22 March 2011
Project No. 42117001

Holcim (New Zealand) Limited
PO Box 6040
Upper Riccarton
Christchurch 8442

Attention: Grant Anderson
Corporate Environmental Advisor

Dear Mr Anderson,

Subject: Private and Confidential
469a Ridge Road, Bombay, Auckland - Preliminary Site Investigation

1 Introduction

URS New Zealand Limited (URS) is pleased to present Holcim (New Zealand) Limited (Holcim) with the following letter report detailing the results of a preliminary site investigation (PSI) undertaken at 469a Ridge Road, Bombay, Auckland (hereinafter referred to as the site). A site location figure is provided in Attachment A.

The purpose of the PSI was to determine the level of contamination within two historical disposal areas identified at the site and to provide recommendations as to whether the materials can remain in situ, if further environmental investigation is required, or if remediation of the historical disposal areas is necessary.

URS understands that prior to the purchase of the site by Holcim, the previous landowner disposed of sawdust and other 'detritus' such as cleanfill at the site. Holcim now wishes to sell the site, and as part of the sales process, and to meet its internal policy regarding land sales, Holcim has engaged an independent consultant to ascertain if there are liabilities associated with the disposal areas prior to entering into a sale agreement.

The PSI was completed in accordance with the URS proposal dated 4 February 2011.

2 Scope of Works

A URS field staff member oversaw the advancement of 15 test pits (sample locations TP1 to TP15) across the two historical disposal areas (hereinafter referred to as the Northern Fill Area and Southern Fill Area) on 11 and 14 February 2011. Figure 2 illustrates the test pit locations.

The URS field staff member logged the geology of the materials encountered and collected soil samples from across the profile. Wherever possible a soil sample was collected from within the fill material (between 0.5 and 4.0 m below ground level (bgl)), and from the natural material beneath the fill (between 1.5 and 3.8 m bgl). Table 1 provides a summary of the PSI test pit locations and samples collected for laboratory analysis.

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Table 1 – Summary of PSI Test Pit Soil Sample Locations

Test Pit Location	Depth of Test Pit (m bgl)	Natural Material Encountered	Depth of Soil Samples (m bgl)	Number of Soil Samples Collected
Southern Fill Area				
TP1	2.4	Yes	1.2 2.4	2
TP2	3.0	Yes	1.2 3.0	2
TP3	3.5	Yes	1.6 3.5	2
TP4	1.5	Yes	0.9 1.5	2
TP5	3.8	Yes	1.8 3.5	2
TP6	4.0	Yes	2.0 4.0	2
Northern Fill Area				
TP7	3.0	Yes	1.5 3.0	2
TP8	4.0	No	1.5	1
TP9	2.1	Yes	0.8 2.1	2
TP10	2.1	Yes	1.1 2.1	2
TP11	4.0	No	0.5 4.0	2
TP12	1.0	Yes	0.5 1.0	2
TP13	4.0	No	2 4	2
TP14	1.0	Yes	0.5 1.0	2
TP15	3.2	Yes	1.6 3.2	2
Total Number of Soil Samples Collected for Laboratory Analysis				29
Total Number of Soil Samples Analysed				25

Soil samples were screened in the field for the presence of volatile ionisable compounds (hydrocarbon products) using a portable photoionisation detector (PID). A portion of each soil sample collected was placed into a zip lock plastic bag and allowed to volatilise. Headspace measurements were then conducted by piercing the plastic bag with the tip of the PID.

All soil samples were immediately stored under chilled conditions prior to transportation, in accordance with standard URS chain of custody procedures, and sent to Hills Laboratories of Hamilton. All soil samples were analysed for a basic heavy metal suite including arsenic, cadmium, chromium, copper, lead, nickel, and zinc. In addition, three soil samples were also analysed for total petroleum hydrocarbons (TPH) and benzene, ethylbenzene, toluene, and xylenes (BTEX) compounds.

Following the collection of soil samples the test pit locations were backfilled with the excavated spoil, with the site surface track rolled.

