

18. Contaminated land

Overview

The majority of the areas identified as contaminated do not present a significant risk to human health or local ecology. The highest risk areas are the portions of MacKays Crossing where the potential for unexploded ordnances (UXO) has been identified, the identified soil contamination at the Porirua Gun Club and a former nursery and the potential presence of asbestos in building materials.

Contaminated land has the potential to affect local ecology and human health during construction and operation of the Project. This potential effect can be avoided through remedial work and by placing a road on the contaminated soils and essentially capping the contamination. The adverse effects associated with UXO can be avoided through investigation, careful excavation and management / disposal methods, and by observing appropriate protocols in the event of accidental UXO discovery. Remedial action may also be required.

Implementation of these measures, through the Contaminated Soil Management Plan (CSMP), will ensure that any adverse effects arising from contaminated land during construction and operation of the Project will be appropriately managed.

18.1 Introduction

In order to assess the potential effects of contaminated land in relation to the Project, a land contamination assessment and investigation of the land within and immediately surrounding the Project was undertaken. This assessment is detailed fully in **Technical Report 16**.

18.2 Existing environment – Contaminated land

The Project area is primarily comprised of greenfields areas, being areas that are used as pastures for grazing, forests and undisturbed lands. There are also areas along the proposed designation where farming, commercial or industrial activities take place, or have taken place in the past and these were the areas selected for intrusive investigation.

Within these areas, the contaminated land assessment identified several sites where contaminants of concern are present, and which could pose a human health risk and / or an ecological risk. These sites were (with the indicative location shown in Figure 18.1):

- **Site A** (Pt Lot 4 DP 4269): A market garden, where hazardous materials have been stored and pesticides, herbicides and fertilisers have been applied;
- **Site B** (Lot 1 DP 53032): An area that was formerly used (prior to purchase by the Crown) for storage of imported cars prior to their distribution around New Zealand;

- **Site C** (Lot 1 DP 47726): Former nursery, where pesticides have been used and heavy metal concentrations have been detected. Asbestos is present in building materials on the site;
- **Site D** (Section 1 SO Plan 402089): A former stockyard site, where metals are present;
- **Site E** (Section 4 SO Plan 38167): Garden supplies store and green waste composting facility, where pesticides have been applied, and treated timber has been stored, used and burned at the site. The site also contained an outhouse and above-ground tanks for fuel storage;
- **Site F** (Section 353 Porirua District): Mana Coach depot, where vehicles are stored and repaired, and fuel and other hazardous materials are stored;
- **Site G** (Pt Lot DP51158): GWRC historic sheep dip site, where pesticides are present; and
- **Site H** (Section 1 SO Plan 36634): Porirua Gun Club, where ammunition and clay targets have contaminated the soil.

The land contamination study also identified that it is possible that there may be UXO present at MacKays Crossing, adjacent to SH1, where past military activities were conducted.

