

**IN THE MATTER** of the Resource Management Act  
1991

**AND**

**IN THE MATTER** of an application to **HAMILTON  
CITY COUNCIL** for private plan  
change 7 to the operative  
Hamilton City District Plan by  
**GREEN SEED CONSULTANTS  
LIMITED**

## **STATEMENT OF EVIDENCE OF TERESA (TERRE) NICHOLSON**

### **1. INTRODUCTION**

- 1.1 My name is Teresa (Terre) Nicholson. I am a Principal Environmental Consultant with HD Geo Limited. I have been employed by HD Geo Limited for 3.5 years.
- 1.2 Prior to that, I was a Principal Environmental Consultant with 4Sight Limited (5 years), AECOM (2 years), and Aurecon (2 years).

#### **Qualifications and experience**

- 1.3 I hold:
- (a) a Bachelor of Science Degree in Civil/Environmental Engineering from the University of Nevada, Las Vegas (1983); and
  - (b) a post-graduate Diploma in Hazardous Materials Management from the University of California at Davis (1990).
- 1.4 I have 35 years' experience as a contaminated land practitioner. I have worked as an occupational hygienist, waste management specialist, and compliance expert in the US (22 years) and New Zealand (13 years). I have had extensive training in risk assessment and risk communication from the US Environmental Protection Agency.
- 1.5 I was a Certified Environmental Manager in the US and am a Certified Environmental Practitioner – Soil Contamination Specialty ("**CEnvP-SC**") in New Zealand.
- 1.6 I provide technical and project management services to a wide variety of clients, including Transpower, Waka Kotahi ("**NZTA**"), several territorial authorities, the Ministry for the Environment, InterGroup, and numerous land development companies.

- 1.7 I am currently the Environmental Manager for Blue Haven Development's New Plymouth project which includes removal of asbestos-containing buildings and contaminated soil from the former Ravensdown Fertiliser factory. During the past year, I have supported more than 40 land development projects ranging from simple 2-lot subdivisions to large developments with residential, commercial, and industrial use.

### **Involvement in the Rotokauri North Plan Change Project**

- 1.8 I was initially engaged by Green Seed Consultants Limited ("**GSCL**") to conduct a preliminary site investigation ("**PSI**") with limited sampling across the entire planned development site to evaluate potential risk to human health from the planned urban development. I am the author of the PSI report that was filed in support of the private plan change application to Hamilton City Council dated 11 July 2018.
- 1.9 The PSI identified dwellings and farm sheds present across Stage 1 of the development. The majority of the land was used for grazing. The remaining stages of the development had farm sheds, rubbish pits, a junk yard, and a disused milking shed present.
- 1.10 In July 2019, I was engaged to conduct a detailed site investigation ("**DSI**") of these targeted locations listed in the PSI as having the potential to cause soil contamination.

### **Purpose and scope of evidence**

- 1.11 The purpose of my evidence is to provide an overview of the PSI and DSI conducted at the site. My evidence will address the following matters:
- (a) A brief description of the plan change area (Section 3);
  - (b) The preliminary site investigation - methodology and findings (Section 4);
  - (c) The detailed site investigation – methodology and outcomes (Section 5);
  - (d) Recommendations as a result of the PSI and DSI (Section 6);
  - (e) Comments on the section 42A report prepared for Hamilton City Council (Section 7);
  - (f) Comments on the proposed plan provisions (Section 8); and
  - (g) My conclusion (Section 9).
- 1.12 A summary of my evidence is set out in Section 2 below.

## **Expert Witness Code of Conduct**

- 1.13 I have been provided with a copy of the Code of Conduct for Expert Witnesses contained in the Environment Court's 2014 Practice Note. I have read and agree to comply with that Code. This evidence is within my area of expertise, except where I state that I am relying upon the specified evidence of another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