In addition, a single surface water sample (SW1) was collected for analysis. This sample was collected from standing water down-gradient of the northern fill area. Figure 2 illustrates the surface water sample location.

3 Results

3.1 Observations

The following plates present visual observations made by the URS field staff member during the PS1 on 11 and 14 February 2011. As illustrated by Plate 1 the fill areas is visible at the ground surface and characterised by visible wood chips and poor grass coverage. Plates 2 and 3 represent the contents of typical test pits including large wood fragments and sawdust. Plates 4 and 5 illustrate the discoloration of standing water in the vicinity of both the northern and southern filling areas. A surface water sample was collected from one standing water area within the northern fill (SW1).

Plate 1: View North Towards the Southern Fill Area

Plate 2: Typical Contents of Test Pits – Wood Fragments

Plate 3: Typical Contents of Test Pits – Sawdust

Plate 4: Ponded Water Downgradient of the Northern Fill Area

Plate 5: Sample Location SW1

3.2 Analytical Results

3.2.1 Adopted Acceptance Criteria

The acceptance criteria for the PSI have been adopted on advice by Environment Waikato (EW)[1]. The analytical results were directly compared against the following criteria to determine if contaminants of concern are present at concentrations that require remediation or long-term management:

- Heavy metal concentrations in soils were compared directly to the unofficial Environment Waikato cleanfill criteria, the proposed MfE National Environmental Standards for residential/lifestyle landuse scenarios[2], and background concentrations for inorganic elements in the Auckland Region[3].
- TPH and BTEX concentrations in soils were compared directly MfE 1999 Guidelines[4] Tier 1 acceptance criteria for the protection of groundwater quality.
- Heavy metal concentrations in surface water were compared directly against the ANZECC 2000 Guidelines for the protection of 95 % of freshwater species[5].

3.2.2 Headspace Observations

Volatile ionisable compounds were only detected within the headspace of samples collected from sample locations BH1 (range of 0.1 to 5.4 ppm) and BH5 (range of 0.0 to 0.3 ppm). The recorded headspace readings were considered to be negligible.

3.2.3 Summary of Laboratory Results

Soil Analytical Results

Soil analytical results are presented in Table 2 (refer Attachment B). Laboratory chain of custody information is provided in Attachment C.

Heavy metals, including arsenic, chromium, copper and nickel were recorded at concentrations that exceeded the Environment Waikato cleanfill values analysed by the laboratory. Table 3 presents a summary of the exceedances including location of the soil sample, and contaminant concentration ranges. Elevated concentrations of arsenic, chromium and copper are consistent with the timber treatment process.

[1] Environment Waikato, 2011. Personal Communication with Barry Campbell, Senior Resource Officer, Resource Use Group, Environment Waikato, 16 March 2011.
[2] Ministry for the Environment, 2010. Proposed National Environmental Standard for Assessing and Managing Contaminants in Soil, Discussion Document.
[3] Auckland Regional Council, 2001. Background Concentrations of Inorganic Elements in Soils from Auckland Regions, Technical Publication 153.
[4] Ministry for the Environment: Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand.
[5] Australian and New Zealand Environment and Conservation Council, 2000. The Australian and New Zealand Guidelines for Fresh and Marine Water Quality.

TPH and BTEX compounds were measured below the method detection limit within two of the three samples analysed. TPH C_{15} -C_{36} range hydrocarbons were recorded (3,000 mg/kg) in one of the three samples analysed. This sample location corresponded to fill materials within the Southern Fill Area.

Based on the TPH chromatogram for the sample, the soil contamination indicates the presence of diesel range hydrocarbons and longer chain hydrocarbons consistent with lubricating oil. The measured concentration did not exceed the adopted acceptance criteria.

Table 3 – Summary of Heavy Metal Soil Sample Exceedances

Contaminant of Concern	Sample Soil Type	EW Cleanfill Values (mg/kg)	Minimum Measured Concentration (mg/kg)	Maximum Measured Concentration (mg/kg)	Number of Recorded EW Cleanfill Value Exceedances
Arsenic	Fill Material	20	3	860	9
	Natural Material	20	2	170	5
Chromium	Fill Material	40	20	2,300	9
	Natural Material	40	41	200	7
Copper	Fill Material	130	9	660	6
	Natural Material	130	13	990	1
Nickel	Fill Material	20	4	36	1
	Natural Material	20	12	220	6

Surface Water Analytical Result

The surface water analytical result is presented on Table 4 (refer Attachment B). Laboratory chain of custody information is provided in Attachment C.