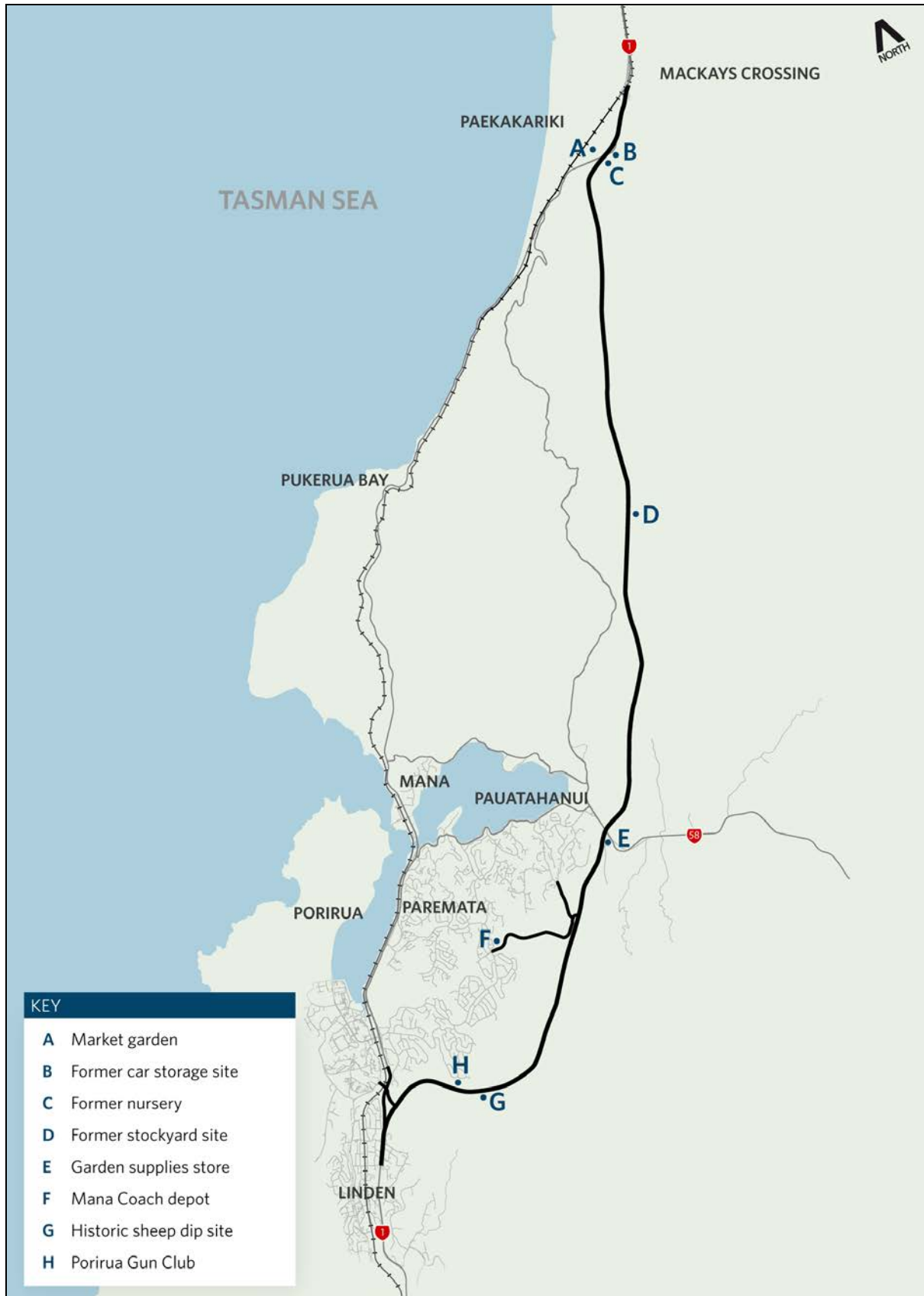


Figure 18.1: Sites investigated for potentially contaminated land

18.3 Assessment of effects

18.3.1 Construction of the Project

Potential effects from contaminated land during construction of the Project are risks to human health and risks to ecology.

18.3.1.1 Human health risk

Several contaminants of concern were present at concentrations above expected background values at most of the sites investigated, with the exception of the Mana Coach depot. This is indicative of anthropogenic activities at the sites, such as the application of fertiliser, pesticides and herbicides, and the presence of galvanised structures. However, at the majority of these sites, the presence of these contaminants is not at concentrations high enough to present a risk to human health.

The highest risk sites are the Porirua Gun Club and the former nursery. At the Gun Club, numerous near-surface samples in the firing range areas returned results above human health risk based guideline values⁹⁶ for lead and polycyclic aromatic hydrocarbons (PAH). Several of the corresponding deeper samples were also analysed and all but one returned results at the human health risk based guideline of 3,300mg/kg for lead.

Detectable concentrations of pesticides and higher than background concentrations of metals were detected at the former nursery. However, only arsenic in one sample returned laboratory results above the human health risk based guideline criterion of 70mg/kg. This was in a near-surface soil sample where elevated concentrations of lead, copper and zinc were also detected. Asbestos was detected in two of the building samples collected. The samples collected indicate that asbestos is present in some of the building materials, which has a potential human health risk. As such, additional investigation would be conducted prior to building demolition, to ensure that the risk to human health during construction of the Project is appropriately managed.

During construction, dust arising from areas with soil contamination levels above risk-based guideline values also presents a potential adverse effect. This risk arises for known contaminated land and any contaminated land that may be discovered during construction. Accidental discovery is a hazard of contaminated land, a protocol for which is outlined in the CSMP.

18.3.1.2 Ecological risk

Concentrations of several contaminants, such as antimony, lead, copper, zinc, arsenic, chromium, and nickel, which may present an ecological risk were also present at most of the sites investigated. Pesticide and benzo(a)pyrene were also detected above ecological risk-based guideline values at some sites. This is indicative of anthropogenic activities at the sites. However, at the majority of the identified sites, the ecological risk is believed to be relatively low, based on the analytical results from the samples collected and the disturbed nature of the sites.

