



ASBESTOS IN SOIL

A Guide for Workplaces



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Design and layout	David Ronalds
Printed by	Printlink, Petone, Wellington
ISBN	978-1-98-852200-5 (pbk) 978-1-98-852201-2 (ePub)
Published	May 2018
Copyright	BRANZ Ltd, 2018
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Funded from the
Building Research Levy

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ABOUT THIS GUIDE

This is a brief guide for those responsible for workplaces where there is known to be or suspected to be asbestos contamination in soil. This situation can incur obligations under health and safety law.

It has been written for a person conducting a business or undertaking (PCBU) under the Health and Safety at Work Act 2015.

It sets out the key things that PCBUs need to know about asbestos-contaminated soil and the regulations that apply – in particular, the Health and Safety in Employment (Asbestos) Regulations 2016.

This guide should be read in conjunction with the more comprehensive BRANZ publication *New Zealand Guidelines for Assessing and Managing Asbestos in Soil* and WorkSafe New Zealand's Approved Code of Practice for the Management and Removal of Asbestos.



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GLOSSARY

ABS

Activity-based sampling – air sampling for asbestos fibres while conducting a physical activity.

accredited testing laboratory

Only accredited laboratories (or ones working towards accreditation approved by WorkSafe) can test for asbestos.

ACD

Asbestos-containing debris or dust.

ACM

Asbestos-containing material.

ACOP

Approved Code of Practice: Removal and Management of Asbestos.
www.worksafe.govt.nz/topic-and-industry/asbestos/management-and-removal-of-asbestos

ACS

Asbestos-contaminated soil.

AF

Asbestos fines, including free fibres of asbestos, fibrous asbestos, small fibre bundles and ACM fragments.

airborne contamination standard

An average concentration over any 8-hour period of 0.1 respirable fibres per millilitre of air. [Source: Asbestos Regulations]

AMP

Asbestos management plan.

ARCP

Asbestos removal control plan.

Asbestos Regulations

Health and Safety at Work [Asbestos] Regulations 2016
www.legislation.govt.nz/regulation/public/2016/0015/latest/DLM6729706.html?src=qs

asbestosis

Chronic lung disease with inflammation or scarring of lung tissue.

bonded ACM

Asbestos bound in a matrix such as cement with minimal free fibres.

Class A

Removal work involving asbestos that requires a Class A licensed asbestos removalist.

Class B

Removal work involving asbestos that requires a Class B licensed asbestos removalist.

CLMG

Contaminated Land Management Guidelines
www.mfe.govt.nz/land/risks-contaminated-land/managing-contaminated-land/contaminated-land-management-guidelines

competent person

A person with the knowledge and skills of relevant asbestos-removal industry practice and who holds one of the qualifications listed by WorkSafe.

conceptual site model (CSM)

A system diagram of site conditions, the distribution of contamination and how it might be transported to those who may be affected by it.

DSI

Detailed site investigation.

enclosure

A controlled environment, typically with impermeable plastic sheeting walls, where asbestos-related work may be carried out.

f/mL

Fibres per millilitre of air.

fibrous asbestos (FA)

Severely weathered asbestos materials or loose fibrous material such as insulation products.

friable

Asbestos in a powder form or able to be crushed to a powder by hand when dry.

GPG

Good Practice Guidelines: Conducting Asbestos Surveys
www.worksafe.govt.nz/topic-and-industry/asbestos/working-with-asbestos/conducting-asbestos-surveys

HAIL

Hazardous Activities and Industries List – activities and industries likely to contaminate land through hazardous substance use, storage or disposal.

www.mfe.govt.nz/land/hazardous-activities-and-industries-list-hail

IANZ

International Accreditation New Zealand

www.ianz.govt.nz

independent assessor

A person licensed by WorkSafe to conduct air monitoring and clearance inspections for friable and non-friable asbestos projects.

licensed asbestos removalist

A PCBU with a Class A or Class B licence for asbestos removal.

LIM

Land information memorandum – a territorial authority document with information about a particular property.

MBIE

Ministry of Business, Innovation and Employment

www.mbie.govt.nz

mesothelioma

Cancer of the lining of the lungs.

MfE

Ministry for the Environment

www.mfe.govt.nz

MoH

Ministry of Health

www.health.govt.nz

NES-CS

Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011

www.legislation.govt.nz/regulation/public/2011/0361/latest/DLM4052228.html?search=ts_regulation_contaminants_resel&p=1&sr=1

non-friable

Asbestos that is not in a powder form and cannot be crushed to a powder by hand when dry.

NZAAG

New Zealand Asbestos Advisory Group, a special interest

group of the Australasian Land and Groundwater Association [ALGA].

www.landandgroundwater.com

NZDAA

New Zealand Demolition and Asbestos Association

www.demolition-asbestos.co.nz

PCBU

Person conducting a business or undertaking. This could be a company or an individual.

PPE

Personal protective equipment – face mask, respirator, eye protection, disposable coveralls and so on.

PSI

Preliminary site investigation.

RAP

Remedial action plan.

receptor

A person, other creature or ecological system that may be harmed by asbestos.

respirable asbestos fibres

Fibres small enough to penetrate deep into the lung. These may be up to 3 µm in width and more than 5 µm long with a length-to-width ratio over 3:1.

SQEP

Suitably qualified and experienced practitioner.

SVR

Site validation report.

trace level

An average concentration over any 8-hour period of less than 0.01 respirable asbestos fibres per millilitre of air. [Source: Asbestos Regulations]

WA Guidelines

Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia
http://ww2.health.wa.gov.au/Articles/A_E/Asbestos-contaminated-sites

WorkSafe

WorkSafe New Zealand – the work health and safety regulator

www.worksafe.govt.nz





DANGER

ASBESTOS

**CANCER AND LUNG DISEASE
HAZARD**

KEEP OUT

**AUTHORIZED
PERSONNEL ONLY**

**RESPIRATORS AND
PROTECTIVE CLOTHING
ARE REQUIRED IN
THIS AREA.**

1. INTRODUCTION

Once thought of as safe, asbestos and asbestos-containing materials were widely used in the construction of New Zealand homes, offices, factories and other buildings from the 1920s to the mid-1980s.

Unfortunately, its use brings serious health risks. Tiny asbestos fibres breathed into the lungs can cause fatal or potentially fatal illnesses, including asbestosis (chronic lung disease with inflammation or scarring of lung tissue) and several types of cancer. Symptoms may not appear until 20 years after exposure. Most work-related deaths in New Zealand today come from past exposure to asbestos.

Asbestos is a naturally occurring fibrous mineral. Importing raw blue and brown asbestos (the most hazardous types) was prohibited in 1984, and importing raw white asbestos (chrysotile, the most commonly used type in New Zealand) was prohibited in 1998. Importing asbestos-containing materials was banned in 2016, yet many materials installed in the past remain in place today.

Asbestos-containing materials such as asbestos-cement wall and roof cladding and waterpipes can still be found in many New Zealand buildings. These materials, known as composites or bonded products, are less hazardous if undisturbed because the asbestos fibres are contained in other materials, usually cement.

In some cases, such as structural applications, power stations or major plants, factories and workshops, 'limpet' asbestos may have been sprayed on structures. These situations present greater risks to workers' and others' health but are becoming increasingly less common.

Soil can also become contaminated with asbestos through run-off from these products, poorly executed demolition or removal of asbestos materials and uncontrolled dumping in the past.

Asbestos contamination of soils is different from other forms of contamination. Asbestos is inert and does not

affect groundwater or have toxic effects in soil in the way that hydrocarbon or toxic contaminants do. It does not get into the food chain. The only risk to health is from breathing respirable asbestos fibres (fibres small enough to penetrate deep into the lungs) that may be raised from the soil by wind or other disturbance.

