Under the Resource Management Act 1991
In the matter of Notices of Requirement to enable the construction, operation and maintenance of the City Rail Link

Between

Auckland Transport

Requiring Authority

and

Auckland Council

Consent Authority

Statement of Evidence of David Lance Dangerfield

Qualifications and Experience

1. My full name is David Lance Dangerfield.

2. I have worked as an environmental consultant for the past 13 years in New Zealand and Australia. My work experience includes assessment of potentially contaminated sites, due diligence auditing, acoustics, hygiene services and property risk. I graduated with a degree in Environmental Technology in 1997 at the University of Tasmania. I am a New Zealand representative of the Industry Leadership Panel for the Australasian Land and Groundwater Association (ALGA). My qualifications and experience are consistent with requirements under the National Environmental Standard for the Assessment and Management of Contaminants in Soil to Protect Human Health (Ministry for the Environment, 2012) (NES).

3. My key project experience includes:

   (a) State Highway 16 Contaminated Land Specialist for the Causeway Alliance, NZTA, 2012-ongoing – My role to date has included both technical support and planning for consent requirements under the NES for proposed modifications to the design. I am also assisting with the management of contaminated soil and groundwater along the alignment for construction and addressing Board of Inquiry conditions;

   (b) Additional Waitemata Harbour Crossing, 2010 – Involved review of constructability constraints from contamination within the proposed design footprint for NZTA;

   (c) Assessment of sites and lineal developments for consenting under the National Environmental Standard (NES). Examples include (excluding the CRL project);

      (i) Auckland Manukau Eastern Transport Initiative (AMETI) project 2011-present – Assessment of miscellaneous sites

for the construction of a bus lane (Mt Wellington). The information is currently being used for consenting and construction tendering purposes;

(ii) Consenting for several sewer rehabilitation projects across Auckland;

(iii) Consenting for the Grafton Gully and Portage Road cycleway in Auckland;

(iv) Mill Road Consenting for Notice of Requirement (NoR) (October 2012 to present) - Review initially included provision of information for route selection as part of the Scheming Assessment report. This role has now broadened to include consenting under the NES for NoR;

(d) Project Manager for Remediation of Patea Freezing Works, Patea, New Zealand, 2008-February 2013 – Assessment of soil (including asbestos), groundwater, on-site treatment/disposal, tender evaluation, contractor management, human health and environmental risk assessment;

(e) Environmental compliance and human health risk evaluation of various petroleum sites including delineation of impact within soil, groundwater (including vapour intrusion); and

(f) Legal advice for an asbestos in soils litigation case – 2009 and 2010. This included preparation of an expert report to the court.

4. In relation to the City Rail Link (CRL), I project managed the preparation of the Stage 1 (Preliminary Site Investigation) and the preliminary Stage 2 ESA (Detailed Site Investigation) which I then incorporated into the Contaminated Land Assessment (CLA - AECOM, 25 July 2012, Revision 4[1]) report. I was responsible for development of

[1] Volume 3, Part 1 Appendix 6 of the Assessment of Environmental Effects (AEE).

the scope and delivery of the program and subsequent Technical Expert advisory services.

5. I understand the CRL to comprise the construction, operation and maintenance of a 3.4 km underground passenger railway (including two tracks and three stations underground) running between Britomart Station and the North Auckland Line (NAL) in the vicinity of the existing Mount Eden Station and an additional 850 m of track modifications within the NAL. For ease of reference in my evidence, the stations included in the CRL NoR have been temporarily named Aotea Station, Karangahape Station and Newton Station. I understand that the stations will be formally named in the future.

6. I am familiar with the project area. I have supervised the desk studies, site investigations and CLA report, and been on numerous site visits along the entire length of the proposed CRL designation. I have been working on this project from my first commission in December 2011.

7. I authored the AECOM independent expert assessment of the actual and potential effects associated with the CRL NoR from a contamination perspective. AECOM's CLA report is Volume 3, Part 1 Appendix 6 of the Assessment of Environmental Effects (AEE). The AEE supports the NoR served by Auckland Transport on Auckland Council to designate the CRL for future construction, operation and maintenance.

