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Guide to the duty to manage contaminated land

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and recognise the continuing connection to, and aspirations for Country.

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# Purpose

Section 39(2) of the [*Environment Protection Act 2017*](https://www.legislation.vic.gov.au/in-force/acts/environment-protection-act-2017) (the Act) – the duty to manage contaminated land (duty to manage) – requires a person in management or control of contaminated land to minimise risks of harm to human health and the environment from the contaminated land so far as reasonably practicable[[1]](#footnote-2).

For a person to be required to comply with the duty to manage, **both** of the following circumstances must apply:

they are the person in management or control of the land

the land is contaminated within the meaning of section 35 of the Act. Note that the definition of land includes groundwater.

This guideline sets out reasonably practicable steps duty holders may take to comply with their duty to manage. It may help you to make decisions about what actions are appropriate to your circumstances. It also provides references to other information published by EPA and other bodies to assist you to identify, assess and manage risks from land (including groundwater) contamination.

This guideline cannot specify all actions that you may need to take to comply with your duties. Instead, it describes some principles to apply when approaching your duties and exercising judgement to assist you to comply with your duty to manage.

This guidance is targeted at environmental professionals and duty holders with a reasonable level of knowledge of environmental performance and contaminated land.

EPA’s website contains information designed for those with less technical knowledge or a different role in managing contaminated land – <https://www.epa.vic.gov.au/for-business/new-laws-and-your-business/manage-contaminated-land>).

## How to use this guideline

This guideline is one of several publications EPA has issued to support the contaminated land scheme. Figure 1 illustrates where this guidance (highlighted in light blue) applies within the contaminated land framework. Appendix A discusses the broader framework for contaminated land management in Victoria and Appendix B sets out the contaminated land provisions under the Act.

Text box 1 
Identify the potential for land to be contaminated. EPA Publication 2010 – Potentially contaminated land  

Proceed to text box 2 

Text box 2 
Undertake preliminary site investigation (PSI) and/or (as appropriate) Undertake detailed site assessment (DSI) NEPM ASC  

Proceed to text boxes 3a and 3b   

Text box 3a 
A substance is present in concentrations above the background level (s 35(1)(a)); either specified in the regs/determination (s 36(a)), or Naturally occurring.  EPA Publication 2033 – Background levels (s 36(b)) 

If yes to both textbox 3a and 3b then proceed to textbox 4   

Text box 3b 
A substance creates a risk of harm to human health or the environment (s35(1)(b)).  EPA Publication 1940 – Contaminated Land: understanding section 35  

If yes to both textbox 3a and 3b then proceed to textbox 4   

Text box  4  
Contaminated land (s35).  EPA Publication 2010 – Potentially contaminated land 

Proceed to text boxes 5a and 5b   

Text box 5a 
Duty to manage – minimise risks of harm to human health and the environment from the contaminated land so far as is reasonably practicable (s 39) EPA Publication 1977 – Duty to Manage Contaminated Land (This publication)  

Consider proceeding to text box 6, based on specific circumstances   

Text box 5b 
In relation to contaminated land, is there ‘notifiable contamination’? (s 37)  EPA Publication 2008 – Duty to notify of contaminated land  

If yes proceed to text box 6  

Text box 6 
Notify EPA including management response (s 40,41). EPA Publication 2008 – Duty to notify of contaminated land 

No further actions  


1. Figure 1: The context of this publication (highlighted in light blue) in relation to the general steps that may apply under the contaminated land duties.

This guideline sets out the steps you can take to determine if you have a duty to manage contaminated land under section 39(2) of the Act and, if so, how to fulfil your duties:

Step 1: Determine if you are the person in management or control of the land (section 3).

Step 2: Identify any contamination of land you ought reasonably to know of (section 4).

Step 3: Investigate and assess contamination (section 6)

Step 4a: Provide and maintain reasonably practicable risk control measures (section 7)

Step 4b: Provide information to any person you reasonably believe may be affected by contamination as a risk control measure (section 8)

Step 5: Review reasonably practicable risk control measures (section 9).

Section 10 describes how EPA will assess compliance and section 11 provides a series of case studies to illustrate the principles described in this guideline.

## Scope of the guideline

This guideline supports duty holders by setting out a standard of conduct that supports compliance with the duty to manage. It describes assessment methods for addressing contamination, and then provides a framework to support the selection of management actions and risk controls. The guideline supports duty holders to make decisions that are proportionate to the risks of harm.

This guideline does not address:

requirements for seeking planning approval to develop a site – see <https://www.epa.vic.gov.au/for-business/find-a-topic/planning-guidance>

how to meet the duty to notify – EPA publication 2008 [*Guide to the duty to notify of contaminated land*](https://www.epa.vic.gov.au/about-epa/publications/2008-1)  provides guidance on the requirements and processes for notifications.

notifiable incidents – see <https://www.epa.vic.gov.au/for-business/new-laws-and-your-business/reporting-a-notifiable-incident>

pollution events – see <https://www.epa.vic.gov.au/report-pollution/reporting-pollution>.

## Status

This publication provides guidance to assist those in management or control of contaminated land to interpret the requirements of the duty to manage as set out in section 39 of the Act.

Adopting the approach set out in this guideline may help you to demonstrate to EPA and other interested parties (including other duty holders and other government agencies) that you have taken reasonable steps to comply with your duty to manage. Refer to section 9 for more details on documenting compliance.

The guideline provides you with advice and support to comply. It also informs you what, if any, action EPA requires of you; both voluntarily and, when appropriate, through remedial notices.[[2]](#footnote-3)

This publication supersedes the proposed draft publication: *Assessing and controlling contaminated land risks: A guide to meeting the duty to manage for those in management or control of land. (Publication 1977, June 2021)*

# Overview of the duty to manage

Section 39 of the Act imposes a duty on those in management or control of contaminated land (including groundwater) to minimise risks of harm to human health and the environment from the contaminated land so far as is reasonably practicable (**duty to manage**). If you are a **person in management or control of contaminated land**, you must comply with this duty.

The duty to manage applies to land (including groundwater) that is contaminated within the meaning of section 35 of the Act:

*… land is contaminated if waste, a chemical substance or a prescribed substance is present on or under the surface of the land, and the waste, chemical substance or prescribed substance—*

*(a) is present in a concentration above the background level; and*

*(b) creates a risk of harm to human health or the environment.*

*Land is not contaminated—*

*(a) merely because waste, a chemical substance, or a prescribed substance is present in a concentration above the background level in water that is on or above the surface of the land; or*

*(b) if any prescribed circumstances apply.*

Anyone engaging or proposing to engage in an activity associated with contaminated land must also meet their **general environmental duty** (**GED**) (refer to section 15.3 of Appendix B for further details).

# Determine if you are in management or control of the land

The duty to manage applies to any person in management or control of land. You are in management or control of the land if you exercise power or control over that land.

A person in management or control of land can include:

the registered owner of the land

a person with a proprietary right to occupy the land, such as a tenant under a lease agreement or a licensee under a licence agreement

a person holding a right of way or entry onto land (for example, a utility company with buried infrastructure)

a person who is authorised to occupy the site under a construction agreement (for example, a principal contractor)

a committee of management or control appointed under the *Crown Land Reserves Act 1978* (see the example below for further information).

Management and/or control of land may be shared by more than one person and therefore held concurrently between two or more duty holders.

Where the duty to manage is shared by more than one person, EPA recommends that parties discuss and agree on how contamination will be managed. If the parties cannot agree on who will take primary responsibility for managing the contamination, it may be appropriate to seek legal advice.

## Examples of shared or limited management and control of contaminated land

***Owner landlord***

Site owners who are landlords may choose to meet their duty to manage by limiting a lessee or tenant’s level of management or control of the land to minimise risks of harm from contaminated land, such as prohibiting the use of a basement area as a habitable space where there is a risk of harm to occupants from soil vapour.

***Lessee occupier***

When a party leases a contaminated site from a landlord, the lessee may share part of the duty to manage. Some examples of shared management and control arrangements include:

* restricting the lessee’s permitted activities to undertaking indoor repairs and limiting the lessee’s responsibility to actions relating to the inside of the building
* requiring the lessee to undertake certain activities, such as:
  + providing access to the site to enable the owner to review risks and controls or to address a contamination issue unrelated to the lessee’s activity and not related to a permitted use of the site

maintaining certain contamination risk controls such as vapour barriers

refraining from disturbing soil or extracting groundwater as a contamination risk management measure.

***Contractors***

A third party such as a principal contractor may share management or control of land under a contract, for example, where they are assigned rights and obligations under the contract to develop a site and to address contamination.

However, a contract of this kind may not prevent the landowner or tenant from also retaining management or control of the land. In this case, both parties would be required to comply with the duty to manage. The contractor must be provided with adequate information about the contamination, including their management obligations under the contract, as set out in section 39(2)(e) of the Act.

***Committees of management***

Management or control may also be conferred by legislation, such as the *Crown Land Reserves Act* *1978*, which assigns shared management or control of Crown land to committees of management to ‘manage, improve, maintain and control’ Crown land reserves.

## Dealing with contamination caused by other parties

In some cases, the person who manages or controls a site will not be the person who originally caused the pollution incident or contamination of the site.

One of the principles of environmental protection, as set out in section 17 of the Act, is the principle of **polluter pays**: *Persons who generate pollution and waste should bear the cost of containment, avoidance and abatement.*

This is reflected in the duty to manage through the right to recover reasonable costs from a person who caused or contributed to the contamination in accordance with section 39(3) of the Act. This guideline sets out a clear standard of conduct for meeting the duty to manage to help inform what reasonable costs may be recovered from those who caused or contributed to the contamination. If a duty holder wishes to pursue costs against an alleged polluter, EPA recommends they seek independent legal advice.

The principle also informs the regulatory decisions EPA makes when taking remedial and compliance action. EPA retains powers under sections 273 and 274 of the Act to issue remedial notices directly against a person who has caused or contributed to contamination that poses onsite or offsite risks of harm to human health or the environment. This includes any person EPA reasonably believes caused or permitted the land to be contaminated, or the owner or occupier of the land at the time the contamination first occurred.

Enforcement of the principle of polluter pays may only be practical when the person or business still exists and can be readily located. For example, in the case of legacy contamination, the polluter may be deceased or, in the case of a business, no longer operating so cost recovery from the polluter is not possible.

# Identify potential contamination

If you are in management or control of land, you will need to consider if that land, including groundwater, has the potential to be contaminated, in accordance with the definition of contaminated land provided in section 35 of the Act as described in EPA Publication 1940 [*Contaminated land: Understanding section 35 of the Environment Protection Act 2017*](https://www.epa.vic.gov.au/about-epa/publications/1940).

If you find that it has been contaminated, or has the potential to be contaminated, you need to consider and proportionately investigate any potential risks of harm the contamination may pose to people and the environment. You have an obligation to manage those risks. To help you identify if you have a risk that needs to be managed, it is important to understand the potential for your land to be contaminated.

## Determining when you ought reasonably to know the land you manage or control may be impacted by contamination

This section provides a summary of useful information to help you to determine when you ought reasonably to know the land you manage or control might be impacted by contamination.

EPA publication 1915 [*Contaminated land policy*](file:///C:/Users/moffite/AppData/Local/Microsoft/Windows/INetCache/Content.Outlook/UBBI3FYE/Contaminated%20land%20policy)sets out EPA’s expectations on when it is reasonable to assume the potential for contamination, and what level of response may be required.

EPA publication 2010 [*Potentially contaminated land - a guide for business*](https://www.epa.vic.gov.au/about-epa/publications/2010) provides advice on what information and observations may assist you to conclude that the land is *potentially* contaminated.

Evidence of potential contamination may also be found unexpectedly when engaging in a range of activities, including demolition and soil disturbance. Information about historic mining waste which may be encountered during earthworks in the Goldfields region is available on EPA’s webpage [Understanding the types of historic mining waste in the Goldfields region](https://www.epa.vic.gov.au/for-business/find-a-topic/understanding-the-types-of-historic-mining-waste-in-the-goldfields-region).

Past land uses can also indicate whether a site may be contaminated and the nature of the potential contaminants. The following resources may assist you:

EPA’s webpage [What causes contamination](https://www.epa.vic.gov.au/for-business/new-laws-and-your-business/manage-contaminated-land/about-contamination/what-causes-contamination) provides a non-exhaustive list of potentially-contaminating land activities.

The [Victoria Unearthed](https://www.environment.vic.gov.au/sustainability/victoria-unearthed) database may provide specific information related to land you manage or control and the land adjacent to your land.