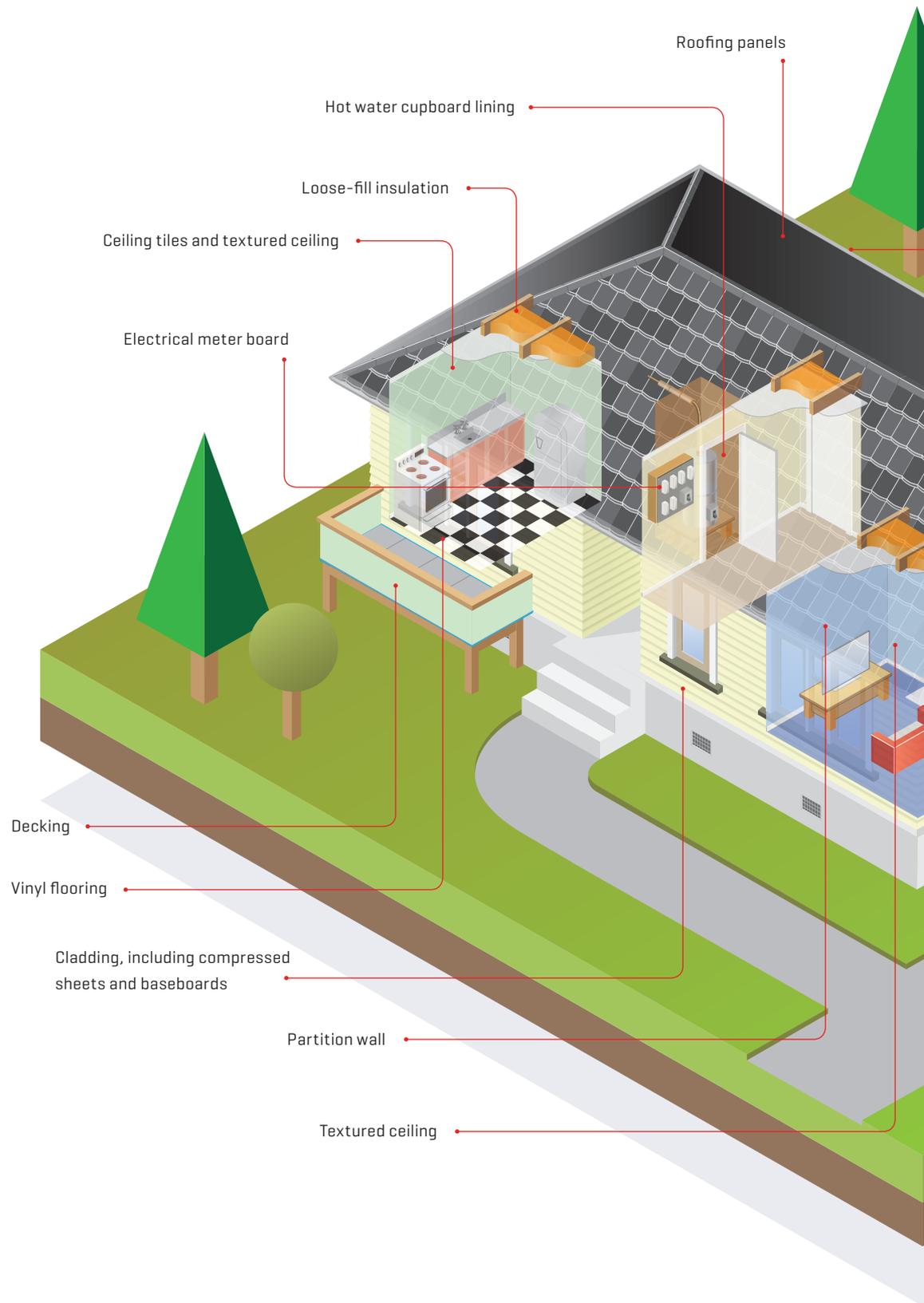
Once asbestos or materials containing it are found or suspected in soil, its presence should be investigated. Where the site is a workplace, that is a responsibility, under the Health and Safety at Work (Asbestos) Regulations 2016, for "a person conducting a business or undertaking" (PCBU), a role found in the Health and Safety at Work Act 2015. Most businesses, whether large companies, sole traders or self-employed, are PCBUs. WorkSafe's examples of an undertaking include government departments, local councils, schools and charities such as the SPCA.

When it comes to asbestos in soil, there could be several different PCBUs involved, such as:

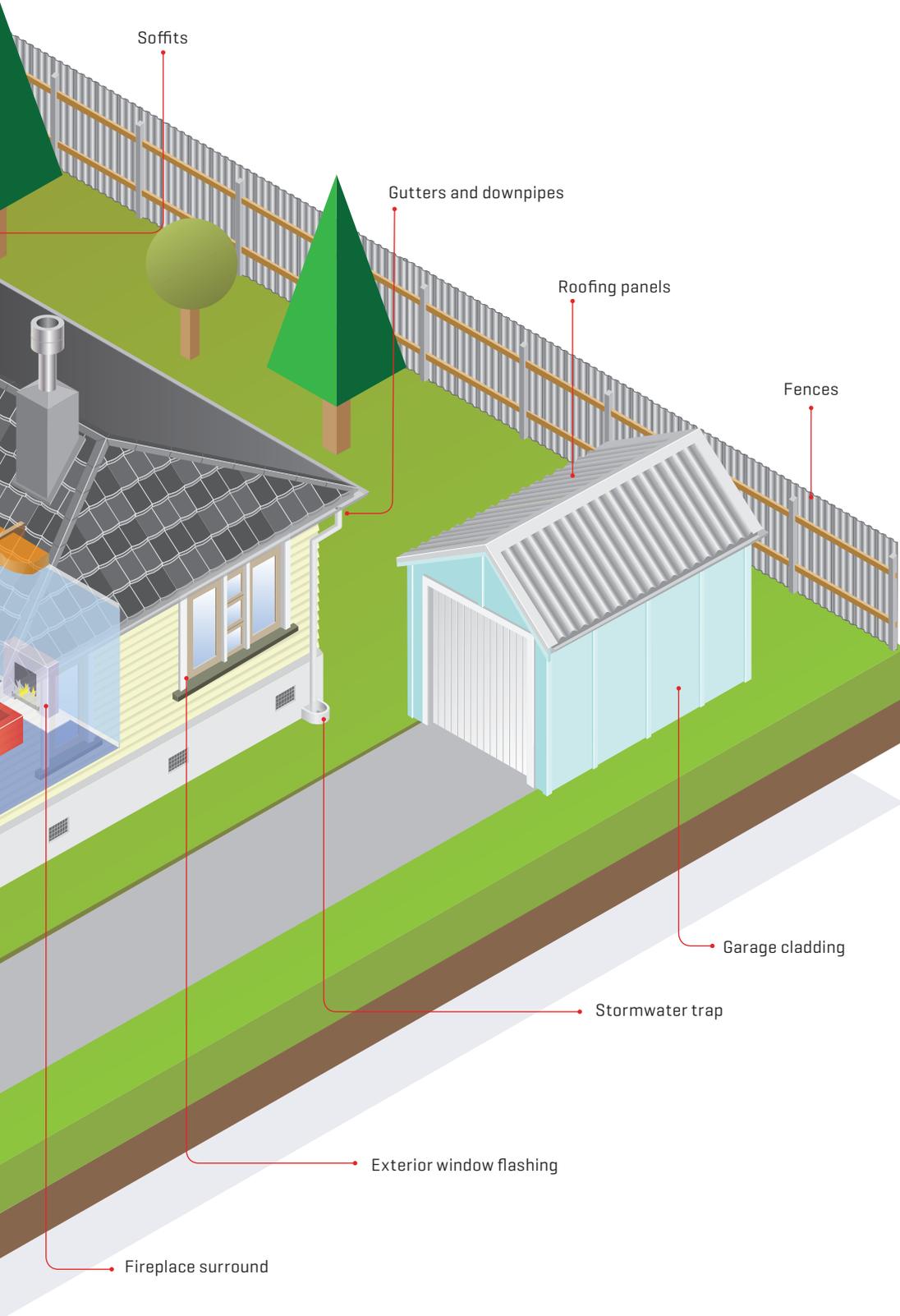
- a PCBU with management or control of a workplace on a contaminated site
- a PCBU carrying out asbestos removal work
- a demolition company or building contractor who carries out demolitions.

