TETRA TECH COFFEY

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25 February 2022

Our ref: 773-WLGGE225406AE

Upper Hutt City Council
838-842 Fergusson Drive
Upper Hutt Central
Upper Hutt 5018

Attention: Emily Thomson

Dear Emily,

Mangaroa Peatlands Extent - Mapping Update

Introduction

Upper Hutt City Council (UHCC) requested Tetra Tech Coffey (NZ) Ltd refine the southern extent of the Mangaroa Peatlands in the area around Katherine Mansfield Drive, Upper Hutt as outlined in Tetra Tech Coffey's proposal "Mangaroa Peatlands Extent – KMD" dated 18 November 2021.

Mangaroa Peatland area in the Upper Mangaroa Valley has been identified as a geotechnical hazard in previous reporting and mapping by Tetra Tech Coffey as part of the input into Plan Change 47 – Natural Hazards (PC47) and Plan Change 50 - Rural and Residential Chapters Review (PC50). More details about this can be found in the following report:

- "Upper Hutt City Council Residential & Rural Chapter Review" Coffey Services NZ Ltd, reference 773-WLGGE225406AB rev 6 dated 12 October 2020

The extent of this peat hazard overlay has been determined based on the area mapped as peat in the Geology of Wellington 1:50 000 Map[1]. Katherine Mansfield Drive runs near the south-eastern boundary of this peat overlay, crossing some mapped peat areas. Some of the rural-lifestyle properties in the area overlap the peat overlay area. During the consultation process, some residents have provided submissions relating to the location of the Mangaroa Peat Overlay on their property. Discussions with Upper Hutt City Council (UHCC) have determined that a site walkover with access to relevant properties be undertaken to refine the southern boundary of the peatland extent.

Methodology

The following steps were undertaken:

1. Site walkover on 21 December 2021 and 25 January 2022 to conduct geological and geomorphological mapping to refine the southern boundary of the peatland where possible.
2. Review of available data including any available geotechnical reports as well as geology, contour and soil maps.

The peatland boundary was only adjusted where there was clear evidence that areas currently mapped as peat were likely not peat. The following key criteria was the basis of the adjustment of the peat extent:

[1]Begg, J.G.; Mazengarb, C. 1996. Geology of the Wellington area: sheets R27, R28, and part Q27, scale 1:50,000. Institute of Geological & Nuclear Sciences geological map 22. Institute of Geological & Nuclear Sciences, Lower Hutt. 128 p. + 1 sheet.

- Exposed ground: Where the upper soil profile (below any topsoil) was able to be viewed (for example via cuttings or pits), this was used to confirm the presence or otherwise of peat at that location.
- Slope angle: The peat area is characterised by flat topography, with some gentle slopes around the margins. Therefore, areas that were moderate to steep were generally excluded from the peat extent.
- Discussions with property owners: Where there was information provided about soil behaviour or conditions from property owners experience, this was used to refine the peat extent boundary.
- Soil maps: The existing peat extent and site observations were compared with the soil maps[2] (ref). In particular the NZSC Soil Order where those soils mapped as Brown or Ultic soil were generally considered outside of the peat extent and soil drainage where moderately and well drained soils were generally considered outside of the peat extent.

The following table summarises the properties where the peat boundary has been adjusted.

Table 1: Properties Affected by Peat Hazard Extent Adjustments

Katherine Mansfield Drive		Janet Frame Way		Ashton Warner Way	
Physical Address	**Legal Description**	**Physical Address**	**Legal Description**	**Physical Address**	**Legal Description**
-	Lot 4 DP 381858	4a	Lot 20 DP 78794	4	Lot 5 DP 56754
-	Pt Lot 1 DP 24378	4b	Lot 19 DP 78794	12	Lot 6 DP 56754
50a	Lot 1 DP 72375	5a	Lot 14 DP 78794	16	Lot 7 DP 56754
50b	Lot 2 DP 72375	5b	Lot 17 DP 78794		
50e	Lot 1 DP 89007	5c	Lot 16 DP 78794		
50f	Lot 6 DP 72375	6	Lot 18 DP 78794		
52	Lot 7 DP 72375				
83	Lot 46 DP 56753				
91	Lot 45 DP 56753				
93	Pt Lot 44 DP 56753				
110	Lot 1 DP 508688				
115	Lot 43 DP 56754				
122	Lot 4 DP 56754				
155a	Lot 27 DP 75528				
156	Lot 12 DP 56754				
157	Lot 41 DP 56756				
159	Lot 40 DP 56756				
160	Lot 13 DP 56754				
165a	Lot 39 DP 56756				
165c	Lot 38 DP 56756				
174	Lot 14 DP 56754				
176b	Lot 15 DP 56754				
191	Lot 34 DP 56756				