8. I have read the Code of Conduct for Expert Witnesses as contained in the Environment Court Consolidated Practice Note, Section 5, October 2011, and I agree to comply with it as if this hearing was before the Environment Court. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

Background and role

9. Auckland Transport engaged AECOM to complete the contaminated land investigation works, and I project managed this work. The scope of my role was to identify past and present land uses along the designation that have the potential to trigger consenting under the NES. As part of this, my scope included the identification of contaminants of primary concern (CoPC) with potential to impact human health. Ecological considerations were incorporated where relevant, however given that the NES was the main driver for the work I have undertaken to support the NoR, human health was the primary consideration.

10. A number of legislative triggers require that contamination be considered as part of the NoR for the CRL designation, including s43D(4) of the Resource Management. This means that all requirements under the NES for the CRL alignment must be identified and addressed in the NoR submission.

11. As identified in paragraphs 9 and 10 above, the NES is the primary regulation for assessing contamination for the NoR. The NES requires that human health effects be considered where potential for contamination in soil exists from identified present and historic land uses.

Scope of Evidence

12. My evidence will address the following:

    (a) Methodology for assessing contaminated land effects for both construction and operation of the CRL. I will also identify how these effects can be mitigated so they are acceptable;

    (b) Response to Planner's Report; and

    (c) Proposed Conditions.

Summary of Evidence

13. From my studies undertaken as part of the CLA along the CRL designation, there is potential for contaminated soil and groundwater from past and current industrial activities conducted. The primary contaminants of concern present above the NES for protection of human health are heavy metals (arsenic at TP107_0.9-1.0) and B(a)P (at two locations (BH167_0.1-0.2 and TP104 0.6-0.7). Note that locations TP104 and TP107 are within the existing NAL designation and have been included for completeness.

14. The results of my preliminary investigation presented in the CLA show contaminants are present at a limited number of locations; the majority of the soil and groundwater samples analysed returned concentrations below the NES.

15. Based on the Preliminary Stage 2 ESA findings, the key potential adverse effects related to contamination requiring mitigation include:

(a) Exposure to workers and members of the public due to dermal, ingestion and inhalation exposure pathways;

(b) Mobilisation of contaminants through the creation of preferential pathways; and

(c) Contaminated sediment runoff into stormwater.

Methodology

16. The CLA and associated site investigation works identified potential for contaminated soil and groundwater from past and current industrial activities conducted along the CRL designation. Preliminary desk study research and site visits identified a number of sites and areas where Hazardous Industries and Activities List (HAIL) activities or industries have previously or are currently being undertaken. These identified sites required further consideration to identify potential risk to human

health or the environment. The CLA and supporting studies focused on cut and cover sections of the designation as well as proposed station locations where construction will occur. Refer to Appendix A, Figure 1 for locations of identified HAIL activities or industries with potential to impact the designation footprint. The identified locations are either on or adjacent to the designation footprint. Locations adjacent to the designation footprint have either been included for completeness or because they may conform to the Ministry for the Environment's HAIL definition where up gradient sources of contamination may have potential to leach/impact the designation footprint.

17. The identified locations of HAIL within the footprint of the NOR include the following:

(a) Foreshore reclamation which included uncontrolled filling from historical industrial sources (Britomart and Lower Albert Street);

(b) Marine sediments with potential to generate acidic conditions when disturbed (eg when in an aerobic environment) (Britomart and Lower Albert Street);

(c) Basements to office towers generally outside the designation footprint containing underground storage tanks for auxiliary power supplies, as well as buildings containing hazardous materials and storage of hazardous substances in bulk quantities (Britomart and Lower Albert Street);

(d) Road corridors where coal tar and gasworks derived fill have been used as a base layer (entire alignment);

(e) Former petrol station site (Pitt Street);

(f) General historic uncontrolled filling activities (entire alignment);

(g) Automotive workshops (various locations in Newton, Eden Terrace, Mt Eden and Grafton);

(h) Former rail marshalling yards and North Auckland Line (NAL) corridor (Newton, Eden Terrace, Mt Eden and Grafton);

(i) Former ammunition factory and plastics manufacturing facility (Mt Eden);

(j) Former timber treatment site (Mt Eden); and

(k) Printing factories (various - Newton, Eden Terrace, Mt Eden and Grafton).

