

CONTAMINATED LAND

What is this?¹

The Resource Management Act (RMA) 1991 defines contaminated land as land that has a hazardous substance in or on it that has significant adverse effects on the environment; or is reasonably likely to have significant adverse effects on the environment.

Contamination is not always limited to a specific site. Hazardous substances may travel through the soil into groundwater, or be carried to nearby land and waterways in rainwater or on dust particles. Vapour and gases from certain types of contaminated land may present additional risks of explosion and odour.

Why is it important?

There is a legacy of soil contamination in New Zealand that is mainly associated with historic practices involving the storage and use of hazardous substances, and disposal of hazardous wastes. Contaminants can become a problem when they exist in concentrations that may harm human health and the environment, such as soil, surface water, groundwater and ecosystems. People, animals and the environment can be exposed to hazardous substances on contaminated land in a number of ways, including direct contact with contaminated soil, swallowing food or water from contaminated environments and breathing vapours or contaminated dust. As well as endangering health, these substances can limit the use of land, cause corrosion that may threaten building structures, and may even reduce land value.

However, much of the New Zealand literature is silent on existing contaminated residential properties. Contaminants that could potentially exist on residential sites are:

- Lead-based paints on weatherboard houses. Natural weathering and renovation may leave an elevated lead imprint in the soil. Highest lead levels are usually closest to the foundations.
- Soil residues from historic gardening/pesticide use and or home business/hobby activities
- Asbestos residues (usually from asbestos cement sheeting) in the soil from house or outbuilding demolitions.²

Children with pica who eat soil are sometimes found to have elevated blood lead levels from contaminated soil. Pica is an eating disorder that affects children between one and six years of age, characterised by persistent and compulsive food cravings to eat non-food items.³

Data

Environment Canterbury identifies sites that may be contaminated, using the Ministry for the Environment's Hazardous Activities and Industries List (HAIL) which lists over 50 specific land use types with the potential to cause contamination. Examples of land uses included in HAIL are:

- sheep dips, which may be contaminated with arsenic and other insecticides;
- timber treatment sites, which may be contaminated with copper, arsenic, and/or chromium or other timber treatment chemicals;



¹ Information is derived from the Ministry for the Environment (<http://www.mfe.govt.nz/laws/standards/contaminants-in-soil/>) and Environment Canterbury publications (<http://ecan.govt.nz/publications/Pages/contaminated-land.aspx>) unless otherwise stated.

² Information supplied by L. Graham, Health Protection Officer, Community and Public Health.

³ <http://www.kidshealth.org/parent/emotions/behavior/pica.html> Accessed 24.11.12.

- former gasworks, which may be contaminated with benzene and other volatile aromatic hydrocarbons, phenols and cresols, polycyclic aromatic hydrocarbons (PAHS), and/or inorganic substances such as cyanides, ammonia and sulphates;
- closed landfills, which may be contaminated with used or surplus hazardous substances;
- fuel service stations, which may be contaminated by benzene, toluene, petrol, diesel, and/or other petroleum-related substances;
- horticultural sites, which may be contaminated by pesticides and/or herbicides.

Environment Canterbury uses a database to manage information about HAIL land that is, or has been, associated with the use, storage or disposal of hazardous substances. The database is called the Listed Land Use Register (LLUR) and it is being continually updated with new information, so although a site may not currently be registered on the LLUR, this does not necessarily mean that it hasn't been used for a HAIL in the past. As of November 2012, Environment Canterbury had identified and assigned classification on 3524 sites LLUR. There are 2605 sites recorded in Christchurch.

If there is no analytical information available for a site and the presence or absence of contamination has not been determined, the site will be registered by Environment Canterbury as 'not investigated'. Where Environment Canterbury has received analytical information from an investigation, the site may be classified in one of six ways. Classifications refer to the level of contamination (e.g. contaminated, significant adverse effects, at or below background concentrations) and the land use (for example residential or commercial).⁴

The City Council maintains some information on contaminated sites within Christchurch.⁵ When residential land use is located near current or former commercial/industrial land where hazardous substances were used or stored, or where there have been land use changes from HAIL commercial/industrial land use to residential use, there may be a greater likelihood that residents are living near or on known or potentially contaminated land.

Impact on inequalities

Evidence from other parts of New Zealand in the late 1990's did suggest that there is a strong positive relationship between increased hazardous substance sites and high deprivation levels.⁶ No comprehensive studies are available for Christchurch; though the City Council did undertake a comparison of contaminated sites⁷ it was aware of and compared these to the New Zealand deprivation index (NZDep) in 2010. This study did not show any linkage between contamination sites and deprivation levels but was not based on complete data. Environment Canterbury's function is to identify and manage information about contaminated land; they have not compared this information to the deprivation index.