EPA publication 1940 [*Contaminated land: Understanding section 35 of the Environment Protection Act 2017*](https://www.epa.vic.gov.au/about-epa/publications/1940) provides information on what EPA regards as the evidence that confirms land or groundwater is contaminated.

Planning Victoria’s [Planning Practice Note 30 (Potentially contaminated land), July 2021](https://www.planning.vic.gov.au/__data/assets/pdf_file/0027/97164/PPN30-Potentially-contaminated-land.pdf) provides an indicative list of land uses with a medium or high risk of causing land contamination.

National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM (ASC)), in particular [Schedule B2](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_3) (Guideline on Site Characterisation) sets out a method for identifying the type of chemicals that may be present as soil or groundwater contamination.

## Contamination from offsite activities or diffuse sources

Your duty to manage may extend to cover contamination originating from offsite activities if your land is impacted by that contamination.

The origin of the contaminants may be relevant in assessing which risk controls are considered ‘reasonably practicable’. Some types of contamination are mobile and may mean that multiple duty holders need to work cooperatively to address the contamination.

Contaminated land can be caused by diffuse sources rather than onsite activities (for example, runoff from historic widespread use of pesticides containing chemicals that are now banned). This may be referred to as ‘diffuse anthropogenic contamination’ or ‘ambient background concentrations’.[[3]](#footnote-4) The NEPM (ASC) considers ambient contamination to be part of background contamination.

The Act defines the background level of waste, a chemical substance or a prescribed substance as its 'naturally occurring' concentration (where the background level is not specified in or determined in accordance with the Environment Protection Regulations (the Regulations) or an environment reference standard). This difference is explained in EPA publication 1940 [*Contaminated land: understanding section 35 of the Environment Protection Act 2017*](https://www.epa.vic.gov.au/about-epa/publications/1940). Further information about how to determine when the concentration of a chemical substance represents naturally occurring background levels is provided in EPA Publication 2033 [Background Levels Methodology Guidance.](https://www.epa.vic.gov.au/about-epa/publications/2033)

# What to do if you identify an imminent risk of harm

Some contaminants can pose imminent or serious risks of harm due to their:

* toxicity
* pathogenicity
* flammability
* explosivity.

Contamination may result in long-term exposure such as significant vapour intrusion events, contamination in drinking water lines or in groundwater abstracted for drinking water.

Where there is an imminent or serious risk, EPA recommends that duty holders do not delay taking action to control those risks. You should identify impacted receptors and prioritise actions to mitigate exposure. Waiting until the contamination is fully assessed before taking action does not satisfy the precautionary principle[[4]](#footnote-5) and may result in you failing to take reasonably practicable action to mitigate risks.

Managing the imminent or serious risk of harm may also include contacting EPA as soon as practicable through the 24-hour Pollution Watch Line (1300 EPA VIC or 1300 372 842). Irrespective of any mandatory notification obligations, EPA may be able to assist in minimising significant or imminent risks of harm from contamination through its broader response powers, and collaboration with other agencies (for example, water corporations, Department of Health and Emergency Management Victoria). Table 1 provides examples of when you should consider alerting EPA, and other parties where relevant, immediately as part of your risk management response:

Table 1: Examples of circumstances that may indicate a potential imminent risk of harm

|  |  |
| --- | --- |
| **Reports of ill health** | Site residents or neighbours have reported ill health potentially associated with the contamination. Also consider the informing the Department of Health <https://www.health.vic.gov.au/contact-us>. |
| **Flammable or explosive vapour levels** | Soil or vapour sampling identifies highly flammable or explosive substances in vapour or soils that may result in fire or explosion (for example, methane above the lower explosive limit). Also consider if it is appropriate to inform emergency services. |
| **Groundwater in use when contaminant detected** | Groundwater or surface water known to be abstracted for drinking water purposes is reported to contain contaminant concentrations at levels that could pose an acute health risk or an existing long-term chronic exposure that warrants swift action to reduce exposure. Also consider informing your local water authority. |
| **Ingress into drinking water** | The site assessment identifies contamination in drinking water service lines that may ingress into water supply, particularly where it has corrosive properties or acute toxicity. |
| **Indoor vapour exceedances** | Indoor air sampling identifies vapour intrusion leading to indoor air concentrations above levels that could pose an acute health risk, or an existing long-term chronic exposure that has the potential to result in ill-health. Also consider informing the Department of Health <https://www.health.vic.gov.au/contact-us>. |
| **Likely acute ill health** | Any other instance where the evidence points towards a likely acute health impact or an existing long-term chronic exposure that has potential to result in ill-health. |
| **Poor practices close to waterways** | Site inspection identifies the absence of adequate spill containment (for example, bunding) beneath bulk liquid storage vessels in the immediate proximity of waters (including a stormwater drain), where there is a potential to cause a discharge that may have toxic impacts on aquatic life (for example, fish kills or similar impacts), or an impact on human health. Also consider informing your local water authority.  The site assessment identifies a discharge (or a high risk of discharge) of any substance, including polluted groundwater, to surface waters at concentrations that may have toxic impacts on aquatic life (for example, fish kills), or potential impacts on human health.  Also consider informing your local water authority. |
| **Unmanaged friable asbestos** | A site owner or occupant identifies friable asbestos in an uncontrolled environment, such that there is a significant risk that asbestos fibres may be released into the air environment and present a risk to people either onsite or offsite. |

EPA recommends you take immediate action to prevent people and the environment from being exposed to the contamination or reduce exposure to levels that no longer pose a risk. This may include simple interventions such as provision of alternative water or putting up fencing and signage but may also extend to more significant interventions such as relocation.

If an environmental auditor appointed under Part 8.3 of the Act becomes aware of an imminent state of danger in relation to land while carrying out any of their functions under the Act, they must notify EPA as soon as practicable through the 24-hour Pollution Watch Line (1300 EPA VIC or 1300 372 842).

# Investigate and assess land contamination

If you have identified that the land you manage or control has the potential to be contaminated, then you need to understand what, if any, action you need to take.

At this point you may appoint a contaminated land specialist to complete further assessment works. Information on how to appoint an environmental consultant is provided in EPA Publication 1702 [Factsheet: engaging consultants](https://www.epa.vic.gov.au/about-epa/publications/1702).

Contamination must be assessed to identify:

the risks of harm to human health or the environment

the reasonably practicable risk control measures (for example, remediation and management measures)

the information that must be communicated to stakeholders.

The assessment should be conducted in a way that ensures that contamination is sufficiently described and understood to allow identification of reasonably practicable risk control measures.

The Act does not prescribe a single method for assessing contamination. Contaminated land assessment methods are informed by the state of knowledge. There is a significant body of guidance available to support identification and assessment of contamination risks. Section 6.5 of this guideline identifies key resources that are important for assessing and managing risks from contaminated land.

This section of the guideline sets out the common stages in the contaminated land assessment process in the order in which they are typically performed, in accordance with the NEPM (ASC). Other approaches may be adopted based on site-specific considerations. The stages are:

Preliminary site investigation (PSI) – The PSI generally involves looking at the site history and past uses to identify the potential for a site to be impacted by land contamination (see section 6.1).

Conceptual site model (CSM) – The CSM attempts to explain site features to understand potential risks of harm from contaminated land and groundwater, and to predict how environmental values may be impacted by the contamination. The CSM may also be used to determine if a DSI is appropriate (see section 6.2).

Detailed site investigation (DSI) – The DSI generally involves soil, groundwater and sometimes vapour sampling to determine the level of contamination impacts at a site (see section 6.3).

Risk assessment (human health and ecological) – A risk assessment uses numerical modelling to predict the degree of risk of harm related to the level of contamination at a site (see section 6.4).

Although this is the standard order of assessment, different approaches are also possible and are informed by the amount of information already available at each stage.

The assessment process should provide you with the information you need to determine if there are risks of harm to human health or the environment associated with contamination of land at your site. If risks of harm exist you should proceed to the next stage of risk management.

## Preliminary site investigation (PSI)

A PSI forms the initial stage of a site investigation. It usually involves a desktop study and site inspection to collect information such as:

* location
* current and historic land uses and activities
* interviews with site representatives
* site layout
* building construction
* geological and hydrogeological setting
* potential sources and pathways of contamination.

A PSI may also include limited sampling of soil, groundwater, surface water and sediment, as appropriate, based on the understanding of site background information.

The information collected during a PSI should be used to assess information gaps and prepare an initial CSM, which will help you to both understand potential risks of harm from contaminated land and groundwater and plan a more detailed site investigation (DSI) if required.

A PSI does not necessarily need to result in standalone reports, and under some circumstances, the work and findings may be included in a DSI report (see section 6.3).

Section 2.1 of [Schedule B2 of the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_3) describes information recommended for inclusion in a PSI.

## Developing a conceptual site model (CSM)

The development of a CSM is an essential part of site assessment. A CSM provides the framework for identifying how the site may have become contaminated and how potential receptors may be exposed to contamination, either in the present or the future. It forms the basis of understanding sources of contamination, how users (people and ecological receptors) may be exposed and informs future sampling and analysis.

The CSM is a collation of site-related information about contamination sources, potential receptors and exposure pathways between those sources and receptors.

A preliminary CSM constructed from the findings of the PSI will also identify data gaps and should continue to be developed and refined throughout the investigation process as new information becomes available through the DSI stage (section 6.3**Error! Reference source not found.**) and Risk Assessment stage (section 6.4**Error! Reference source not found.**).

A CSM generally includes:

known and potential sources of contamination, including the transport mechanisms (such as ‘top down’ spills or subsurface releases from corroded tanks or pipes) and environmental fate (including degradation, transformation, etc.) of contamination

nature and distribution of contaminants of concern

potentially affected media (such as soil, sediment, groundwater, surface water, indoor and ambient air) and the likelihood of contaminated media providing an ongoing source of contamination

environmental setting including geological, hydrogeological and soil characteristics

human and ecological receptors

potential and complete exposure pathways, including direct contact, inhalation, and ingestion

surrounding land, groundwater and surface water use.

A CSM can be presented in different formats including schematic or graphical, flow charts or tables. See section 4 of [Schedule B2 of the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013L00768/a6ad1138-32ba-4acf-a1bc-4a5ade7a8bf7) which provides detailed guidance on developing and verifying a CSM.

## Detailed site investigation (DSI)

A DSI aims to delineate the type, levels, and extent of contamination to inform risk assessment and risk management and, if necessary, provide the basis for developing an appropriate remediation or management strategy. See section 2.2 of [Schedule B2 of the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013L00768/a6ad1138-32ba-4acf-a1bc-4a5ade7a8bf7).

A DSI typically refines the preliminary CSM developed in the PSI, to address data gaps and refine potential source-pathway-receptor linkages. A DSI may involve sampling of:

* soil
* groundwater
* surface water
* sediment
* biota (for example fish)
* soil vapour
* indoor air.

Sometimes the DSI and PSI stages can be combined. Sometimes several iterations of the DSI may be necessary to further understand certain aspects of the contamination.

A DSI may require statutory approvals, including licences for groundwater monitoring well/bore installation and permits from the local council or other land managers for investigations on public land (to investigate offsite sources and impacts, understand groundwater flow and/or confirm the extent of a contaminant(s)). Where contamination has migrated onto surrounding land, you may need to approach the person in management or control of that land to proceed with your investigation.

A plan setting out data quality objectives (DQO) and a sampling and analysis quality plan will support the process of completing a DSI. A DQO process is outlined in Appendix B of [Schedule B2 of the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013L00768/a6ad1138-32ba-4acf-a1bc-4a5ade7a8bf7).

### Sampling design, data quality and statistical analysis

When designing a sampling strategy you should consider the site history, onsite conditions, hydrology and geology and industry best practice (state of knowledge). You should also consider designing a sampling program that will provide adequate data quality for statistical analysis. Further guidance on sample design is provided in section 6 of [Schedule B2 of the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_3).

[Schedule B1 of the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_2) provides a discussion about sampling and the use of statistical analysis. Section 3.2.1 of Schedule B1 states in relation to site characterisation, ‘*the preferred approach is to examine a range of summary statistics including the contaminant range, median, arithmetic/geometric mean, standard deviation and 95 per cent upper confidence limit*.’

The NEPM (ASC) provides a description of how to analyse your data to determine:

* the average threshold (AT) – that is the 95 per cent UCL on the arithmetic average
* localised elevated value threshold (LEVT) – the concentration of a contaminant that is equal to 250 per cent of the relevant HIL or HSL (as defined in the Glossary of key terms).