[2] S-Map Online Manaaki Whenua Landcare Research https://smap.landcareresearch.co.nz/maps-and-tools/app/ accessed February 2022

191a	Lot 33 DP 56756				
193	Lot 32 DP 56756				
199	Lot 31 DP 56757				
285	Lot 2 DP 557634				
321	Lot 1 DP 534395				

Future Work

We assess that the revised peatland extent map is sufficient for an area-wide assessment. Site specific intrusive investigation could be undertaken for proposed dwellings within the mapped peatland area to confirm the presence and/or extent of peat and determine the geotechnical hazard and mitigation measures on a case-by-case basis.

If more information about the peat hazard is required, an InSAR (Interferometric Synthetic Aperture Radar) assessment could be undertaken. InSAR is a remote sensing technique which would provide information about the extent and amount of settlement detected in the peat area. This technique assesses ground deformation over time which enables settlement to be detected from radar reflected surfaces such as residential or agricultural roof areas, roadways, and/or other repeatable ground surfaces. This could be undertaken using publicly available data having a resolution of 30m ground cells dating back to 2014. It is noted that the publicly available data would allow understanding of deformation of reflected surfaces in the peat area. To refine the mapped extent and increase the accuracy of the deformation over time using InSAR, commercially available data having a resolution of 10m ground cells could be considered for analysis.

If further physical testing data is required, an intrusive investigation comprising cone penetrometer testing (CPTs) would be the method recommended. This would provide individual point data that would further inform the peat extent and thickness.

For and on behalf of Tetra Tech Coffey (NZ) Ltd

Prepared by

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Reviewed by

David Sullivan
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Principal Engineering Geologist/Geotechnical Engineer

Cc James Beban (Urban Edge Planning)

Nick Tait (UHCC)

Attachments

Figure 1 – Geotechnical Hazard – Peat (pdf and GIS file)

Figure 2 – Changes to peat extent

Please note: This report must be read in the context of the attached limitations.

IMPORTANT INFORMATION ABOUT YOUR TETRA TECH COFFEY REPORT

As a client of Tetra Tech Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Tetra Tech Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Tetra Tech Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Tetra Tech Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Tetra Tech Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Tetra Tech Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Tetra Tech Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Tetra Tech Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Tetra Tech Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Tetra Tech Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Tetra Tech Coffey to work with other project design professionals who are affected by the report. Have Tetra Tech Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

