EPA VICTORIA

Contaminated land: understanding section 35 of the *Environment Protection Act 2017*

Publication 1940 February 2021

VICTORIA State Government

Disclaimer

The information in this publication is for general guidance only. It does not constitute legal or other professional advice and should not be relied on as a statement of the law. Because it is intended only as a general guide, it may contain generalisations.

You should obtain professional advice if you have any specific concern. EPA has made every reasonable effort to provide current and accurate information, but does not make any guarantees regarding the accuracy, currency or completeness of the information.

EPA acknowledges Aboriginal people as the first peoples and Traditional custodians of the land and water on which we live, work and depend.
We pay respect to Aboriginal Elders, past and present.

As Victoria's environmental regulator, we pay respect to how Country has been protected and cared for by Aboriginal people over many tens of thousands of years.

We acknowledge the unique spiritual and cultural significance of land, water and all that is in the environment to Traditional Owners, and recognise their continuing connection to, and aspirations for Country.

For languages other than English, please call **131 450**.
Visit **epa.vic.gov.au/language-help** for next steps.
If you need assistance because of a hearing or speech impairment, please visit **relayservice.gov.au**

Contents

1 Overview

In Victoria, the new *Environment Protection Act 2017* (the Act)[1] and Environment Protection Regulations 2021 (the Regulations) are intended to commence on 1 July 2021. They are designed to prevent harm to human health and the environment from pollution and waste. This includes harm from past pollution and waste related activities and incidents.

At the centre of the Act is the **general environmental duty** (GED). The GED aims to prevent harm from arising in the first place, which includes ***preventing*** land, water, and air from becoming contaminated by pollution and waste.

The Act also establishes a range of duties, powers and functions relating to circumstances where pollution or waste has already impacted land or groundwater, such that it is regarded as 'contaminated' for the purposes of the Act. **Table 1** sets out each of the provisions that reference or rely on section 35 of the Act, which define contaminated land.

Protecting the Victorian community and its environment from risks of harm is EPA's primary objective in implementing the Act. This includes ensuring both the community and environment are not exposed to an unacceptable risk of harm from the presence of contamination.

This publication provides information on EPA's understanding of the definition of contaminated land. It identifies the principles and standards EPA regards as applicable to identifying land that is contaminated within the Act meaning. The publication also clarifies the relevance of key standards, such as the Environment Reference Standard (ERS) (epa.vic.gov.au/about-epa/laws/new-laws/environment-reference-standard) and the *National Environment Protection Measure (Assessment of Site Contamination) 1999* (NEPM (ASC)) (legislation.gov.au/Details/F2013C00288), to contamination matters under the Act.

For more information on the legislative scheme as it relates to contaminated land, please *Contaminated Land Policy* (publication 1915) (epa.vic.gov.au/about-epa/publications/1915).

Key abbreviations used in this document

NEPM (ASC)	National Environment Protection Measure (Assessment of Site Contamination) 1999
GED	General environmental duty
ERS	Environment Reference Standard
DtN	Duty to notify of contaminated land
DtM	Duty to manage contaminated land
CSM	Conceptual site model
HSL/HIL	Health screening Level/Health investigation level
EIL	Ecological investigation level

[1] As amended by the *Environment Protection Amendment Act 2018*.

Table 1: Sections and parts of the Act using the definition of contaminated land in section 35.

Regulatory element	Part/Section	Purpose
The contaminated land duties	Part 3.5	The duty to manage (DtM) contaminated land and the duty to notify (DtN) of contaminated land by person(s) in management or control of land.
Remedial action on contaminated land	Section 273, 274 & 275	A notice to investigate, environmental action notice and site management order may be based on land that is, or reasonably believed to be, contaminated.
Environmental audit system	Part 8.3	The purpose of undertaking a preliminary risk screen assessment (PRSA) is to confirm the likelihood land is contaminated. An environmental audit considers the nature and extent of the risk of harm from the contaminated land and may be conducted whether or not it is preceded by a PRSA.
Waste soil	Sections 25, 133-135, 139, 142 & 143; Regs 62 & 68	The duties applicable to the management of waste soil include requirements for soil sourced from contaminated land. Soil sourced onsite from contaminated land must be classified as one of the priority waste categories set out in Schedule 6 of the Regulations as soon as practicable.
EPA clean up powers	Part 10.3	One of the bases for EPA to exercise its clean up powers under Part 10.9 arises in relation to contaminated land.
Functions and referrals to EPA	Section 357	EPA's functions include identifying and responding to opportunities to eliminate or reduce risks of harm and improve environmental quality. EPA is also a referral authority and advisor to responsible authorities making decisions under the *Planning and Environment Act 1987* and the *Environmental Effects Act 1978*.
Certain authorised officer powers of entry or inspection	Section 246 (2)(c))	EPA's authorised officers may enter or inspect a place or premises to determine if there is a risk of harm to human health or the environment from contaminated land.

2 What is the role of this publication?

Figure 1 illustrates where this publication fits within the broader and established investigation and management processes for contaminated land in Victoria under the NEPM (ASC) and EPA's guidance to support duty holders to comply with the Act. Further context can also be found in *Contaminated Land Policy* (publication 1915) (epa.vic.gov.au/about-epa/publications/1915).

This publication is primarily designed to assist those who:

- have obtained data regarding the state of land they manage or control already, or
- who are planning to undertake sampling.

This publication is intended to assist in interpreting and understanding significance of such data in confirming whether land is contaminated.

For those in management or control of land that have *yet* to consider the potential of their land to be contaminated or undertake any level of investigation, EPA recommends consulting its guidance on potentially contaminated land first. A range of resources can be found at epa.vic.gov.au.

