PATTLE DELAMORE PARTNERS LTD
Level 5, PDP House
235 Broadway, Newmarket, Auckland 1023
PO Box 9528, Auckland 1149, New Zealand

Office +64 9 **523 6900**
Web **www.pdp.co.nz**
Auckland Tauranga Hamilton Wellington
Christchurch Invercargill

solutions for your environment

17 November 2021

Simon Parham
Chief Operating Officer
Waitomo Energy Limited

Dear Simon

DESKTOP REVIEW – WEST STREET, SH1, ASHBURTON

1.0 Introduction

Pattle Delamore Partners Limited (PDP) has been engaged by Waitomo Energy Limited (Waitomo) to undertake a limited desktop review for the property identified as Designation D65 on West Street, State Highway 1, Ashburton ('the site'). It is understood Waitomo intend to lease the site for redevelopment as a Waitomo-branded fuel stop and have submitted a land use consent application to the Ashburton District Council (ADC). Following the submission of the application, ADC have requested via a Section 92 letter that a Detailed Site Investigation (DSI) should be conducted on the basis the site has been potentially subject to contamination.

The purpose of this desktop review is to provide a high-level assessment in relation to potential contamination issues that may be identified at the property and provide information regarding the geological conditions and sensitivity of the underlying groundwater aquifer, as groundwater in the vicinity of the site is used for public water supply purposes. This information will allow a preliminary conceptual site model for the site to be developed, which will include an assessment of the likely source-receptor pathway linkages.

It is understood that Waitomo intends to undertake a DSI once consent has been granted for site redevelopment. This approach has been successfully adopted at other brownfield sites across the country and subject to the development of appropriate consent conditions, the necessary 'checks and balances' via approval mechanisms can still be put in place by Council. On this basis, we have outlined proposed consent conditions to ensure the appropriate handling and management of contaminated soils occurs and if required (based on the findings of the DSI), validation sampling and reporting is conducted.

This letter has been prepared to fulfil the requirements of the desktop review to assist Waitomo with the consent application. While the letter is not considered to be a preliminary site investigation (PSI) as defined in the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil) Regulations 2011* (referred to as the NESCS), the contaminated land assessment has been overseen by a Suitably Qualified and Experienced Practitioner (SQEP).

2.0 Summary of Site Information

The following table is a summary of the information obtained from Waitomo and other readily available information sources, including Environment Canterbury (ECan), the New Zealand Geotechnical Database (NZGD), and published literature.

Table 1: Site Summary

SITE DETAILS / HISTORY	
The site is located on West Street, State Highway 1, opposite Ashburton Domain (337 West Street). Surrounding the site is a mix of industrial and commercial land use, as well as the Ashburton Domain to the north. The site has operated as a railway yard and railway storage area since at least 1940-44. The site has had several small buildings present, one of which remains on site.	
GEOLOGICAL HAZARDS	
PDP have not completed a full (or intrusive) assessment of the possible ground conditions that may exist on site, the following assessment is based on published information only; the actual conditions on site may differ to the following interpretation and can be confirmed by site investigation and subsequent reporting.	
Geology	The geological map for the Christchurch area compiled by Forsyth, P.J., Barrell, D.J.A and Jongens, R. (2008), shows that the site and surrounding area is underlain by *"Grey river alluvium beneath plains or low level terraces (Q1a)"* and *"Light brownish grey river gravel, sand, silt within abandoned outwash plains or low to mid-level terraces (Q2a)"* of Holocene age. The nearest bore is an ECan well K37/0585 used for public water supply (approximately 30 m north of the site). The well was installed in 1995 and recorded earth overlying brown clay to 2.5 m below ground level (bgl), underlain by hard claybound gravels, free claybound gravels and/or free stained gravels to a depth of 26.0 m bgl. Below this is a water bearing unit of free gravels with sand that were encountered to 30 m bgl. This well is screened from 26.5 m to 29.5 m bgl.
Topography	The site appears to be flat with a slight grade to the west.
Groundwater	There are 17 registered wells within a 500 m radius of the site; seven for public supply, three for domestic supply, five with expired consents or no longer in use, one geotechnical bore and one listed as not drilled. Where recorded, groundwater levels range from 3.90 to 13.3 m; screen depth ranges from 7 m (K37/2963) to 109.5 m (K37/3533). From the Environment Canterbury map viewer, five of these are registered as community drinking water supply points. The site falls into the groundwater protection zone for three of these supply points – K37/1284, K37/0585 and L37/0443; the site also potentially falls within the groundwater protection zone of well K37/0492 (dependant on final site layout). ∴ K37/0585 – GW at 3.90 m, screened from 26.5 to 29.5 m. Located approximately 25 m northwest of the site. ∴ K37/1284 – GW at 9.70 m, screened from 90.6 to 96.6 m. Located approximately 150 m west of the site.