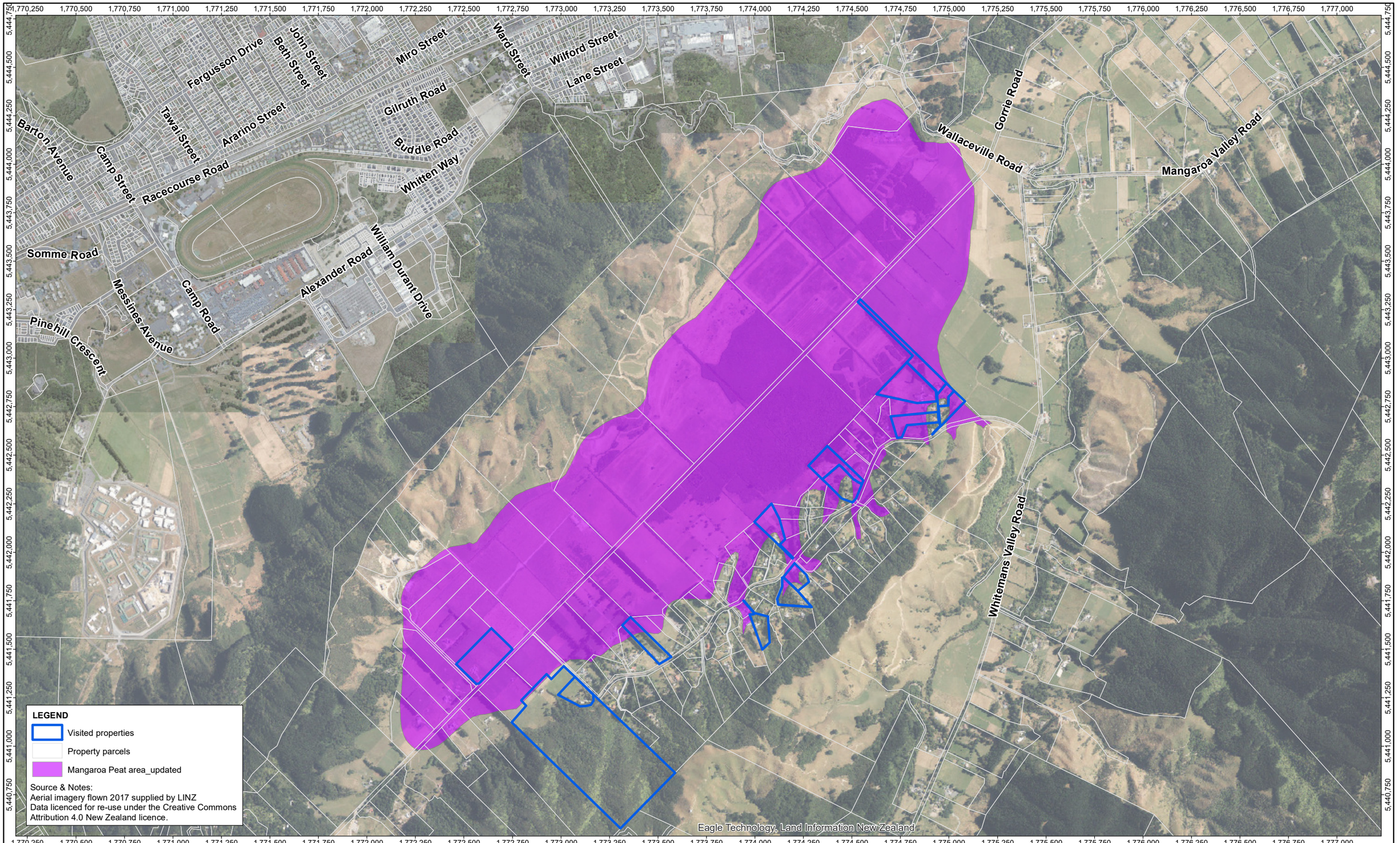
Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Tetra Tech Coffey for information relating to geoenvironmental issues.

Rely on Tetra Tech Coffey for additional assistance

Tetra Tech Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Tetra Tech Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Tetra Tech Coffey to other parties but are included to identify where Tetra Tech Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Tetra Tech Coffey closely and do not hesitate to ask any questions you may have.