These summary statistics are particularly important to understand because they are used to determine when contamination may constitute notifiable contamination. (See EPA Publication 2008 [*Guide to the duty to notify of contaminated land*](https://www.epa.vic.gov.au/about-epa/publications/2008-1)). However, it is important to note that when evaluating risks outside of the context of notification, statistical approaches such as the AT and LEVT may not provide a complete picture of risk. For example, you may not have enough samples of surface water, groundwater, or vapour to provide an accurate indication of risk.

Guidance on performing these calculations is provided in Section 3.2.1 of [Schedule B1 of the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_2)

Detailed guidance on sampling design and statistical approaches is provided in the following documents:

* AS 4482.1-2005 [Guide to the investigation and sampling of sites with potentially contaminated soil Non-volatile and semi-volatile compounds](https://infostore.saiglobal.com/en-au/Standards/AS-4482-1-2005-121739_SAIG_AS_AS_255480/)
* US EPA [Guidance for Data Quality Assessment](https://www.epa.gov/quality/guidance-data-quality-assessment)
* [ProUCL user guide](https://www.epa.gov/sites/default/files/2016-05/documents/proucl_5.1_user-guide.pdf) (US EPA)

## Risk assessment

Risk assessment is a staged process that starts with a comparison of measured or modelled site contaminant concentrations (exposure concentrations) with relevant objectives, criteria or benchmarks (trigger concentrations). Typically, where exposure concentrations are below trigger concentrations, risks are low and acceptable, and no further risk assessment is required.

Initially, a comparison is made between the concentrations of any indicators with objectives in the [ERS](https://www.epa.vic.gov.au/about-epa/laws/epa-tools-and-powers/environment-reference-standard), or other relevant guidelines and the results obtained from the target site. This is referred to as a Tier 1 risk assessment and enables the site data collected from a DSI to be used to support an *initial* assessment of the risk of harm.

Further risk assessment stages may be necessary where:

exposure concentrations are above trigger concentrations

trigger concentrations (for example objectives in the ERS) for a particular contaminant or site circumstance are not readily available, or

the data are not clear about whether there is a risk of harm.

In these situations, risk modelling or further site investigation may be necessary to support a more detailed risk assessment. This is known as a Tier 2 risk assessment, or site-specific risk assessment. See [Schedule B4 of the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_5).

Human health risk assessment involves assessing risks to people under various exposure scenarios such as a residence, a commercial building or a recreational area. Ecological risk assessment (ERA) typically assesses risks to groups of ecological receptors, such as aquatic organisms or terrestrial organisms. Occasionally, an ERA may assess risks to a single type of receptor, such as an endangered animal, or a particular domesticated or farmed animal.

Under the [NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288):

* methods for evaluating risks to human health are set out in [Schedule B4*: Guideline on Site-Specific Health Risk Assessment Methodology*](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_5)
* guidance on vapour intrusion investigation and risk assessment are set out across [Schedule B2: *Guideline on Site Characterisation*](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_3) and [Schedule B4*: Guideline on Site-Specific Health Risk Assessment Methodology*](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_5)
* risks of harm to ecological receptors are addressed in [Schedule 5a: *Guideline on Ecological Risk Assessment*](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_6).
* risks of harm specifically in groundwater can be assessed using [Schedule B6: *Guideline on the Framework for Risk-Based Assessment of Groundwater Contamination*](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_9)*.*

As noted previously, some risks of harm are not addressed directly by the methods set out in the NEPM (ASC). Where these scenarios arise, you should seek specialist support to ensure risks are adequately characterised.

## Key resources for investigating and assessing land contamination

### Environment Reference Standard

The [Environment Reference Standard (ERS)](https://www.epa.vic.gov.au/about-epa/laws/epa-tools-and-powers/environment-reference-standard) identifies the environmental values the Victorian community wants to achieve and maintain. Environmental values are uses, attributes or functions of the environment, such as land that can be used to produce food. For a more detailed description of the content and function of the ERS, please refer to Section 15.5 of Appendix B.

EPA publication 1940 [*Contaminated land: Understanding section 35 of the Environment Protection Act 2017*](https://www.epa.vic.gov.au/about-epa/publications/1940)provides information on the relationship between the ERS and the identification of contaminated land and groundwater.

The assessment of contaminated land is not limited to the environmental values, indicators and objectives set out in the ERS. Contaminated land assessments must consider all reasonable uses of land and groundwater, and the ecological functioning of the location including the potential for offsite impacts. Publication 1940 outlines examples of circumstances that may require consideration beyond the ERS when assessing if a chemical substance may create a risk of harm.

### National Environment Protection (Assessment of Site Contamination) Measure 1999

The [NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288) forms part of the state of knowledge and has an important role as a guidance document for assessing the nature and extent of contamination, as well as for assessing the risks of harm from contamination.

The NEPM (ASC) establishes a nationally consistent approach to the assessment of site contamination. It sets out:

the general process for the Assessment of Site Contamination (Schedule A)

general guidelines for the Assessment of Site Contamination (Schedule B, compiled across 22 volumes).

The NEPM (ASC) provides information to support each stage of contaminated site assessment, including:

describing site characteristics

laboratory analysis

human health and ecological investigation and screening levels for soil and groundwater, their derivation, and methodologies for deriving investigation levels for other contaminants

human health, ecological and groundwater risk assessment guidance

community engagement and risk communication

competency frameworks.

[Schedule B1 of the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_2) sets out the most commonly encountered contaminants and provides a range of scenarios and concentration thresholds (for example the ‘HILs’ or Health Investigation Levels) above which further investigation may be required to ascertain the risks of harm. It is important to note that these are *investigation* or *screening* levels, not remedial levels.

Schedule B1 is not an exhaustive list of all chemical substances and does not include standards or sources of information for all considerations for contaminated land and groundwater, including many of the environmental values set out in the ERS. The question of whether contamination creates a risk of harm to human health or the environment may therefore require consideration of matters and guidance beyond the NEPM (ASC).

EPA publication 1940 [*Contaminated land: Understanding section 35 of the Environment Protection Act 2017*](https://www.epa.vic.gov.au/about-epa/publications/1940)provides further information on evaluating contaminants not expressly addressed in the NEPM (ASC).

### National Chemicals Working Group of The Heads of EPAs Australia and New Zealand PFAS National Environmental Management Plan

The National Chemicals Working Group of the Heads of EPAs Australia and New Zealand PFAS National Environmental Management Plan ([PFAS National Environmental Management Plan](https://www.epa.vic.gov.au/for-community/environmental-information/pfas/pfas-national-environmental-management-plan)*)* (as amended from time to time) forms part of the state of knowledge and has an important role in assessing the nature and extent of PFAS contamination, as well as for assessing the risks of harm from PFAS contamination. Updates to the NEMP will be available on the EPA or [DCCEW](https://www.dcceew.gov.au/environment/protection/publications/pfas-nemp-2) website.

### Other guidelines

Victorian legal requirements prevail over state of knowledge guidance such as the NEPM (ASC). Where the content of the NEPM (ASC) addresses matters that are also covered by Victorian law, then the Victorian law must prevail. For example, in applying the approaches in the NEPM (ASC) for asbestos contamination, you must ensure that you are complying with Victorian safety and dangerous goods laws. References in the NEPM (ASC) to ambient background concentrations must be adjusted in recognition of the definition of contaminated land under the Act.[[5]](#footnote-6)

National and international guidelines can be considered part of the state of knowledge in the assessment and management of contaminated land. Several of these are referenced within the ERS and NEPM (ASC). You should consider relevant guidance when assessing the risk of harm and taking action to address that risk.

When evaluating the appropriateness of guidance, particularly from international sources, consider whether the guidance is:

current

based on commonly agreed science

setting a comparable level of protection to Australian standards.

# Provide and maintain measures to minimise risk of harm

Once the risks of harm from the contamination are assessed, the next step is to identify and undertake all reasonably practicable measures to minimise those risks.

Section 6(1) of the Act states that:

*A duty imposed on a person under this Act to minimise, so far as reasonably practicable, risks of harm to human health and the environment requires the person—*

*(a) to* ***eliminate*** *risks of harm to human health and the environment so far as reasonably practicable; and*

*(b) if it is not reasonably practicable to eliminate risks of harm to human health and the environment, to* ***reduce*** *those risks so far as reasonably practicable.*

Several parts of the Act should be considered to understand what will achieve compliance with the duty to manage in relation to minimising risk. These are the:

hierarchy of risk management controls (supported by section 6(1) of the Act and discussed further in section 7.1 of this guideline)

factors that must be considered to determine what is reasonably practicable in your circumstances (section 6(2) of the Act and section 7.1 of this guideline)

principles of environment protection in Chapter 2 of the Act (section 7.12 of this guideline).

The following sections step through how to select risk controls to meet your duty to manage.

## Hierarchy of risk controls

This section sets out an order of preference for selecting risk control options to minimise the risk of harm.

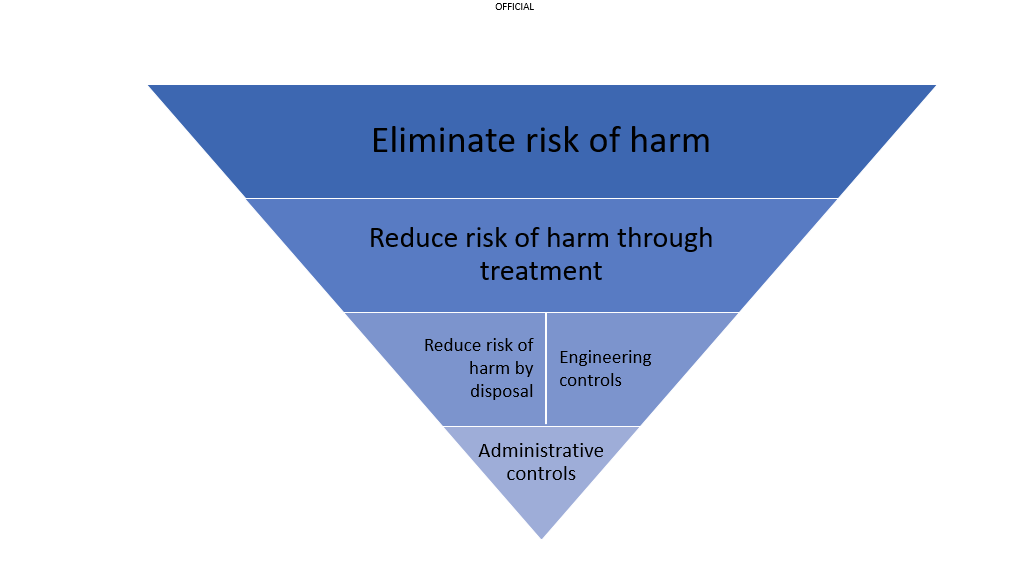
Section 6(1) of the Act creates the basis for recognising a hierarchy of risk control measures. Risk control measures must be considered in the order of those that **eliminate** the risk (that is, *most effective)* to those that **reduce** the risk (that is, *least effective)*.

Figure 2 illustrates the hierarchy of risk control measures. Where more than one option is reasonably practicable to minimise the risks of harm, the higher order measure (that is higher up the hierarchy) is to be preferred.

Risk control measures that eliminate the risk or remove the need for human actions to manage the risk must be preferred over risk control measures that do not. Risk reduction must only be considered where risk elimination is not reasonably practicable.

Risk reduction of contaminated land should also reflect the order of preference set out in the waste hierarchy (described in section 7.6).

Further information about establishing a risk management framework, including a description of the hierarchy of risk controls is available in EPA publication 1695 [*Assessing and controlling risk: A guide for business*](https://www.epa.vic.gov.au/about-epa/publications/1695-1).



1. Figure 2 – Hierarchy of risk control measures for reducing the risk of harm from contaminated land as far as reasonably practicable

## Interim controls

When you suspect a site is contaminated, a precautionary approach could involve implementing interim risk controls while undertaking an investigation to understand the longer-term risks and controls that may be required for the site.

Reasonably practicable interim controls could include signage, alerts, fencing, and providing advice on appropriate use of groundwater. If a source of ongoing pollution is identified (for example, a leaking tank or pipeline), you should take urgent action to eliminate the source and contain the spread.

It may be necessary to require people onsite to wear personal protective equipment (PPE) or avoid contact with areas where contamination is suspected while further investigations are underway. Reliance on PPE is the least effective or lowest order of risk controls. PPE only addresses human health impacts and cannot mitigate environmental impacts. It is a temporary solution and relies on people adhering to protocols. PPE should be a last line of defence if individuals could be directly exposed to hazards from contamination (for example, P2 and dust masks, or respirators).

