulphur compounds • Reactive monomers (e.g. isoprene, isobutylene) • Acids (e.g. sulphuric, hydrochloric) • Monocyclic aromatic hydrocarbons (e.g. xylene, toluene) • Solvents
- Soap/detergents	• Potassium compounds • Phosphates • Ammonia alcohols • Esters • Sodium hydroxide • Surfactants • Silicate compounds • Acids (e.g. sulphuric, stearic) • Oils
- Solvents	• Ammonia • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • Chlorinated organics (e.g. carbon tetrachloride)
Compost manufacturing *	• Nutrients (e.g. phosphorus, nitrogen) • Metals (e.g. aluminium, iron, potassium, zinc)
Concrete batching or cement product manufacturing *	• Asbestos
Defence works and defence establishments	• Metals (e.g. aluminium, copper, lead, mercury, silver) • Explosives (e.g. TNT, 2,4 DNT, 2,6 DNT, RDX) • Hydrocarbons • Solvents
Drum or tank re-conditioning or recycling facility	• Dependent upon contents of drums • Solvents (e.g. methylene chloride, ortho-dichlorobenzene) • Total petroleum hydrocarbons • Metals (e.g. cadmium, chromium, lead, zinc)
Dry cleaning establishment	• Chlorinated hydrocarbons (e.g. trichlorethylene, ethane, 1,1,1 - trichloroethane, carbon tetrachloride, perchlorethylene) • Volatile Organic Compounds (VOCs)
Electrical transformers	• Metals (e.g. copper, lead, tin, mercury) • Polychlorinated biphenyls • Solvents
Electricity generation/power stations *	

INDUSTRY, ACTIVITY & LANDUSE	COMMON CONTAMINANT TYPES
	• Fly ash (fly ash can comprise of sulphates, metals, total dissolved solids, selenium) • Total petroleum hydrocarbons • Polycyclic aromatic hydrocarbons (e.g. tars) • Asbestos • Polychlorinated biphenyls • Metals • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene)
Explosives production or bulk storage	• Acid (e.g. acetone, nitric, ammonium nitrate, sulphuric) • Ammonia • Solvents (e.g. methanol, PCP) • Chlorinated hydrocarbons • Metals (e.g. aluminium, copper, lead, mercury, silver) • Explosives (e.g. TNT, 2,4 DNT, 2,6 DNT, RDX) • Total petroleum hydrocarbons (fuel)
Fertiliser manufacture or storage	• Calcium phosphate, calcium sulphate, copper chloride, • Sulphur, sulphuric acid, • Molybdenum, selenium, boron, cadmium, • Nitrates, ammonia
Fibreglass reinforced plastic manufacturing *	• Solvents • Resins • Styrene
Foundry operations	• Metals, particularly iron, aluminium, lead, zinc, copper, tin, nickel, chromium and oxides), chlorides, fluorides and sulphates of these • Acids • Coke (PAHs) • Fuel oil
Gasworks	• Cyanide • Nitrate • Sulphide/sulphate • Metals (e.g. aluminium, antimony, arsenic, barium, boron, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, vanadium, zinc) • Thiocyanates • Total petroleum hydrocarbons • Polycyclic aromatic hydrocarbons (e.g. creosote) • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • Phenols

INDUSTRY, ACTIVITY & LANDUSE	COMMON CONTAMINANT TYPES
Iron and steel works	• Metals (e.g. nickel, copper, chromium, lead, magnesium, manganese, selenium, zinc) • Acids (e.g. sulphuric, hydrochloric) • Mineral oils • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • Polycyclic aromatic hydrocarbons (e.g. coke residues) • Refer to Gasworks
Intensive agriculture	• Carbamates • Organochlorine pesticides • Organophosphate pesticides • Herbicides (e.g. triazine, atrazine) • Nitrates • Salinity • Metals (e.g. aluminium, arsenic, cadmium, copper, iron, lead, magnesium, potassium) • Nutrients (e.g. nitrogen, phosphorus)
Landfill sites *	• Dependent on landfill type and waste disposed • Polychlorinated biphenyls • Alkanes • Sulphides • Metals • Organic acids • Nutrients (e.g. nitrogen, phosphorus) • Total petroleum hydrocarbons • Polycyclic aromatic hydrocarbons • Ammonia • Landfill gas (e.g. methane) • Total Dissolved Solids (TDS) • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene)
Livestock dip or spray race operations	• Metals (e.g. arsenic) • Carbamates • Organochlorine pesticides • Organophosphate pesticides • Herbicides • Synthetic pyrethroids
Market gardens, orchards, glass houses	• Metals (e.g. cadmium, arsenic, copper, lead, mercury, magnesium, aluminium, iron) • Organochlorine pesticides (e.g. DDT, Dieldrin) • Organophosphate pesticides (e.g. Azinphos ethyl, Diazinon, Fenthion) • Carbamates • Total petroleum hydrocarbons (fuel) • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene)