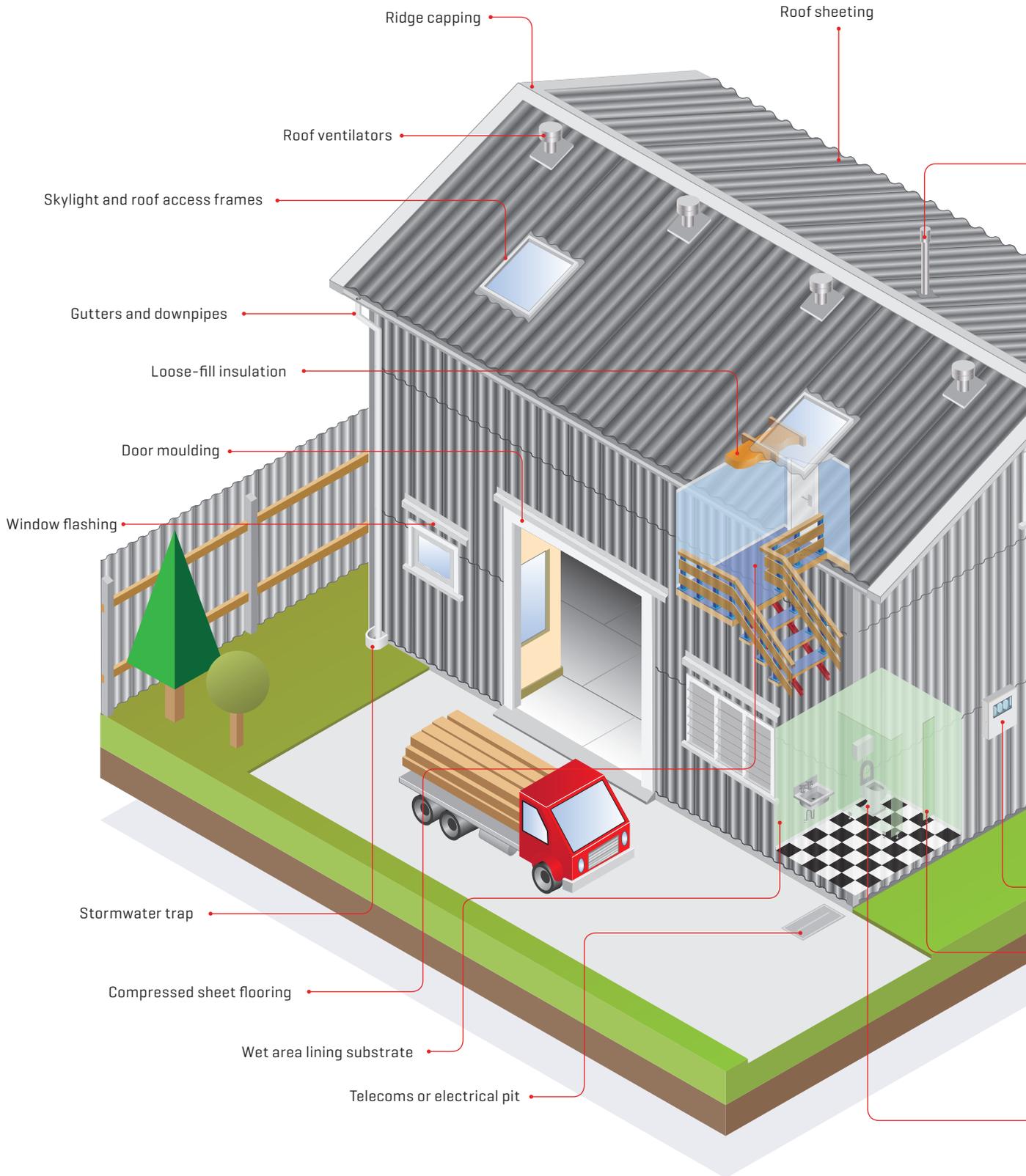
A 'competent person' (a term from the Asbestos Regulations) or a 'suitably qualified and experienced practitioner' (from the National Environmental Standards) can help with investigation, management and design of remediation works. They may also be able to undertake removal of less-serious contamination.

For removal of more-serious contamination, a Class A or Class B licensed asbestos removalist will be required.

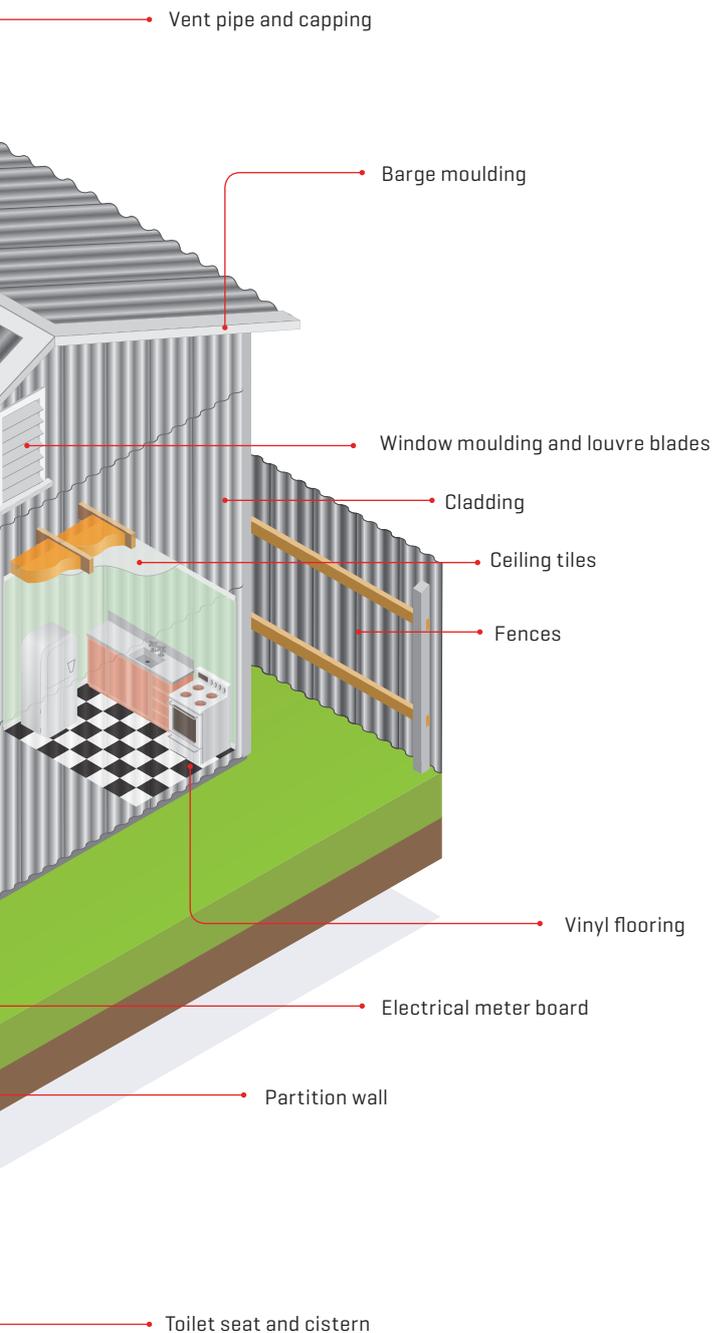


■ Commonly found asbestos in residential buildings.





Commonly found asbestos in non-residential buildings.



A PCBU investigating asbestos contamination of soils will have duties under the:

- Health and Safety at Work Act 2015
- Health and Safety at Work [Asbestos] Regulations 2016
- Approved Code of Practice: Management and Removal of Asbestos 2016 [following the code is one way of demonstrating compliance with the Act and Regulations]
- Resource Management [National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health] Regulations 2011 [NES-CS]
- Contaminated Land Management Guidelines.

You can find details of where to get these and other documents and resources in the More information section at the end of this guide.



HARDIES FIBROLITE
FACTORY

Hardies Fibrolite Factory, Penrose, Auckland, Whites Aviation Ltd.
Ref: WA-02425-G, Alexander Turnbull Library, Wellington, New Zealand.

2. ASBESTOS IN THE SOIL OF NEW ZEALAND PROPERTIES

Although natural asbestos exists in New Zealand, not much was mined here. Raw asbestos was mostly imported and made into construction and industrial products at factories in Auckland, Christchurch and Dunedin.

Many buildings, especially in the 1940s–1970s, used asbestos-cement roof and wall cladding, soffits, guttering and fencing. Materials containing asbestos were also used in surface finishes [for a textured look, to block sound or stop flame spreading], thermal insulation and pipes, and lagging for insulating plant and equipment.

2.1 How asbestos gets into soil

Asbestos or building materials containing asbestos can get into soil and can be a health risk if the fibres become airborne and people breathe them in.