You may need to implement erosion and sediment controls before finalising an assessment or during construction activities that are taking place at the same time. Ongoing controls should be in place to prevent incidental soil from being washed off the site and onto surrounding areas during normal occupancy conditions.

## Occupational health and safety

Some contaminated sites will also be workplaces within the meaning of the *Occupational Health and Safety Act 2004*. Any person undertaking work on a contaminated site must also meet their obligations under that Act. WorkSafe Victoria and EPA have partnered to publish guidance on managing workplace hazards arising from contaminated land in [*Industry Standard: Contaminated construction sites*](https://www.worksafe.vic.gov.au/resources/contaminated-construction-sites)*.*

## Eliminating risks of harm

Eliminating risks of harm to human health and the environment may mean the destruction or removal of:

primary and secondary sources of the contamination, for example, an underground storage tank may be a primary source and the associated non-aqueous phase liquids (NAPL) plume a secondary source

in some instances, the entire area of affected soil or groundwater.

You may also eliminate risks of harm by reducing the concentration of the contaminants with cleanup activities (that do not include dilution) so that the land or groundwater is no longer considered to be contaminated under section 35 of the Act. Examples of eliminating risks of harm from the contaminated land include *in-situ* and *ex-situ* treatment, bioremediation and phytoremediation techniques and chemical reduction/oxidation.

### Guidance on designing a remediation strategy

The Heads of Environment Protection Authorities Australia and New Zealand (HEPA) has endorsed the [National Remediation Framework](https://www.remediationframework.com.au/) for the remediation of contaminated sites to eliminate or reduce the risk of harm. This framework represents the best evidence at the time it was published. When designing a remediation strategy, you should also consider the state of knowledge for emerging treatment technologies.

EPA publication 2001 [*Guidance for the cleanup and management of contaminated groundwater*](https://www.epa.vic.gov.au/about-epa/publications/2001)provides further information on the cleanup of contaminated groundwater.

## Risk of harm reduction through treatment of the contamination

Treatment of the contamination (including active and passive remediation) can reduce the risk of harm associated with it rather than achieving elimination, for example, by focusing on the areas with the highest concentration of contamination (sometimes called hotspots).

Often this will mean considering different options that are suitable and available for the site and then considering the degree of risk reduction that can be achieved by each option. It is appropriate to consider cost as part of this process, but only to compare the relative effectiveness of technology choices. Cost alone cannot be used to justify a less effective treatment option – it must always be compared to the level of risk reduction that is reasonably practicable (section 7.11).

When considering onsite treatment of contamination you need to balance your decision against other potential environmental impacts, such as:

* the impact on local amenity that may arise from the treatment in sensitive areas (for example, residential zones)
* the indirect impacts resulting from the process of treatment – such as energy use, waste production and air emissions.

You should consider the principles of environment protection (Section 7.12) when selecting a risk reduction approach.

Contaminated material may also be treated offsite and brought back onsite for reuse if the risks of harm have been reduced to an acceptable level. If the contaminated material is classified as reportable priority waste you will need to ensure the waste is tracked using Waste Tracker (<https://www.epa.vic.gov.au/for-business/waste/transporting-waste>) and transported to a lawful place for treatment in accordance with section 142 of the Act and Division 3 of the Regulations.

Diluting and mixing contaminated soils with other materials to reduce contaminant concentrations is an **unlawful practice**. Regulation 70 of the Regulations prohibits a person who has the management or control of priority waste from mixing, blending or diluting contaminated soils (when classified or classifiable as priority waste) with other wastes which results in a change to the waste classification of the priority waste, other than in accordance with a designation. Contravention of this provision can attract fines and prosecution. More generally, these activities cause contamination to spread and increase the area of contaminated land, which is inconsistent with the environment protection principles of the Act, and the duty to manage*.*

When the total removal of the contamination source is not reasonably practicable (for example, certain NAPL source(s)), risk reduction actions are necessary to stop the contamination source from having a detrimental impact on the condition of the groundwater (for example *in situ* decommissioning of underground infrastructure that cannot be removed due to building stability constraints).

## Risk of harm reduction through the disposal of contaminated materials

When *in situ* impacted materials are removed and cannot otherwise be used at that site (either due to the level of contamination or because the site or project cannot accommodate those materials) waste duties may apply. The waste duties are set out in Parts 6.4 and 6.5 of the Act. More information on managing waste soil is provided at <https://www.epa.vic.gov.au/for-business/waste/waste-classification/managing-waste-soil>.

Physical removal of the contaminated soil or groundwater may *eliminate* the risk at your site. However, the removal of contaminated soil or groundwater from one location to another effectively transfers the *hazard* posed by the contamination to the site receiving it. The duty to manage will now apply to the person(s) in management or control of that site. However, in some circumstances it may be easier to control the risks at the other site (for example, at a permissioned landfill).

Contaminated materials must only be transferred to a place or premises that can lawfully receive it as these premises are designed to safely contain the hazardous aspects of the contamination.

In some circumstances, treatment may be required before contaminated materials are removed from a site and further treatment may be required at the site receiving those materials.

When transferring contaminated materials (including soil) from your site you will also be subject to various waste duties relating to the management and control of the waste materials, as well as the GED regarding the activities associated with the waste transfer. EPA has published a range of guidance to assist duty holders who are subject to those duties at <https://www.epa.vic.gov.au/for-business/waste/waste-duties>.

Sometimes a combination of treatment and disposal may be a way of achieving risk reduction at the site receiving the contaminated materials. The principles of environment protection set out in Part 2.3 of the Act must also be considered when EPA makes decisions around compliance with the Act as a whole. This includes consideration of the principle of the waste management hierarchy set out in section 18 of the Act and summarised as follows: ‘*Waste should be managed in accordance with the following order of preference, so far as reasonably practicable—*

*(a) avoidance;*

*(b) reuse;*

*(c) recycling;*

*(d) recovery of energy;*

*(e) containment;*

*(f) waste disposal.’*

Disposal of contaminated soil offsite to comply with the duty to manage needs to be balanced against the negative impacts, both direct and indirect, of transporting, disposing of, and managing the waste elsewhere.

## Engineering controls

The next level in the hierarchy of risk controls is the use of engineering solutions to reduce the risks of harm without removing the contamination itself. An engineering solution removes or reduces the reliance on human actions to minimise the risks of harm. Engineering controls have the potential to fail at some point, and preference should be given to robust, passive systems that do not rely on extensive maintenance and human action to perform adequately.

There is a wide range of engineering solutions that may be appropriate for managing contamination risks (the choice of which should be informed by a site-specific CSM). Examples of engineering controls include containment, encapsulation and use of barriers (for example encasing under tarmac or a slab), fencing off, soil stabilisation and venting (for example, to facilitate safer methane off-gassing).

The advantages that engineering controls offer include:

a reduction in waste disposal requirements

they may remain effective for long periods

they may be incorporated into the design or development of a site.

There are many examples in Victoria where contaminated materials have been retained onsite either as part of the reconfiguration of the site (for example, entombed in embankments required as part of the development) or, where not specifically required for the site development, encased in a way that enables the area to be safely used (for example, creating a mound in a public park).

Any intention to retain contaminated material must be fully justified and documented to be regarded as a reasonably practicable risk control measure. In some instances, EPA must be notified of the intention to retain the waste (see EPA Publication 2008: [*Guide to the duty to notify of contaminated land*](https://www.epa.vic.gov.au/about-epa/publications/2008-1)) or a development licence may be required (see Item 74 in Schedule 1 of the Regulations *L02—Contaminated sites—on-site soil retention*).

Engineering controls do not *eliminate* the risk of harm. Ongoing management will be required for the life of the engineering control (for example, through a monitoring and maintenance program). If it becomes apparent that the engineering control is not adequately minimising the risks of harm to an acceptable level, further action will be required. You should also consider the intergenerational impact that retention of contamination raises, as per the principles of environment protection.

You will need to review the effectiveness of the engineering controls if changes to the site conditions disrupt the controls and create a new exposure pathway (for example, cutting into a slab or disturbing a buried barrier), or where the sensitivity of the receptors changes (for example, a sparsely unoccupied site is used more frequently). See section 9.

## Administrative controls

Administrative controls include the implementation of protocols, procedures and information to change the behaviours of people on a site to ensure they do not expose themselves to the risks of harm. While they may be less reliable than higher-order risk controls (due to reliance on human behaviour), they can still be quick to implement, effective when well-managed and will often complement other risk control measures.[[6]](#footnote-7)

Examples of administrative controls include:

site access restrictions and signage (for example, indicating the presence of contaminated soil)

communicating/advertising that groundwater use without treatment should be restricted

monitoring programs (for example, groundwater monitoring, monitoring for natural attenuation)

policies and procedures addressing:

handling disturbed soil (for example, where underground services are needed)

preventative work practice controls (for example, equipment maintenance and improved housekeeping)

adequate training procedures, policy, supervision or shift design that reduce risks, such as induction processes, permitting systems and competency training, and responding to incidents or identifying ‘unexpected finds’ and buried waste

community consultation, including the various ways you can inform potentially affected individuals about the nature of the hazard and any steps they can take to reduce exposures, thereby minimising resulting risks.

Sharing of information on the risks of harm from the contamination is an important administrative control and is discussed in section 8.

Typically, administrative controls will be documented in a site or environmental management plan (EMP) that sets out what the range of controls are and the requirements of each to remain effective in minimising the risks of harm from the contamination.

There are many examples of how to prepare an EMP available in the public domain. One example is NSW EPA (2022) [Preparing environmental management plans for contaminated land, Practice Note](https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/contaminated-land/22p3473-emps-for-contaminated-land-practice-note.pdf?la=en&hash=CBC7F6F0E1997C8B5229A83A2407AEC7F7E5E31B), but EPA recommends that you select a template appropriate to your specific circumstances and proportionate to the level of risk that requires management:

There are many limitations to the effectiveness of administrative controls, such as:

unpredictable human behaviour

changes in staff and management over time and a loss in skills or corporate knowledge

changes in site occupancy

loss of information over time

inadequate allocation of responsibility.

Relying on administrative controls can be a more costly option in the long term because of the time and effort required to ensure they remain effective (for example, retraining, updating management plans, transferring information).

Ultimately, relying on administrative controls will only be acceptable where it is proportionate to the risks of harm, to complement other controls and to address residual risks, or where there is no other reasonably practicable risk control measure.

## Responding to risks on adjacent sites

If contamination from your site is impacting adjacent land, you must identify and take reasonably practicable measures within your management or control to reduce the offsite risk, such as removing or reducing the source.

If contamination is impacting multiple sites (for example, where a plume straddles multiple land parcels) you must work with adjacent duty holders to address the contamination risk.

## Risk management recommendations in environmental audits

Since the early 1990s around 3,000 contaminated land environmental audits have been completed in Victoria under the *Environment Protection Act 1970.* Around 75 per cent of these resulted in a Statement of Environmental Audit being issued for the site.

Statement conditions provided in environmental audits under the *Environment Protection Act 1970* and recommendations in environmental audits under the Act into the future will be relevant to assessing the actions required to meet your duty to manage. The audit findings and conditions/recommendations form part of the information about your site that you must consider in your compliance approach. Where conditions were identified through an audit and remain relevant to the circumstances of the site, these need to be accounted for as part of your duty to manage.

Examples of the types of recommendations (previously conditions) in environmental audit statements include:

a note that groundwater is polluted and is not suitable for certain uses without prior testing for the suitability of intended use[[7]](#footnote-8)

ongoing future groundwater monitoring required to demonstrate contamination plume stability or assess the potential changes of groundwater usage and hydrogeology altering the risk

requirements to install a vapour barrier to mitigate the risk of vapour intrusions

developing and maintaining an EMP for the site

maintaining a physical barrier, for example, concrete, clay capping, clean fill covering over residual contaminated soil, to prevent access

linking the environmental audit outcome to a specific development plan and requiring any changes to development to be reviewed by an environmental auditor.

An environmental auditor may also present information in an audit report that is relevant to the ongoing use of the site, but does not form part of the audit decision and statement recommendations (or conditions). For example:

a requirement to appropriately decommission groundwater monitoring bores once no longer required

reference to background/diffuse levels of contaminants in groundwater that are not attributed to the site but may prevent some uses

considerations around aesthetic aspects, including odour, minor residual asbestos fragments or inert material that is not considered to pose a risk to human health.