18. I undertook a subsequent preliminary Stage 2 Environmental Site Assessment (Detailed Site Investigation) as part of the CLA at targeted/accessible locations where there was potential for soil and groundwater impact identified from the Stage 1 ESA. My findings from this assessment were:

(a) The majority of the soil and groundwater samples analysed returned concentrations below the NES Soil Contaminant Standards (SCS) and other selected environmental criteria.

(b) The locations where exceedences above the NES were reported in soil were identified as:

(i) heavy metals (arsenic) at one location (TP107_0.9-1.0) within the NAL designation[2]; and

(ii) benzo(a)pyrene (a Polycyclic Aromatic Hydrocarbon) at two locations (within a roadway [BH167_0.1-0.2] and NAL corridor in Eden Terrace [TP104_0.6-0.7]). The locations where these exceedences occurred are shown in Appendix A, Figure 2 of my evidence.

[2] It is understood that works to be undertaken within the existing NAL designation are not part of this NoR process but have been included for completeness.

(c) Based on the preliminary Stage 2 ESA findings, the key potential adverse effects requiring mitigation include:

(i) Exposure to workers and members of the public due to dermal, ingestion and inhalation exposure pathways;

(ii) Mobilisation of contaminants through the creation of preferential pathways; and

(iii) Contaminated sediment runoff into stormwater.

(d) The above identified effects will require mitigation and management to address the health and safety of construction workers and the general public, together with environmental considerations. The mitigation and management requirements I refer to in the paragraph (f) below are consistent with accepted industry practice for contaminated sites in New Zealand.

(e) The options for mitigating these potential risks will be addressed, as required in the conditions of the designation, via the proposed Construction Environmental Management Plan (CEMP)[3].

(f) Actual implementation of control measures during construction will be addressed and managed under the CEMP, which includes requirements around a Remedial Action Plan (RAP) and Hazardous Materials Removal Specification process. Key recommended mitigation and management measures included in the requirements for the CEMP are:

(i) Further site characterisation of identified locations where HAIL activities and industries have occurred;

(ii) Health and safety training and planning that addresses hazardous substances;

[3] The full suite of proposed NoR conditions are attached to the evidence of Fiona Blight.

(iii) Development and implementation of erosion control, dust control, and stormwater management plans;

(iv) Appropriate soil and groundwater classification, management, and disposal;

(v) Sealing off trenches where potential for mobilisation of contamination exists;

(vi) Where contamination has potential to create hazardous atmospheres; prepare procedures for the identification of these areas and implementation of work controls;

(vii) Monitoring and management requirements for the removal/disturbance of contaminated material including oversight by a suitably qualified and experienced practitioner;

(viii) Guidance on the placement of re-used contaminated material, including reporting and tracking requirements;

(ix) Specific requirements for the temporary stockpiling of contaminated material including selection of designated locations and the necessary control measures;

(x) Community liaison with general public on disturbance of contaminated material, particularly in relation to management of adverse effects in accordance with the Communication and Consultation Plan; and

(xi) Preparation of a Validation Report at completion of soil disturbance works during the construction phase. The report is to be submitted to the Auckland Council Consent Monitoring officer documenting the management of soil and evidence of appropriate disposal. It will include a record of all analytical results, volumes, tip dockets, and any

incidents or complaints and how these were addressed. It will also identify any areas which need on-going monitoring and management by the Requiring Authority. This may include future soil disturbance/excavation in areas where contamination remains post-construction.

(g) With proper implementation of these measures, in my opinion the risk to workers, members of the public, and the environment is considered to be low.