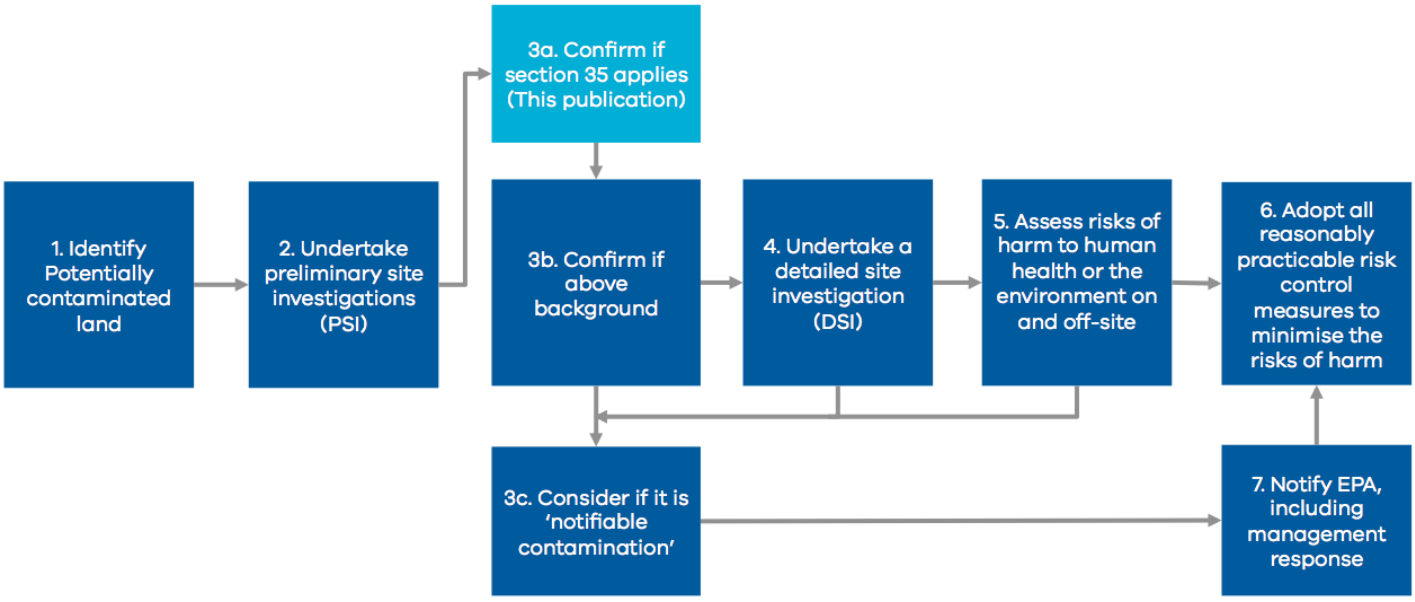

Figure 1: The context of this publication (highlighted in light blue) in relation to the general components of the Act contaminated land duties, supported by other EPA guidance. This figure provides only generalised account of steps that may apply in relation to contaminated land. EPA will make guidance on each of the topics identified in dark blue available at www.epa.vic.gov.au before 1 July 2021.

This publication has been designed to address circumstances in which land or groundwater may be contaminated. Where available, EPA identifies the role of well-established standards to make clear the boundary between land covered and not covered by section 35 by reference to concentration thresholds. In some circumstances, it is not appropriate to adopt a concentration threshold when

characterising risks of harm. For some chemical substances, standards that protect human health or the environment have not yet been agreed on. Where such standards are not available, this publication sets out the circumstances and considerations for deriving appropriate thresholds.

To support the definition, EPA identifies in this publication:

- how the environmental values that should be protected in Victoria as set out in the ERS are to be considered
- the sources of information to support identifying contaminants that may harm human health or the environment
- the role of the indicators set out in the ERS to determine the boundary between land covered and not covered by section 35, and where their use is appropriate
- the principles relevant to characterising contaminated land where agreed standards are not immediately available.

Duty holders and their advisors can use this publication to help determine whether a part of the Act applies to their circumstances. In particular, this publication should be read in conjunction with the EPA guidance *Assessing and controlling risks of harm from contaminated land*, to be released in April 2021.

This publication also assists environmental auditing and preliminary risk screen assessments. Where appropriate, this publication may be incorporated by reference into environmental auditor guidelines issued under part 8.3 of the Act.[2]

EPA will use this publication when establishing grounds for issuing remedial notices or taking other regulatory action, and when acting as a referral authority to other parts of government (such as in relation to matters under the *Planning and Environment Act 1987*).

[2] *Environment Protection Act 1970* examples of such auditor guidelines include *Environmental auditor (contaminated land): Guidelines for issue of certificates and statements of environmental audit* (publication 759) (epa.vic.gov.au/about-epa/publications/759-3) and The cleanup and management of polluted groundwater (publication 840) (epa.vic.gov.au/about-epa/publications/840-2)

3 Contaminated land definition

The Act defines *contaminated land* in section 35 as follows:

> *Subject to subsection (2), **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*[3]*—*
>
> *(a) is present in a concentration above the **background level**; and*
>
> *(b) creates a risk of **harm** to **human health** or the **environment**.*[4]

The words highlighted in **blue** are also defined under the Act. **Table 2** summarises the definitions for each of these words.