The outcome of environmental audits is based on the best available knowledge and ensuring appropriate action at the time of completion. However, knowledge surrounding contamination and industry assessment and remediation practices continues to evolve. Therefore, some of the older audits do not address all risks of harm to a level consistent with the current state of knowledge. For example, before the year 2000 audits generally did not include groundwater investigations, vapour intrusion risks emerged as a matter for audits around 2010, and consideration of the presence of PFAS began around 2015.

Therefore, when relying on environmental audit recommendations as part of your compliance approach, you need to consider the age of the audit report and recommendations and whether some additional inquiry is needed.

## Minimising risks of harm so far as reasonably practicable

### Determine what is reasonably practicable in the context of risk control

Having identified risk minimisation options in line with the hierarchy of risk controls, you must select, and implement, all controls that are reasonably practicable to minimise the risks of harm to human health and the environment and fulfil the requirements of the duty to manage.

To determine what is **reasonably practicable** you must consider the five factors set out in section 6(2) of the Act (some guidance on how you may consider these factors is set out in Table 2).

To assist in understanding what ‘reasonably practicable’ means more generally, refer to [*Reasonably Practicable*](https://www.epa.vic.gov.au/about-epa/publications/1856) (publication 1856).

Table 2 Factors to account for when evaluating which risk control measures are reasonably practicable

|  |  |
| --- | --- |
| Factor | Questions to consider |
| **Likelihood of risks eventuating** | * How well do you understand the nature and extent of the contamination and how likely is it that receptors will be exposed? * How frequently will the land be disturbed (e.g., during maintenance, redevelopment of the site etc.)? * How likely is it that people will be exposed for the duration required for impacts to occur (acute or chronic)? * Where are the receptors in relation to the contamination and any predominant direction in which the contamination is moving or is likely to move? |
| **Degree of harm that would result if risks eventuated** | * Is the receiving environment already impacted by diffuse anthropogenic concentrations of the contaminants of concern? * What would the consequence of short- and long-term exposures be without risk controls? * What would the consequence be of any failure in the proposed risk controls? * Are contaminants present on the site highly toxic, persistent, bioaccumulating, or do they possess any other properties that make them highly hazardous? * Can the contamination result in environmental impacts that are serious or irreversible? * What is the ecological significance of the receiving environment? |
| **What the duty holder knows, or ought reasonably to know, about the harms or risks of harm and any ways of eliminating or reducing those risks** | * How well do you understand the potential risks (based on your state of knowledge and what you should reasonably know about the risk)? * How well have risks from contamination been characterised? * What work did you do to evaluate the risks and develop adequate risk controls? * What types of practices are being adopted to eliminate or reduce those risks on comparable sites? * What information exists in the public domain on this matter? * What guidance or compliance advice has been provided by EPA? * What is known about historical incidents? |
| **Availability and suitability of ways to eliminate or reduce those risks** | * What technologies, processes and equipment are available to control the risk? * What risks do the available technologies create? (Sometimes a remedial approach to mitigate a specific risk can create a new risk.) |
| **Cost of eliminating or reducing those risks** | * What is the cost of the risk control measures available in comparison to the degree to which the risks of harm would be reduced? * What would be the cost per unit reduction of risk for each control option? |

### Decide what is reasonably practicable for land under shared management or control

When more than one person is in management or control of the land, the parties may have different views about what is reasonably practicable depending on the scope of their management or control of the land.

In this situation, a comprehensive environmental management framework (EMF) or environment management system (EMS) (for example, accredited or in accordance with AS/NSZ ISO 14001) may provide one way of demonstrating how reasonably practicable risk control measures are being implemented, particularly when the levels of management or control change over the life of a project. An EMF or EMS can provide an opportunity for a duty holder to demonstrate how risks of harm have been eliminated or otherwise reduced so far as reasonably practicable at a point in time, as well as in the long term.

## The principles of environmental protection

Any decision about risk reduction activities should also take into account the principle of integration of environmental, social and economic considerations as set out in Part 2.3 of the Act. The risks and benefits of undertaking any management action should be weighed up against the risks and benefits of not taking that action.

## Document your rationale for selecting and timing risk control measures

To meet the duty to manage contaminated land you should consider the requirements of this section when selecting or discounting a particular risk control measure. You should not simply select one or more measures without considering the effectiveness of that approach.

To assist you to demonstrate compliance with the duty to manage, consider documenting the following (taking into account the factors set out in Table ):

the various risk control measures you have considered to address the risk of harm

the comparison between them that was conducted before deciding which action to undertake

the action taken to eliminate or minimise the risk of harm.

This may assist you to demonstrate to EPA, or a person with or to whom management or control of the land will be shared or transferred, that you:

have considered the alternatives

have decided on the most appropriate control measures

are complying with the duty to manage, so far as reasonably practicable.

Information addressing the questions listed in Table will inform EPA's evaluation of whether the proposed risk controls are reasonably practicable.

Depending on the risks identified, the relevance of timeframes for implementing selected risk control measures should be factored into your rationale. For example, where there is an immediate significant risk to human health, short-term interim controls may be required to secure a site or ensure appropriate public health interventions are enabled. Once the immediate risks are addressed, a more detailed analysis of risk control measures can be done, with a focus on targeting the highest order risk controls.

# Provide information to affected people

Section 39(2) of the Act includes two specific administrative controls for minimising risks of harm to human health or the environment from contamination:

*(d) provision of adequate information to any person that the person in management or control of the contaminated land reasonably believes may be affected by the contamination, including—*

*(i) sufficient information to identify the contamination; and*

*(ii) the results of investigation and assessment referred to in paragraph (b); and*

*(iii) the risks of harm to human health and the environment from the contamination;*

*(e) provision of adequate information to enable any person who is reasonably expected to become a person in management or control of the contaminated land to comply with the duty to manage contaminated land.*

Sharing of information is one way of *minimising the risk of harm* to human health and the environment.[[8]](#footnote-9) You are only required to share information when it will support the reduction of the risk of harm. It is not intended to be a mere disclosure of facts.

You must evaluate the effectiveness of information sharing as a risk reduction measure in the context of the duty to manage and all other risk control measures being implemented. Information on contaminated land should be communicated thoughtfully and targeted towards any actions recommended to the recipients to assist them to protect themselves, and the part of the environment they manage or control.

When the impact of the contamination is occurring offsite, information may need to be shared with those responsible for managing and protecting the environmental values of the impacted areas. For example, if contamination is migrating into a river, it may be appropriate to provide information to:

* the relevant water corporation
* catchment management authority
* local conservation groups
* the Traditional Owners
* any significant users of the river (for example, recreational fishers).

The purpose of sharing information is to support the reduction of the risk of harm. Similarly, if another person offsite may be affected by the contamination, such as through the installation of a bore on their site, they can make decisions around how to minimise exposure to that contamination.

If the risks of harm are being adequately managed onsite and sharing of information to people offsite would not result in any further risk reduction, then information sharing is not required.

Information on contamination must be shared with a person who may reasonably be expected to come into management or control of the land to enable them to meet their duty to manage once they take management or control. This is to comply with section 39(2)(e) of the Act. The scope of a person’s duty is influenced by the level of management or control they will have over the land and is discussed in more detail in section 2. For some people, such as tenants who do not have access to soil or use the groundwater, there may be no reason to share information on the presence of contamination if there are no further actions required to minimise the risks of harm (for example, the site owner has capped the contamination or removed borehole access).

Sharing information on the contamination with a person who may come into management or control of the site, allows them to make informed decisions about their proposed activities for that site.

Sharing information as a risk control measure does not eliminate the need to implement other risk controls. If there are other risk controls that will eliminate or reduce the risks of harm and they are reasonably practicable, they must also be implemented. In many situations, sharing information will be one of various actions taken to meet the duty to manage.

### Shared information may need to be updated

For the provision of information to be an effective risk control measure, it may be necessary to provide updates to the recipients of the initial information, as well as any new parties who may be effected, when circumstances change, or new information is made available.

### Communicating information on risks of harm

Clear and timely communication on potential risks of harm is essential when undertaking investigations, building and maintaining trust with the community, and managing expectations. For example, the actual risks of harm are often low due to the way people use their property. In this case, the community information should outline why and how the risks of harm are low in a clear and accessible manner.

Sometimes risk assessments identify the potential for risks to human health from prolonged exposure to contamination. In these cases, it is important to consider the needs of the individuals or community receiving the information and ensure it is tailored to meet their concerns, is easy to understand, and available through multiple communication channels.

Where your investigation identifies a need to communicate with potentially impacted people, EPA recommends that you develop appropriate communication and engagement strategies that support open, transparent, and timely communication. These plans may include information such as:

key stakeholders, including government and community – you should also consider influencers such as respected and trusted members of the community or spokespeople

proposed methods of communication at key milestones throughout the investigation, risk management and remediation phases

details for key contacts

communication channels for providing information and data to impacted parties where necessary

avenues for questions/requests for further information from affected stakeholders

contingency planning for scenarios that require additional support (for example, health impact assertions, communicating with different language groups)

documentation and record keeping ensuring that queries are responded to and closed out.

For further specific guidance on risk communication, please refer to:

[enHealth](https://www.health.gov.au/resources/publications/enhealth-guidance-risk-communication-principles) Risk Communication Guidance – Risk Communication Principles

[NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288) Schedule B8 - ‘Community Engagement and Risk Communication’.

### Record of information sharing

If you rely on sharing information as a risk control measure you should keep a record of who you shared the information with to demonstrate how this measure has been effective. It may also be necessary to take steps to ensure recipients have understood the information provided to them. By maintaining these records, you should also be able to determine what, if any, updates may be needed in the future if circumstances change in relation to the contamination, or if new knowledge is obtained.

# Review reasonably practicable risk control measures

The final step in fulfilling the duty to manage is to undertake periodic reviews of the selected risk control measures to ensure they remain effective in reducing the risks of harm so far as is reasonably practicable. In the context of contaminated land management, this also includes ensuring that any remedial works undertaken to minimise risks are properly validated. For example, where *in situ* treatment has been adopted – checking that it has worked; where engineering controls have been adopted – periodically checking to ensure they are operating effectively.

This step covers two main themes:

* Ensuring risk control measures are and remain effective.
* The circumstance that may trigger the need for further action (for example starting back at Step 1 – identify hazards).

## Validate risk control measures

Checking risk controls (and being able to effectively demonstrate this) is a key measure to ensure compliance with the duty to manage. Depending on the nature of the controls, different types and frequencies of checks will be appropriate.

When risk controls involve the treatment or removal of contamination, the key control check is validation sampling, which is to be carried out in a manner consistent with a recognised sampling method. In some cases, validation sampling occurs over a period of time (for example, ongoing groundwater sampling after remediation).

When risk controls involve engineering controls (section 7.7), you will need to monitor the performance of the system, which may include the development of an ongoing monitoring and maintenance plan. A documented record of monitoring the control should be available on request if it is to form part of your compliance approach.

For administrative controls (section 7.8) checking the effectiveness of the controls is particularly important. Internal systems may be developed to ensure that the administrative controls are followed. When relying on administrative controls to demonstrate compliance, keeping a written record will support you to demonstrate how the controls are working, for example under a site management plan or EMP.

In some circumstances, it is appropriate to monitor the fate and transport of groundwater contamination as part of *both* assessments of groundwater contamination and implementing management controls. Monitoring can also provide information on the contamination that may be appropriate to share with others who may be affected by it.

## Changes in circumstances

There are five general circumstances in which a review of your risk control measures may be appropriate:

if you become aware that the risk control measure is not operating as intended or is not as effective as you initially assumed

before any alteration is made to the site that could change the risk profile of the contamination that remains on the site

if new or additional information about the nature, extent or mobility of the contamination becomes available

if any incident or unexpected event that involves the contamination takes place or occurs in an area where contamination remains on the site

if, for any other reason, the risk control measures do not adequately control the risks.

Having a documented control measure option analysis will also be beneficial for the duty holder when reviewing control measures in the future. For example, a control measure that is not reasonably practicable now may become reasonably practical for implementation in the future.

## Frequency of conducting reviews

Evaluating risk controls is a dynamic process. Regular evaluation helps to identify whether risk reduction measures are still appropriate. It also helps to determine if measures can be improved to comply with the duty to manage in a way that is reasonably practicable.

Generally, the higher up the risk control hierarchy from which the risk control measure has been selected, the less frequently they need to be reviewed, with actions that eliminate the risk requiring no further review. You will need to review controls such as engineering and containment actions in line with any recommendations made around the implementation of those measures, including reference to any relevant standards.