## **2. SUMMARY OF EVIDENCE**

### **PSI assessment and findings**

- 2.1 For the PSI, we initially used an HD Geo unmanned aerial vehicle (drone), to capture high-resolution video and photographic images from the site. The images included site topography. We used this imagery to identify and evaluate potential areas where activities that are included on the Ministry for the Environment's Hazardous Activities and Industries List ("**HAIL**") may have occurred.
- 2.2 The HAIL is a compilation of activities and industries that have the potential to cause land contamination resulting from hazardous substance use, storage, or disposal. These activities can include rubbish dumps, junkyards, sheds where chemicals or fuels are/were stored and used, workshops, and fuel tanks. In addition, lead-based paint or asbestos building materials can lead to soil contamination.
- 2.3 We also used the drone footage to evaluate pastures where superphosphate fertiliser could have accumulated, such as in low-lying areas. Superphosphate fertiliser can lead to elevated cadmium concentrations in the soil which can present a risk to human health.
- 2.4 Based on the drone imagery, we targeted our site inspection in areas where potentially contaminating activities had been present.
- 2.5 We conducted inspections of sheds, barns, workshops, a rubbish dump, and other site features which could result in soil contamination. Most of these currently remain in use; therefore, full sampling and analysis was not appropriate at the time the PSI was conducted. We recommended investigating these features at the time of subdivision.
- 2.6 A report was prepared in accordance with CLMG No. 1.

### **DSI assessment and outcomes**

- 2.7 In July 2019, a DSI of a portion of Stage 1 of the proposed development was conducted. It targeted the potentially contaminating activities present in the Stage 1 investigation area.

- 2.8 We collected soil samples at representative locations across the pastures and had them analysed for cadmium. Samples were collected in accordance with Contaminated Land Management Guidelines (“**CLMG**”) No. 5. No sample results were above the applicable residential land use guideline values in the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (“**NESCS**”).
- 2.9 With the exception of lead adjacent to two sheds (where lead-based paint had been used), all samples returned results below the applicable guideline values for residential land use from the NESCS. Remediation of the soil around the sheds was recommended, while the remainder of the locations investigated were considered suitable for residential land use.
- 2.10 We are currently undertaking additional sampling and analysis at other areas within Stages 1 and 5 where potentially contaminating activities have occurred. Following evaluation of laboratory results, we will provide a report in accordance with CLMG No. 1. If soil contamination is discovered, it is likely to be limited in extent and easily remediated. The remaining stages of the development will be evaluated as the project progresses.

### **Recommendations**

- 2.11 We have recommended that the potential HAIL activities across the site be investigated and remediated as required, as part of the resource consent process and following completion of the relevant DSIs. This is standard practice and, in my opinion, will ensure that any contamination within the PC7 area is appropriately identified and mitigated.

### **3. DESCRIPTION OF PLAN CHANGE AREA**

- 3.1 The site is located south of Te Kowhai Road and east of Exelby Road in the area known as Rotokauri, north-west of Hamilton City. The site is located within the Hamilton Basin, which is characterised by low rolling hills, and plains with low terraces and gullies draining into the Waikato and Waipa Rivers. The site is mostly flat, with isolated high points.
- 3.2 The majority of the site has been historically used for grazing beef and sheep, dairy farming with numerous farm buildings across the site, and some rural residential activity.
- 3.3 Presently, the site is primarily used as pasture for grazing cattle. There are a variety of farm buildings present, including milking sheds, residences, barns, and storage sheds.
- 3.4 Other activities present at specific properties included farm rubbish dumps, a junkyard, boat repair, and an orchard.

#### 4. THE PRELIMINARY SITE INVESTIGATION - ASSESSMENT METHODOOLOGY AND FINDINGS

##### PSI – assessment methodology

- 4.1 We conducted a desktop study which included a thorough review of historical and current aerial photos, Waikato Regional Council records, Hamilton City Council records, and relevant environmental investigations. We also obtained and reviewed footage from a fly-over with an unmanned aerial vehicle (drone), which assisted us in identifying areas of interest for further on-site investigation.
- 4.2 We then undertook an in-person site inspection, which was conducted with my colleague Matt Moore. This consisted of conducting a visual inspection while driving and walking around the site, targeting those areas identified through the drone footage and aerial photos as being of interest.
- 4.3 Based on the data obtained from desktop study, the drone footage, and the site inspection, we identified potential contaminating activities and contaminants of potential concern (“**COPC**”).
- 4.4 The potential contaminating activities included use of superphosphate fertiliser (which can lead to elevated cadmium concentrations in the soil), use of lead-based paint and asbestos on historic buildings, and storage and use of fuel and chemicals (such as persistent pesticides).
- 4.5 A conceptual site model (“**CSM**”) was then developed that evaluated potential source-pathway-receptor links which could lead to risk from human exposure to contaminants. The primary source-pathway-receptor linkages are:
  - (a) Consumption of produce grown in contaminated soil;
  - (b) Ingestion or inhalation of contaminated soil or water by construction workers and future site residents; and
  - (c) Dermal absorption of contaminants through skin contact with contaminated soil, surface water, or groundwater.
- 4.6 Contaminant behaviour in the soil is also considered in constructing the CSM. Heavy metals, persistent pesticides, and asbestos typically do not migrate deep into the soil whereas hydrocarbons and other liquid hazardous substances can be highly mobile through the soil and groundwater.
- 4.7 The CSM was used, along with the desktop study and site inspection, to design a sampling and analysis programme that was used for both the PSI and DSI.