Table 2: Defined terms for understanding section 35

Term	Summary	Section
Land	Any land, whether publicly or privately owned, and includes any buildings or other structures permanently affixed to the land; and groundwater.	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.	3
Background level	See section 6.1 of this publication.	36
Waste	The Act defines waste *inclusively* through a range of circumstances of matter and substances.	3
Harm	Means an adverse effect on human health or the environment (of whatever degree or duration) and includes amenity and certain changes in conditions.	4
Human health	Defined to include psychological health	3
Environment	The physical factors of the surroundings of human beings including the land, waters, atmosphere, climate, sound, odours and tastes; the biological factors of animals and plants; and the social factor of aesthetics;	3

[3] The proposed Environment Protection Regulations do not prescribe any additional substances to be included in the definition in section 35.
[4] Section 3 defines contaminated land for all other parts of the Act outside of Part 3.5 that refer to contamination or contaminated land by reference to the definition in section 35.

4 Legislative intent of the definition

As with any defined term, the meaning and application of the definition of contaminated land must be interpreted within the context of each provision in which it is used in the Act.

The definition must also be understood in relation to the objectives and purposes of the Act and the decision-making principles for environmental protection in Chapter 2.

The Act purpose is:

> *to set out the legislative framework for the protection of human health and the environment from pollution and waste* **(section 1(f))**

EPA's application of the definition must enable it to meet its objective:

> *to protect human health and the environment by reducing the harmful effects of pollution and waste* **(section 357(1))**

To achieve this objective EPA must:

> *exercise its powers and perform its duties and functions under this Act or any other Act for the purposes of achieving the objective set out in subsection (1) to the extent that it is practicable to do so having regard to the nature of the power being exercised or the duty or function being performed* **(section 357(2))**

Importantly, the definition of contaminated land determines whether the Act provisions that rely on section 35 (see Table 1) apply to a set of circumstances. Circumstances that fall outside of the definition of contaminated land will not be regulated by Act provisions that rely on the phrase. They may still be subject to other parts of the Act, such as the GED (see boxed section *Naturally occurring chemical substances and the GED* on page 12) or the waste duties. **Figure 2** shows the relevance of section 35 in relation to the two key contaminated land duties. **Figure 3** sets out an example of how this may apply in practice.

To ensure objectives, purposes and principles of the Act are achieved, the definition should not be read narrowly. This could have the effect of unintentionally reducing the obligations of potential duty holders and discourage addressing the adverse impacts of contaminated land. The aims of the contaminated land provisions are not simply to allocate liability between parties, but to achieve an appropriate level of protection for the community and environment by those who manage or control contaminated land.

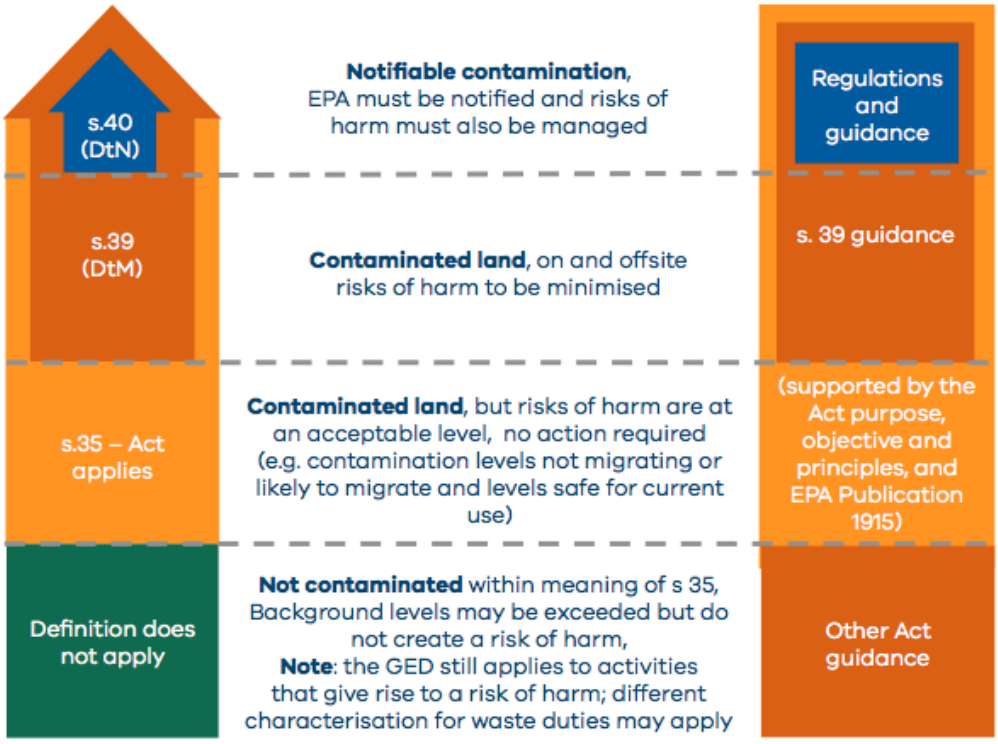

Figure 2: Role of section 35 in confirming when the Act may apply and when compliance with the duty to manage (DtM) and the duty to notify (DtN) is required.

