Envirolink Limited
20 Stafford Drive
Mapua 7005

4 February 2025

Attention: Martyn O'Cain

Re: Site contamination specialist review of remedial action plan

Site: Maitahi Subdivision, 7 Ralphine Way, Nelson

Dear Marty,

Preamble

Envirolink Limited (Envirolink) has engaged HAIL Environmental Limited (HAIL Environmental) to undertake a site contamination specialist review of *Remediation action plan: Maitahi Subdivision, 7 Ralphine Way, Nelson*, draft version 2, February 2025 ('the RAP', 'the site'). This report was prepared by Envirolink in relation to a proposed high density residential subdivision of the site, indicatively for a retirement village.

HAIL Environmental has not been engaged to review the underlying site investigation reports that inform this RAP. Therefore, we have had to take them as read, unless we have explicitly identified information gaps or deficiencies that appear to compromise the RAP. We could provide a more robust review if these reports were added to our scope.

Context

HAIL Environmental understands from the RAP that the Ralphine Way property has an area of approximately 44 ha, is legally Part Section 11 Brook Street and Maitai District, is approximately 2 km from central Nelson up the Maitai (Maitahi) River valley, and has been used for pastoral farming. Envirolink's client CCKV Maitai Development Company Limited Partnership proposes a subdivision of the site for mixed use development, including high density residential use, esplanade reserve and recreational reserves.

Envirolink has identified three areas of the site requiring remediation: a historic woolshed and stockyard incorporating a sheep dip / spray and footbath ('the woolshed area'), a runout area used by recently treated sheep ('the southern paddock'), and a former homestead. The RAP principally addresses the woolshed area; the other two areas are considered generally suitable for the proposed use.

HAIL ENVIRONMENTAL LIMITED
Wellington, New Zealand
www.hailenvironmental.co.nz

Considering the woolshed area, sheep dipping and spraying are relatively well-understood activities. Livestock dips are category A8 of the Ministry for the Environment (MfE)'s *Hazardous activities and industries list* ('the HAIL', revised 2011). In 2006, MfE released *Identifying, investigating and managing risks associated with former sheep-dip sites: a guide for local authorities* ('the sheep-dip guidelines'). While contaminated land regulation and practice have advanced considerably since 2006, much of the information in the sheep-dip guidelines remains relevant.

In this case, one complicating factor is that the stream running through the site, the Kākā Hill Tributary, is to be realigned through the woolshed area. Stormwater treatment wetlands are to be formed along the stream.

Envirolink has determined that soils in the vicinity of the former sheep dip are contaminated with historic pesticides: arsenic, reported at up to 810 mg/kg, and the organochlorine compound dieldrin, reported at up to 620 mg/kg. Dieldrin is a scheduled persistent organic pesticide under the Stockholm and Basel Conventions and under New Zealand's hazardous substances regulatory framework. These concentrations are well above national Soil Contaminant Standards for high-density residential use, which are 45 mg/kg for both arsenic and dieldrin. In fact, the highest dieldrin result could trigger restrictions made by the Environmental Protection Authority under the Hazardous Substances and New Organisms Act, which would mean that it could not legally be disposed of within New Zealand at this time.

Several other contaminants were also elevated in Envirolink's sampling, including cadmium, chromium, copper, lead, nickel, zinc, DDT and hexachlorocyclohexane. Envirolink argues, and HAIL Environmental generally agrees, that focusing on the main contaminants arsenic and dieldrin is both necessary and sufficient for remedial planning purposes, and this should effectively address these other contaminants.

In that regard, another complicating factor is that the Maitahi River valley drains the northern side of the Bryant Range, formed of Dun Mountain – Maitai Terrane "mafic and ultramafic igneous and sedimentary rocks in a sheared serpentinite matrix" as described on the Q-Map 1:250,000 geological map. Mafic and ultramafic rocks typically contain naturally elevated concentrations of common anthropogenic contaminants including chromium, copper, nickel and sometimes asbestos. The RAP could usefully refer to the discussion in *Background concentrations of trace elements and options for managing soil quality in the Tasman and Nelson Districts,* a report to Tasman District Council by Landcare Research, dated June 2015. In that report, Landcare highlights the issue of elevated chromium and nickel in mafic soils of the Nelson-Tasman region, explains that a separate set of background values are required for those soils, and explains that insufficient data was available at the time to construct such a background. Accordingly, where soil samples from the site show chromium, copper and nickel enriched to a comparable extent, it is likely that they are naturally occurring, so it would be inappropriate and practically impossible to 'remediate' them.