Administrative controls may require more frequent review to verify that they are working and remain effective, and whether there are any new (and/or more reasonably practicable) controls available. For example, training as a control measure should be conducted as often as new people commence at the site, and refresher training may be required periodically to ensure those who have already received training can recall the policies and procedures and demonstrate their understanding and adherence to them.

# How EPA will assess compliance

One purpose of this guideline is to provide duty holders with an understanding of what EPA expects for compliance with section 39 of the Act. EPA will use the guideline as part of the way it assesses compliance with section 39.

## EPA’s regulatory approach

Any enforcement activityEPA undertakes will be guided by our Regulatory Intent and our **Compliance and enforcement policy** (<https://www.epa.vic.gov.au/about-epa/publications/1798-2>).

Our regulatory approach uses a mix of encouragement and deterrence to motivate action and deliver improved outcomes for Victorian communities and the environment.

As a science-based regulator, we apply a risk-based approach that uses science, intelligence and evidence to prioritise our effort to where we can make the biggest difference. When we make decisions under the Act, we are guided by the principles of environment protection. Our decisions also give regard to human rights under the Charter of Human Rights and Responsibilities.

We work with other organisations, agencies and partners to protect human health and the environment. Local government (councils) play an important role as joint-regulators, bringing timely responses to localised issues of pollution and waste.

We respect and acknowledge Traditional Owner cultural values and knowledge and their responsibility and duty to protect and heal Country. We engage and collaborate with Traditional Owners to consider cultural values as part of our regulatory approach.

When we use our regulatory tools, we focus on the problem and desired outcome and apply them in a consistent, transparent, and proportionate way.

## Recording evidence of your compliance with the duty to manage

There are no routine reporting requirements relating to the duty to manage. However, EPA expects that on request, duty holders will be able to provide evidence of their compliance with the duty to manage.

There are references throughout this guideline to documentation that may aid a duty holder in demonstrating compliance with specific steps in the risk assessment and management process.

[Implementing the general environmental duty](https://www.epa.vic.gov.au/for-business/find-a-topic/environment-protection-laws-and-regulations/implementing-the-general-environmental-duty---a-guide-for-licence-holders/documentation-and-demonstration-of-the-ged) also provides a useful general guide to how to approach documentation of compliance more generally under the Act.

# Case studies

## Case study: Identifying potential contamination on Lennie’s land

### Identifying potential contamination

Lennie owns a property in an industrial estate on the northern edge of Melbourne. As the owner, she is in management and control. The previous owner provided Lennie with an environmental report. The report includes the results of some soil and groundwater sampling and testing done previously. The assessment considered the current and past land uses of the site. Past use included the chemical treatment of timber for preservation. Lennie is also aware from a report on past insurance claims that there had been several fires at the site. The buildings on the site date from a time when asbestos cement sheets and lead paint were used.

Based on this information, Lennie concludes her property is potentially contaminated.

### Assessing potential contamination – preliminary site investigation

Lennie is considering developing her property, identified as potentially contaminated.

Lennie has engaged an environmental consultant to help her understand the contamination status. Contaminated land is complex. Lennie does not have suitable qualifications or experience to assess the land herself. She asks the consultant to conduct a PSI. This assessment will consider whether contamination at the site could pose a risk to human health or the environment.

The consultant investigates the history. They consider the records provided to Lennie by the previous owner. They also review public records such as historic aerial photography, council records, and nearby environmental audits. Finally the consultant conducts a site visit to determine if there are any obvious visual or olfactory signs of contamination at the site. During the site visit the consultant identifies that the buildings are weathered and there are several places where the asbestos sheeting is damaged. This indicates to the consultant that there is the potential for hazardous building materials such as flakes of lead based paint and fragments of asbestos cement to have accumulated in soil surrounding the buildings.

Based on the PSI, the consultant identifies likely contamination which may pose a risk to human health or the environment. The consultant identifies that soil and groundwater at the site may be affected by copper, chrome and arsenic from the timber treatment, PFAS (Per-and polyfluoroalkyl substances) from historic fires, and asbestos and lead from the erosion of the building materials.

The consultant recommends further assessment to better understand the contamination. The further assessment is called a DSI. As part of the assessment, the consultant will consider the potential risks to human health and the environment.

### Assessing potential contamination – conceptual site model

While conducting the PSI for Lennie’s land, the consultant prepares a preliminary CSM. To develop the preliminary CSM the consultant collects information about the site. This includes information about the underlying soil type, geology, and hydrogeology. The consultant also collects information about the surrounds, including neighbouring land uses. They consider potential receptors that may be affected.

The CSM identifies two sensitive receptors in the vicinity of Lennie’s land. A neighbouring property is occupied by a residential apartment complex. The site is in Melbourne’s Merri Creek catchment.

### Assessing potential contamination – detailed site investigation

Based on the results of the PSI, the consultant recommended Lennie conduct a DSI.

Lennie asks the consultant to assess if the land is 'contaminated land' under the Act. If so, she would need to meet the duty to manage. She asks the consultant to consider the most sensitive onsite use.

The DSI involves the consultant collecting soil and groundwater samples. They then analyse them for a range of potential contaminants identified in the PSI. Lennie’s land is zoned 'industrial'. So the consultant considers the results against the Health-Based Investigation Levels (HIL) values in [Schedule B1 of NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_2) for Commercial/industrial Properties (HIL D).

The results of the soil assessment show contamination near the boundary. They also suggest it originates from the site. The consultant updates the CSM to include this finding. They tell Lennie that contamination from her land may be moving to the neighbours' land.

Based on the updated CSM, the consultant modifies the assessment. They'll now consider the potential for offsite contamination. This means consideration of human health in a high-density residential setting. They'll reference the HIL B values in [Schedule B1 of NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_2): Residential with minimal opportunities for soil access.

The DSI finds that contamination at the border with the neighbouring site is below the relevant criteria so there is no need to share information with the neighbours.

If the contamination at the border was at higher levels, it could affect the neighbours' land use. If so, Lennie would need to inform her neighbours about the contamination, as part of her obligation to share information. This obligation is in section 39(2)(d) of the Act.

The CSM shows that the site is in Melbourne’s Merri Creek catchment and that groundwater from the site is flowing in the direction of Merri Creek. So, the investigation needs to consider the potential for groundwater originating from the site to impact on Merri Creek. The consultant refers to the [ERS](http://www.epa.vic.gov.au/about-epa/laws/epa-tools-and-powers/environment-reference-standard). They find applicable indicators for environmental values relevant to Merri Creek and compare these to the results of the groundwater sampling conducted at the site. They find that the groundwater results are less than the applicable indicators and therefore they conclude it is unlikely groundwater from the site will adversely impact the environmental values of Merri Creek.

## Case study: Choosing reasonably practicable risk controls to minimise risks of harm from contamination: Kinsella Chemicals Pty Ltd

Kinsella Chemicals operates several manufacturing facilities across Australia and New Zealand. Ju-Lin is the environment manager for Victorian operations. Having learned about the new Act, Ju-Lin evaluates Kinsella Chemicals’ operations. She is preparing a compliance plan she will take to the company’s CEO to approve.

Ju-Lin identifies one of Kinsella Chemicals’ sites where contamination is likely based on an assessment the company conducted before purchase. The due diligence assessment found old site records showing several large spills occurred. There is no evidence these were cleaned up, and as such she predicts contamination.

Ju-Lin has concluded that risk elimination is not reasonably practicable. This is based on the level of risk posed by the contamination resulting from the spills, and its location in relation to established infrastructure. Ju-Lin then looks at how the risks of harm could be reduced so far as reasonably practicable, based on the hierarchy of risk controls.

Ju-Lin identifies several hotspots. Some are suitable for onsite treatment of the soil. In other areas, concrete paving barriers can be used to minimise access to low-level contamination. She also writes an SMP establishing policies and procedures, and training. The plan details how contamination risks must be managed on the site. She takes this information to the CEO to demonstrate how Kinsella Chemicals can meet its duty to manage.

All this information can be shared with any future occupant or owner of the site, should Kinsella Chemicals relinquish or share management or control of the site in the future.

# Glossary of key terms

|  |  |  |
| --- | --- | --- |
| Term | Summary | If appears in the Act,  relevant Section |
| Aquifer | (Defined in section 3 of the Act)  A geological structure or formation or an artificial land fill permeated or capable of being permeated permanently or intermittently with water. | NA |
| Average threshold | (Defined in regulation 4 of the Environment Protection Regulations 2021)  The 95% upper confidence limit on the arithmetic average concentration of a contaminant in or on soil that is equal to the Health Investigation Level (HIL) for that contaminant for the current use of the land, as specified in section 6 of  [Schedule B1 to the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_2). See NEPM (ASC) Sch. B2: section 13.2. | NA |
| Background level | Section 36 of the Act defines the background level of waste, a chemical substance or a prescribed substance in relation to land is:   * the background level specified in, or determined in accordance with, the regulations or an environment reference standard in relation to the waste, chemical substance or prescribed substance; or   if the regulations or an environment reference standard do not specify, or set out how to determine, a background level for the waste, chemical substance or prescribed substance – the naturally occurring concentration of the waste, chemical substance or prescribed substance on or under the surface of land in the vicinity of the land.  See EPA Publication 1940 [*Contaminated land: understanding section 35 of the Environment Protection Act 2017,*](https://www.epa.vic.gov.au/about-epa/publications/1940) | 36 |
| Contaminant | A chemical substance the presence of which may result in the land being ‘contaminated land’ within the meaning of section 35 of the *Environment Protection Act* *2017*. | 35 |
| Contaminated land | Land where waste, a chemical substance or a prescribed substance is present on or under the surface of the land, and the waste, chemical substance or prescribed substance—  (a) is present in a concentration above the background level; and  (b) creates a risk of harm to human health or the environment.  Land is not contaminated—  (a) merely because waste, a chemical substance, or a prescribed substance is present in a concentration above the background level in water that is on or above the surface of the land; or  (b) if any prescribed circumstances apply.  See EPA Publication 1940 [*Contaminated land: understanding section 35 of the Environment Protection Act 2017*](https://www.epa.vic.gov.au/about-epa/publications/1940) for information on this definition. | 35 |
| Environment | The physical factors of the surroundings of human beings including the land, waters, atmosphere, climate, sound, odours and tastes; and the biological factors of animals and plants; and the social factor of aesthetics. | 3 |
| Groundwater(part of the definition of ‘land’) | Any water contained in or occurring in a geological structure or formation or an artificial landfill below the surface of land.  (As set out in clause 13(2) of the Environment Reference Standard, environmental values do not apply to water within a landfill cell). | 3 |
| Harm | An adverse effect on human health or the environment (of whatever degree or duration) and includes:  (a) an adverse effect on the amenity of a place or premises that unreasonably interferes with or is likely to interfere with enjoyment of the place or premises;  (b) a change to the condition of the environment so as to make it offensive to the senses of human beings; or  (c) anything prescribed to be harm for the purposes of the Act or Regulations.  Harm may arise as a result of the cumulative effect of harm arising from an activity combined with harm arising from other activities or factors. | 4 |
| Health Investigation Levels (HILs) | Assessment criteria presented in the NEPM (ASC) | NA |
| Health Screening Levels (HSLs) | Assessment criteria presented in the NEPM (ASC) | NA |
| Human health | Defined to include psychological health. | 3 |
| Land | Any land, whether publicly or privately owned, and includes any buildings or other structures permanently affixed to the land; and groundwater. | 3 |
| Localised elevated value threshold | (Defined in regulation 4 of the Environment Protection Regulations 2021)  The concentration of a contaminant in an individual soil sample that is equal to 250% of the HIL for that contaminant for the current use of the land, as specified in section 6 of Schedule B1 to the NEPM (ASC).  This applies to what is sometimes referred to as a ‘hotspot’. Such hotspots may be associated with the source of a contaminant on a site, or they can be a location at which a contaminant has preferentially accumulated. | NA |
| Non-aqueous phase liquid | (Defined in the Environment Protection Regulations 2021)  An organic or inorganic liquid that—  (a) is not miscible with water; and  (b) can exist in soil or groundwater in various forms; and  (c) is commonly present as a measurable thickness (phase-separated) or sheen; and  (d) may be identifiable analytically (in soil or groundwater) when solubility has been reached or observed to be present within the unsaturated soil, rock profile or aquifer matrix.  Example: oil in water. | NA |
| Pathway | A route through which contamination could spread. This means how people or the environment come into contact with the contamination. For example, chemicals leaking into groundwater, vapour emissions through soil or air or both, or exposed contaminated soil. | NA |
| Receptor | Someone or something the contamination could impact. Receptors include children, workers, community members, residents, and the environment, such as animals, plants, and waterways. | NA |
| Site | (Defined in the *Environment Protection Act 2017*)  Specified land or a specified parcel of land. | 3 |
| Source | Where the contamination comes from. For example, a leaking oil drum or a landfill site. The original source may no longer be present, but the contaminant could still be. | NA |
| State of knowledge | The body of accepted knowledge that is known or ought to be reasonably known about the harm or risks of harm to human health and the environment and the controls for eliminating or reducing those risks.  The state of knowledge will develop over time as new technology, systems and processes develop or where there is an emerging risk.  See EPA Publication 1741 [Industry guidance: supporting you to comply with the general environmental duty](https://www.epa.vic.gov.au/about-epa/publications/1741-1) for more information about the state of knowledge. | NA |
| Waste | Includes any of the following—  (a) matter, including solid, liquid, gaseous or radioactive matter, that is deposited, discharged, emitted or disposed of into the environment in a manner that alters the environment  (b) a greenhouse gas substance emitted or discharged into the environment  (c) matter that is discarded, rejected, abandoned, unwanted or surplus, irrespective of any potential use or value  (d) matter prescribed to be waste  (e) matter or a greenhouse gas substance referred to in paragraph (a), (b), (c) or (d) that is intended for, or is undergoing, resource recovery | 3 |