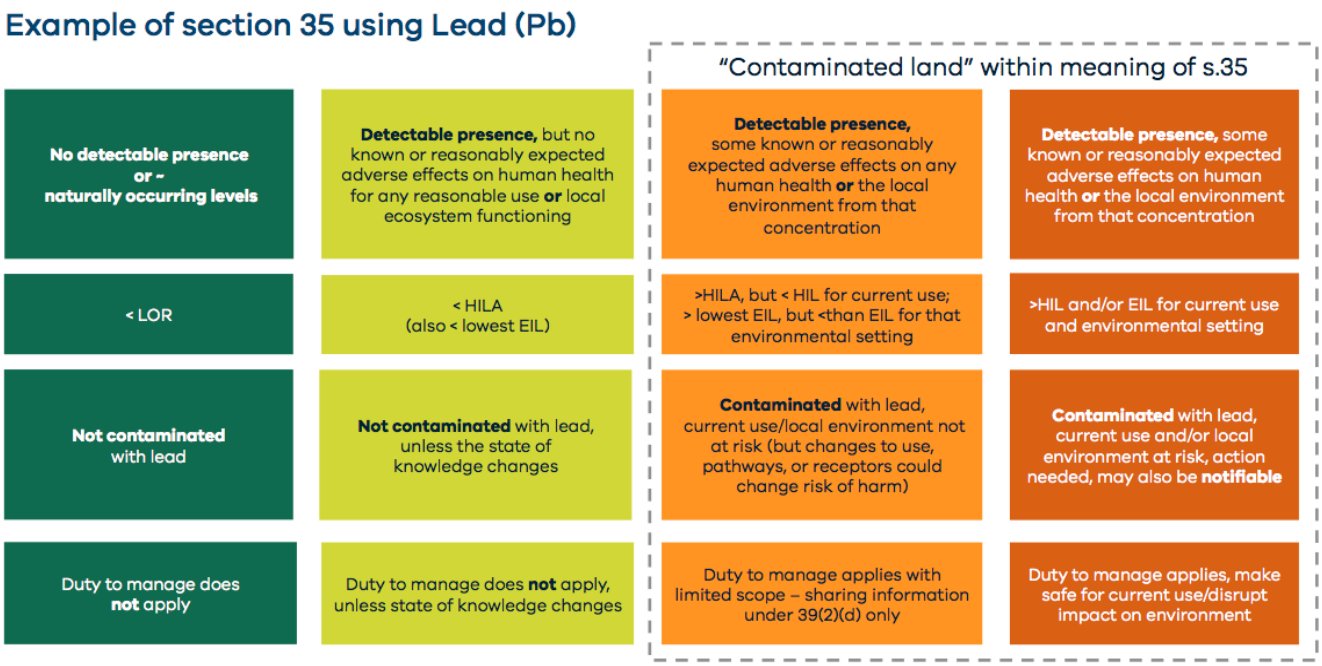

Figure 3: Example using lead (Pb) of how section 35 delineates when the Act does and does not apply using. Reference to the NEPM (ASC) health investigation level A (HILA) and when duties may apply here is based on the example site fitting within assumptions applicable to HILA land use. Also, as the HILA for this land use is 300 mg/kg it is not necessary to consider the ecological investigation level for lead (470 mg/kg) separately when simply confirming land is contaminated. Upon confirming land is contaminated, human health and environmental risks of harm would need to be considered as part of compliance with section 39. LOR = limits of reporting.

5 Summary of EPA's guiding principles for applying the definition

EPA has identified principles (**Table 3)** to help guide the interpretation and application of provisions that rely on the definition in section 35.

Table 3: Guiding principles supporting EPA's approach to applying the definition of contaminated land

The definition is a starting point, not an end point	Section 35 establishes when the Act applies and *may* trigger certain obligations or support compliance action by EPA. The definition alone does not confirm a compliance obligation. Compliance requirements are created by the duties (e.g. section 39 or section 40) or where the presence of contamination creates an unacceptable risk of harm so as to support EPA to take remedial action. The presence of contamination may also limit the reuse of soil removed from the site under waste-related duties and Regulations.
Contamination is the result of a previous activity involving pollution or waste; it represents the state of the land or groundwater at a point in time	The Act defines pollution as any emission, discharge, deposit, disturbance or escape of a solid, liquid or gas. The definition of contamination includes a chemical substance or waste that is present at a concentration above the naturally occurring concentrations in the vicinity. Taken together, contamination represents the outcome of a form of pollution that occurred from a previous activity. The words 'contamination' and 'contaminated' describe a **state of land or groundwater** that has resulted from previous activity. These terms do not describe the act that caused that state to exist. Other duties, such as the duty to restore a site following a pollution incident (section 31), will apply in relation to *actions* that have resulted in contamination. In such circumstances, a number of duties may apply concurrently to the circumstances, including the duty to manage contaminated land (section 39). The terms 'contaminated land', 'contamination of land' and 'contamination' (when used in relation to soil or groundwater) are also interchangeable and share a single meaning for the purposes of the Act. Each describes the **current** state of land arising at a point in time (see section 38 of the Act).

Contamination is a question of fact, but may initially need to be presumed where there is reasonable evidence	Whether or not land is contaminated is a question of *fact* – that is empirical evidence of the *actual* presence of a substance at levels or in circumstances that may create a risk of harm. Provisions in the Act that rely on section 35 apply where there is a reasonable level of information indicating the land or groundwater is *potentially* contaminated land. That is, an absence of direct measurements of chemical substances is not evidence of the absence of contaminated land. For example, evidence indicating a site once hosted poor storage of hazardous chemicals will support a reasonable belief that the land may be contaminated and may support EPA to issue a notice to investigate under section 273 of the Act. To require absolute proof that contamination is present would otherwise frustrate the investigative intent of that notice.
The definition is not determined according to the current land use	When interpreting the definition, particularly whether a chemical substance or waste creates a risk of harm, the analysis is **not** determined by the current land use alone. To limit the definition in this way would frustrate provisions such as section 39(2)(d) and (e), which are intended to compel a person with information on the contamination status of their land to share it with others who may be affected by the contamination or where they will come into management or control of that land.
Notifiable contamination is a *subset* of the definition in section 35	Section 35 is expressly stated to apply to all of Part 3.5. Section 37 defines 'notifiable contamination' as a *particular circumstance* of contamination. Therefore, notifiable contamination is a subset of the definition of contaminated land. To be notifiable, it must meet the definition in section 35 and 37.
Land or groundwater is contaminated where the presence of a substance creates an imminent or acute risk	On occasion contamination may pose an imminent or acute risk to human health or the environment. Immediate action is required under section 39 where there is potentially explosive or acutely toxic concentrations of chemicals in air or drinking water supplies. In such circumstances, emergency management actions must be implemented as necessary to minimise such risks or harm.