Table 1: Site Summary	
	⁘ L37/0443 – GW at 4.43 m, screened from 17 to 20 m. Located approximately 115 m northeast of the site. ⁘ K37/0492 – GW at 4.40 m, screened from 24.97 to 27.75 m. Located approximately 238 m north of the site. The ECan depth to groundwater map layer indicates the depth of groundwater at the site falls between the 0.5 m and 5.0 m groundwater contours. Groundwater is anticipated to flow in a westerly direction towards the Ashburton River.
Nearest Surface Water Body	The nearest surface water body is the Ashburton River, located approximately 1.6 km west of the site.
Available Geotechnical Testing	The New Zealand Geotechnical Database (NZGD) has four test pits and three boreholes recorded within 500 m of the site. The four test pits, located approximately 160 m east of the site, have been dug to a depth of 2.0 m bgl. No groundwater was noted in any of these test pits. These test pits encountered topsoil between 0.2-0.4 m bgl, variably underlain by sandy silt to a maximum depth of 0.9 m bgl, and/or gravels to 2 m bgl. Three boreholes located approximately 360 m southeast of the site at the Ashburton Intermediate School, are drilled to a depth of 10.64 m bgl. The boreholes encountered topsoil overlying silty and sandy gravels. Groundwater was encountered in two of these boreholes, at a depth of 4.65 m bgl.
ENVIRONMENTAL CONDITIONS	
Historical Aerial Photographs	1940-44: The site is occupied by a train yard, including small sheds, railway tracks, railway carriages, and a turning circle to the east. One small shed appears to be the shed currently present on site. 1955-59: An additional small shed is present closer to West Street. Storage of timber is noted on site. 1975-79: The main railway building and turning circle have been removed from site. The three small sheds remain as per the 1955-59 aerial image. 1980-84: One small shed to the east has been removed from site. 1985-89 and 1995-99: The images are of poor resolution, however, there appears to be just one small shed remaining on site, in its present-day location. The railway line is still present on site. 2000-04: As above, the image quality is poor, however there appears to be no major change since the 1995-99 aerial image. 2010: Small piles of aggregate are present on the site to the east. Behind the small shed and further to the west there is a storage area for shipping containers. 2015-2020: No significant change is noted since the 2010 aerial image. Aggregate is no longer stored on site.

Table 1: Site Summary	
Environment Canterbury's Listed Land Use Register	A review of the LLUR document obtained from Environment Canterbury (ECan) showed the site is registered based on the HAIL activities identified. The site is listed under the following: ⁘ HAIL F6 – Railway yards. The site is categorised in the LLUR document as being 'verified HAIL – not investigated.' Within 150 m of the site, the following sites are listed on the ECan LLUR: ⁘ 30 m north of the site, at the Ashburton Domain, the site is listed under HAIL A17 – Storage tanks or drums for fuel, chemicals or liquid waste. Site notes indicate one underground storage tank is on site, containing 3(c) product. The site is categorised as 'verified HAIL – not investigated.' ⁘ Approximately 71 m southeast of the site, at 606 East Street, the site is listed under HAIL F3 – Engine reconditioning workshops. The site is described as Honda Country store, and services motorcycles. The site is categorised as 'verified HAIL – not investigated.' ⁘ Approximately 110 m east of the site, at 8 Grey Street, the site is listed under HAIL A5 – Drycleaning plants. The site is listed as 'not investigated', with the site name being Wrights Dry Cleaners. This is the same location as well L37/0573; the well card details of this bore list "*diesel contamination from AIS*", however the bore is not in use. AIS is a truck and heavy vehicle servicing centre located at 22 Robinson Street, Ashburton, approximately 1.4 km west of 8 Grey Street. The site is categorised as 'verified HAIL – not investigated.' ⁘ Approximately 140 m southwest of the site, at 1 Cox St, the site is listed under HAIL F4 – Motor vehicle workshops. The site is described as Bridgestone Tyre Centre and provides mechanical repairs. The site is categorised as 'verified HAIL – not investigated.'
Building Construction and Potential Asbestos Issues	Asbestos material was commonly used in the rail industry, including in train insulation, brake pads and lining. It is considered likely that asbestos materials have been used on or surrounding the site during railway operations. Based on publicly available images, the shed present on site appears to be constructed from corrugated iron. Aerial photographs indicate it was built during the 1940's and therefore the presence of asbestos containing materials used in the shed construction is considered to be low, however repairs or alterations made since construction may contain asbestos products.