Arsenic, copper, and chromium were measured at concentrations that exceeded ANZECC 2000 Guidelines for the protection of 95 % of freshwater species.

4 Summary and Recommendations

The purpose of the PSI was to determine the level of contamination within two historical disposal areas identified at the site and to provide recommendations as to whether the materials can remain in situ, if further environmental investigation is required, or if remediation of the historical disposal areas is necessary.

Based on the laboratory analytical results, the materials consistently exceed the cleanfill criteria for the Region for arsenic, chromium and copper. On this basis the material is deemed to be contaminated. Further, in comparison to the NES guidelines arsenic is consistently measured at concentrations that present a risk and drive the need for management. Arsenic is ubiquitously observed to exceed NES in the sawdust and in 75% of the subsoil samples. Arsenic is a significant and persistent risk driver in the soils and groundwater at the site.

URS has completed a preliminary statutory assessment in which the results of the PSI have been compared against the EW Regional Plan. The purpose of this assessment was to determine if the fill materials can remain in situ, and if remediation of the historical disposal areas is necessary.

The analytical results collected to date exceed the adopted soil and surface water guideline criteria for the PSI. Taking this into consideration URS proposes the following three options for the management of the fill materials.

Option 1 - In-Situ Stabilisation

This course of action would leave the fill materials in place at the site. In order to facilitate this option further environmental investigation work would likely be required to satisfy EW that any potential long-term effect associated with discharges from the fill areas will be no more than minor. These environmental investigations would need to include additional infill soil and surface water sampling, as well as hydrogeological characterisation. The hydrologeological assessment will allow for the characterisation of groundwater depth and direction and the potential for flow through the fill materials. These additional investigations would then be used to undertake an environmental risk assessment and, if deemed necessary by the outcomes, mitigating measures could then be designed to enable the discharge to meet the appropriate environmental standards.

An investigation and environmental risk assessment would provide the basis upon which to determine if hydraulic containment (i.e., cap constructed of low permeability compacted clay materials) or drainage measures etc. would be required and be capable of reducing the contaminant loadings in the water discharge to within acceptable environmental standards in the long-term.

If the fill materials were to remain in place, a long-term resource consent will be required from EW to authorise the discharge from the fill areas. We have been advised by EW that this may be permissible as a Discretionary Activity in accordance with Rule 3.5.4.5 of the Regional Plan where:

> *Any discharge of a contaminant into water, or onto or into land, in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water, that is not specifically provided for by any rule, or does not meet the conditions of a permitted or a controlled activity rule in this Plan, is a Discretionary Activity (requiring resource consent).*

In order for EW to authorise the long-term resource consent an Assessment of Environmental Effects (AEE) document will be required to be prepared (underpinned by the risk assessment). The assessment will outline how the activity will or may effect the environment over the long-term. The long-term resource consent is likely to include compliance monitoring requirements i.e., annual groundwater monitoring, which will incur annual charges for the consent holder.

It is possible for the discharge consent to be transferred to a new party, should they agree to the liability associated with the long-term discharge from the site. If this transfer is not agreed to by the other party the responsibility for the discharge will be held by Holcim as the consent holder.

Option 2 - Remediation to Landfill

This course of action would involve the removal of the fill materials from the site with disposal to a licensed landfill facility i.e., EnviroWaste Hampton Downs Landfill. We have been advised by EW that this remedial work could be completed (from a physical works, contaminated land perspective) as a Permitted Activity.

In order to undertaken this course of action EW has indicated that they would require the provision of a Remedial Action Plan (RAP) prior to commencement of works. A RAP documents the proposed remediation programme, associated environmental controls and validation testing programme prior to remediation activities commencing. A RAP is required prior to any remediation works taking place because it is important to avoid a site being disturbed and exposed to the elements for any longer than absolutely necessary during remediation works, to ensure involvement of all relevant parties (including relevant regulatory authorities), and to ensure that contingencies are put in place to deal with any problems during remediation.