6 Understanding the key components

6.1 Background level

The definition of *background level* is set out in section 36 of the Act:

(a) *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*

(b) 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.

Ambient background concentrations under the NEPM (ASC)

The Act defines background levels *differently* to the NEPM (ASC), which adopts the concept of 'ambient background concentrations'[5] representing the sum of **both** naturally occurring levels and levels that are present due to diffuse anthropogenic sources. While the Act confers on EPA the power to make a determination under section 36(a) to set background levels above naturally occurring concentrations, the default position for background levels is the *naturally occurring* concentration only.

If a person asserts the presence of chemical substance as naturally occurring in the vicinity of the land but its presence also exhibits qualities that may create a risk of harm, EPA will only accept it as *naturally occurring* within the meaning of section 36(b) where such an assertion is supported by sufficient empirical evidence.

In relation to synthetic substances, the background level is presumed to be *zero* (or at least below the lowest practicable limit of reporting or detection) unless EPA otherwise makes a determination under section 36(a) in relation to a particular substance in particular circumstances.

EPA is developing a contaminated land determination that sets out the methodology for deriving the background level of specified naturally occurring chemical substances.

The background level methodology comprises a set of requirements that must be met to substantiate that specified naturally occurring chemical substances are not present at a concentration above background levels. The three main requirements in the methodology are:

- literature review and data analysis of local geology and hydrology
- conceptual site model (CSM)
- multiple lines of evidence approach.

[5] See 2.5.7 of Schedule B1 of the NEPM (ASC)

The background level determination only needs to be used in circumstances where there is uncertainty about whether a chemical substance detected at a location occurs naturally in the vicinity of that land. The contaminated land determination will be released by 1 July 2021. Information on developing a CSM can be found in EPA guidance *Assessing and controlling risks of harm from contaminated land*, to be released in April 2021.

Naturally occurring chemical substances and the GED

Where elevated concentrations of a substance are adequately substantiated as being naturally occurring in the vicinity of that land, but may still create a risk of harm, the GED requires those risks to be managed. The GED does not rely on the definition of contaminated land to apply. Any risks of harm from pollution or waste must be minimised under the GED, including risks of harm that occur naturally.

Similarly, soil and groundwater that falls within the definition of waste but does not meet the definition of contaminated under section 35 may still be subject to obligations under other parts of the Act that require management of the risks of harm arising from naturally occurring hazards. This is particularly important where soil or groundwater with naturally elevated concentrations of a potentially harmful chemical substance may be transferred outside the vicinity in which the substance occurs naturally.

For example, acid sulfate soils left undisturbed are naturally occurring, but if a person's activities disturb those soils they can give rise to a risk of harm that is covered by the GED and may attract requirements under the waste provisions, such as the duties around priority waste management under section 139. If activities involving a naturally occurring soil type like acid sulfate soils subsequently cause discharge of sulfuric acid or a change in soil chemistry (for example by mobilising metals by altering water levels), the levels of those metals compared to the naturally occurring levels of undisturbed soil may increase and create a risk of harm. This would also be captured by the definition of contamination.

6.2 Creates a risk of harm

The word risk is not defined in the Act and so has its ordinary meaning as being a chance of something occurring. When combined with the definition of harm in section 3 of the Act, a risk of harm means 'a **chance** of an adverse effect on human health or the environment (of whatever degree or duration)'.

By itself, the expression risk of harm does not confirm the *significance* of the risk of harm – only that there is a chance or potential for harm.[6] The significance of a risk of harm can be described qualitatively (such as negligible, low, high and extreme), or in some circumstances may be expressed quantitatively (for example with a numerical estimate). As such, the expression risk of harm in the context of section 35 is akin to the word 'hazard' – that is presence of a chemical substance or waste that has an inherent characteristic capable of causing harm.

[6] In this context, the expression "risk of harm" is comparable to the word "hazard" as adopted under occupational health and safety legislation.

The expression 'risk of harm' in section 35(b) should not be confused with 'unacceptable risk of harm', which describes circumstances in which action to reduce the risk is required. See EPA guidance *Assessing and controlling risks of harm from contaminated land* (to be released April 2021) for guidance on how EPA expects unacceptable risks of harm from contamination to be addressed.

Because the definition in section 35 determines whether the Act applies at all, 'creates a risk of harm' needs to be interpreted in a way that ensures the Act can achieve its objectives to protect human health and the environment. It must also align with the eleven principles of environmental protection, such as proportionality, the precautionary principle and evidence-based decision-making.[7]

To ensure the Act can fulfil its purposes and EPA can meet its objectives consistently with the principles, a risk of harm is created by the presence of a chemical substance or waste when:

1. that chemical substance or waste has an **inherent characteristic** that may be hazardous to human health or disruptive or damaging to the environment (for example pathogenicity, toxicity, oxidative status, flammability, explosivity, acidity); and/or
2. where assessment criteria/methods are available, the level of contamination present is **capable** of producing a harmful outcome (irrespective of the prevailing use of the land) for human health or the normal functioning of those aspects of the environment within the ecological footprint of the location.