96. Ministry for the Environment Contaminated Land Management Guidelines (MfE CLMG) and National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

The highest risk sites for ecological impacts are identified as the Gun Club and the former nursery. At the Gun Club, antimony, lead, copper, zinc and benzo(a)pyrene concentrations were identified in numerous locations across the site, all of which exceeded the ecological risk based values⁹⁷. These contaminants are particularly noticeable around the firing range area and appear to be present due to discharge of ammunition and clay targets.

Arsenic, chromium, copper, nickel and zinc concentrations at the former nursery were well above ecological risk based criteria and several times above expected background concentrations in several near-surface samples. Low concentrations of pesticides were also present, which is likely because of past activities undertaken at the site.

As is explained further below, although ecological guideline values were exceeded in some instances, the concentrations are not likely to pose a threat to local ecology during construction of the Project because the sites are located within the area proposed for the Main Alignment, limiting potential exposure.

18.3.1.3 Possible unexploded ordnances

The land assessment indicated that it is possible that UXO are present in the land adjacent to SH1 at MacKays Crossing. It is likely that the UXO are present at a depth of less than 1m below ground surface. While UXO are unlikely to spontaneously explode, certain activities which could create large pressure waves, sudden impact or sparking could cause detonation, posing a hazard to construction workers and to the public.

Extreme caution should be exercised when conducting activities in the area that could lead to vibration or similar disturbance of the UXO. Proper excavation and management / disposal are required for those areas which contain suspected UXO and where construction is expected.

There is a possibility that, following detonation of UXO (assuming it is detonated in place) residual contamination could be present, presenting a potential risk to construction workers.

18.3.2 Operation of the Project

During operation, the concentrations of contaminants identified are not likely to pose an adverse effect to human health. Although ecological guideline values were exceeded in some instances, the concentrations are not likely to pose a threat to local ecology because the sites are located within the area proposed for the Main Alignment, limiting exposure and ensuring that that potential adverse effect is largely avoided by placing the road on the affected sites. The soil removed from these sites will not be utilised in ecologically sensitive areas. Stormwater treatment devices and dust control measures will be in place to seek to ensure that adverse ecological effects do not occur. Therefore, the ecological risk of contaminated land associated with the operation of the Project is expected to be low.

97. Ministry for the Environment Contaminated Land Management Guidelines (MfE CLMG).

18.4 Measures to avoid, remedy, mitigate or offset potential adverse effects

From the contaminated land assessment, the sites that present the greatest risk to human health and the environment have been identified as the Gun Club, the former nursery and in the MacKays Crossing area (only in relation to UXO).

At the Gun Club, remedial work will be required, particularly in the firing range areas⁹⁸. This remedial action will be undertaken through a remedial action plan, to be approved by GWRC. At the Gun Club and the former nursery, appropriate on-site soil management will be required if the contaminated soil is left in place. Potential adverse effects are largely avoided by placing a road on the contaminated soils and essentially capping the contamination. Soil from these sites will not be utilised in ecologically sensitive areas and will not be used to construct stormwater management devices. If soil is to be removed, it will need to be disposed of off-site, at a properly licensed landfill. Some soil from the Gun Club may require treatment at a licensed facility prior to disposal. Monitoring will be undertaken to track and record where soil is relocated, to verify that it is appropriately placed and to prevent spread of contamination during future operations (e.g. road maintenance). Dust and erosion control measures will be required as described in the CSMP.

The land assessment indicated that it is possible that UXO is present in the land adjacent to SH1 at MacKays Crossing. Proper excavation and management / disposal are required for those areas which contain suspected UXO and where construction may affect the UXO. Discovery and disposal of UXO is dangerous, but not an uncommon occurrence and protocol is outlined in the CSMP. The Army is normally commissioned to identify and dispose of the UXO. It is recommended that, following detonation of UXO, samples should be collected and analysed to evaluate the potential risk to construction workers from remaining contaminants. Remedial action may be required, with appropriate soil treatment and disposal. This will ensure that potential adverse effects are largely avoided.

A CSMP has been developed to address the management of material with contaminants present. The primary approach of the CSMP is as a framework for the development of particular contaminated soil control practices and procedures to minimise effects on human health and safety and to reduce impacts on the environment.

98. Some of the contaminated area of land is located outside the Main Alignment. Remedial work will be undertaken as part of the wider Project works, when the Gun Club is relocated.