APPENDIX E Contaminated Land Memorandum

[Memo name]

To	**Ben Ryder**
CC	Sean Crocker, Dathan Proudlove, Melissa Pendley
From	Emily Frost
Date	24/06/2025
Subject	Bridge 217 Soil Chemistry Results
Reference	[C5001-02-577-12000-EW-PP-TREC-000001]
Revision	1

Background

Following the devastation of Cyclone Gabrielle, a temporary rail bridge was constructed in 2023 to allow for the restoration of the KiwiRail line South of Napier. However, circumstances have necessitated the life span of the bridge be extended to fifty years. This will require significant works to strengthen the existing structure, and reduce the potential impacts caused by weathering and flood events.

Specifically, it has been proposed that the water levels of the Waitangi basin are lowered by approximately 1m, facilitated by the removal of earth from the surrounding bank. As a result of this, desktop investigations revealed that the Awatoto Pump Station (formerly Mission Pump station) discharges receiving stormwater directly upstream to the immediate area of works (Figure 1). Stormwater from the Waitangi Drain is collected from the Napier suburb known as Awatoto, an industrial park which in the past has experienced non-compliance in discharge, as a result, it was identified that there was a risk of legacy contaminants becoming exposed because of the planned works.

Methodology

On the 28th of May, TREC SQEP went to site to dig a series of test pits to collect composite samples for processing. A series for 4 test pits of 30cm diameter and 1m depth were dug, with samples taken in composite (Figure 1). Approximately 1000cm^3 composite soil samples were collected per test pit and shipped to Hills laboratory for processing for a suite of analytes, including:

1. Heavy Metals
2. Polycyclic Aromatic Hydrocarbons
3. Total Petroleum Hydrocarbons
4. Volatile Organic Compounds

Figure 1. Test pit locations in association with the Awatoto Pump station (formerly Mission Pump station).

Results

The results from the composite samples taken at the four test pits across the site revealed that sediment to 1m depth did not have significantly elevated total petroleum hydrocarbons, heavy metals, polycyclic aromatic hydrocarbons nor volatile organic compounds compared to background levels. In addition, results indicate that sediment is well within the guidelines stipulated under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health, those published as median values under the background soil concentrations and soil guideline values for the protection of ecological receptors (Eco-SGVs), as well as being considered “clean fill”.

Table 1 Results of composite samples taken in four test pits at Awatoto.

Analysis grouping	Analyte	Site one	Site two	Site three	Site four
Total Petroleum Hydrocarbons	C7 - C9	< 20	< 20	< 20	< 20
	C10 - C14	< 20	< 20	< 20	< 20
	C15 - C36	< 40	< 40	< 40	< 40
	Total hydrocarbons (C7 - C36)	< 80	< 80	< 80	< 80
Polycyclic Aromatic Hydrocarbons	Total of Reported PAHs in Soil	< 0.4	< 0.3	< 0.4	< 0.4
	1-Methylnaphthalene	< 0.013	< 0.011	< 0.014	< 0.013
	2-Methylnaphthalene	< 0.013	< 0.011	< 0.014	< 0.013
	Acenaphthylene	< 0.013	< 0.011	< 0.014	< 0.013
	Acenaphthene	< 0.013	< 0.011	< 0.014	< 0.013
	Anthracene	< 0.013	< 0.011	< 0.014	< 0.013
	Benzo[a]anthracene	< 0.013	< 0.011	< 0.014	< 0.013
	Benzo[a]pyrene Potency Equivalency Factor (PEF) NES	< 0.031	< 0.026	< 0.033	< 0.032
	Benzo[a]pyrene Toxic Equivalence (TEF)	< 0.031	< 0.026	< 0.033	< 0.032
	Benzo[a]pyrene (BAP)	< 0.013	< 0.011	< 0.014	< 0.013
	Benzo[b]fluoranthene + Benzo[j]fluoranthene	< 0.013	< 0.011	< 0.014	< 0.013
	Benzo[e]pyrene	< 0.013	< 0.011	< 0.014	< 0.013
	Benzo[g,h,i]perylene	< 0.013	< 0.011	< 0.014	< 0.013
	Benzo[k]fluoranthene	< 0.013	< 0.011	< 0.014	< 0.013
	Chrysene	< 0.013	< 0.011	< 0.014	< 0.013
	Dibenzo[a,h]anthracene	< 0.013	< 0.011	< 0.014	< 0.013
	Fluoranthene	< 0.013	< 0.011	< 0.014	< 0.013
	Fluorene	< 0.013	< 0.011	< 0.014	< 0.013
	Indeno(1,2,3-c,d)pyrene	< 0.013	< 0.011	< 0.014	< 0.013
	Naphthalene	< 0.07	< 0.06	< 0.07	< 0.07
	Phenanthrene	< 0.013	< 0.011	< 0.014	< 0.013
	Perylene	< 0.013	< 0.011	< 0.014	< 0.013
	Pyrene	< 0.013	< 0.011	< 0.014	< 0.013
Heavy Metals	Total Recoverable Arsenic	4	2	3	4
	Total Recoverable Cadmium	< 0.1	< 0.1	< 0.1	< 0.1