Table 1: Site Summary

In summary, the site appears to have been used as a railway yard since at least the 1940's. A railway yard building remains on the site today; the remainder of the site is vacant. The site is listed on the LLUR under HAIL category F6 and is tagged as Verified HAIL – not investigated. No soil information is recorded for the site.

Initial findings from a geological and hydrogeological perspective indicate that the site is variably underlain by silty and sandy gravels to at least 110 m bgl. Groundwater is expected to be approximately 2.5 to 5 m bgl, based on surrounding bores. The site falls within the groundwater protection zone for public water supply as there are three bores adjacent to the site.

3.0 Conceptual Site Model

Based on the desk-top review findings the potential key contaminants of concern for the site are expected to include heavy metals, asbestos and polycyclic aromatic hydrocarbons (PAH) associated with the former railway usage on site. Asbestos may be also present in soils if former buildings contained ACM and were poorly demolished or were present in a deteriorated condition.

Table 2: Conceptual Site Model

SOURCE INFORMATION	
HAIL land use (contaminant source)	⁘ Former railway ⁘ Former use of asbestos building products
Identified contaminants of concern	⁘ Heavy metals, asbestos and PAH (from railway usage) ⁘ Asbestos (from former buildings if present and poorly demolished or in a deteriorated condition)
Potential mechanism of soils contamination	⁘ Use and breakdown of railway components and unloading and handling of hazardous goods ⁘ Demolition/removal/deterioration of asbestos building materials onsite
RECEPTORS	
Identified receptors	⁘ Workers during site development (short term) ⁘ Future maintenance workers (short/long term) ⁘ Groundwater users ⁘ Surface water receptors
PATHWAYS	
Identified pathways	⁘ For workers: dermal contact and / or incidental ingestion of impacted soils (directly or fugitive dust). ⁘ For environmental receptors: discharges of contaminants with surface water or groundwater flow.

Table 2: Conceptual Site Model	
Potentially complete exposure pathways identified	⁘ Dermal contact, ingestion and inhalation of potentially contaminated soils by construction and maintenance workers (if a source is present and appropriate management controls are not put in place) – site will be largely sealed at completion. ⁘ Leaching of contaminants to shallow groundwater through the soil profile (if a source is present) – this is likely to be limited to PAH (if present) due to low mobility of metals and asbestos. ⁘ Overland discharge of potentially contaminated soils and sediment with surface water flows to stormwater and / or surface water during site redevelopment (if a source is present and appropriate erosion and sediment control practises are not put in place).

Waitomo has first-hand experience developing brownfield sites into fuel stops, and specifically former rail siding properties. Given the historical information reviewed the CSM is understood, and contaminants are expected to be typically localised to shallow soils and able to be managed appropriately through the development of contaminated site management plans and asbestos removal control plans. These plans also provide appropriate controls for ensuring erosion and sediment control practises are adopted such that groundwater and surface water effects are minimised. Waitomo will engage specialist fuel contractors who are experienced in handling contaminated soils.

4.0 Summary and Conclusions

PDP has undertaken a preliminary desktop review for the site located at West Street, SH1, Ashburton as part of a due diligence process with the purpose of identifying potential risks associated with contaminated land at the property. This desktop review has been written to supplement a resource consent application for the site for the redevelopment as a fuel stop. Waitomo has significant experience developing brownfield properties into fuel stops and proposes that the DSI be undertaken as a condition of the resource consent. The DSI will be developed and overseen by a Suitably Qualified and Experienced Practitioner to ensure the requirements of the NES-CS are maintained. The following summarises the anticipated geological/hydrogeological conditions and CSM anticipated following a review of publicly available information, and proposed draft consent conditions are provided in the following sections:

- The site is anticipated to be underlain by silty and sandy gravels based on the available geological information for the site and surrounding area.
- Shallow groundwater is anticipated to be encountered between 2.5 to 5 m bgl based on adjacent bore information and anticipated to flow in a westerly direction towards the Ashburton River.
- The site falls within the groundwater protection zone of three nearby public supply wells. These wells are screened from between 17 m bgl to 90.6 m bgl to a maximum depth of 96.6 m bgl, and therefore draw from a deep unconfined aquifer with a shallow aquifer expected to be present above (as described above). One of these public supply wells is located in the up hydraulic gradient direction of the site (L37/0443); two are west of the site within the Ashburton Domain.
- A review of historical aerials and the ECan LLUR identified the site is listed under HAIL category F6, relating to former railway yards at the site (since at least 1940). No record of soil sampling has been identified during this desktop investigation.