Children are particularly at risk from exposure to soil contaminants because they receive a higher exposure per unit body weight than adults. Children aged between 6-24 months are most exposed because of their hand-to-mouth activities and patterns of play.⁸

⁴ Further information is available from <http://www.ecan.govt.nz/advice/your-land/contaminated-land/pages/contaminatedland-identification.aspx>

⁵ This includes sites that are under investigation and sites which have undergone partial or complete remediation.

⁶ Salmond, K. 1999. Setting our sights on justice: Contaminated sites and socio-economic deprivation in New Zealand. *International Journal of Environmental Health Research* Vol.9 (1)

⁷ Christchurch City Council. 2010. Monitoring and Research data - Contaminating Activity. Christchurch: Christchurch City Council.

⁸ Langley, A. 2004. The assessment and management of contaminated land. In: Cromar, N., Cameron, S., Fallowfield, H. (eds). *Environmental health in Australia and New Zealand*. Melbourne: Oxford University Press, p.310-318.

Solutions

The National Environmental Standard for Assessing and Managing Contaminated Soil to Protect Human Health (NES) came into effect on 1 January 2012. The objective of the NES is to ensure land affected by contaminants in soil is appropriately identified and assessed when soil disturbance and/or development activities take place and, if necessary, remediated or the contaminants contained to make the land safe for human use⁹.

District councils have a responsibility to ensure the effects of contaminated land are controlled, and administration of the NES helps them to meet their function under the RMA for the prevention or mitigation of any adverse effects of the development, subdivision, or use of contaminated land (RMA 1991, section 31 (1)(b)(iia)).

The Ministry for the Environment has developed a strategy for managing contaminated land¹⁰ which includes a contestable remediation fund made available each year to fund the investigation, remedial planning and remediation of sites that pose a risk to human health and the environment. Several sites in Christchurch have benefited under this scheme. Environment Canterbury has a contaminated land information management strategy to ensure that the information it holds is managed in a clear consistent manner and that it can readily be made available to land owners and other interested parties.

Hazardous chemicals are controlled by the Hazardous Substances and New Organisms (HSNO) Act (1996) and Resource Management Act (1991) which provide a greater measure of protection against unintentional contamination of land than in the past. Regional Councils are allowed to impose stricter conditions than the minimum set down under the HSNO Act. The HSNO Act and the RMA in conjunction are used together to control the use and disposal of hazardous substances. A number of documents are available for guidance including in planning and assessing consent applications so as to prevent any further contamination of land

Data limitations

There are gaps in the information held by Environment Canterbury, and not all HAIL sites have been identified which means the LLUR is currently incomplete. Environment Canterbury has a ten year programme to identify HAIL sites in Canterbury. HAIL site identification in Christchurch is currently being prioritised to assist with earthquake recovery work. Site identification is based partly on knowledge of past land use that may involve use of hazardous substances. If there is no information on past land use it is difficult to know if those areas may be contaminated.

The City Council does not have a list of all of the HAIL/LLUR sites in Christchurch nor is there a single data source linking LLUR data to land types and deprivation index.

Connections with other issues

Drinking Water, Recreational Water Quality, Open and green spaces.

⁹ Ministry for the Environment. 2012. Users' Guide – National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

¹⁰ Ministry for the Environment. 2006. Working towards a comprehensive policy framework for managing contaminated land in New Zealand. Wellington: Ministry for the Environment. <http://www.mfe.govt.nz/publications/hazardous/policy-framework-contaminated-land-nov06/policy-framework-contaminated-land-nov06.pdf> Accessed 12.10.10.

Impact of the earthquakes

As time passes and these papers are updated the initial sections on the impact of the earthquake are going to be kept as an archive. Updates are provided where possible.

As at November 2012

The earthquakes have resulted in the creation of unprecedented volumes of demolition wastes. To manage this effectively, Environment Canterbury, Christchurch City Council, CERA, Selwyn and Waimakariri District Councils joined forces in 2012 to create a team of five people to monitor the movement and disposal of earthquake waste which could adversely affect the rebuild of the city and impact future land use.

The Residential Red Zone Household Hazardous Waste (RRZ HHW) Project was set up through initial discussions between Environment Canterbury and CERA and supports earthquake recovery in the worst affected suburbs. The project aims to remove all household hazardous waste (i.e. paint, waste oil, fuel, household and garden chemicals etc.) from residential red-zoned properties prior to them being demolished to prevent discharge to the environment, reduce risks to site workers and public and mitigate legacy contaminated land issues for future Cantabrians. The project has been extremely successful in the first six months of its three-year operational period. To the end of September 2012, 95 tonnes of HHW has been collected directly from residential red zone properties and through over-and-above volumes received at Christchurch and Waimakariri transfer stations.

As at October 2011

The earthquakes of 2010 and 2011 significantly changed the landscape of Christchurch. The full impact of land settlement and the implications of this on rebuilding parts of Christchurch is still to be determined. Vigilance is required to assess the land, post-earthquakes and whether there is any effect on known contaminated areas and if the number of contaminated sites increases.

Prepared by Community and Public Health with input from Environment Canterbury.