	Total Recoverable Chromium		14		9		12		16
	Total Recoverable Copper		7		4		4		8
	Total Recoverable Lead		11.3		5.5		6.6		14.3
	Total Recoverable Nickel		11		6		9		13
	Total Recoverable Zinc		49		31		37		53
Volatile Organic Compounds	Bromobenzene	<	0.3	<	0.3	<	0.3	<	0.3
	Benzene	<	0.3	<	0.14	<	0.3	<	0.3
	1,3-Dichlorobenzene	<	0.3	<	0.3	<	0.3	<	0.3
	Bromodichloromethane	<	0.3	<	0.3	<	0.3	<	0.3
	4-Chlorotoluene	<	0.3	<	0.3	<	0.3	<	0.3
	Bromoform (tribromomethane)	<	0.5	<	0.5	<	0.5	<	0.5
	Bromomethane (Methyl Bromide)	<	0.3	<	0.3	<	0.3	<	0.3
	2-Butanone (MEK)	<	50	<	30	<	50	<	50
	n-Butylbenzene	<	0.3	<	0.3	<	0.3	<	0.3
	tert-Butylbenzene	<	0.3	<	0.3	<	0.3	<	0.3
	Carbon disulphide	<	0.3	<	0.3	<	0.3	<	0.3
	Carbon tetrachloride	<	0.3	<	0.3	<	0.3	<	0.3
	Chlorobenzene (monochlorobenzene)	<	0.3	<	0.3	<	0.3	<	0.3
	Chloroethane	<	0.3	<	0.3	<	0.3	<	0.3
	Chloroform (Trichloromethane)	<	0.3	<	0.3	<	0.3	<	0.3
	Chloromethane	<	0.3	<	0.3	<	0.3	<	0.3
	4-Methylpentan-2-one (MIBK)	<	9	<	6	<	9	<	9
	Acetone	<	50	<	30	<	50	<	50
	1,2-Dibromo-3-chloropropane	<	0.5	<	0.5	<	0.5	<	0.5
	Dibromochloromethane	<	0.3	<	0.3	<	0.3	<	0.3
	1,2-Dibromoethane (ethylene dibromide, EDB)	<	0.3	<	0.3	<	0.3	<	0.3
	Dibromomethane	<	0.3	<	0.3	<	0.3	<	0.3
	1,2-Dichlorobenzene	<	0.3	<	0.3	<	0.3	<	0.3
	1,3-Dichloropropane	<	0.3	<	0.3	<	0.3	<	0.3
	Dichlorodifluoromethane	<	0.5	<	0.5	<	0.5	<	0.5
	1,1-Dichloroethane	<	0.3	<	0.3	<	0.3	<	0.3