Soil can become contaminated in many ways:

- Factory waste products containing asbestos were used as fill [and in some cases even as paving surfaces] from the 1930s to the 1970s.
- Materials containing asbestos were dumped.
- Past building demolitions may have left asbestos-containing materials behind.
- Old underground waterpipes and conduits may contain asbestos.
- Rainwater and wind over many years can wash fibres off degrading wall and roof cladding.
- Using a high-pressure waterblaster on a wall or roof cladding can blast fibres off.

Asbestos fibres do not break down or decompose and will remain in the soil indefinitely. Many common building materials that contain asbestos may slowly degrade in the soil, however. This can lead to asbestos fibres being released over time.

Friable asbestos is the form of most concern. Friable is defined in regulations as “in a powder form or able to be crumbled, pulverised or reduced to a powder by hand pressure



■ Manufacturing asbestos fibrolite (ca 1940s).

Pascoe, John Dobree, 1908–1972 Photographic albums, prints and negatives. Ref: J/4-000378-F, Alexander Turnbull Library, Wellington, New Zealand.

when dry”. This is of concern because respirable asbestos fibres can easily become airborne if the material is disturbed.

Larger items such as sheet cladding in a reasonable condition where the fibres are bound in a cement matrix usually have lower risk.

In soil, fibrous asbestos and asbestos fines [which includes free fibres, small fibre bundles and small fragments of



■ Asbestos-cement sheet fragments in soil from dumping or an old demolition.

materials containing asbestos) are a major cause for concern. These have been broken up by past activity and are therefore more likely to be present in association with respirable fibres.

The regulations around asbestos removal are based on risk:

- Those working with any quantities of friable asbestos require a Class A licensed removalist.
- Removal of more than the equivalent of 10 m² of non-friable asbestos or associated asbestos-contaminated dust or debris requires a Class B licensed removalist.
- Smaller quantities of non-friable asbestos may be removed by suitably trained persons that are aware of the risks of asbestos, have suitable respiratory protection as required and dispose of material appropriately.

In situations where the asbestos is present in soil, the *New Zealand Guidelines for Assessing and Managing Asbestos in Soil* recognise that, while asbestos-containing material is likely to be degraded/broken up and therefore could be more friable, it has also been mixed with non-asbestos-containing material [that is, soil]. Therefore, the concentration of asbestos in the soil will be one of the biggest risk drivers. For soils, four types of work are recognised, depending on the concentration of asbestos-containing material and/or fibrous asbestos and asbestos fines in the soil. These are:

- Class A work
- Class B work

- asbestos-related work
- unlicensed asbestos work.

While the practical risk depends partly on the type and amount of asbestos present, it also depends on the site's surface cover, soil type and soil moisture levels. Dry soil poses a greater risk because asbestos fibres can more easily become airborne. Tests have shown that adding just 5% moisture can reduce airborne asbestos by 80–95%. This explains why sprinklers or misters are often used on a site being investigated or remediated.

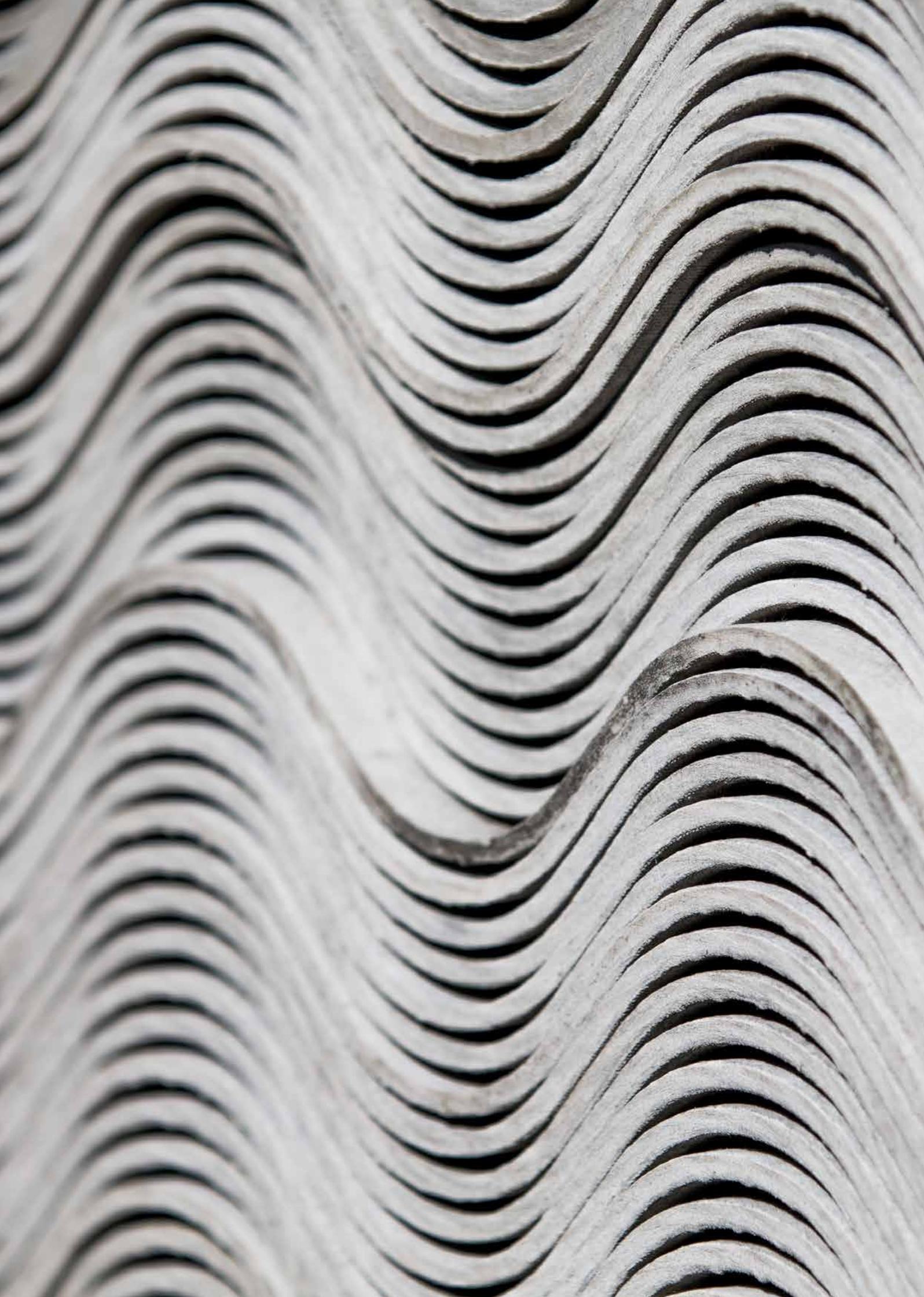
2.2 Think there may be asbestos in soil?

Asbestos is very often mixed with other materials and decreasingly seen in its raw form. It is difficult to identify because individual fibres are not visible to the naked eye. As a comparison, an average human hair is 10–30 times thicker. If there is clear evidence of the likelihood of asbestos contamination at harmful levels, laboratory tests are required to confirm the extent. Alternatively, it may be more practical to assume the presence of asbestos and either remove or manage the risk accordingly.

Assuming there are work activities that may lead to workers or others disturbing soil or being exposed to dust from exposed soil, there is a range of clues that may lead a PCBU to suspect that soil is contaminated:

- People may have found remains of building materials likely to contain asbestos in the soil – things like pieces of old fibre-cement roof or wall cladding.
- A history of use of the site may suggest it, especially if the use is on the HAIL list or the local HAIL register. [The Hazardous Activities and Industries List is overseen by the Ministry for the Environment. HAIL registers are usually held by regional councils but occasionally by territorial authorities. The local register is the best place to start.]
- Council records or other documents may include references to asbestos on the site – for example, in fill brought in to change the ground level.
- Existing cladding or other materials containing asbestos may have had inappropriate treatment [such as cleaning by high-pressure waterblasting].

This initial assessment is usually something that a PCBU will be able to make with their own resources and by referring to relevant documents. Once a PCBU suspects that soil on a site may be contaminated with asbestos, further investigation may be required. The next section looks at what is required and who performs the different tasks.





3. WHO DOES WHAT IN INVESTIGATIONS AND REMEDIATION?

Different individuals and organisations have specific roles to play in investigating or remediating asbestos in soil. Primary responsibility rests with the PCBU managing or controlling a workplace on a contaminated site.

