



Bellevue site – Clean up

Clean-up strategy

The clean-up strategy for the former waste control site at Bellevue initially prioritised the protection of the Helena River. fact Sheet 18, in this series, provides information on the outcomes of the risk assessment process undertaken that formed the basis for the clean-up strategy. A two-phase process for remediation is underway. The first phase consisted of constructing two underground treatment walls (known as a permeable reactive barrier system), to prevent contaminants reaching the Helena River. The Department of Environment Regulation (DER) and its project manager, LandCorp, are about to enter the second phase of the clean-up strategy—dealing with contamination on the site of the fire.

Remediation approach

The results from annual monitoring, extensive soil and groundwater investigations and some remediation trials led to DER and LandCorp's decision to limit the movement of groundwater contaminants toward the river, while closely monitoring the behaviour of soil and groundwater contaminants at the location of the fire. The second plume at the end of Stanley Street has added to the complexity of the issues and will be included in the overall site management plans.

The remediation goal is to return the former waste control site to commercial/industrial use, and to return non-potable use of groundwater to affected properties.

Phase one remediation

The permeable reactive barrier (PRB) system was successfully installed in 2010. The PRBs form a passive treatment scheme, which makes use of the natural groundwater flow to channel contaminants to an in-ground treatment area. As groundwater passes through the barriers, contaminants are destroyed and treated groundwater flows out the other side.

The Bellevue underground treatment system is the first to be constructed in the world with two site-specific barriers. One barrier contains sawdust to deal with nitrates in

the groundwater and the second barrier contains zero valent iron, which reacts with the groundwater to treat chlorinated solvents.

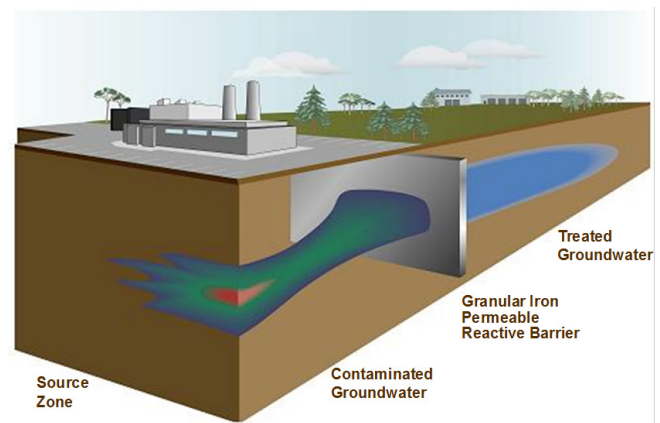


Figure 1: How a PRB works (figure courtesy Adventus)

For more information about the results of groundwater monitoring since the installation of the PRB, see fact Sheet 18 in this series.

Phase two remediation

LandCorp, DER's project manager for the Bellevue site, has called for expressions of interest (EOI), asking environmental remediation contractors to put forward their plans and predicted costs to clean-up the contaminant sources. Investigations and trials in the years since the fire have not identified a clear option for remediation. It may be that the successful bid will employ one or a combination of techniques such as:

- ◆ bio-remediation—the use of microorganisms to break down contaminants
- ◆ in-situ chemical oxidation (ISCO)—injecting chemical oxidants to break down the contamination in-ground
- ◆ in situ stabilisation—mixing a tailored cement mixture into the subsurface to physically and chemically immobilise the contaminants
- ◆ thermal conductive heating—applying heat to the soil to vapourise the contaminants.



Installing the PRB (image courtesy Golder Associates)

For more information on the Bellevue site

Visit DER's webpage at www.der.wa.gov.au/bellevue for more information and updates on the former Waste Control Site at Bellevue.

More information is also available from other fact sheets published as part of this series:

- ◆ Fact Sheet 16 – Background and risk
- ◆ Fact Sheet 18 – Groundwater monitoring

For more information on contaminated sites in WA

DER has published a series of fact sheets and administrative and technical guidelines to assist with the assessment, management and remediation of contaminated sites. These publications along with more information on contaminated sites are available at www.der.wa.gov.au/contaminatedsites.

or by writing to:

Contaminated Sites
Department of Environment Regulation
Locked Bag 33
CLOISTERS SQUARE WA 6850

or by telephoning the Contaminated Sites Hotline on 1300 762 982.

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Legislation

Free electronic copies of the *Contaminated Sites Act 2003*; the Contaminated Sites Regulations 2006; and the *Environmental Protection Act 1986* are available from the State Law Publisher (www.slp.wa.gov.au).

Contact details

For information on compliance with the *Contaminated Sites Act 2003* and Contaminated Sites Regulations 2006, or any other related matter, please contact the Contaminated Sites Information Line on 1300 762 982.