(h) No operational effects were identified due to the use of an electrical rail network (with the exception of the very infrequent use of diesel-powered vehicles for maintenance purposes). In the unlikely event of a pollution incident during operation and maintenance of the CRL, mitigation measures will be identified as part of future resource consents.

(i) Positive effects are possible in that contaminated soil will be removed from the area (and possibly groundwater[4]).

Response to submissions

19. I have reviewed the three submissions that were lodged during the notification period that make reference to contamination. They are summarised as follows:

(a) Submission 28[5] raises concern about odour generation resulting from disturbance of contaminated land at the corner of Pitt and Vincent Streets (within NoR 2 and 3). The submitter notes that this was a garage/petrol station until 2010.
I understand that the CRL will not be disturbing the surface at this location as this section will be running tunnels. I understand these tunnels are proposed to be bored using earth pressure balance Tunnel Boring

[4] Any removal or replacement of groundwater associated with the CRL is to be addressed under separate future resource consents.
[5] PAL Properties, 18 February 2013.

Machines (TBM) and therefore surface soil disturbance is currently not proposed at this location and concerns raised require no further consideration.

I also note that in the CLA document for this former petrol station, I include the following statement quoted from Council files '(the former petrol station) *Site has been remediated to meet soil acceptance criteria for commercial land-use*'.

Refer to evidence provided by Ms Camilla Needham in relation to the submission on air quality.

(b) Submission 61[6] asserts that '*short term adverse effects of the CRL will be significant and have been understated*' – including '*contaminants being deliberately and inadvertently released into the environment*' and specifically relates to NoRs 1 to 6.

This is a general statement with no specific location or type of contaminant noted. In my CLA report I identify areas of concern for contamination, as well as mitigation measures to avoid the submitter's concerns (refer to Figure 1 [Appendix A] below for a summary of identified locations). The proposed draft conditions also address the management of soil to mitigate the mobilisation of contaminants and include procedures for the control of erosion, sediment, stormwater, dust and odour. The proposed conditions include procedures to manage stockpiling, disposal and placement of any contaminated material and will be further addressed in the CEMP.

In addition, further site investigation during resource consenting will provide greater certainty around characterisation of potential contaminants within the CRL designation.

(c) Submission 110[7] opposes NoR 6 for reasons that include air quality and contamination. My evidence is limited to the contamination element, refer to evidence provided by Ms Needham in relation to the air quality element. The submitter raises concern that disturbance of gasworks waste in the Nikau Street area will cause '*odour and hazardous discharges and adversely affect human health*.'

[6] ML Hoeft Partners, 7 March 2013.

In the CLA report, I have identified the Mt Eden industrial area (comprising Newton, Eden Terrace, Mt Eden and Grafton) as having a long industrial history where activities and industries identified as HAIL have been undertaken. From the historical research I have identified specific areas, land uses and contaminants that are likely to be encountered during construction, including coal tar/gasworks waste within road corridors. In the CLA, I have identified the overall risk, potential effects and options for avoiding, remediating or mitigating effects associated with this activity. This will be further addressed in the CEMP.

Response to Planner's Report

20. I confirm that I have received and read Auckland Council's Section 42a Planner's report, 11 June 2013. The report provides a detailed review of the NoR to confirm that any adverse impacts have been adequately addressed. My response specifically relates to the technical report for contaminated land[8] which is reported in Section 9.14 of Planner's report.

21. In relation to contamination the report states that '*the mitigation measures proposed by AT and encapsulated within the draft proposed conditions are thorough and deal, inter alia, with the potential adverse environmental effects identified in submissions*' (page 167, Auckland Council, 11 June 2013).

22. In the report, the Council is satisfied that the indicative Contamination Remediation Plan presented in the CLA '*addresses all the key parameters that will be needed in the management of contamination during CRL construction activities*' (page 167, Auckland Council, 11 June 2013).