In meeting their obligations, a PCBU may have dealings with some or all of the following:

- A competent person or a suitably qualified and experienced practitioner [SQEP].
- A licensed asbestos removalist [for removal of more serious contamination].
- An independent asbestos assessor [for clearance and air monitoring of more serious contamination].
- An accredited laboratory to do the testing.

3.1 Person conducting a business or undertaking [PCBU]

This role is found in the Health and Safety at Work Act 2015. Most businesses, from large employers to sole traders or self-employed people, are PCBUs. Volunteer bodies, householders and workers are not PCBUs.

Several PCBUs may be involved in one project, in which case, they must consult, cooperate and coordinate as far as reasonably practicable.

Under the Health and Safety at Work Act, a PCBU must ensure the safety of their employees, contract workers and subcontractors and others who may be affected by the work. This includes people living or working on an asbestos-contaminated site and neighbours too. What is required of a PCBU is set out in the Asbestos Regulations and the Approved Code of Practice, but a competent person or an SQEP can provide guidance for particular circumstances.

The Asbestos Regulations have very specific requirements. First, a PCBU must not carry out or direct or allow a worker to carry out work involving asbestos [Regulation 7]. There are exceptions for a range of situations, as long as the work is done in accordance with the regulations. These include:

- sampling and identification
- removal and disposal, including demolition
- transport and disposal of asbestos or asbestos waste.

Each of these activities is subject to detailed regulations.

Regulation 7 also exempts work involving “soil that a competent person has determined does not contain asbestos-containing materials or asbestos in a quantity that is likely to lead to airborne contamination a level that exceeds trace level”. [Trace level is defined in the regulations as an average concentration of less than 0.01 respirable asbestos fibres per millilitre of air.] A competent person to make the assessment is likely to be an environmental scientist or similar person.

The other key provision in the regulations regarding asbestos-contaminated soil is that a PCBU “who knows or ought reasonably to know” that there is a risk of exposure to respirable asbestos fibres in the workplace must identify the asbestos giving rise to the risk [Regulation 10].

This regulation further limits this duty with respect to contaminated soil – the duty to identify only applies where there is “reasonable cause to suspect” its presence.

Together, these provisions mean that, while PCBUs have a clear duty to manage the risks of asbestos to workers, they only have a duty to identify asbestos in the soil of a workplace where workers are likely to be exposed to the risk and there is reasonable cause to suspect contamination at a level that will release respirable asbestos fibres into air.

Other regulations say that PCBUs with management or control of a workplace:

- must ensure that exposure of a person at the workplace to airborne asbestos is eliminated so far as is reasonably practicable, or (where not reasonably practicable to eliminate exposure) is minimised [Regulation 9]
- must ensure that the airborne contamination standard for asbestos in the workplace is not exceeded – this is an average concentration over any 8-hour period of 0.1 respirable asbestos fibres per millilitre of air
- must ensure that the location of asbestos or asbestos-containing materials at the workplace is clearly indicated
- if asbestos or asbestos-containing materials are identified, must ensure that a written asbestos management plan for the workplace is prepared – this must be kept up to date and be accessible to workers
- where they commission asbestos removal work, must ensure that the work is carried out by a removalist who is licensed to do the work if a licence is required or by a competent person
- before the work starts, must inform their workers, anyone else at the workplace and anyone occupying premises close to the workplace that asbestos removal work is to be carried out
- must ensure that only workers and others associated with the asbestos removal work have access to an asbestos removal area.

PCBUs that are responsible for workers carrying out asbestos removal work or asbestos-related work must, amongst other things:

- provide health monitoring
- carry out air monitoring where appropriate
- separate any removal work areas from other parts of the workplace during removal
- ensure workers are trained in the identification and safe handling of and suitable control measures for asbestos and asbestos-containing materials, and records of the training must be kept.

There are general requirements for all PCBUs:

- They must not use or direct or allow a worker to use a high-pressure water spray or compressed air on asbestos or asbestos-containing materials.
- They must not use or direct or allow a worker to use on asbestos or asbestos-containing materials a power tool, a

broom or any other implement that causes the release of airborne asbestos into the atmosphere unless the use of the equipment is controlled.

Potential further obligations under the Resource Management Act

The National Environmental Standards (which fall under the Resource Management Act 1991) affect land potentially or actually contaminated. The requirements set out in this regime for an owner/manager of contaminated land only apply in certain cases, such as subdivision, changing land use or removing/replacing a fuel storage system. These actions are sometimes referred to as ‘triggers’. Remediation cannot be required under the NES-CS unless one of these triggers applies. Refer to the BRANZ document *New Zealand Guidelines for Assessing and Managing Asbestos in Soil* for more guidance on these situations.

PCBUs have other obligations, too. For example, the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016 require PCBUs to provide workers with adequate information, supervision, training and instruction for any work that they have to do.

Part B of the Approved Code of Practice gives more information for workplace PCBUs.

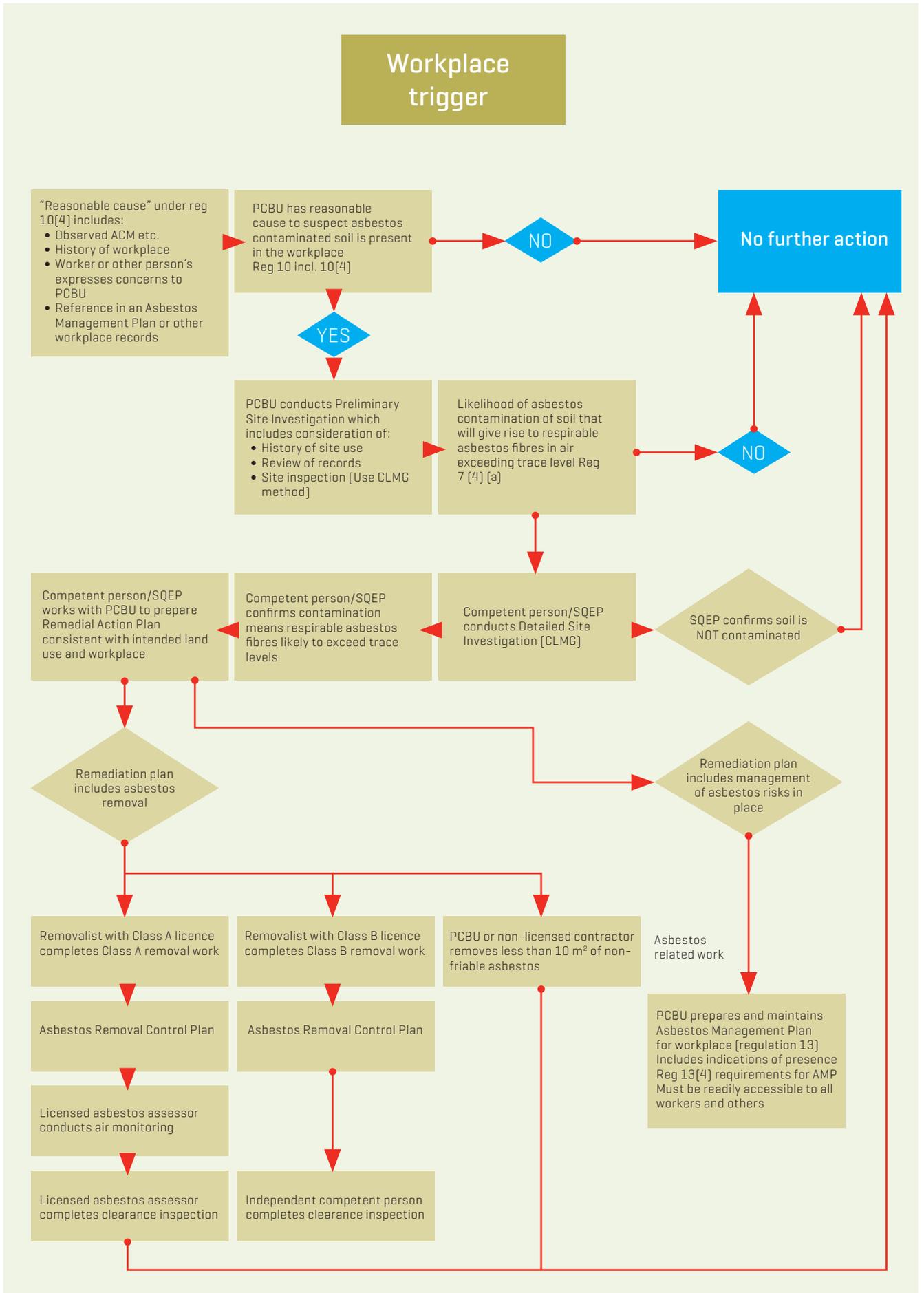
3.2 Competent person

There are a number of determinations under the Asbestos Regulations that a PCBU is required to ensure are made by a competent person. For most sites with asbestos contamination, this is probably the most important person – they will be the one advising the PCBU how to investigate, manage and/or remediate the soil.