revision	no.	description	drawn	approved	date
	A	ORIGINAL ISSUE	RZ	SM	23.02.22

0 200 400 600 800
SCALE 1:18,000 (A3) METRES

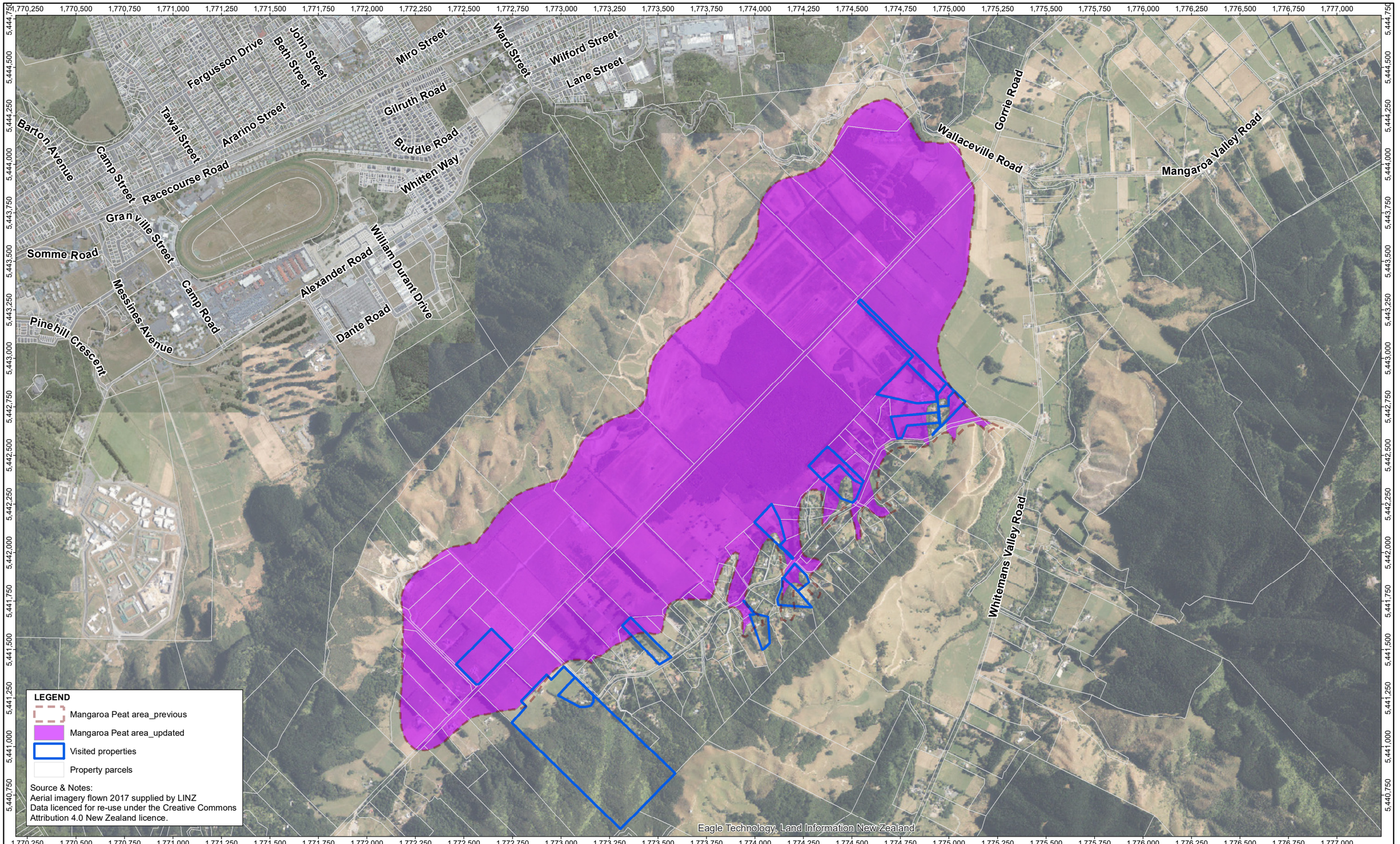
Projection: NZGD 2000 New Zealand Transverse Mercator

drawn	RZ
approved	SM
date	23.02.2022
scale	AS SHOWN
original size	A3

TETRA TECH COFFEY

client:	UPPER HUTT CITY COUNCIL
project:	MANGAROA PEAT EXTENT
title:	GEOTECHNICAL HAZARD - PEAT
project no:	773-WLGGE225406AE
figure no:	01
rev:	A

MXD ref: 225406AE_01_GIS001_1



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TETRA TECH COFFEY

client: UPPER HUTT CITY COUNCIL

project: MANGAROA PEAT EXTENT

title: CHANGES TO PEAT HAZARD EXTENT

project no: 773-WLGGE225406AE | figure no: 02 | rev: A

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