INDUSTRY, ACTIVITY & LANDUSE	COMMON CONTAMINANT TYPES
Metal treatment or coating *	• Solvents • Metals (e.g. aluminium, cadmium, chromium, lead) • Paint residue
Metal finishing and treatments (e.g. electroplating) *	• Metals (e.g. aluminium, barium, cadmium, copper, chromium, lead, nickel, tin, zinc) • Acids (e.g. sulphuric, hydrochloric, nitric, phosphoric) • Alkalis • Plating salts • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene) • Chlorinated hydrocarbons (e.g. 1,1,1 – trichloroethane, tetrachloroethylene) • Cyanide
Metal smelting or refining *	• Metals (e.g. aluminium, copper, gold, lead, selenium, silver, tin) • Chlorides
Mining and extractive industries *	• Acids • Alkalis • Total Dissolved Solids (TDS) • Organic flocculants (e.g. sulphate, cyanide) • Metals (e.g. arsenic, copper, iron, mercury) • Total petroleum hydrocarbons • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene)
Motor vehicle workshops	• Total petroleum hydrocarbons • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • Solvents • Resin • Heavy metals • PAHs
Oil or gas production, refining and storage *	• Total petroleum hydrocarbons • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • Acids (e.g. sulphuric) • Alkalis • Lagging, insulation (e.g. asbestos) • Metals (e.g. lead, zinc, copper, nickel, chromium, cadmium, barium, arsenic, mercury). Metals should be decided according to the composition of the deposit and known impurities • Cyanides

INDUSTRY, ACTIVITY & LANDUSE	COMMON CONTAMINANT TYPES
Orchard and market gardens	• Metals (e.g. cadmium, arsenic, copper, lead, mercury, magnesium, aluminium, iron) • Organochlorine pesticides (e.g. DDT, Dieldrin) • Organophosphate pesticides (e.g. Azinphos ethyl, Diazinon, Fenthion) • Carbamates • Total petroleum hydrocarbons (fuel) • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene)
Pest control depots	• Carbamates • Organochlorine pesticides • Organophosphate pesticides (e.g. Diazinon) • Herbicides (e.g. Atrazine, Fenamiphos) • Fungicides
Printing shops (see also photography)	• Acids • Alkalis • Solvents • Metals (e.g. chromium)
Port activities	• Metals • Paint residues (tin, lead) • Total petroleum hydrocarbons • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • PAHs
Railway yards	• Total petroleum hydrocarbons • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • Phenols • Metals (e.g. arsenic, lead, zinc, cadmium, chromium, iron) • Creosote • Nutrients (e.g. nitrates, ammonia) • Carbamates • Organochlorine pesticides • Organophosphate pesticides • Herbicides
Rifle range	• Explosives (e.g. TNT, 2,4 DNT, 2,6 DNT, RDX) • Metals (e.g. lead)
Scrap metal recovery *	• Metals (e.g. lead, cadmium, magnesium) • Solvents • Polychlorinated biphenyls • Oil and grease • Total petroleum hydrocarbons • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • PAHs
Service stations, petrol stations and fuel	

INDUSTRY, ACTIVITY & LANDUSE	COMMON CONTAMINANT TYPES
storage facilities	• Total petroleum hydrocarbons • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • Polycyclic aromatic hydrocarbons • Metals (e.g. barium, cadmium, copper, lead, nickel, zinc) • Phenols • Chlorinated hydrocarbons (e.g. trichloroethylene) • Oil and grease
Sewage treatment plant *	• Nutrients (e.g. phosphorus, potassium, nitrogen) • Metals (e.g. aluminium, arsenic, cadmium, chromium, cobalt, lead, nickel, zinc) • Phenols • Pathogens
Sheep and cattle dips	• Metals (e.g. arsenic) • Carbamates • Organochlorine pesticides • Organophosphate pesticides • Herbicides • Synthetic pyrethroids
Tannery (and associated trades)*	• Acids (e.g. hydrochloric) • Metals (e.g. chromium, manganese, aluminium, copper) • Formaldehyde • Phenols • Salts • Solvents (e.g. kerosene, white spirit) • Total petroleum hydrocarbons • Oil and grease • Cyanide • Ammonia • Formaldehyde
Textile operations *	• Metals (e.g. cadmium, chromium, titanium, carbon, zinc, aluminium, tin) • Acids (e.g. sulphuric) • Alkalis (e.g. caustic soda) • Salts • Chlorinated hydrocarbons (e.g. perchloroethylene) • Monocyclic aromatic hydrocarbons (e.g. benzene, toluene, ethylbenzene & xylene) • Organochlorine pesticides (e.g. Dieldrin, Aldrin) • Dyestuff residues • Sodium hypochlorite • Phenols
Timber preserving/saw mills/Wwood storage *	• Chlorinated hydrocarbons (e.g. pentachlorophenol) • Polycyclic aromatic hydrocarbons (e.g. creosote, naphthalene) • Organochlorine pesticides • Metals (e.g. arsenic, copper, chromium) • Ammonia

