



13 May 2016

Brendon Love
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Bay of Plenty Regional Council
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Our ref: 2124648
IM comments 3
Your ref:

Dear Brendan

Kopeopeo Canal Remediation - Consent Variation Application Independent Monitor comments in relation to Contaminated Land aspects

1 Introduction

Further to your request of 10 February 2016, I have commented on (in my role as the appointed independent monitor) the technical aspects associated with the sediment dredging method that is proposed as an alternative to the consented method for the remediation of Kopeopeo Canal. In preparing this commentary I have considered observations I made during a site visit during the dredging trial conducted in September 2015, the subsequent sampling results of surface water and filtrate testing conducted during the trial and information in the following relevant reports:

- *Bay of Plenty Regional Council Resource Consent Application Number 67173 Consent Holder: Bay of Plenty Regional Council (Natural Hazards Group)*
- *Whakatane District Council Resource Consent for Land Use File numbers LL-2012-8085-00 Consent Holder: Bay of Plenty Regional Council (Natural Hazards Group)*
- *Kopeopeo Canal Area to be Remediated and Containment Sites Gis-487835*
- *Kopeopeo Canal Containment Site 1B (New CS1) - Conceptual Design*
- *Kopeopeo Canal Containment Site 2 Site Plan Removal, Remediation and Storage of Canal Sediment*
- *Kopeopeo Canal Containment Site 3 Site Plan Removal, Remediation and Storage of Canal Sediment*
- *Ice Geo & Civil (2016) Kopeopeo Canal Remediation: Containment Sites - Geotechnical Considerations*
- *Peter West (April 2016) Kopeopeo East Canal Restoration Project; Flooding and Drainage Management Plan for Wet Dredging Method*
- *Dr. Joanne Kelly (2016) Memo: Support of the application for variation to the resource consent to remove the contaminated sediment from the Kopeopeo Canal*
- *Opus (2016) Kopeopeo Canal Remediation Project Discharge Water Quality from the Kopeopeo Canal Containment Sites*
- *Jacobs (2016) Kopeopeo Canal Remediation Bay of Plenty Regional Council Revised Groundwater Assessment*

- Jacobs (2016) *Kopeopeo Canal Remediation Bay of Plenty Regional Council Revised Air Quality Assessment*

2 Independent Monitor comments

This commentary is based on information presented in the reports and documentation cited in Section 1, the Independent Monitor's and GHD's remediation experience as well as information gathered in the past 12 months of the Independent Monitor's involvement in the project and feedback received from the Community Liaison Group and other members of the community.

In providing this commentary on the remediation method presented in the Consent Variation, the following elements have been considered in relation to remediation principles, in particular those that are relevant to the Kopeopeo Canal remediation project:

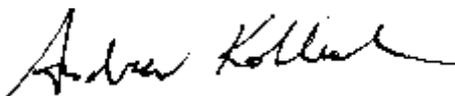
- a) The method of remediation;
- b) Construction and long term management of the containment areas
- c) Groundwater quality at the containment areas
- d) Air quality during remedial works and at the containment areas during and after remediation
- e) Health and safety of the workforce and the community during remediation and at the containment areas
- f) Surface water quality and hydrology

Table 1 (attached) presents information relevant to these aspects for both the consented remedial option and that proposed in the Consent Variation application. Comments are made on the viability of the proposed alternative method in relation to efficacy, logistics, long term effectiveness, health and safety and materials handling.

3 Concluding remark

The information reviewed in preparing this commentary has demonstrated that dredging the sediments from Kopeopeo Canal is a practical alternative method to the consented method. With appropriate planning and execution, the alternative method will allay community concerns regarding dust generation and contamination of other areas, avoid hundreds of truck movements carting contaminated sediments, maintain the water flow in the Canal during remediation and allow the sediments to be placed in a controlled and safe manner that will access for the bioremediation phase. If you have any further queries, please do not hesitate to contact the undersigned directly on 61 2 9239 7187.

Regards



Andrew Kohlrusch

Principal Environmental Scientist

Encl. Table 1 – Method Comparison – Consent method and Variation (Proposed) method