Under the regulations, a competent person is “a person who has the knowledge, experience, skills, and qualifications to carry out a particular task under these regulations, including any knowledge, experience, skills, and qualifications prescribed in a safe work instrument”.

A competent person can have a variety of roles. For example, they could be competent to:

- make a determination that soil “does not contain ACM [asbestos-containing materials] or friable asbestos in a quantity that is likely to lead to airborne contamination at a level that exceeds trace level”
- carry out clearance inspections for Class B asbestos removal, including surface testing and air monitoring if required
- issue a clearance certificate for Class B asbestos removal work.



Decision flowchart for work involving asbestos in soil.

A competent person will usually hold a certificate for an asbestos assessor training course specified by WorkSafe or a tertiary qualification in occupational health and safety, occupational hygiene, science or environmental health. Refer to the Approved Code of Practice.

In practice, for assessing a larger-scale or more complex contamination site and developing remediation options, a competent person will often be an SQEP.

3.3 Suitably qualified and experienced practitioner (SQEP)

In some cases, the PCBU responsible for a site will need to engage an SQEP. This is a role created under the Resource Management Act 1991. In dealing with contaminated soil under that legislation, an SQEP certifies preliminary and detailed site investigation reports and can design management measures and sign off a remedial action plan. In other workplace situations, they may complete detailed site investigations for a PCBU and advise on the likely level and extent of contamination.

The role is outlined in the NES-CS, but it is not defined in much detail. Different types of contamination may require different types of experience – work involving asbestos in soil must be overseen by a person competent in that area, for example.

Someone who is an SQEP for work involving asbestos is likely to also be a competent person.

Territorial authorities have discretion over who they will accept as an SQEP and sometimes hold lists of consultants they regard as being suitably qualified and experienced for working with asbestos. For anyone looking for an SQEP, the local territorial authority would be one place to start.

The SQEP must be independent and apply good professional practice and could be expected to:

- be expert in a specific and relevant field so that they could, for example, provide expert testimony in the Environment Court
- if undertaking a detailed site investigation (supervised), have at least tertiary education in environmental science or engineering or a related field with 1 or more years of related professional experience
- if certifying a report on behalf of their company, be a senior or principal scientist/engineer with a relevant tertiary education and at least 10 years' related experience
- be a member of a recognised professional body such as Engineering New Zealand or the Certified Environmental Practitioner (CEnvP) scheme run by the Environment Institute of Australia and New Zealand.

3.4 Licensed asbestos removalist (Class A or Class B)

No licence is required for removing:

- 10 m² or less of non-friable asbestos or asbestos-contaminated material over the whole course of the removal project
- asbestos-contaminated dust or debris associated with this
- minor amounts of asbestos-contaminated dust or debris not associated with the removal of friable or non-friable asbestos.

Where there are larger quantities or there is friable asbestos, a licence is required. WorkSafe only issues licences to PCBUs, although removalists must provide details of suitably trained supervisors as a condition of receiving the licence.

Removalists with a Class A licence can deal with the highest-risk situations, removing:

- any amount of friable asbestos or asbestos-contaminated material
- any amount of asbestos-contaminated dust or debris
- any amount of non-friable asbestos or asbestos-contaminated material.

Removalists with a Class B licence can remove:

- any amount of non-friable asbestos or asbestos-contaminated material
- asbestos-contaminated dust or debris associated with removing any amount of non-friable asbestos or asbestos-contaminated material.

A licensed asbestos removalist must:

- ensure that removal work is supervised by a supervisor they have nominated to WorkSafe
- be satisfied that their workers carrying out licensed work hold a certificate from a relevant training course for the class of work they are doing
- provide appropriate instruction to a worker to ensure that work is carried out in accordance with the asbestos removal control plan for the workplace
- keep a training record for their workers doing licensed work
- give their workers doing licensed work information about the health risks of the work
- prepare an asbestos removal control plan for any licensed removal work and give a copy to the person who commissioned the work
- give WorkSafe written notice at least 5 days before they plan to begin licensed asbestos removal work (the form to do this is on the WorkSafe website: <http://forms.worksafe.govt.nz/asbestos-removal-notification>).

Part G of the Approved Code of Practice gives more information for licensed asbestos removalists and licensed asbestos assessors.

There is a list of current asbestos removal licence holders on the WorkSafe website.

3.5 Independent asbestos assessor

A licensed asbestos assessor inspects completed remediation work and provides a clearance certificate for Class A removal work. They can also carry out air quality monitoring during Class A removal work [or where there is uncertainty if the trace level in air is likely to be exceeded]. Asbestos assessor licences are held by individual people, not PCBUs. There is a list of current asbestos assessors on the WorkSafe website.

3.6 Accredited testing laboratory

Asbestos samples must be tested by an accredited or approved laboratory. Laboratories can be approved by WorkSafe to test samples for up to 12 months while in the process of getting accreditation. There are links to help find accredited laboratories on the WorkSafe website.

3.7 WorkSafe New Zealand

WorkSafe New Zealand is the work health and safety regulator. This Crown agency enforces compliance with all the relevant laws and regulations and oversees the asbestos removal licensing scheme. It also provides extensive advice and information on asbestos. The WorkSafe website is the number one place to visit for information on the topic – see www.worksafe.govt.nz/topic-and-industry/asbestos.



4. TESTING ASBESTOS AND ASSESSING RISK

Respirable asbestos fibres are not visible to the naked eye, and the only way to determine the amount of asbestos present is by testing. The PCBU may take expert advice from a competent person or an SQEP to ensure that appropriate sampling is carried out. The samples should be submitted to a laboratory accredited to test for asbestos.

The results of testing will allow an assessment to be made as to whether asbestos contamination exists and, if it does, how much risk it poses. From this, the PCBU can consider all the options, taking expert advice, and decide how the contaminated site should be managed or remediated.

A key objective of the Asbestos Regulations is to ensure that the volume of respirable fibres in the air stays below what is currently thought to be an acceptable level of risk.

The regulations apply to all work involving asbestos. They define work as involving asbestos “if the work involves manufacturing, supplying, transporting, storing, removing, using, installing, handling, treating, disposing of, or disturbing asbestos or ACM”. The regulations divide work involving asbestos into the two categories of:

- asbestos removal work
- asbestos-related work.

The World Health Organisation estimates an exposure of 0.01 asbestos fibres per millilitre of air [the “trace level” in the regulations] could result in an extremely low increased cancer risk of an exposed person. As exposure to asbestos during contaminated site work is generally limited to work hours, this limit is considered acceptable for worker exposure.

Depending on site use, a site may require further assessment and completion of a Tier 2 human health risk assessment [under the NES-CS] if concentrations are found in test samples that are:

- more than 0.001% w/w asbestos fibres and/or asbestos fines and/or
- more than 0.01% w/w asbestos-containing material [Table 1].

This is required to demonstrate that risks associated with the material are at an acceptable level or that implementation of management controls, mitigation or remediation is required to manage the potential human health risks.

A PCBU responsible for a workplace where there are risks of exposure to respirable fibres at above trace levels from asbestos contamination will need to make decisions around the risks and how best to remediate or manage them.

Decisions will be based on the level of risk. If action is to be taken, exactly what is practicable and appropriate for the circumstances? All remediation involves cost, and some options come with a high cost. Land use, location and public perception will be key parts of the decision.

To sum up, the PCBU’s decisions around what action to take will be based on the individual circumstances of the site, the test results and the advice from the experts engaged. See Table 1 and consult the BRANZ document *New Zealand Guidelines for Assessing and Managing Asbestos in Soil* for more detail.