Considering hydrological context, the RAP states that groundwater has been encountered at 1.5 to 2.4 m below ground level, and that the flow direction in the woolshed area is currently southeast toward the Maitahi River. The RAP does also mention a historic stream channel running beneath the woolshed, which HAIL Environmental suggests may be acting as a preferential pathway. There are stated to be no current water takes within 1 km of the site, and we presume none are proposed as part of the development.

Proposal

The RAP proposes to excavate contaminated soils from the planned esplanade reserve, and from directly around the former homestead. Depending on concentrations these soils will be either:

- Reused within recreational reserves
- Encapsulated in a lined, capped cell approximately 1 km north of the woolshed area, subject to an ongoing site management plan
- Disposed of to a suitably consented facility such as York Valley Landfill
- Bagged and stored in sealed containers for future disposal when a destruction technology that meets EPA's requirements is available, potentially thermal treatment or mechanochemical dehalogenation.

Envirolink provides remedial criteria for both arsenic and dieldrin, for soils in the riparian corridor, in the wider esplanade reserve and recreational reserves, and for future residential use; for groundwater; and for disposal. In the latter regard, Envirolink cites an EPA proposed 'low content limit' of 50 mg/kg for dieldrin as the maximum concentration that could be encapsulated, a purely regulatory constraint. For arsenic, it proposes the limit for encapsulation be the generic managed fill waste acceptance criterion (WAC) from the WasteMINZ *Technical guidelines for disposal to land*. This WAC was developed to protect aquatic environments from leaching from unlined fills, so it should be quite precautionary for a lined fill.

On that basis, Envirolink estimates the impacted soil covers approximately 2,000 m², with a conservative mean thickness of 500 mm, thus perhaps 1,000 m³ requires remediation. Of this, if HAIL Environmental understands correctly, Envirolink estimates around half will be reusable, quarter will require encapsulation, and the rest will require offsite disposal: around 30-40 m³ will require storage pending destruction. These estimates do not seem to allow for chasing out contamination below the proposed stream base invert at 1.5 m below ground level.

A range of conventional soil handling, erosion, and health and safety controls are proposed.

A site validation report is proposed "in full compliance with MfE guidelines" – no detailed scope is proposed – along with an ongoing management plan for contamination remaining on site.

Comments

The RAP is structured to comply with MfE's *Contaminated land management guidelines No. 1: Reporting on contaminated land in New Zealand* (2021 revision). Its signatory, Martyn O'Cain, holds current Certified Environmental Practitioner – Site Contamination specialist certification, which should give regulators confidence that he meets the definition of a suitably qualified and experienced practitioner. (In passing, the quality assurance page is titled 'Detailed site investigation' rather than 'Remedial action plan', which should be corrected.)

As the RAP openly states, it rests on limited information at several places. To address these limitations, further investigation is proposed, presumably after resource consent is granted. That is why the RAP is presented as a draft only. This approach is feasible and understandable. HAIL Environmental is comfortable that the general issues posed by the site are well established, and there seems no more risk of unexpected discoveries than would usually be the case on a remedial project.

Nonetheless, these limitations pose significant risks to the integrity of the RAP and to the development. It is not yet clear:

- How much soil exceeds hazardous substances criteria for dieldrin
- When and how soil that exceeds hazardous substances criteria will be disposed of (treatability trials are stated to be in process)
- The lateral and vertical depth of contaminated soil in the woolshed area that requires removal from site
- The lateral and vertical depth of contaminated soil in the woolshed area that requires encapsulation
- Design constraints for the encapsulation cell, such as access, stability, drainage, space available, etc.
- The relative costs and benefits of removal and encapsulation
- The lateral and vertical depth of contaminated soil in the woolshed area that is suitable for reuse
- Any constraints on reuse in recreational reserves, including required soil properties, stability, volumes available, etc.
- Whether remedial criteria should be applied to gravels, and if so, how
- Whether it is necessary to address groundwater contamination, and if so, how
- Whether the old stream channel is acting as a preferential pathway
- How further investigations will be reported, and how any regulator concerns will be addressed
- What precisely will be done by way of validation
- Who will undertake long-term management and monitoring, and for what period.