The reference to 'creates a risk of harm' does not imply that a site-specific risk assessment must be carried out before the definition can apply, or should be assumed to apply.

Risk assessment may be required by section 39 of the Act if it is reasonable to *presume* land is contaminated based on what is known (or should be known) about the land. In practice a level of analysis is likely to be needed to confirm if land meets the definition in section 35.

Determining whether a chemical substance creates a risk of harm may be assisted by considering the environmental values that are to be protected in Victoria as set out in the ERS. The next section sets out how the ERS relates to section 35.

[7] See Chapter 2 of the Act.

The role of land use zone and planning legislation

The *Planning and Environment Act 1987* (P&E Act), may provide some useful information when evaluating the impact contamination may have on human health or the environment. Where there is a proposal to change the current zoning of the land to support more sensitive use, the P&E Act may require the affected area to be subject to a preliminary risk screen assessment or environmental audit to ensure that any change in use takes into account prior land use history and the potential for unacceptable risks to human health or the environment.[8]

Land use planning zones may support a wide range of permitted uses. For example, mixed use zoning can include residential use. Commercial zone 1 permits child care, community care accommodation and rooming houses without a planning permit. Industrial Zone 1 uses that do not require a permit include grazing animal production, crop raising and take away food premises.

Accordingly, the current zoning and use of the land is not sufficient alone to account for the risks of harm that may arise to human health and the environment from contamination where subsequent uses on or offsite are more sensitive. For example, a site with Commercial Zone 1 may currently be used as a warehouse but in the future may become a childcare centre or community care accommodation. Screening soil vapour criteria against commercial health screening levels or interim health investigation levels under the NEPM (ASC) may not be sufficiently protective to identify whether the site is contaminated for these reasonably foreseeable uses.

[8] Under section 12(2)(b) of the P&E Act, in preparing a planning scheme or amendment, a planning authority must take into account any significant effects which it considers the scheme or amendment might have on the environment or which it considers the environment might have on any use or development envisaged in the scheme or amendment.

7 How does section 35 relate to the ERS?

7.1 Broad purposes of the ERS

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

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

An environmental value identifies attributes and the functioning of the environment and how we use it that are important to us. The environmental values guide outcomes Victorians want for human health and the environment.

Although the ERS and the definition in section 35 serve separate purposes under the Act, both the ERS and section 35 may use other national standards – the ERS by express reference; section 35 by implication. For example, the indicators and the objectives of the ERS used to characterise environmental values of land refer to the NEPM (ASC). Some of the *indicators* in the ERS include reference to chemicals listed in Appendix A of Schedule B2 of the NEPM (ASC) and some of the *objectives* refer to investigation levels listed in Section 6 of Schedule B1. The ERS also makes clear that the indicators include any other contaminants present at the site as determined by the current use or site history assessed in accordance with the NEPM (ASC) and other incorporated standards. These considerations are also relevant to addressing the question of fact as to whether land is contaminated within the meaning of section 35.

The ERS is not a compliance standard. Its primary function is to provide an environmental assessment and reporting benchmark. The substances and concentrations provided for in the ERS may assist in identifying and defining the environmental values that may be threatened by the contamination of land and groundwater at a particular location. As such, it can be used to assist in determining whether or not land is contaminated within the meaning of section 35, but does not represent the *only* circumstances that constitute contamination. The ERS may also help define environmental values that may be adversely impacted by unmanaged contamination, such as surface water.

As a reference standard it provides a framework to consider all the environmental values that may be threatened by the presence of chemical substances above background levels, noting that this is not limited to the current land use alone.

7.2 Correct use of the ERS in relation to contaminated land

While the ERS indicators and objectives are useful in characterising certain land uses at particular points in time, this does not mean the objectives in the ERS can be used to justify the ongoing presence of contamination of land – particularly where that land may better serve the community by accommodating more sensitive uses in the future or where offsite impacts threaten the environmental values of adjacent land.

The ERS is also not exhaustive of all chemical substances and does not include standards or sources of information for all considerations for contaminated land. The question of whether chemical substances present on land create a risk to human health or the environment may require considerations beyond the ERS.

Examples of circumstances that may require consideration beyond the ERS include:

- acute and physical risks to human health and the environment;[9]
- 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 accumulation of chemicals into food for the general population.

Accordingly, in referring to the ERS to assess if a chemical substance may create a risk of harm, all reasonable uses of land and groundwater and the ecological functioning of the location (including potential for offsite impacts) must be considered. This may require consideration of a range of appropriate exposure scenarios, not simply the current land use.

In some circumstances it may be acceptable to limit potential environmental values where the existing natural environmental condition will not support sensitive uses. For example, this can be particularly relevant for groundwater where the natural salinity of waters may not support all uses. If in doubt, EPA should be contacted before making such assumptions.

Examples of information and resources to assist in understanding if a site is contaminated are set out in EPA guidance *Assessing and controlling risks of harm from contaminated land* (April 2021) and other EPA guidance published on interpretation of the ERS. These guidance documents provide information on what EPA regards as reasonable consideration of potentially impacted receptors.

8 Risks of harm **not** addressed by established investigation levels

8.1 Overview

Ecological investigation levels (EIL) have been derived for only eight contaminants specific to Australian soil conditions in the NEPM (ASC). While more extensive, the health investigation levels

[9] Sites that are also workplaces are subject to additional obligations under the *Occupational Health and Safety Act 2004* where acute risks of harm are present. Standards that may assist in characterising acute risks include National Transport Commission *Australian Dangerous Goods Code*(ntc.gov.au/codes-and-guidelines/australian-dangerous-goods-code), the *Globally harmonized system (GHS) of Classification and Labelling of Chemicals* (safeworkaustralia.gov.au/classifying-chemicals#the-ghs) and the *Hazardous Chemical Information System* (hcis.safeworkaustralia.gov.au/).