In addition, a Site Validation Report (SVR) will be required to be completed post remedial works. The SVR must assess the results of the post-remediation testing against the clean-up criteria stated in the RAP.

This remedial option is likely to incur significant short-term costs. URS have not sought a quote for disposal of the fill materials from a landfill operator. However, from our experience disposal fees alone may be in the order of $70 per tonne.

Removal of the fill material from the site would ensure that no long-term resource consent is required for the property, thus eliminating any long-term responsibilities or liability associated with a discharge from the historical fill areas.

Option 3 - Remediation to Off-Site Engineered Cell

This course of action would involve the removal of the fill materials from the site, with disposal to an engineered cell located on an alternative site owned by Holcim i.e., the quarry facility located on Ridge Road.

An engineered cell would involve the disposal of the sawdust materials within a contained cell constructed of low permeability compacted clay materials or man-made materials such HDPE or geosynthetic clay liner. The purpose of the engineered cell would be to encapsulate the sawdust materials such that water infiltration and consequential leachate generation is minimised over the long-term.

Removal of the fill material from the site would ensure that no long-term resource consent is required for the property, thus eliminating any long-term responsibilities or liability associated with a discharge from the historical fill areas.

As with Option 2, this course of action is likely to require approval of a RAP by EW prior to works commencement. Further, this course of action is likely to require a long-term resource consent to authorise the design of the engineered cell as well as the long-term discharge from the approved disposal site owned by Holcim. We have been advised by EW that remedial this remedial option may be acceptable and has precedent in the Waikato Region. This option would likely be consented as a Discretionary Activity in accordance with Rule 5.2.7.1 of the Regional Plan where:

> *The discharge of contaminants into or onto land, and any subsequent discharge of contaminants into water or air (excluding discharges to air permitted by Rule 6.1.13.1) as part of the operation of a landfill is a Discretionary Activity (requiring resource consent).*

We would recommend that further discussion be held with EW to confirm their preliminary approval to this course of action before proceeding with any planning for this remedial option.

5 Closure

We trust that the above meets with your approval. Please do not hesitate to contact us should you wish to discuss the document and its contents.

Yours sincerely

URS New Zealand Limited

Emma Trembath
Senior Environmental Scientist

Chris Simpson
Principal

Attachments:

A Figures
B Tables
C Laboratory Report and Chain of Custody Information

Limitations

This discussion and all information in this report are provided strictly in accordance with and subject to the following limitations and recommendations:

a) This report should be read in full and no excerpts are to be taken as representative of the findings. No responsibility is accepted by URS for use of any part of this report in any other context.
b) This discussion is based solely on the information and findings contained in this report.
c) This conclusion is based solely on the scope of work agreed between URS and Holcim and described in Section 2 of this report.
d) URS cannot unequivocally confirm that contamination is not present across areas of the site not included in the PSI.
e) This report contains information obtained by inspection, sampling, testing or other means of investigation. This information is directly relevant only to the points in the ground where they were obtained at the time of the assessment. The borehole logs indicate the inferred ground conditions only at the specific locations tested. The precision with which conditions are indicated depends largely on the frequency and method of sampling, and the uniformity of conditions as constrained by the project budget limitations. The behaviour of groundwater and some aspects of contaminants in soil and groundwater are complex. URS conclusions are based upon the analytical data presented in this report and our experience. Future advances in regard to the understanding of chemicals and their behaviour, and changes in regulations affecting their management, could impact on our conclusions and recommendations regarding their potential presence on this site.
f) This report has been prepared for the sole benefit of Holcim and neither the whole nor any part of this report may be used or relied upon by any party other than Holcim.
g) This Report is dated 18 March 2011 and is based on the conditions encountered during the site investigations conducted, and information reviewed in February and March 2011.
h) URS accepts no responsibility for any events arising from any changes in site conditions or in the information reviewed that have occurred after the completion of the site investigations.
i) The investigations carried out for the purposes of the Report have been undertaken, and the Report has been prepared, in accordance with normal prudent practice and by reference to applicable environmental regulatory authority and industry standards, guidelines and assessment criteria in existence at the date of this Report.
j) Where this Report indicates that information has been provided to URS by third parties, URS has made no independent verification of this information except as expressly stated in the Report.
k) URS has tested only for those chemicals specifically referred to in this Report. URS makes no statement or representation as to the existence (or otherwise) of any other chemicals.
l) Except as otherwise specifically stated in this report, URS makes no warranty or representation as to the presence or otherwise of asbestos and/or asbestos containing materials ("ACM") on the site. If fill has been imported on to the site at any time, or if any buildings constructed prior to 1970 have been demolished on the site or materials from such buildings disposed of on the site, the site may contain asbestos or ACM. Without limiting the generality of sub-clauses even if asbestos was tested for and those test results did not reveal the presence of asbestos at specific points of sampling, asbestos may still be present at the site if fill has been imported at any time, or if any buildings constructed prior to 1970 have been demolished on the site or materials from such buildings disposed of on the site.
m) No investigations have been undertaken into any off-site conditions, or whether any adjoining sites may have been impacted by contamination or other conditions originating from this site.
n) Investigations undertaken in respect of this Report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and contamination may have been identified in this report.

o) Subsurface conditions can vary across a particular site and cannot be exhaustively defined by the investigations described in this report. It is unlikely therefore that the results and estimations expressed in this report will represent conditions at any location removed from the specific points of sampling.
p) A site which appears to be unaffected by contamination at the time the report was prepared may later, due to natural phenomena or human intervention, become contaminated.
q) Except as specifically stated above, URS makes no warranty, statement or representation of any kind concerning the suitability of the site for any purpose or the permissibility of any use, development or re-development of the site.
r) Use, development or re-development of the site for any purpose may require planning and other approvals and, in some cases, environmental regulatory authority and accredited site auditor approvals. URS offers no opinion as to whether the current use has any or all approvals required, is operating in accordance with any approvals, the likelihood of obtaining any approvals for development or redevelopment of the site, or the conditions and obligations which such approvals may impose, which may include the requirement for additional environmental works.
s) URS makes no determination or recommendation regarding a decision to provide or not to provide financing with respect to the site.
t) The ongoing use of the site and/or the use of the site for any different purpose may require the owner/user to manage and/or remediate site conditions, such as contamination and other conditions, including but not limited to conditions referred to in this Report.
u) All estimates for potential costs are presented as preliminary estimates only as at the date of the Report. The estimate of potential costs has been based on URS experience and judgement and, in some cases, on cost information provided by site management. Unless as otherwise expressly stated in this report, no detailed quotation has been obtained for rectification of issues and/or other actions identified in this Report. The cost estimates that have been provided may therefore vary from actual costs at the time of expenditure. Where estimates are presented as output from statistical simulations, the estimates are by definition prone to variation in line with accuracy of available information. If events do not occur as assumed, actual results may vary significantly from the current assessment. Accordingly, URS does not confirm or guarantee the achievement of the forecasts, as future events, which by their very nature are not capable of independent substantiation. Similarly, URS expressly disclaims responsibility for any changes that may occur that affect the estimates and conclusions drawn after this time. Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The user should therefore select appropriate confidence levels to suit their particular risk profile.

Attachment A
Figures

469a Ridge Road, Bombay
Site Location Plan

Client: **HOLCIM**			Status: **FINAL**
	File: **42117001\SITE_LOCATION.MXD**	Designed: **SS**	
	Scale: 1:50,000	Drawn: **SS**	
	Original Size: **A4**	Checked: **ET**	**Figure 1**
	Date Created: **15 Feb 2011**	Approved: **ET**	

Legend

- Test Pit Locations
- Surface Water Sample Location
- Approximate Extent of Fill Area

Rev	Description	App	Date
A	469a Ridge Road, Bombay Site Layout and Sample Location Plan	ET	28/02/11