## **PSI outcomes**

- 4.8 The outcome of the PSI were findings that additional investigation was warranted for:
- (a) Site buildings, such as farm sheds and barns where lead-based paint, asbestos, or hazardous substances could be present;
  - (b) Potential HAIL activities, such as junkyards and rubbish disposal areas; and
  - (c) Pastures where superphosphate fertiliser could lead to elevated cadmium in soil.
- 4.9 **Attached** Figures 1A (**Appendix 1**) and 1B (**Appendix 2**) show areas identified by the PSI as parcels where potentially contaminating activities could be present.

## **5. THE DETAILED SITE INVESTIGATION - ASSESSMENT METHODOOGY AND FINDINGS**

### **DSI – assessment methodology**

- 5.1 The 2019 DSI was conducted for a portion of Stage 1 of the project (see **attached** Figures 2A (**Appendix 3**) and 2B (**Appendix 4**)) and focused on potentially contaminating activities. In this portion of Stage 1, the contaminating activities were primarily associated with building materials (lead-based paint and asbestos), persistent pesticide mixing at farm sheds, and hydrocarbons from fuel storage. Cadmium was also evaluated across the site.
- 5.2 Sampling of the remainder of the Stage 1 area and Stages 2 through 6 was not warranted at this stage, as it is still occupied and used as production land. Thus, any sampling data will not be representative of conditions just prior to development.
- 5.3 The DSI sampling for the pastures focused on cadmium in soil from the use of superphosphate fertiliser. Based on the CSM and contaminant behaviour, concentrations of cadmium were expected to be highest in the low areas where fertiliser would accumulate via surface runoff from rain. This theory was supported by the drone footage, which clearly showed that the grass was darker in colour and thicker in the low areas.
- 5.4 Based on the CSM, samples associated with farm structures were collected at targeted locations where “worst case” contamination was likely to be present. For example, the highest concentration of asbestos in soil from asbestos roofing material would likely be in the drip line under the building’s roof. Lead-based paint in soil is also associated with surface soil within 200 mm to 300 mm from the building walls.
- 5.5 Soil samples were collected from around structures and within pastures and analysed by an accredited laboratory.

5.6 Finally, the laboratory analytical results were compared with the residential land use guideline values in the NESCS, the BRANZ asbestos in soil guideline values, and the Tier 1 Petroleum Hydrocarbon Guidelines.

### **DSI findings**

5.7 The outcome of the DSI was a finding that the cadmium present in the pastures was below guideline values for residential land use from the NESCS.

5.8 With three exceptions, all contaminants (including cadmium present in the pastures) were below applicable guideline values for residential land use from the NESCS.

5.9 Lead was found above guideline values in three samples, all of which are associated with two sheds. These two sheds are designated "pieces of land" under the NESCS.

5.10 The NESCS only applies to pieces of land where HAIL activities have occurred or contamination is present above guideline values. The contaminated soil associated with lead-based paint falls under HAIL Category I: "Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment".

5.11 The remainder of the investigated portion of Stage 1 does not have evidence of HAIL activities. Where no HAIL activities are present, the NESCS does not apply and consent is not required.

## **6. RECOMMENDATIONS**

6.1 Prior to development of the PC7 land, we recommend that the lead-impacted soil from around the two sheds be removed and properly managed on site or disposed of off-site.

6.2 Investigation of properties which are still occupied and used as production land is most appropriately done at the time of subdivision. The rationale is that contaminating activities (e.g., a release from a fuel tank) could happen at any time and results from prior investigations would not be valid. In addition, good practice is that a PSI should be updated if it is over one year old, particularly if the property is still operational and/or occupied.