- Potential contamination related to the former railway usage is likely to be limited to surface soils as typical contaminants are immobile (heavy metals and asbestos). PAH, if present, may have the potential to impact shallow groundwater, and further investigation to assess the soil and groundwater interface is needed on the basis that the Waitomo development will require excavations to a depth of approximately 5.0 m bgl.

  Four additional HAIL sites have been identified within 150 m of the site and include a drycleaners (where diesel contamination is noted in the onsite bore), vehicle servicing centres, and an underground storage tank.

Despite the site overlying a sensitive aquifer, it is considered that standard contaminated land practises can be implemented to enable the appropriate development of the site, regardless of whether the DSI is conducted prior to or after resource consent is granted. As outlined in the Application, Waitomo will undertake a DSI, which will include an assessment of the soil quality. Subject to the results of this DSI, a CSMP will be prepared (as required), and a Site Completion Report will be prepared and provided to council (as required), in general accordance with the rules outlined under regulations 9 or 10 of the NES-CS.

Given the age of the building present on site, an asbestos demolition survey would be required prior to any site buildings being demolished, as per the *Health and Safety at Work (Asbestos) Regulations*, 2016.

4.1 Proposed Consent Conditions

Waitomo would be happy to accept the following proposed conditions and believe that these would allow Council to adequately address any environmental effects from the proposed activity:

- A Detailed Site Investigation (DSI) must be undertaken prior to site redevelopment and will be prepared in accordance with MfE (2021) '*Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand'*. The DSI shall be overseen by a Suitably Qualified and Experienced Practitioner. The DSI will be submitted to ADC prior to site redevelopment;
- The environmental investigations undertaken prior to site redevelopment and the associated soil benchmarking must be assessed as per MfE (2021) '*Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils'*;
- If required following the results of the DSI, a Contaminated Site Management Plan (CSMP) will be prepared prior to site redevelopment and submitted to ADC. The CSMP shall be overseen by a Suitably Qualified and Experienced Practitioner;
- If required following the results of the DSI, and following site redevelopment, a Site Completion Report will be prepared and submitted to ADC. The SCR shall include the following records:
  - Details of soils removed (volumes and disposal information);
  - Records of any unexpected contamination encountered during the works; and
  - Confirmation imported fill was from a cleanfill source.

If there is to be any variation to these conditions, Waitomo would appreciate the opportunity to discuss these conditions with ADC, with a view to agreeing on a final set of conditions, prior to the finalisation and issue of the resource consent.

5.0 References

Forsyth, P.J., Barrell, D.J.A and Jongens, R. (2008). *Geology of the Christchurch urban area*. Scale 1:25000. Institute of Geological and Nuclear Sciences geological map 16. Institute of Geological and Nuclear Sciences Limited, Lower Hutt, New Zealand.

Ministry for the Environment, 2021a. *Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand (Revised 2021).* Ministry of the Environment.

Ministry for the Environment, 2021b. *Contaminated Land Management Guidelines No. 5 Site Investigation and Analysis of Soils (Revised 2021).* Wellington: Ministry for the Environment.

Ministry for the Environment, 2013. *Hazardous Activities and Industries List* (HAIL).

New Zealand Geotechnical Database (www.nzgd.org.nz).

Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

6.0 Limitations

This document has been prepared by Pattle Delamore Partners Limited (PDP) on the specific instructions of Waitomo Energy Limited for the limited purposes described in the document. PDP accepts no liability if the document is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

This document has been prepared by PDP on the basis of information provided by Waitomo Energy Limited and others (not directly contracted by PDP for the work) including Environment Canterbury and New Zealand Geotechnical Database (NZGD). PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the document. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

Owing to the limited nature of this assessment (as described in the Introduction), there may be soil and/or groundwater contamination conditions at the site that have not been identified and which have not been considered in this document. The associated risk may be able to be reduced by undertaking further research or subsoil investigation.

Yours faithfully

PATTLE DELAMORE PARTNERS LIMITED

Prepared by

Erin Gasston

Environmental Geologist

Reviewed and Approved by

Erin Richards

Technical Director – Contaminated Land