(HIL) and health screening levels (HSL) developed for human health are also not exhaustive of all contaminants of concern, generally representing the most frequently encountered contaminants, not necessarily the most important.

Further, soil HIL that are generally protective of human health do not guarantee protection of surface waters from migration of contamination from land. Some HIL and EIL listed in the NEPM (ASC) may be protective of human and ecological health in line with the assumptions associated with their derivation. However, those investigation levels may not be protective in terms of the risk of harm to underlying groundwater, unless the necessary pathways are not present or not expected to be present. The NEPM (ASC) Schedule B5b (section 5.2.3) provides guidance in assessing circumstances that create a risk of harm to groundwater for aquatic ecosystems. It may be adapted to address potential risks to other receptors, such as through livestock through stock water.

Finally, some risks of harm from contamination can only be understood by considering the manner in which the contaminants can become assimilated into biota. This includes eggs, cattle, fish and wildlife. Again, use of investigation levels needs to be carefully considered when such risks of harm are reasonably foreseeable in relation to a particular location.

EPA recognises that selection of screening criteria for a site that is suspected to be contaminated requires a balance to be struck between the seriousness of potential risks of harm and the costs associated with an unbounded approach to assessment. Overall, adoption of appropriate guideline values as screening levels must always be supported by sufficient reasons for their selection. Any assumptions made when adopting such values need to be recorded and expressly acknowledge any limitations in using the information.

This section sets out some of the considerations applicable for substances that do not have screening levels available in the NEPM (ASC) or other publications listed in section 0 below.

8.2 Environment

When characterising contaminants not listed in the NEPM (ASC) by adopting guidelines, values and laboratory animal data published by other jurisdictions, consideration needs to be given to the local relevance of such values and data. The small amount of relevant research that has been done in Australia has shown significant differences in how endemic mammalian species respond to contaminants when compared to the placental mammals used internationally to inform chemical risk assessment.

Some contaminants do not have default added contaminant limits, and EIL are not available or cannot be derived according to the methodology set out in Schedule B5c of the NEPM (ASC). In these cases, it may be appropriate to presume that any concentration detected above the naturally occurring concentration could create a risk of harm to potentially affected receptors. Interim measures such as monitoring and information sharing may then be adopted until further information on those contaminants become available. The higher the concentrations of such substances, or where important exposure pathways may be present (for example into waterways or areas of ecological significance), then it may be appropriate to apply a *precautionary approach*

and regard the land as being impacted by a level of contamination. This should be adopted until it can be established that the presence of such contaminants does not create a risk of harm.

There are no derived EIL for the protection of agricultural land use as historically contaminated land assessment has predominantly focussed on urban settings. Adverse impacts to agriculture, however, can occur both from the misuse of agricultural chemicals and the migration of contamination from adjacent sites. This can threaten environmental values regarding production of food, flora, and fibre, use of water for stock water, irrigation, and aquaculture. In addition to plant toxicity and plant contaminant uptake, considerations for agricultural land should also include grazing livestock, transitory wildlife and native flora for which agricultural land may be the only viable habitat.

Where ecological criteria are available from other jurisdictions, such as Canada and the United States of America, it is important to consider if they are protective of the agricultural industry or consumers of produce. Both should be protected.

8.3 Human health

As noted in Section 7.2, there are scenarios where the investigation levels included within the ERS may not be suitable to assess risk of harm.

For chemical substances where health investigation or screening levels are not available, the methodology set out in Schedule B7 of the NEPM (ASC) may need to be used to derive health investigation levels and equivalent screening criteria for those substances. Schedule B4 of the NEPM(ASC) and enHealth Council guidance on risk assessment (2012) also provide information on how to derive site-specific investigation levels or conduct site specific risk assessment.

NEPM(ASC) notes specialised forms of assessment may be required for a range of contaminants such as radioactive substances or pathogenic materials. Another drawback of the NEPM(ASC) is it does not address acute hazards which must be addressed immediately to minimise any risk of harm.

Source criteria for water that may be used for stock water, irrigation and aquaculture are included in the ERS, however are frequently limited in the selection of chemicals. Where stock water criteria are not available, the Australian and New Zealand Governments and Australian State and Territory Governments Guidelines (known as the ANZG) recommend that human drinking water criteria are adopted as they are also likely to be protective of stock health. Both the stock water and drinking water criteria have not been derived to be protective of the consumption of livestock produce, and it is important to consider whether the chemicals of concern have bioaccumulative properties that might result in concentrations in food produce.

9 Emerging contaminants

Some substances are suspected of creating a risk of harm based on an emerging body of evidence that suggests potentially adverse effects. Such *emerging contaminants* are to be distinguished from the well-understood chemicals that are not included in the NEPM (ASC), but have reliable toxicity reference values that can be adopted. Because the state of knowledge on emerging

contaminants is, by definition, in a state of flux and less settled than other contaminants, the currency of information must be carefully considered when considering whether land is contaminated. The limits in reliable knowledge on emerging contaminants may also limit what may be regarded as reasonably practicable risk control measures.

Refer to EPA's website for updates to information on emerging contaminants and contact EPA where you are uncertain about the status of a particular contaminant.