	1,2-Dichloroethane	<	0.3	<	0.3	<	0.3	<	0.3
	1,1-Dichloroethene	<	0.3	<	0.3	<	0.3	<	0.3
	cis-1,2-Dichloroethene	<	0.3	<	0.3	<	0.3	<	0.3
	trans-1,2-Dichloroethene	<	0.3	<	0.3	<	0.3	<	0.3
	Dichloromethane (methylene chloride)	<	5	<	3	<	5	<	5
	1,2-Dichloropropane	<	0.3	<	0.3	<	0.3	<	0.3
	1,4-Dichlorobenzene	<	0.3	<	0.3	<	0.3	<	0.3
	2-Chlorotoluene	<	0.3	<	0.3	<	0.3	<	0.3
	1,1-Dichloropropene	<	0.3	<	0.3	<	0.3	<	0.3
	cis-1,3-Dichloropropene	<	0.3	<	0.3	<	0.3	<	0.3
	trans-1,3-Dichloropropene	<	0.3	<	0.3	<	0.3	<	0.3
	Ethylbenzene	<	0.3	<	0.3	<	0.3	<	0.3
	Hexachlorobutadiene	<	0.3	<	0.3	<	0.3	<	0.3
	Isopropylbenzene (Cumene)	<	0.3	<	0.3	<	0.3	<	0.3
	4-Isopropyltoluene (p-Cymene)	<	0.3	<	0.3	<	0.3	<	0.3
	Methyl tert-butylether (MTBE)	<	0.3	<	0.3	<	0.3	<	0.3
	Naphthalene	<	0.3	<	0.3	<	0.3	<	0.3
	n-Propylbenzene	<	0.3	<	0.3	<	0.3	<	0.3
	sec-Butylbenzene	<	0.3	<	0.3	<	0.3	<	0.3
	Styrene	<	0.3	<	0.3	<	0.3	<	0.3
	1,1,1,2-Tetrachloroethane	<	0.3	<	0.3	<	0.3	<	0.3
	1,1,2,2-Tetrachloroethane	<	0.3	<	0.3	<	0.3	<	0.3
	Tetrachloroethene (tetrachloroethylene)	<	0.3	<	0.3	<	0.3	<	0.3
	Toluene	<	0.3	<	0.3	<	0.3	<	0.3
	1,2,3-Trichlorobenzene	<	0.3	<	0.3	<	0.3	<	0.3
	1,2,4-Trichlorobenzene	<	0.3	<	0.3	<	0.3	<	0.3
	1,3,5-Trichlorobenzene	<	0.3	<	0.3	<	0.3	<	0.3
	1,1,1-Trichloroethane	<	0.3	<	0.3	<	0.3	<	0.3
	1,1,2-Trichloroethane	<	0.3	<	0.3	<	0.3	<	0.3
	Trichloroethene (trichloroethylene)	<	0.3	<	0.3	<	0.3	<	0.3
	Trichlorofluoromethane	<	0.3	<	0.3	<	0.3	<	0.3
	1,2,3-Trichloropropane	<	0.5	<	0.5	<	0.5	<	0.5

	1,1,2-Trichlorotrifluoroethane (Freon 113)	<	0.3	<	0.3	<	0.3	<	0.3
	1,2,4-Trimethylbenzene	<	0.3	<	0.3	<	0.3	<	0.3
	1,3,5-Trimethylbenzene	<	0.3	<	0.3	<	0.3	<	0.3
	Vinyl chloride	<	0.3	<	0.3	<	0.3	<	0.3
	m&p-Xylene	<	0.5	<	0.3	<	0.5	<	0.5
	o-Xylene	<	0.3	<	0.3	<	0.3	<	0.3

Summary

Following the cyclone, works to increase the life span of the temporary KiwiRail bridge is likely to involve the removal of approximately 1m sediment surrounding both the Northern and Southern abutments to increase flood flow capacity. Due to the upstream proximity of the industrial stormwater pumpstation, Awatoto Pump Station, four test pits were dug to 1m depth and composite samples were taken to assess a range of analytes. Results indicate that there was no contamination risk detected in the samples, with results within guideline values, and the MfE acceptance criteria for class 5 clean fill.