23. No operational effects were identified other than from very infrequent use of diesel-powered vehicles for maintenance purposes. As the

[7] Podium Properties Limited, 18 March 2013.
[8] City Rail Link Notices of Requirement – Contaminated Land Report, MWH, May 2013.

majority of the CRL is '*well below ground level, any minor discharges of oils and grease (for example) from the trains*' etc '*will comprise minor drips on the tracks. There are no ecological or human health adverse effects associated with such discharges'* (page 167, Auckland Council, 11 June 2013).

24. The report endorses the proposed draft conditions as sufficient to satisfactorily mitigate any adverse environmental effects relating to contaminated soil.
'*The suggested conditions are endorsed as sufficient in coverage and appropriate in detail to ensure the effective management of contaminated soil during CRL construction activities such that adverse environmental effects will be satisfactorily mitigated*' (page 167, Auckland Council, 11 June 2013).

25. No matters relating to contamination were required to be addressed, however in terms of topography, the report states that '*stormwater channels could be impacted by construction sourced sediments*' (page 165, Auckland Council, 11 June 2013). I consider that the impact to stormwater channels from general construction-sourced sediments will be controlled under future resource consents such as through implementation of an Erosion and Sediment Plan within the CEMP. Management of contaminated sediments and stormwater is adequately addressed within the proposed draft conditions.

Proposed conditions

26. The preparation, implementation and monitoring of a CEMP is proposed as a condition of the CRL designation. It addresses the overall requirements for the management and mitigation of adverse environmental effects associated with the construction works as well as monitoring and reporting on these works. This includes requirements for cross references to the proposed Communication and Consultation Plan which I consider to be an essential medium through which any contaminated land concerns held by community stakeholders can be

addressed. I also note the proposed designation condition relating to concerns and complaints management, which also provides a mechanism for concerns around contamination to be raised and addressed. I agree that these proposed draft conditions include all the necessary requirements for managing and mitigating adverse effects from contamination during the construction of the CRL.

Conclusion

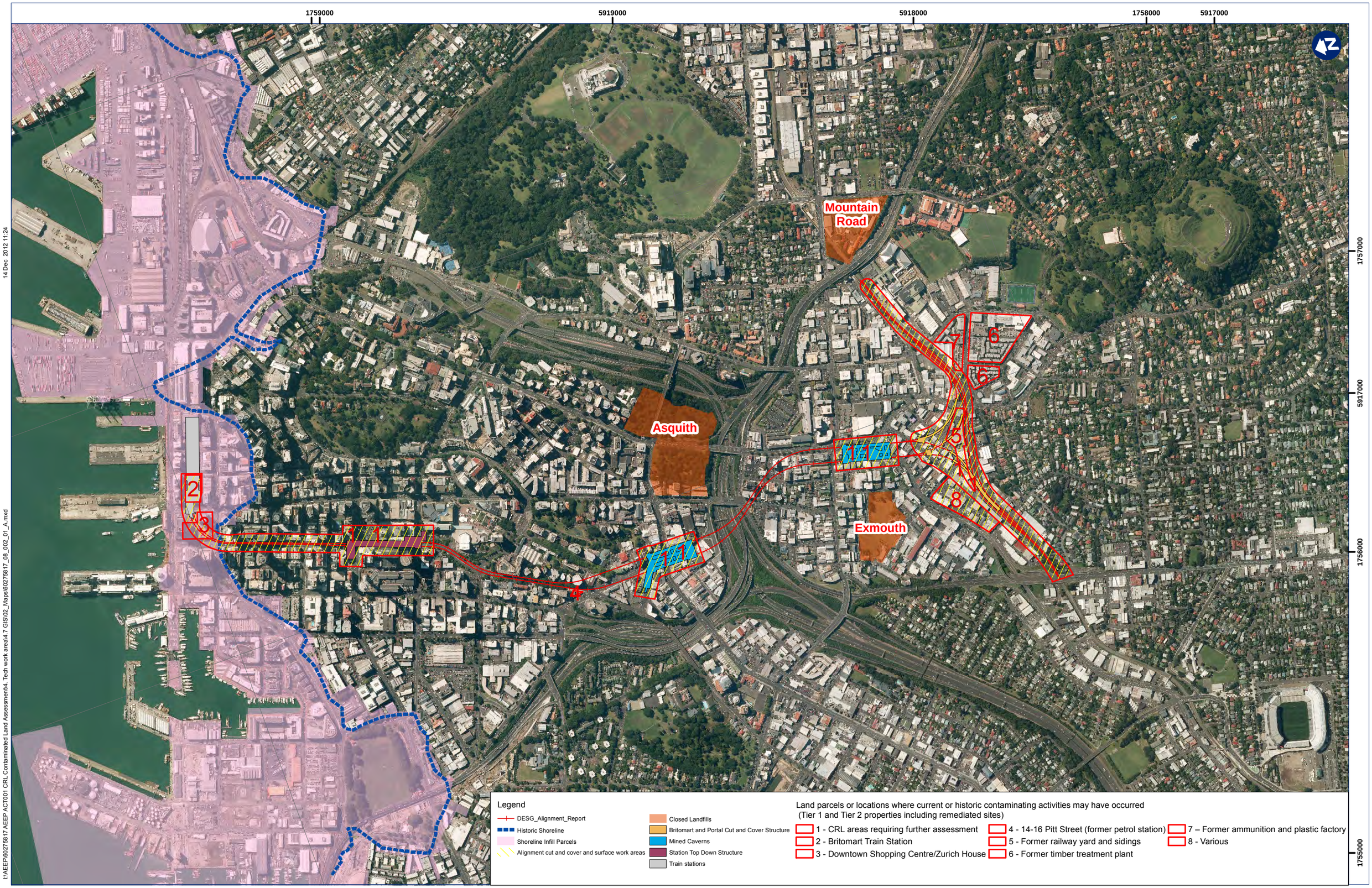
27. The proposed draft designation conditions will manage and mitigate the identified potential adverse effects during the construction of the CRL, addressing the health and safety of construction workers and the general public, together with environmental considerations. Implementation of control measures during construction will be addressed and managed under the CEMP.