Form of asbestos	Soil guideline values for asbestos (w/w)			
	Residential ¹	High-density residential ²	Recreational ³	Commercial and industrial ⁴
ACM (bonded)	0.01%	0.04%	0.02%	0.05%
FA and/or AF ⁵	0.001%			
All forms of asbestos – surface	No visible asbestos on surface soil ⁶			
Capping requirements for residual contamination above selected soil guideline value				
Depth ⁷	Hard cap	No depth limitation, no controls – except for long-term management		
	Soft cap	≥0.5 m		≥0.2 m

- 1. Residential:** Single dwelling site with garden and/or accessible soil. Also includes daycare centres, preschools, primary and secondary schools and rural residential.
- 2. High-density residential:** Urban residential site with limited exposed soil/soil contact, including small gardens. Applicable to urban townhouses, flats and ground-floor apartments with small ornamental gardens but not high-rise apartments [with very low opportunity for soil contact].
- 3. Recreational:** Public and private green areas and sports and recreation reserves. Includes playing fields, suburban reserves where children play frequently and school playing fields.
- 4. Commercial and industrial:** Includes accessible soils within retail, office, factory and industrial sites. Many commercial and industrial properties are well paved with concrete pavement and buildings that will adequately cover/cap any contaminated soils.
- 5. FA and/or AF:** Where free fibre is present at concentrations at or below 0.001% w/w, a proportion of these samples should be analysed using the laboratory analysis method described in section 5.4.4 of the *New Zealand Guidelines for Assessing and Managing Asbestos in Soil* (≥10% of samples). This is due to limitations in the AS 4964-2004 *Method for the qualitative identification of asbestos in bulk samples* and WA Guidelines 500 ml sample method for free fibre.
- 6. Surface:** Effective options include raking/tilling the top 100 mm of asbestos-contaminated soil [or to clean soil/fill if shallower to avoid contaminating clean material at depth] and hand picking to remove visible asbestos and ACM fragments or covering with a soft cap of virgin natural material [VNM] 100 mm thick delineated by a permeable geotextile marker layer or hard cap. Near-surface fragments of ACM can become exposed in soft soils such as sandy pumiceous soils after periods of rain.
- 7. Depth:** Capping is used where contamination levels exceed soil guideline values. Considerations of depth need to incorporate the type and likelihood of future disturbance activities at the site and site capping requirements [see section 6.1 of the *New Zealand Guidelines for Assessing and Managing Asbestos in Soil*]. Ideally, any capping layer should be delineated by a permeable geotextile marker layer between the cap and underlying asbestos/contaminated material. Institutional controls must be used to manage long-term risks, particularly where the cap may be disturbed [see section 7 of the *New Zealand Guidelines for Assessing and Managing Asbestos in Soil*]. Two forms of capping are typically used:
 - a. Hard cap comprises surfaces that are difficult to penetrate and isolate the asbestos contamination, such as tar seal or concrete driveway cover. This would typically not include pavers or decking due to maintenance and coverage factors.
 - b. Soft cap consists of a layer[s] of material that either comprise virgin natural material or soils that meet the asbestos residential soil guideline value from an on-site source. Use of on-site soils may require resource consent.

Table 1. Soil guideline values for asbestos in New Zealand.



DANGER

ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY

5. SITE REMEDIATION OPTIONS

The remediation options the PCBU may consider include:

- in situ management through administrative steps such as controlling land use activities on the site or parts of the site and engineering work such as putting a cap over the area of contamination
- excavation and off-site disposal, removing contaminated soil from the site.

A competent person/SQEP will typically develop a remedial action plan in consultation with the PCBU responsible for the site. This should be discussed with all stakeholders and carefully assessed to ensure that the most appropriate option is selected. The final choice will be guided by what is legally possible together with site-specific considerations such as cost, timeframe constraints and so on.

5.1 In situ management

In situ management options provide cost-effective solutions and are frequently used. Asbestos-contaminated soil may be left in place, the risks managed with a site management plan and institutional controls adopted such as a notation on a local authority LIM report.

In situ management options include the following:

- Requiring more secure containment and designing works on the site so as to avoid disturbing areas of contamination.
- Removing only visible bonded asbestos-containing material near the surface.
- Using clean fill, turf or similar as soft fill over a contaminated area.
- Capping a contaminated area with hard cover such as concrete [for example, under buildings with slab on grade or under concrete yard areas/forecourts]. A membrane may be placed over the asbestos-contaminated soil first to prevent the concrete from becoming contaminated and to mark out the contaminated soil.
- Placing asbestos-contaminated soil in a containment cell on the site, within landscaping or under a roadway for lower-risk contamination.

Temporary treatments such as spray-on polymer coatings can bind the surface layer until the soil can be remediated. This treatment may last for up to a year.

5.2 Excavation and off-site disposal

Removing all asbestos-contaminated soil from the site means there is no need for long-term institutional controls. However, ensuring that all asbestos-contaminated soil has been removed may be a lengthy and costly operation. It may not be commensurate with the risks associated with the contamination present.

During soil excavation and removal, the PCBUs responsible for the site and the removalists must together carefully manage potential short-term risks to site workers and neighbours from possible release of asbestos fibres and dust. A competent person, SQEP or licensed asbestos removalist is needed.

Depending on circumstances, it may be necessary for the PCBU to get a resource consent for the earthworks. A licensed asbestos removalist will develop an asbestos removal control plan as part of the remedial action plan. They must give WorkSafe written notice at least 5 days before licensed work begins.



6. PROTECTIVE EQUIPMENT AND TEMPORARY SITE CONTROLS

6.1 Personal protective equipment

Exactly what health and safety precautions are required depends on the type of site and the nature and severity of the contamination. Details can be found in the Approved Code of Practice. An outline of the protective equipment, dust suppression and decontamination requirements for different levels of work is set out in Table 2. Employers must provide the protective equipment and ensure that the clothing or equipment is worn.

6.2 Temporary site controls

A way to suppress dust and asbestos fibres must be available on site at all times. This will often involve water sprinkling or misting units to keep the surface of the soil damp and stop any loose asbestos fibres from becoming airborne.

Other site controls will depend on circumstances, but may include:



■ Disposable P2 dust mask for lower-risk asbestos-related work.



■ Half-face mask respirator that can be fitted with a P3 filter for Class B removal work.



■ Full-face P3 respirators for Class A removal work.



■ Full-face mask with air supply

Scenario	PPE	Respiratory protective equipment [RPE]*	Dust/asbestos fibre suppression	Decontamination facilities
Class A: friable >1% w/w FA and/or AF in soil	Disposable coveralls rated type 5, category 3, nitrile gloves, steel toe capped gumboots or safety footwear with disposable overshoes.	Full-face P3 respirator with particulate filter. Consider increasing to power-assisted if required.	Water and asbestos-encapsulating polymer emulsion product applied before starting work and during as required.	Basic disposable wet decontamination tent or trailer. Consider powered and plumbed decontamination unit if project scale warrants.
Class B: non-friable >0.01% w/w FA and/or AF in soil >1% w/w ACM		Half-face P3 respirator with particulate filter. Consider increasing to full-face if friable ACM present.		
Asbestos-related work >0.001% w/w FA and/or AF in soil >0.01% w/w ACM		Disposable P2 dust mask.	Water via localised points. Addition of surfactants and polymers where the location is sensitive (such as adjacent to busy centres, schools).	Basic disposable decontamination tent and foot wash.
Unlicensed asbestos work ≤0.001% w/w FA and/or AF in soil ≤0.01% w/w ACM	No asbestos-specific PPE if air monitoring confirms asbestos below 0.01 f/ml.	No asbestos-specific RPE if SQEP confirms unlikely to exceed trace levels in air monitoring [0.01 f/ml] and/or if air monitoring confirms asbestos below 0.01 f/ml.	Temporary cover of contaminated area awaiting remediation.	

*Refer to Part C section 14 of the ACOP and AS/NZS 1715:2009 *Selection, use and maintenance of respiratory protective equipment* for more information on RPE selection.

Table 2. Protective equipment, dust suppression and decontamination required when working with asbestos in soil.

- heavy-gauge polythene placed over the contaminated area when work is not being done
- sumps/barriers to control water run-off
- wheel-wash facilities for vehicles leaving the contaminated site.

It is the asbestos removalist’s responsibility to put up barriers delineating the asbestos removal area and signs showing the presence and location of asbestos and the fact that asbestos is being removed.