Given these uncertainties, the cost and even feasibility of implementing the RAP is far from clear. HAIL Environmental is confident that site-specific remedial criteria could be developed to allow for more reuse of soil and reduce costs, but the benefit of doing so is also unclear.

As written, the RAP takes several of its remedial criteria from an ecology report for the site by Robertson Environmental. In HAIL Environmental's view, this is not adequate – the remedial criteria must be derived within the RAP, by the site contamination specialist. In this regard, the ecologist's role should be limited to advising on the ecological values of the esplanade reserve. If those ecological values are to be high, then HAIL Environmental suggests the more stringent Australia and New Zealand Guidelines (ANZG) 'DGV' toxicant default guideline values for sediment quality be used (see www.waterquality.gov.au).

We understand the proposed groundwater remedial criteria are based on a simple model for groundwater from the source zone entering the stream and subsequently meeting ANZG default water quality guidelines (i.e. ecological criteria) after reasonable mixing, but we do not understand why this is even necessary given the source zone is to be excavated. If groundwater remedial criteria are required, the need for copper and zinc criteria should be reviewed, noting that both were reported in Envirolink's DSI (was this dissolved or total metals?), that the ANZG for copper and zinc have recently been revised, and that there may be a significant local background. Moreover, we do not think the role of the old stream bed is sufficiently understood; the 'further investigation' should be extended to include upgradient and downgradient bores within it.

The RAP is unclear as regards low level contaminated and naturally enriched soils. At section 6.2, it requires the encapsulation area to be reinstated in soils meeting the ordinary Nelson-Tasman background concentrations set out in the Landcare Research report. Further down that same section, it states "if further investigations or validation results show that material is at or below the local background concentrations set for the Maitai / Kākā Valley area, then no further constraints are required for the reuse of that material." This should be clarified – in our view the RAP should:

- Provide for local background to be investigated and determined well before remedial works begin (this would be an extension to the proposed 'further investigation)
- Plan for material meeting local background to be reused on site
- Be clear that it could be difficult to dispose of material that does not meet published regional background, and identify a disposal route if this is required
- Allow for local background to take precedence over ecological guideline values
- Include determination of background copper in Maitahi River water.

While the RAP presents remedial criteria for groundwater, it does not seem to require groundwater remediation. Section 6.3.4 calls for water accumulating in excavations to be pumped out and treated by coagulation / flocculation and activated carbon filtration, but that would be strictly a temporary step, and should be reviewed during the works as it might offer little improvement over settlement alone.

The RAP provides no particular controls for handling soils that have sufficiently high dieldrin concentrations to be considered hazardous substances. HAIL Environmental suggests that this should be reviewed, particularly given the dermal toxicity of dieldrin. We were also expecting specific labelling instructions for these soils.

Section 8.6 calls for groundwater monitoring in the woolshed area after source excavation "on a limited basis" and "as part of the further investigation recommendations." But those investigations should have finished before source excavation; monitoring should sit within the ongoing management plan. In any case the RAP needs to give some indication of what could be done if concentrations are unsatisfactory. Because arsenic and (especially) dieldrin can be expected to be strongly bound to soils, removing or treating groundwater will have little effect: arsenic and dieldrin will continue to move from soil into water for a very long time, perhaps indefinitely.

Further work

HAIL Environmental suggests you also get us to review the supporting investigations and other relevant material. Certainly we would have to do that before we could provide any formal evidence in relation to this project.

HAIL Environmental can assist further if called on, for example in relation to:

- Reviewing the final RAP and expert evidence
- Determining local background concentrations
- Site-specific risk assessment
- Treatment technologies for highly contaminated material
- Reviewing operations and/or subsequent reports.

Limitations

This letter has been prepared for Envirolink by HAIL Environmental in accordance with the purpose and scope set out above, and the usual care and thoroughness of the consulting profession. Any use of any part of this letter by any other party, or in any other context, is the responsibility of the user.

A detailed review of previous investigations was not included in this limited assessment. Information from cited sources has not been independently verified unless specifically stated, and HAIL Environmental assumes no responsibility for any inaccuracy or omission therein.

This document does not purport to give legal or financial advice.

Closing

Should you have any questions related to this matter, please contact the undersigned on [redacted] or [redacted].

Yours sincerely,

Dr. Dave Bull CEnvP-SC CChem
Site Contamination Specialist, Director

Kylie Eckersley CEnvP-SC CChem
Site Contamination Specialist, Director