# Acronyms and abbreviations

|  |  |
| --- | --- |
| Acronyms and abbreviation | Definition |
| CSM | Conceptual site model |
| DQO | Data quality objectives |
| DSI | Detailed site investigation |
| EES | Environment Effects Statement |
| EMF | Environmental management framework |
| EMP | Environmental management plan |
| EMS | Environment management system |
| ERA | Ecological risk assessment |
| ERS | Environment Reference Standard |
| GED | General environmental duty |
| HIL | Health investigation level |
| LEVT | Localised elevated value threshold |
| NAPL | Non-aqueous phase liquid |
| NEPM (ASC) | National Environment Protection (Assessment of Site Contamination) Measure 1999 |
| NEMP | National Environmental Management Plan (for PFAS) |
| PFAS | Per-and polyfluoroalkyl substances |
| PPE | Personal protective equipment |
| PSI | Preliminary site investigation |
| SMO | Site Management Order |

# Appendix A: Broader management of contamination in Victoria

The duty to manage is one of a range of obligations, decision-making processes, and other legislative schemes that together help to identify and manage risks of harm from contamination of land.

**Figure 3** shows where the duty to manage sits within Victoria’s contaminated land scheme. It does not present all obligations relating to contamination (for example, the *Water Act 1989* sets groundwater licensing requirements). This figure shows key components of the regulatory system in relation to contamination. Information on other contaminated land provisions in the Act and other key legislative schemes in Victoria is provided in Appendix B.


Description  

Green text box Planning and Environment Act 1987 

Establishes land use and planning scheme, including planning decisions for developing and using contaminated land  

Subtopics: 
Victorian planning schemes and provisions;  
Planning;  
Environmental Audit Overlays;  
Ministerial Direction 1; 
Planning Practice Note 30; 

Blue text box, Environmental Protection Act 2017  

Defines “contaminated land”, establishes duties relating to contaminated land, includes a duty to manage and notify, and creates an assurance scheme for assessing contamination  

Subtopics:  
Duty to manage contaminated land;  
Clean up of non aqueous phase liquids (Reg 15);  
Duty to notify of certain contaminated land;  
Environmental reference standard; 
Environmental audit and auditor scheme;  
Remedial notices;  
Waste obligations (including soil);  
Permissions for retaining contaminated soil;   
Public register;  
Better Environment Plans.  

Orange text box. Occupational Health and Safety Act 2004 

Regulates health and safety matters at workplaces 

Subtopics:  
Duties to protect employees and other persons at workplaces;   
Construction risk management obligations.  

Teal text box. Environmental Effects Act 1978 

Establishes approval process for projects with a significant impact on the environment. 

Subtopic: 
Consideration of contamination as part of major projects.



1. Figure 3: The duty to manage contaminated land (and duty to clean up NAPL) set in the context of key components of Victoria’s contaminated land scheme.

The contaminated land provisions under the Act build on Victoria’s existing approach to the management of contaminated land and groundwater. The provisions broaden the range of duty holders who have a stake in risk management.

Formerly the Victorian community was protected from risks of harm from contamination through a combination of planning scheme controls (under the [*Planning and Environment Act 1987*](https://www.planning.vic.gov.au/legislation-regulations-and-fees/planning-legislation)*)*, and direct compliance and enforcement action by EPA under the *Environment Protection Act 1970*.

EPA supports a national approach to the assessment of contaminated land and groundwater through the [National Environmental Protection (Assessment of Contaminated Sites) Measure](https://www.legislation.gov.au/Details/F2013C00288). A range of environmental values is supported by indicators and objectives, which are based on the NEPM (ASC) and incorporated into Victoria’s new [Environment Reference Standard](https://www.epa.vic.gov.au/about-epa/laws/compliance-and-directions/environment-reference-standard).

‘Potentially contaminated land’ under the *Planning and Environment Act 1987*

In this guideline, reference is made to the potential for land to be contaminated. This expression is in recognition of the fact that until sampling (of soil, water, groundwater) is undertaken, the presence of contamination can only be inferred by reference to historical land use and visible indicators of contaminating activities – such as old infrastructure.

The *Planning and Environment Act 1987* establishes a system of land use planning and approvals, including through Ministerial Directions and the Victoria Planning Provisions. In the context of that scheme, the expression ‘potentially contaminated land’ has a specific meaning describing certain past land uses (such as mining and industrial) and activities (such as storage of chemicals), which once identified, may require additional processes to be performed before a planning decision can be made for such land and its future use.

In that regulatory setting, land is presumed to be contaminated based on its history of use, until the planning decision maker is satisfied otherwise (for example, through completion of an environmental audit) or where zoning changes are accepted but only on the condition that development of the land for a sensitive use includes further investigation being undertaken. [Planning Practice Note 30 – Potentially Contaminated Land](https://www.planning.vic.gov.au/__data/assets/pdf_file/0027/97164/PPN30-Potentially-contaminated-land.pdf) (DELWP, July 2021) provides guidance on how to identify if land is potentially contaminated and includes indicative land uses and their potential risk of contamination.

The guidance that supports the planning scheme approach to considering contamination risks in planning decisions may be of assistance in meeting the duty to manage contaminated land under the *Environment Protection Act 2017*. It is important, however, to recognise the different legislative intent of guidance supporting the planning scheme as compared to EPA-issued guidance on contaminated land (or other guidance specific to contaminated land referred to therein).

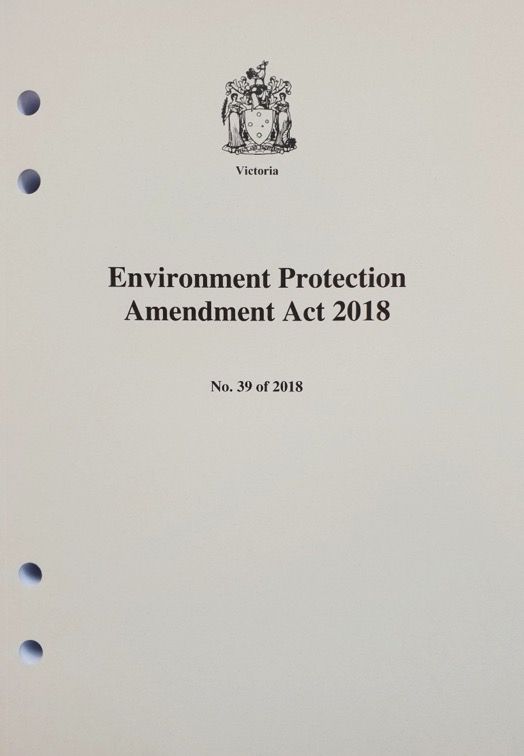
EPA continues to support the role of councils and decision makers in the planning scheme by maintaining the standards of the environmental audit scheme, which provides for consistent and high-quality assessments of potentially contaminated land. EPA’s [environmental audit scheme](https://www.epa.vic.gov.au/for-business/find-a-topic/environmental-audit), in place since 1989, continues with some improvements under the 2017 Act.

EPA also continues to provide advice to councils and planning decision makers on strategic land use decisions. Updated Victoria Planning Provisions related to contaminated land, and supporting documents, have been published by the Department of Environment, Land, Water and Planning to accommodate the Act.

# Appendix B: Overview of the contaminated land provisions in the Act and the role of this guideline

## Role of this guideline in supporting the duty to manage contaminated land

The key documents of the contaminated land scheme are:

[***Environment Protection Act 2017***](https://www.legislation.vic.gov.au/in-force/acts/environment-protection-act-2017/)

Establishes legal obligations regarding contaminated land, including the duty to manage contaminated land.

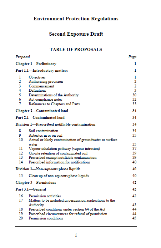
Defines ‘contaminated land’.

Establishes remedial powers for EPA.

Establishes the environment audit and auditor scheme.

Creates rights for third parties to address contaminated land matters.

Specifies compliance requirements in relation to NAPL.

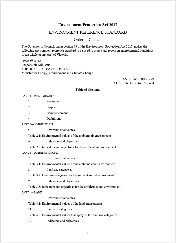
Sets out the principles of environment protection.

[**Environment Protection Regulations 2021**](https://www.legislation.vic.gov.au/as-made/statutory-rules/environment-protection-regulations-2021)

Extends the roles of environmental auditors.

Specifies compliance requirements in relation to NAPLs.

Prescribes the meaning of ‘notifiable contamination’ for the purposes of the Act.

[**Environment Reference Standard**](http://www.gazette.vic.gov.au/gazette/Gazettes2021/GG2021S245.pdf) **(ERS)**

Provides a reference standard to assist in characterising what is important and valued in the environment and for human health.

Lists indicators and associated objectives for four environmental elements: ambient air, ambient sound, land, and water.

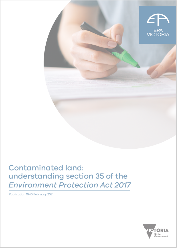
Environmental auditors engaged to assess contamination must have regard to the reference standards for land and groundwater set out in the ERS.

[**Contaminated Land Policy**](https://www.epa.vic.gov.au/about-epa/publications/1915)

Sets out EPA's approach to applying the contaminated land scheme.

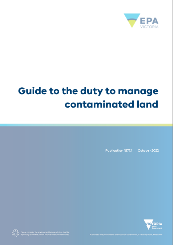
Outlines EPA’s approach to administering the scheme.

Provides stakeholders with an understanding of how EPA will approach contaminated land matters.

**EPA position statements, positions and interim positions**

EPA can propose a formal opinion on how a provision of the Act or the Regulations would apply to a class of persons in specified circumstances or how EPA would exercise a discretion under a provision of the Act or the Regulations. These are formal legal instruments known as ‘position statements’ and require public consultation.

EPA may also publish general information on its position on any relevant matter, including contamination risks and controls, including interim positions.

**Guide to the duty to manage contaminated land (this guideline)**

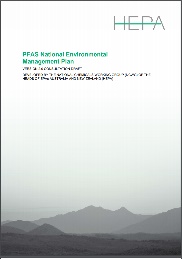
Sets out practical guidance on how to meet the duty to manage for persons in management or control of contaminated land.

Sets the standard of conduct expected by EPA to meet the duty to manage.

**Other EPA guidance**

A range of EPA guidance addresses foundational concepts that apply to a number of duties, such as the expression ‘reasonably practicable’.

Such guidance may be of assistance when developing a compliance approach to the duty to manage for circumstances not specifically covered by this document.

**Other guidance**

For topics or circumstances not covered by EPA’s guidance it may be appropriate for duty holders to look more broadly for information that represents the current state of knowledge on those matters.

From time to time, EPA may incorporate reference to other sources of information to assist duty holders.

Where relying on non-EPA guidance it is important to note that where any inconsistency arises between the non-EPA guidance and the Act, the Act prevails.

## Duty to notify of certain contaminated land

In some circumstances, contamination of land must be reported to EPA under the duty to notify of contaminated land (section 40 of the Act). While this duty *complements* your duty to manage, it does not replace it.

Importantly, where you are required to notify EPA, you must provide information on your management response, or proposed management response, to the notifiable contamination. This guideline can assist you in preparing that response.