Buildings close to the contaminated area should be protected. One option is a 3 m-high chain link fence with

polythene sheeting on the inside for the full fence height. The fence should be strong enough to handle wind.

BRANZ had its own experience of asbestos in soil when roofing on its fire laboratory was found to be shedding asbestos fibres. Asbestos was even found where grass clippings were piled. The lawnmowing operator was provided with disposable coveralls and a disposable P2 mask. Other than lawnmowing, no work on the grounds took place until there was a clear picture of the risks and a remedial action plan was agreed and implemented. All windows and doors to surrounding office buildings were kept closed, and health monitoring was carried out.





7. DOCUMENTATION

The reports, certificates and other paperwork required during investigations and remediation are contained in different places, but especially in the Asbestos Regulations (administered by WorkSafe) and the Contaminated Land Management Guidelines (administered by the Ministry for the Environment).

It is a good idea to talk through the process with local authority staff at the start. They can confirm what reporting is necessary and whether additional steps – such as applying for a resource consent – will be required.

Regardless of whether a report is mandatory or not, all PCBUs should keep good records to:

- document the evidence that helped make a decision
- provide a record of what was done to help prove legal compliance
- leave a record for future property owners or industry practitioners to see how asbestos contamination was remediated – this will be crucial for future site development or change of use.

7.1 Key documents for compliance with the Asbestos Regulations

Preliminary site investigation report

This investigation looks for information to assess the likelihood of contamination and the land's appropriateness for current or proposed uses. A site walk-over and detailed review of the site history are essential. Soil sampling and testing is not common at this stage. If contamination is thought to be likely, this report will provide information for a detailed site investigation.

The preliminary site investigation is completed by the PCBU or for the PCBU by an independent competent person or SQEP. It does not need to be documented under the regulations, but it is good practice to record the decisions, who made them and the basis on which they were made.

Contaminated Land Management Guidelines No. 1: *Reporting on contaminated sites in New Zealand* presents the recommended content of a formal preliminary site investigation report.

Detailed site investigation report

Where a preliminary site investigation concludes there is a likelihood of contamination that could lead to exposure to respirable fibres above trace levels by a worker or others, a detailed site investigation will usually be required. This investigation typically involves taking samples for testing by an accredited laboratory and then analysing the results to assess the level of contamination. The report will usually be signed off by an SQEP. Although a detailed site investigation does not have to be documented under the regulations, it is essential for demonstrating compliance with the regulations.

Contaminated Land Management Guidelines No. 1: *Reporting on contaminated sites in New Zealand* explains the contents of a detailed site investigation report.

Laboratory reports

PCBUs must know what to look for in laboratory reports. Key information includes:

- asbestos type[s] present
- percentage of asbestos-contaminated material, fibrous asbestos and asbestos fines (based on a sample's dry weight)
- combined percentage of fibrous asbestos and asbestos fines.

Contaminated Land Management Guidelines No. 5: *Site investigation and analysis of soils* and the WA Guidelines (see More information) give information about laboratory testing requirements and data interpretation.

Asbestos management plan

If asbestos or asbestos-containing material is identified at a workplace or is likely to be present from time to time or stored in a containment on site, a PCBU responsible for the workplace must ensure that an asbestos management plan is prepared and kept up to date. It must be made available to

workers, their representatives and contractors coming onto the site. The regulations set out the required content.

7.2 Where a licensed asbestos removalist is used

Asbestos removal control plan

Where licensed asbestos removal work is done, a licensed removalist must prepare an asbestos removal control plan. This details the asbestos to be removed and how the removal will be carried out. It describes the asbestos removal area, any air monitoring points and the transport and disposal of waste. The PCBU who commissioned the work must get a copy. The Approved Code of Practice [in Appendix H] has a template for an asbestos removal control plan.

Air monitoring plan

Air quality monitoring for asbestos fibre, dust and other contaminant emissions must be carried out for Class A removal work or where there is uncertainty if the trace level in air is likely to be exceeded. It may also be of benefit to provide reassurance to users of neighbouring properties on sites where lower-risk work is being carried out but the site is in a sensitive location such as a residential area or beside a school. An independent licensed assessor carries this out for Class A work.

Clearance certificate

For licensed asbestos removal work, a clearance inspection must be carried out and a certificate provided before the area can be reoccupied. Licensed asbestos assessors issue clearance certificates for Class A licensed work. A competent person can issue a certificate for removal work that did not require a Class A licensed removalist. The Approved Code of Practice [in Appendix I] has a template for a clearance certificate.

7.3 Additional documents under the Resource Management Act

Preliminary site investigation report

As above, but completed by the SQEP and documented in all cases.

Detailed site investigation report

As above.

Conceptual site model

A conceptual site model should be started once asbestos in the soil is suspected. This is a system diagram showing where contamination is and how it could be released and transported to those who may be affected by it. It can include

maps and drawings. In simple terms, it explains what is going on at the site. It helps to guide initial investigation work, and it is added to as more information is found.

Contaminated Land Management Guidelines No. 5: *Site investigation and analysis of soils* provides more information.

Remedial action plan

Detailed remedial action plans are drawn up by the SQEP advising the PCBU. Key elements are the remediation or management goals that ensure the contaminated land will be suitable for current or proposed land use and will pose no unacceptable risk to human health or the environment. The plan should detail risk-reducing procedures.

Contaminated Land Management Guidelines No. 1: *Reporting on contaminated sites in New Zealand* explains the contents of a site remedial action plan.

Site validation report

This report documents the site conditions following remediation and/or mitigation. A key purpose is to inform future site users of the extent of residual impact and the details of any physical work [such as capping] installed to mitigate long-term risks. The site validation report should also include the clearance certificate issued by the independent assessor/competent person when the asbestos work zone and surrounding area is sufficiently decontaminated.

Contaminated Land Management Guidelines No 1: *Reporting on contaminated sites in New Zealand* explains the contents of a site validation report.

Ongoing site management plan

In cases where on-site containment of contamination is proposed rather than removal, an ongoing site management plan must be prepared by an SQEP. This shows how long-term risks will be managed. Specifically, it should show:

- what will be monitored
- frequency of monitoring
- reporting requirements
- period for reviewing the monitoring and management plan.

Contaminated Land Management Guidelines No. 1: *Reporting on contaminated sites in New Zealand* explains the contents of a site management plan. This site management plan will form part of the asbestos management plan.



8. MORE INFORMATION

8.1 Laws, regulations and codes of practice

Approved Code of Practice: Removal and Management of Asbestos

www.worksafe.govt.nz/topic-and-industry/asbestos/management-and-removal-of-asbestos

Contaminated Land Management Guidelines

www.mfe.govt.nz/land/risks-contaminated-land/managing-contaminated-land/contaminated-land-management-guidelines

Health and Safety at Work Act 2015

www.legislation.govt.nz/act/public/2015/0070/latest/DLM5976660.html?src=qs

Health and Safety at Work [Asbestos] Regulations 2016

www.legislation.govt.nz/regulation/public/2016/0015/latest/DLM6729706.html?search=ts_act%40bill%40regulation%40deemedreg_asbestos+regulations_resele_25_a&p=1

8.2 Publications

Good Practice Guidelines: Conducting Asbestos Surveys. WorkSafe New Zealand, October 2016

www.worksafe.govt.nz/topic-and-industry/asbestos/working-with-asbestos/conducting-asbestos-surveys

The Management of Asbestos in the Non-Occupational Environment (2013 edition), Ministry of Health

www.health.govt.nz/publication/management-asbestos-non-occupational-environment

New Zealand Guidelines for Assessing and Managing Asbestos in Soil, BRANZ

www.branz.co.nz/cms_display.php?st=1&sn=315&pg=19344

Users' Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health, April 2012, Ministry for the Environment

www.mfe.govt.nz/sites/default/files/guide-nes-for-assessing-managing-contaminants-in-soil.pdf

Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia. Department of Health, Western Australia, May 2009

http://ww2.health.wa.gov.au/Articles/A_E/Asbestos-contaminated-sites

8.3 Organisations

Ministry for the Environment

www.mfe.govt.nz

Ministry of Business, Innovation and Employment

www.mbie.govt.nz

New Zealand Demolition and Asbestos Association

www.demolition-asbestos.co.nz

WorkSafe New Zealand

www.worksafe.govt.nz



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978-1-98-852200-5 (pbk)