6.3 On this basis, I consider it appropriate to conduct a DSI for potentially contaminating activities at the time of future development, subdivision, or earthworks. A DSI is required to be undertaken in accordance with NESCS and if contamination is identified, and for HAIL activities, consent obtained (as a controlled or restricted-discretionary activity) under the NESCS. If no DSI is undertaken, consent for the parcel will be required under the NESCS for discretionary activity. As such, no additional district plan

rules (including new provisions by way of PC7) are required to address potential contamination as a result of HAIL activities.

6.4 This is consistent with our recommendations in the PSI and DSI.

7. **SECTION 42A REPORT**

7.1 I have reviewed the section 42A report prepared on behalf of Hamilton City Council addressing contamination issues.

7.2 I note that the section 42A author stated as follows:<sup>1</sup>

*"The GHD Limited review report concurs with the PSI recommendations. A Detailed Site Investigation (DSI) report will need to be prepared in conjunction with the subdivision process for subdivision sites within the growth cell.*

...

*I concur with the GHD Limited review conclusions that at the plan change stage no further action is required. I consider that the potential adverse environmental effects associated with land contamination are able to be managed effectively such that they will be acceptable."*

7.3 I support the position of the Hamilton City Council as stated above.

8. **PLAN PROVISIONS**

8.1 I have reviewed the proposed plan provisions prepared by Tollemache Consultants. I agree that (aside from the requirements of the NESCS) no specific rules or provisions are required for the Plan Change to manage effects from potential HAIL activities resulting from rezoning of the land.

8.2 In my professional opinion, it is appropriate that further DSI be undertaken at resource consent stage and subdivision stage, to ascertain specific levels of contamination within each site and determine whether a more rigorous approach is required to manage any contamination identified. As noted, such DSI will be required in accordance with the NESCS.

9. **CONCLUSION**

9.1 Having regard to the assessment I have undertaken, in my view there is no reason to preclude the rezoning of the PC7 land as sought by GSCL on the basis of contamination. A further DSI can be undertaken at the time of subdivision / development and any areas of contamination identified through those investigations being appropriately remediated.

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<sup>1</sup> Section 42A Hearing Report, 10 September 2021, at [4.52] - [4.54].



9.2 I note that the DSI process will include any associated reports and documents being provided to Hamilton City Council. GSCL will of course also need to obtain any necessary consents under the NESCS, based on the outcomes of the DSI.

**Terre Nicholson**

**24 September 2021**

## Appendix 1

Figure 1A



LEGEND:



Overall site boundary (approximate)



Potentially contaminating activity

PROJECT: Rotokauri SHA Stages 1 to 6	
PROJECT NO: HD992-1	
CLIENT: Green Seed Consultants Limited	
TITLE: Areas of potential contamination	
SCALE: N/A	
Drawing No: 1A	
Drawing by: MM	
Rev Number	
0	Initial

## Appendix 2

Figure 1B



LEGEND:

- Overall site boundary (approximate)
- ▲ Potentially contaminating activity




PROJECT: Rotokauri SHA Stages 1 to 6	
PROJECT NO: HD992-1	
CLIENT: Green Seed Consultants Limited	
TITLE: Areas of potential contamination	
SCALE: N/A	
Drawing No: 1B	
Drawing by: MM	
Rev Number	
0	Initial

## Appendix 3

Figure 2A



LEGEND:

-  Cadmium + pH
-  OCPs + heavy metals
-  Presence/absence asbestos

PROJECT:  
Rotokauri Stage 1 DSI

PROJECT NO:  
HD992

CLIENT:  
Green Seed Consultants

TITLE:  
Site Investigation Plan

SCALE:  
N/A

Drawing No: 2A

Drawing by: MM

Rev Number

0	Initial
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## Appendix 4

Figure 2B





LEGEND:

- Lead
- Heavy metals
- OPCs, TPH, heavy metals

PROJECT:  
Rotokauri Stage 1 DSI

PROJECT NO:  
HD992

CLIENT:  
Green Seed Consultants

TITLE:  
Site Investigation Plan

SCALE:  
N/A

Drawing No: 2B

Drawing by: MM

Rev Number

0	Initial
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