Table 1 Method Comparison – Consent method and Variation (Proposed) method

Remediation Element	Consented Method	Variation Method	Comments
Method of remediation	Mechanical excavation of sediment from the canal bed followed by truck transport to the containment cells.	Removal of sediments by dredging. The sediments and water from the canal will be piped to the cells where it is treated with flocculants and coagulants and transferred to Geotubes for dewatering. The filtrate will be treated prior to discharge into canal.	<p>The proposed method will effectively act as a closed loop with the sediments being transferred to the containment areas in the pipeline with direct discharge into the Geotubes. There will be little if any exposure of the sediments to the atmosphere, thereby mitigating one of the community’s key concerns with the consented approach – release of dioxin laden dust to the atmosphere during the excavation of the sediments and subsequent placement into the containment areas.</p> <p>The proposed method will also provide a more efficient system of working and remove a number of risks (e.g. noise, truck movements, decontamination of trucks and other equipment, dioxin migration to groundwater) that were of concern in the original method.</p> <p>There will be better homogenisation of the sediments which will result in ease of application of ameliorants for bioremediation as well as generating consistent monitoring data.</p> <p>It is understood that the RAP will be replaced in the Variation Consent by a Dredge Management Plan (DMP). The DMP should include the key relevant elements of the RAP as well as the steps required to dredge the sediments in an environmentally sensitive and safe manner taking into account the site specific characteristics.</p>
Construction and long term management of the containment cells	Sediments are to be placed in bunded areas and mixed with lime using excavators. The sediments would be allowed to drain and leachate released to the underlying	The proposed containment cell designs incorporate placement of the Geotubes in a bunded area which itself is contained within a	The proposed method includes treatment of the sediment/water mix with flocculent and coagulant which will control the amount of dioxin that may be present in the water discharged from the Geotubes into the sump and then into the canal. Tests of the filtrate during the treatment trial showed that the amount of dioxin in the

Remediation Element	Consented Method	Variation Method	Comments
	groundwater prior to commencement of bioremediation.	larger bund. The surface of the containment area will be lined with HDPE and a sump constructed to allow collection and then discharge of treated water into the Kopeopeo Canal. Drains are placed along the perimeter to control the influx of surface water. Geotechnical studies have been completed that identify constraints (and further information) that have to be considered in the final design of each of the containment cells.	<p>aqueous fraction would not lead to recontamination of the sediments in the canal.</p> <p>The sump may need to be larger than indicated on the containment cell diagrams to accommodate the large volume of water that will be generated with a 3 percent sediment load.</p> <p>The use of an HDPE liner will act as an appropriate barrier of release of leachate to the groundwater. The groundwater monitoring program nominated by Jacobs (2016) will be necessary to demonstrate the effectiveness of the HDPE liner.</p> <p>The capture of the sediment in the Geotubes is not likely to generate dust or require specific long term management and provide a controlled environment for the subsequent bioremediation.</p>
Groundwater quality at the containment areas	The floor of the containment cell was to be lined with geofabric with the sediments allowed to drain freely with leachate migrating into the underlying groundwater.	The containment cells are to be lined with 1.5mm thick HDPE. Water from the dredging process will be treated and returned to the canal. Surface water drains will be placed along the perimeter of the containment cell and direct water to the canal.	The proposed method will prevent dioxin transport to groundwater in the containment cell areas, with filtrate from dewatering discharged to canal. The HDPE liner will offer far greater protection to groundwater and the surface water drains will minimise water accumulation in the containment cell.
Air quality	Excavation of the sediments, truck movements to the containment cells and the sediments drying in the containment cells could	The proposed option is essentially a closed loop from the time it is dredged to the time it is placed in the Geotubes	<p>The proposed method will significantly reduce dust generation due to the removal of the requirement for transporting the sediment to the containment cells.</p> <p>The consented method was to involve contaminated sediment drying out in the containment cells could</p>

Remediation Element	Consented Method	Variation Method	Comments
	generate dust that would have to be managed.	awaiting dewatering and bioremediation. The potential for dust generation is limited.	generate dust which has a potential exposure pathway for dioxin release. The exposure pathway will be removed by the proposed method as the sediment will be contained in a pipeline which will discharge directly to the Geotubes.
Health and safety	<p>Potential hazards would be present in the excavator working along the stop bank, the truck movements along the stop bank and driving on public roads, truck entry to and from the containment cells and machinery moving contaminated soil within the containment cells.</p> <p>Increased traffic movement as well as potential spillages and release of contaminated soil and/or dust would put both the community and site workers at risk of exposure to dioxins.</p>	Work with the proposed method would involve work over water. Once the pipeline, treatment and Geotube system is set up, there would be limited vehicular movements. Inoculation of the Geotubes may present some safety hazards (such as the size and slumping during dewater and settlement) which would need to be controlled.	The potential for spillage of dioxin contaminated material during the excavation process and the transport from the canal to the containment cells will be removed. The proposed method removes a number of potential opportunities for spillage that were present in the original method and reduces the potential risk of spillage to ground of contaminated sediments. Leaks in the pipeline and/or the Geotubes could result in an uncontrolled release and an appropriate response to such incidents should be recognised in the DMP.
Surface water quality and hydrology	The Canal was to be split into a number of individual segments that could affect its purpose in flood control. Water from one section was to be removed and placed into the remaining unremediated section. No treatment of surface water was advocated.	The dredging method (to be described in more detail in the DMP) is aimed at using silt curtains or similar to allow continued flow in the Canal. Treated water discharged from the Geotubes will be returned to the Canal.	Peter West (2016) has provided information that will allow bespoke design of the containment cells to account for the unique features of the Rangitaiki flood plain. The dredging along with the containment cell design is aimed at mitigating impacts to both surface water quality and flow.