File: 42117001\ SITE_LAYOUT.MXD	Designed: **SS**
	Drawn: **SS**
Scale: 1:1,800	Checked: **ET**
Original Size: **A3**	Approved: **ET**
Status **FINAL**	Date Created: **28 Feb 2011**

URS

Title: 469a Ridge Road, Bombay
Site Layout and Sample Location Plan

Drawing Number **Figure 2**

Rev **A**

Attachment B
Tables

Table 2 - Soil Analytical Results

URS Sample Reference	SSJ242	SSJ241	SSJ248	SSJ247	SSJ250	SSJ249	SSJ255	SSJ254	SSJ257	SSJ256	SSJ273	SSJ272	SSJ260	SSJ265	SSJ264	SSJ267	SSJ266	SSJ269	SSJ268	Soil Acceptance Criteria			
Laboratory Sample Reference	868488.2	868488.1	868488.8	868488.7	868488.1	868488.9	868488.15	868488.14	868488.17	868488.16	868488.33	868488.32	868488.2	868488.25	868488.24	868488.27	868488.26	868488.29	868488.28				
Date Sampled	11-Feb-11	11-Feb-11	11-Feb-11	11-Feb-11	11-Feb-11	11-Feb-11	11-Feb-11	11-Feb-11	14-Feb-11	14-Feb-11	14-Feb-11	14-Feb-11	14-Feb-11	14-Feb-11	14-Feb-11	14-Feb-11	14-Feb-11	14-Feb-11	14-Feb-11				
Sample Location	TP1		TP4		TP5		TP7		TP9		TP11		TP13	TP15		TP16		TP17					
Sample Depth (m below ground level)	1.2	2.4	0.9	1.5	1.8	3.8	1.5	3.0	0.8	2.1	0.5	4.0	4	1.6	3.2	1.6	3.2	1.1	2.2				
Sample Soil Type	Sawdust	Clayey Silt	Sawdust	Clayey Silt	Sawdust	Clayey Silt	Sawdust	Clayey Silt	Sawdust	Silt	Silty Clay	Sawdust	Sawdust	Sawdust	Clayey Silt	Sawdust	Clayey Silt	Sawdust	Clayey Silt	Environment Waikato Cleanfill Values[1]	National Environmental Standards[2]	ARC Background Concentrations (Non-Volcanic)[3]	MfE 1999 Guidelines[4] Protection of Groundwater Quality
Heavy Metals in Soil																							
Total Recoverable Arsenic	**860**	2	**159**	**170**	**560**	14	**61**	2	**63**	**20**	**50**	3	**200**	**71**	**105**	**27**	4	**43**	**20**	20	20	12	-
Total Recoverable Cadmium	0.44	0.1	0.4	0.33	0.47	0.16	0.18	0.14	0.11	0.14	0.1	0.1	0.1	0.1	0.18	0.1	0.1	0.25	0.1	1	5	0.65	-
Total Recoverable Chromium	**2,300**	**41**	**730**	**200**	**690**	**121**	**360**	**130**	**108**	**88**	**128**	20	**186**	**151**	**146**	30	**133**	**330**	**135**	40	560	55	-
Total Recoverable Copper	**660**	13	**220**	**990**	**570**	39	**590**	43	89	49	75	9	**240**	76	61	31	24	**250**	30	130	32,000	45	-
Total Recoverable Lead	4.8	6.7	16.7	19	28	16	8	9.3	3.2	8.5	14.4	10	2.4	5.1	24	3.5	14.9	5.2	11.9	70	730	65	-
Total Recoverable Nickel	5	14	16	15	4	**40**	**36**	**93**	14	**220**	12	9	< 2	7	**48**	5	**46**	4	**45**	20	-	35	-
Total Recoverable Zinc	26	18	110	136	119	175	25	75	32	119	44	23	13	28	64	27	33	21	32	200		180	-
Total Petroleum Hydrocarbons in Soil																							
C7 - C9	-	-	< 14	-	< 60	-	< 40	-	-	< 12	-	-	-	-	-	-	-	-	-	-	-	-	NA*
C10 - C14	-	-	< 30	-	< 110	-	< 80	-	-	< 30	-	-	-	-	-	-	-	-	-	-	-	-	NA*
C15 -C36	-	-	< 60	-	3,000	-	< 160	-	-	< 50	-	-	-	-	-	-	-	-	-	-	-	-	NA*
Total hydrocarbons (C7 - C36)	-	-	< 100	-	3,000	-	< 300	-	-	< 80	-	-	-	-	-	-	-	-	-	-	-	-	-
BTEX in Soil																							
Benzene	-	-	< 0.16	-	< 0.4	-	< 0.5	-	-	< 0.08	-	-	-	-	-	-	-	-	-	-	-	-	0.78
Toluene	-	-	< 0.16	-	< 0.4	-	< 0.5	-	-	< 0.08	-	-	-	-	-	-	-	-	-	-	-	-	(200)
Ethylbenzene	-	-	< 0.16	-	< 0.4	-	< 0.5	-	-	< 0.08	-	-	-	-	-	-	-	-	-	-	-	-	(280)
m&p-Xylene	-	-	< 0.4	-	< 0.7	-	< 1.0	-	-	< 0.16	-	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	-	-	< 0.16	-	< 0.4	-	< 0.5	-	-	< 0.08	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Xylene			< 0.4		< 0.7	-	< 1.0	-		< 0.16										-	-	-	(120)