Generally, EPA will not expect duty holders to routinely analyse for such emerging contaminants unless there are reasonable grounds to suspect they are present. For example, certain phthalates are regarded as an emerging contaminant. Those sites where manufacturing or handling large volumes of phthalates is known or suspected to have occurred need to pay greater attention to activities where their presence is incidental or of a minor extent.

Where an emerging contaminant is detected or suspected, EPA expects that the person in management or control of the land will:

- undertake an appropriate level of monitoring, and, as appropriate, assessment of that substance
- take steps to keep up to date with the developing state of knowledge on those substances.

The objective in adopting this precautionary approach will be to develop an understanding on when the levels detected at the location may be considered significant enough to warrant further investigation or precautionary management of potential exposure pathways.

More information on substances EPA regards as emerging contaminants can be found at epa.vic.gov.au.

10 Pollution versus contamination

The *Environment Protection Act 1970* did not provide a definition for, or expressly refer to, contamination. The concept of contamination of land and groundwater was understood as a state of pollution, a concept which was defined in that Act, augmented by the State Environment Protection Policy (Prevention and Management of Contamination of Land) and State Environment Protection Policy (Waters). The focus of the scheme was identifying protected beneficial uses and how to protect these, rather than defining what constituted contamination *per se*.

Under the new Act, *pollution* is defined broadly and includes 'any emission, discharge, deposit, disturbance or escape of … a solid, liquid or gas, or a combination of a solid, liquid or gas'. It does **not** include any reference to harm, as was the case with pollution under the *Environment Protection Act 1970*.

Under section 35, contamination only applies to concentrations of a substance above the naturally occurring concentration of that substance in the vicinity of the land (unless determined otherwise under section 36(a)).

For a substance to exceed the naturally occurring concentrations there must have, at some point in the past, been an 'emission, discharge, deposit, disturbance or escape of… a solid, liquid or gas' explaining the presence of the elevated concentrations.

Consequently contamination represents a state of land or groundwater arising from past pollution within the new meaning of pollution under the Act.

Importantly, however, the definition of contamination is only complete where that 'emission, discharge, deposit, disturbance or escape' is a type of substance, or in a concentration, that also 'creates a risk of harm to human health or the environment'.

11 Elevated levels in water on or above the land

Section 35(2) clarifies that land is not contaminated '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'.

EPA understands this clarification to make clear that where water, that has in its constituents a chemical substance or waste that might otherwise create a risk of harm, is present on land (for example in a tailings dam) or is being transmitted across or under land (for example in a pipeline), then such circumstances do not necessarily meet the definition of contamination. For example, a properly lined tailings dam would not be regarded as contaminated for the purposes of the Act.

12 Resources

The following references represent standards that help inform the state of knowledge on contamination risks of harm:

- *Contaminated Land Policy* (publication 1915) (epa.vic.gov.au/about-epa/publications/1915)
- The Victorian Environment Reference Standard
- National Transport Commission *Australian Dangerous Goods Code* (ntc.gov.au/codes-and-guidelines/australian-dangerous-goods-code)
- *Globally harmonized system (GHS) of Classification and Labelling of Chemicals* (safeworkaustralia.gov.au/classifying-chemicals#the-ghs) and the *Hazardous Chemical Information System* (hcis.safeworkaustralia.gov.au/)
- National Environment Protection (Assessment of Site Contamination) Measure 1999 (Commonwealth): (legislation.gov.au/Details/F2013C00288)
    - Schedule B1 *Guideline on Investigation Levels for Soil and Groundwater* (legislation.gov.au/Details/F2013C00288/Html/Volume_2),
    - Schedule 4, *Guideline on Site-Specific Health Risk Assessment Methodology*(legislation.gov.au/Details/F2013C00288/Html/Volume_5)
    - Schedule B5b, *Guideline On Methodology To Derive Ecological Investigation Levels In Contaminated Soils* (legislation.gov.au/Details/F2013C00288/Html/Volume_7)
    - Schedule 6 , *Guideline on The Framework for Risk-Based Assessment of Groundwater Contamination* (legislation.gov.au/Details/F2013C00288/Html/Volume_9)
    - Schedule B7 *Guideline on Derivation of Health-Based Investigation Levels* (legislation.gov.au/Details/F2013C00288/Html/Volume_19),
- Victorian Occupational Health and Safety Regulations 2017 (legislation.vic.gov.au/in-force/statutory-rules/occupational-health-and-safety-regulations-2017/008)
- NHMRC, NRMMC (2011) *Australian Drinking Water Guidelines Paper 6—National Water Quality Management Strategy*. National Health and Medical Research Council, National Resource Management Ministerial Council, Commonwealth of Australia, Canberra (nhmrc.gov.au/about-us/publications/australian-drinking-water-guidelines)
- Australian and New Zealand Governments and Australian State and Territory Governments (2018) Australian and New Zealand Guidelines for Fresh and Marine Water Quality (waterquality.gov.au/guidelines/anz-fresh-marine)
- National Chemicals Working Group of The Heads of EPAs Australia and New Zealand (2019) *PFAS National Environmental Management Plan* (epa.vic.gov.au/for-community/environmental-information/pfas/pfas-nemp-2-0) (as amended from time to time)
- Food Standards Australia New Zealand (2017*) Perfluorinated chemicals in food*. Australian Government, Canberra. (health.gov.au/internet/main/publishing.nsf/content/ohp-pfas-hbgv.htm)
- Department of Health (2017) Health based guidance values for PFAS for use in site investigations in Australia (health.gov.au/internet/main/publishing.nsf/Content/2200FE086D480353C%20A2580C900817CDC/$File/fs-Health-Based-Guidance-Values.pdf). Australian Government, Canberra.