In some instances, a duty holder may only become aware that they have notifiable contamination while taking steps to meet their duty to manage. EPA recommends that as part of meeting your duty to manage, you consider how you will determine whether your contamination meets the criteria under Chapter 2 of the Regulations for ‘notifiable contamination’.

For more information on the duty to notify, refer to EPA Publication 2008 [*Guide to the duty to notify of contaminated land*](https://www.epa.vic.gov.au/about-epa/publications/2008-1) and publication 1915 [*Contaminated Land Policy*](https://www.epa.vic.gov.au/about-epa/publications/1915).

## General environmental duty

While the duty to manage is the primary duty for addressing risks of harm from contamination, those who engage in an activity that involves contaminated land must also comply with the GED. When a person is engaging in an activity involving contaminated land that may give rise to risks of harm to human health or the environment from pollution or waste, the person must minimise those risks so far as reasonably practicable.

While this guideline helps to identify the risks of harm from contaminated land and how they might arise, EPA recommends that risks that could arise from an activity involving contaminated land (for example, developing an old industrial site) are integrated into broader compliance with the GED. In particular, when conducting the risk identification and management actions set out in section 25(4) of the Act, EPA recommends that you consider contamination risks as part of your compliance approach to activities you engage in on contaminated land.

You should consult EPA’s sector guides to help identify risks of harm that are commonly associated with these different sectors, with the aim to also prevent contaminated land.

<https://www.epa.vic.gov.au/for-business/find-your-industry>

You may also consider EPA's guidance in [*Assessing and controlling risk: A guide for business*](https://www.epa.vic.gov.au/about-epa/publications/1695-1) (publication 1695) in your approach to minimising risks of harm from activities involving contaminated land.

## Environment Protection Regulations 2021

### Non-aqueous phase liquids (NAPL)

Regulation 15 of the Regulations requires that:

*A person in management or control of land where a non-aqueous phase liquid is present in soil or groundwater must, so far as reasonably practicable—*

*(a) clean up the non-aqueous phase liquid; and*

*(b) if the source of the non-aqueous phase liquid is located on the land, remove or control the source of the liquid.*

It is mandatory that you comply with regulation 15 to demonstrate compliance with your duty to manage under section 39 of the Act.

The key aspect of regulation 15 is that it **prescribes** that part of your compliance approach **must** include the cleanup of the NAPL and removal or control of the source of the NAPL on your land so far as reasonably practicable.

For example, you cannot rely solely on natural attenuation of the NAPL as a risk control measure where it remains reasonably practicable to directly remove the NAPL, including its source.

See EPA publication 840 [*The cleanup and management of polluted groundwater*](https://www.epa.vic.gov.au/about-epa/publications/840-2) for more information on what EPA expects in relation to NAPL. While publication 840 still reflects EPA’s expectations for treatment of NAPL, it is currently being revised to reflect the new legislative framework.

### Contaminated land management and waste management

The Act establishes distinct waste and contaminated land obligations. Depending on the circumstances one or both may apply.

When there is no opportunity to safely reuse contaminated soil as part of site development, it will meet the definition of ‘waste’ as it will be regarded as ‘surplus’. When it is excavated from the land the waste duties in Chapter 6 of the Act and Part 4 of the Regulations will govern which obligations apply. Further, waste duties of the Act apply when the soil also fulfils the definition of ‘industrial waste’ (for example, if the soil is generated from commercial development of a site). For waste soils, this means that any waste soils arising from commercial, industrial or trade activities or from laboratories are considered to be industrial waste. Any waste soil being transported for a fee or reward is also industrial waste (other than the collection of kerbside waste by or on behalf of a council or a Waste and Resource Recovery Group).

When soils are sourced on-site from contaminated land that is industrial waste, they must be classified in accordance with Regulation 62 as soon as practicable.

EPA has published a range of guidance to support compliance with each part of the Act. See [www.epa.vic.gov.au](http://www.epa.vic.gov.au).

## Environment Reference Standard

The ERS defines important qualities of the environment in Victoria, for the community, government, and industry. It:

* identifies environmental values that the Victorian community wants to achieve and maintain
* provides a way to assess those environmental values in locations   
  across Victoria.

An environmental value is an aspect of the environment that is important to us, and how we use it. It is an outcome Victorians want for human health and the environment.

EPA will use the ERS as a guiding reference in many situations. This includes   
when we:

* monitor and assess environmental quality
* identify and respond to threats to the environment and human health
* take opportunities to improve environmental quality
* provide advice and recommendations to other decision makers.

Importantly, the ERS is a reference tool to help make decisions – it does not create specific obligations, set out compliance limits the law can enforce, or imply a level that is acceptable to ‘pollute up’ to.

The ERS may assist in interpreting the definition of contaminated land in section 35 of the Act for a particular location. EPA publication 1940 [*Contaminated land*: *Understanding section 35 of the Environment Protection Act 2017*](https://www.epa.vic.gov.au/about-epa/publications/1940) provides information on how to consider the ERS in the context of the definition in the Act.

EPA recommends that environmental professionals consider the ERS when assessing potentially contaminated land. The ERS is a reference tool to help identify potential risks of harm from the presence of chemical substances in the environment. In some circumstances, aesthetic aspects will also be relevant to the management of contaminated land. The ERS sets out various indicators and objectives relating to such environmental values.

The ERS does not contain an exhaustive list of all potentially contaminating chemical substances and other matters which should be considered as part of contaminated land assessment. Some risks of harm may not be covered by the ERS and environmental professionals may provide recommendations based on appropriate alternative guidance within the state of knowledge. Examples of circumstances that may require consideration beyond the ERS include:

acute and physical risks to human health and the environment

pathogenic materials and waste, radioactive substances, unexploded ordinance and explosive gas mixtures on and under land

the potential for land contamination to impact water

the presence of chemicals or exposure pathways other than those set out in the ERS

criteria to support the assessment of indicators for agricultural land use, stock watering and irrigation

the potential for, or measurement of, the accumulation of chemicals into food for the general population.

The ERS may also assist those who manage or control contaminated land to understand the risks of harm from contamination of land and groundwater, and to prioritise risk management actions.

## Environmental audit

An environmental audit is an additional step that may accompany the contaminated land assessment process. An environmental auditor is engaged to provide an independent assessment of site conditions and risks, which may include a review of the contamination assessment process conducted by the environmental consultant. Environmental auditing remains an important element of Victoria’s contaminated land regulatory framework by providing access to expert support and assurance for assessment and management of contaminated land.

The duty to manage does not automatically trigger a requirement to complete an environmental audit. The reasons for initiating an environmental audit include:

* planning system requirements – to satisfy councils that your land is safe for the proposed use or to consider risks for developments proposed within a landfill buffer zone
* EPA remedial notice or order – to prove to EPA you’ve cleaned up your site or addressed identified risks
* EPA operating licence – to show you’ve met your licence conditions
* voluntary – to prove your land is safe for the existing or intended use or to assess any potential risk to human health or the environment from industrial activities
* due diligence – to assess for contaminated land to assist your decision making.

The outcome of an environmental audit will be:

an environmental audit statement, which must include, among other things, the results of the audit and any recommendations

an environmental audit report, containing a review of all relevant information the environmental audit collected and the reasons for the findings.

The information describing the nature and extent of contamination and the recommendations will help inform what, if any, actions are expected of a person in management or control of the audited site, under their duty to manage (for example maintain a vapour barrier, or ongoing groundwater monitoring).

Further information on the environmental audit scheme can be found at [www.epa.vic.gov.au/for-business/find-a-topic/environmental-audit](https://www.epa.vic.gov.au/for-business/find-a-topic/environmental-audit).

## Site management orders

The Act (section 275) provides EPA with the power to issue SMOs to ensure long-term management of contamination on a site. An SMO mandates specific management actions to minimise the risks of harm associated with contamination that remains on a site. The existence of the SMO is noted on the title of the property.

When an SMO is in place, a duty holder should incorporate compliance with it into their broader compliance with the duty to manage. For example, an SMO will generally include requirements to provide information on the SMO to any future owner or occupier of the site, which may be parallel to actions otherwise taken under section 39(2)(e).

Compliance with the SMO and the duty to manage represent distinct requirements under the Act. However, compliance with the SMO conditions will satisfy part, and in some cases all, of the requirements under the duty to manage.

Some of the measures recommended by an environmental auditor on completion of an environmental audit under Part 8.3 of the Act may subsequently be translated into an SMO for that site. In all other instances, the recommended measures from an environmental audit should be incorporated into the compliance approach under the duty to manage (see section 15.6 of Appendix B for further details).

EPA’s approach to the issue of SMOs will be set out in future guidance, to be released before the issue of any SMOs.

## The land use planning system

The *Planning and Environment Act 1987*, in particular through [Ministerial Direction 1](https://www.planning.vic.gov.au/__data/assets/pdf_file/0018/101718/Ministerial-Direction-Section-12-No.1-Potentially-contaminated-land.pdf), has sought to ensure that before 'potentially contaminated land'[[9]](#footnote-10) is used for a ‘sensitive use’ (that is, residential use, child care centre, kindergarten, preschool centre, primary school, even if ancillary to another use) or for a children’s playground or secondary school, a rigorous assessment and, if needed, cleanup or management of the contamination through the environmental audit system must take place.

Councils acting as planning or responsible authorities and other decision makers under the *Planning and Environment Act 1987* have played, and will continue to play, a critical role in protecting the community from contamination risks through the land use planning system. For example, councils will continue to require assessment of potentially contaminated land through the planning permit process, or apply the Environmental Audit Overlay through a planning scheme amendment process, to ensure the assessments through the environmental audit system take place before buildings and works associated with a sensitive use, children’s playground or secondary school occur.

Further information on potentially contaminated land and land use planning can be found in [Planning Practice Note 30 – Potentially Contaminated Land](https://www.planning.vic.gov.au/__data/assets/pdf_file/0027/97164/PPN30-Potentially-contaminated-land.pdf) (DELWP, July 2021).

## Other relevant legislation

Contaminated land is also regulated under other legislative schemes. This guideline contributes to the state of knowledge for contaminated land assessments conducted under those other schemes such as:

environment effects statements under the *Environment Effects Act 1978*

work plans prepared under the *Mineral Resources (Sustainable Development) Act 1990*

disclosures under the *Sale of Land Act 1962* (for example, disclosure of any notices, property management plans, reports or orders that have been issued in relation to livestock disease or land affected by contamination from agricultural chemicals as part of a sale of agricultural land).

## Accessibility

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Please telephone 1300 372 842 or email [contact@epa.vic.gov.au](mailto:contact@epa.vic.gov.au)

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1. To assist in understanding what ‘reasonably practicable’ means more generally, refer to [Reasonably Practicable](https://www.epa.vic.gov.au/about-epa/publications/1856) (publication 1856) [↑](#footnote-ref-2)
2. Guidance on how EPA will assess a duty holder’s standard of conduct is set out in EPA’s Compliance & Enforcement Policy, which can be found here: <https://www.epa.vic.gov.au/about-epa/what-we-do/compliance-and-enforcement/epas-compliance-approach> [↑](#footnote-ref-3)
3. See 2.5.7 of [Schedule B1 of the NEPM (ASC)](https://www.legislation.gov.au/Details/F2013C00288/Html/Volume_2). [↑](#footnote-ref-4)
4. Chapter 2 of the Act defines the precautionary principle: “If there exist threats of serious or irreversible harm to human health or the environment, lack of full scientific certainty should not be used as a reason for postponing measures to prevent or minimise those threats”. [↑](#footnote-ref-5)
5. [Publication 1940](https://www.epa.vic.gov.au/about-epa/publications/1940) (<https://www.epa.vic.gov.au/about-epa/publications/1940>) addresses the concept of ‘ambient background concentrations’ of a substance. See also section 4.2 of this guideline. [↑](#footnote-ref-6)
6. Site Management Orders (SMOs) are issued by EPA, and the conditions of them are generally a form of risk control. However, compliance with SMOs and the duty to manage contaminated land represent distinct requirements under the Act. See section 15.7 of Appendix B for further information on SMOs. [↑](#footnote-ref-7)
7. This may also be by a Groundwater Quality Restricted Use Zone. [↑](#footnote-ref-8)
8. Sharing information about site contamination is comparable to occupational health and safety requirements around sharing information on the presence of hazards in workplaces, such as the presence of asbestos, lead, and other hazardous substances to employees, contractors and visitors attending the site. [↑](#footnote-ref-9)
9. [↑](#footnote-ref-10)