Note:
All results presented in mg/kg.
1) Environment Waikato, 2011. Personal Communication with Barry Campbell, Senior Resource Officer, Resource Use Group, Environment Waikato, 16 March 2011.
2) Ministry for the Environment, 2010. Proposed National Environmental Standard for Assessing and Managing Contaminants in Soil, Discussion Document.
3) Auckland Regional Council - Background Concentrations for Inorganic Elements in the Auckland Region for Non-Volcanic Soils.
4) Ministry for the Environment: Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand, August 1999 (MfE 1999 Guidelines). Guideline values conservatively adopted for Sand soil category and a commercial/industrial landuse scenario. Tables 4.17, 4.19, and 4.20.
- Compound Not Sampled or Guideline Value Not Adopted.
* : NA indicates contaminant not limiting as estimated health-based criterion is significantly higher than that likely to be encountered on site.
< : Recorded value less than laboratory analytical detection limits.
( ) : Brackets denote values exceed threshold likely to correspond to formation of separate phase hydrcarbons.
Bold - Exceeds Environment Waikato Cleanfill Values.
Italics - Exceeds Auckland Regional Council - Background Concentrations for Inorganic Elements in the Auckland Region for Non-Volcanic Soils.

Table 4 - Surface Water Analytical Result

URS Sample Reference	SSJ274	ANZECC 2000 Guidelines[1]
Laboratory Sample Reference	868488.34	
Date Sampled	14-Feb-11	
Sample Location	SW1	Guideline Values for the Protection of 95 % of Freshwater Species
Sample Depth (m below ground level)	-	
Sample Soil Type	-	
Heavy Metals in Water		
Arsenic	**0.147**	0.013
Cadmium	< 0.000053	0.0002
Chromium	**0.028**	0.001
Copper	**0.0143**	0.0014
Lead	0.00039	0.0034
Nickel	0.0051	0.011
Zinc	0.0058	0.008

Note:
All results presented in mg/L.
1) Australian and New Zealand Environment and Conservation Council (ANZECC), 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000 Guidelines).
Bold - Exceeds ANZECC 2000 Guidelines for the protection of 95 % of frashwater species.
< : Recorded value less than laboratory analytical detection limits.