David Dangerfield
2 July 2013

Appendix A

Figure 1 – Key Stage 1 Desk Study Sites of Interest (Figure F2 of the CLA)

Figure 2 – Soil Sampling Locations (Figure F4 of the CLA)



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Rev.	By	App.	Description	Date

Notes:

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Designed	P.Fearon	Checked	D. Dangerfield
Drawn	P.Fearon	Checked	K. Healy
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Map features depicted in terms of NZTM projection.

Data Sources:
NZ Topographical Features – LINZ NZ National Topo Dataset 2006
Cadastral Boundaries – LINZ NZ Cadastral Dataset 2007

AECOM

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Project: **City Rail Link - Contaminated Land Assessment**

Title: **Figure F2 - CRL Designation**
Key Stage 1 Desk Study Sites of Interest

Scale: 1:12,000 (A3 size) 100 50 0 100 200 300 400 500 600 Meters

Status: FINAL | Map No. 60275817_08_002_01 | Rev. A

AECOM - TP107

Depth	Arsenic (mg/kg)	Standard (mg/kg)
0.9-1.0	308.8	70

AECOM - TP104

Depth	B(a)PTEF(mg/kg)	Standard (mg/kg)
0.6-0.7	47.54	35

AECOM - BH167

Depth	B(a)PTEF(mg/kg)	Standard (mg/kg)
0.1-0.2	50.46	35

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Map features depicted in terms of NZTM projection.

Data Sources:
NZ Topographical Features – LINZ NZ National Topo Dataset 2006
Cadastral Boundaries – LINZ NZ Cadastral Dataset 2007

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Project: **City Rail Link - Contaminated Land Assessment**

Title: **Figure F4 - Environmental Site Assessment Soil Sample Locations**

Scale: 1:12,000 (A3 size) 100 50 0 100 200 300 400 Meters

Status: FINAL | Map No. 60275817_08_004_01 | Rev. A