INDUSTRY, ACTIVITY & LANDUSE	COMMON CONTAMINANT TYPES
Woolscouring *	• Nutrients (e.g. phosphorus, nitrogen) • Total Dissolved Solids (TDS) • Oil and grease • Detergents • Pesticides • Bleaching agents (e.g. hydrogen peroxide)

Compiled from:

- Victorian Environment Protection Authority (Vic EPA) (1995) *Potential Contaminating Land Uses (*Publication 472).
- Ministry for Environment (New Zealand) (2004) *Contaminated Land Management Guidelines Schedule B: Hazardous Activities and Industries List (HAIL) with Hazardous Substances <http://www.mfe.govt.nz>*.

*** Prescribed activities under the *Environmental Protection Regulations 1987.* A licence or registration from the DoE is required to undertake a prescribed activity. The Environmental Regulation Branch of the DoE should be contacted for further information on licence requirements on (08) 9222 7000.**

4 GLOSSARY

Assessment	Study of a site to determine possible and actual contaminants. May involve a desktop review of the site and may also include the collection and analysis of soil, groundwater or sediment samples.
Competent professional	Possessing the skills, knowledge, experience, and judgement to perform the assigned tasks or activities satisfactorily.
Contaminated	In relation to land, underground water under that land or surfance water on that land, means a substance present above background concentrations, that presents, or has the potential to present, a risk of harm to human health, the environment or any environmental value.
Detailed Site Investigation (DSI)	An investigation which confirms and delineates potential or actual contamination through a comprehensive sampling program.
Groundwater	All waters occurring below the land surface.
Point source	Localised source of contamination such as storage tanks, pumps and drums.
Practitioners	Suitably qualified professionals with experience in environmental investigations and management.
Preliminary Site Investigation (PSI)	An investigation consisting of a desktop study, a detailed site inspection review of historical records/aerial photographs. The preliminary site investigation should be of such scope as to be sufficient to indicate whether contamination is present or likely to be present and to determine whether a detailed site investigation should be conducted. Also to provide information for designing a DSI.
Site	An area of land, underground water under the land, or surface water on that land

5 REFERENCES

5.1 CITED REFERENCES

Department of Environment (DoE) (2004) *Reporting of Known or Suspected Contaminated Sites.*

Department of Environmental Protection (DEP) (2000) *Certificate of Contamination Audit Scheme.*

Department of Environmental Protection (DEP 2000) *Contaminated Site Auditor Accreditation Scheme*

Department of Environmental Protection (DEP) (2000) *Disclosure Statements.*

Department of Environmental Protection (DEP) (2001) *Reporting on Site Assessments.*

Ministry for Environment (New Zealand) (2004) *Contaminated Land Management Guidelines Schedule B: Hazardous Activities and Industries List (HAIL) with Hazardous Substances*

Victorian Environment Protection Authority (Vic EPA) (1995) *Potential Contaminating Land Uses (*Publication 472).

5.2 OTHER USEFUL REFERENCES

Australian and New Zealand Environment and Conservation Council (ANZECC) and National Health and Medical Research Council (NHMRC) (1992) *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*.

Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ)(2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*

Australian and New Zealand Environment and Conservation Council (ANZECC) and National Health and Medical Research Council (NHMRC) (1995) *Guidelines for Groundwater Protection in Australia.*

Department of Environment (DoE) (2003) *Assessment Levels for Soil, Sediment and Water (Draft V3).*

Department of Environmental Protection (DEP) (2001) *Development of Sampling and Analysis Programs.*

National Environment Protection Council (NEPC) (1999) *National Environmental Protection (Assessment of Site Contamination) Measure.*

Standards Australia (1997) *AS/NZ 4482.1 Guide to the sampling and investigation of potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds.*

Standards Australia (1998) *AS/NZ 5667.11 Water quality – Sampling. Part 11: Guidance on sampling of groundwaters.*