Attachment C
Laboratory Report and
Chain of Custody Information

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
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ANALYSIS REPORT

Client:	URS New Zealand Limited	**Lab No:**	868488 SPv2
Contact:	E Trembath	**Date Registered:**	16-Feb-2011
	C/- URS New Zealand Limited	**Date Reported:**	22-Feb-2011
	PO Box 821	**Quote No:**	43622
	AUCKLAND 1140	**Order No:**	25743
		Client Reference:	42117001 Confidential
		Submitted By:	Aaron Thorburn

Sample Type: Soil

Sample Name:		SSJ241 11-Feb-2011 10:25 am	SSJ242 11-Feb-2011 10:30 am	SSJ247 11-Feb-2011 12:07 pm	SSJ248 11-Feb-2011 12:10 pm	SSJ249 11-Feb-2011 3:00 pm
Lab Number:		868488.1	868488.2	868488.7	868488.8	868488.9
Individual Tests						
Dry Matter	g/100g as rcvd	-	-	-	53	-
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	< 2	860	170	159	14
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.44	0.33	0.40	0.16
Total Recoverable Chromium	mg/kg dry wt	41	2,300	200	730	121
Total Recoverable Copper	mg/kg dry wt	13	660	990	220	39
Total Recoverable Lead	mg/kg dry wt	6.7	4.8	19.0	16.7	16.0
Total Recoverable Nickel	mg/kg dry wt	14	5	15	16	40
Total Recoverable Zinc	mg/kg dry wt	18	26	136	110	175
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	-	-	-	< 0.16	-
Toluene	mg/kg dry wt	-	-	-	< 0.16	-
Ethylbenzene	mg/kg dry wt	-	-	-	< 0.16	-
m&p-Xylene	mg/kg dry wt	-	-	-	< 0.4	-
o-Xylene	mg/kg dry wt	-	-	-	< 0.16	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	-	-	-	< 14	-
C10 - C14	mg/kg dry wt	-	-	-	< 30	-
C15 - C36	mg/kg dry wt	-	-	-	< 60	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	-	-	-	< 100	-

Sample Name:		SSJ250 11-Feb-2011 3:05 pm	SSJ254 11-Feb-2011 4:30 pm	SSJ255 11-Feb-2011 4:35 pm	SSJ256 14-Feb-2011 9:00 am	SSJ257 14-Feb-2011 9:05 am
Lab Number:		868488.10	868488.14	868488.15	868488.16	868488.17
Individual Tests						
Dry Matter	g/100g as rcvd	26	-	36	62	-
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	560	< 2	61	20	63
Total Recoverable Cadmium	mg/kg dry wt	0.47	0.14	0.18	0.14	0.11
Total Recoverable Chromium	mg/kg dry wt	690	130	360	88	108
Total Recoverable Copper	mg/kg dry wt	570	43	590	49	89
Total Recoverable Lead	mg/kg dry wt	28	9.3	8.0	8.5	3.2
Total Recoverable Nickel	mg/kg dry wt	4	93	36	220	14
Total Recoverable Zinc	mg/kg dry wt	119	75	25	119	32
BTEX in Soil by Headspace GC-MS						
Benzene	mg/kg dry wt	< 0.4	-	< 0.5	< 0.08	-

Sample Type: Soil						
Sample Name:		SSJ250 11-Feb-2011 3:05 pm	SSJ254 11-Feb-2011 4:30 pm	SSJ255 11-Feb-2011 4:35 pm	SSJ256 14-Feb-2011 9:00 am	SSJ257 14-Feb-2011 9:05 am
Lab Number:		868488.10	868488.14	868488.15	868488.16	868488.17
BTEX in Soil by Headspace GC-MS						
Toluene	mg/kg dry wt	< 0.4	-	< 0.5	< 0.08	-
Ethylbenzene	mg/kg dry wt	< 0.4	-	< 0.5	< 0.08	-
m&p-Xylene	mg/kg dry wt	< 0.7	-	< 1.0	< 0.16	-
o-Xylene	mg/kg dry wt	< 0.4	-	< 0.5	< 0.08	-
Total Petroleum Hydrocarbons in Soil						
C7 - C9	mg/kg dry wt	< 60	-	< 40	< 12	-
C10 - C14	mg/kg dry wt	< 110	-	< 80	< 30	-
C15 - C36	mg/kg dry wt	3,000	-	< 160	< 50	-
Total hydrocarbons (C7 - C36)	mg/kg dry wt	3,000	-	< 300	< 80	-

Sample Name:		SSJ260 14-Feb-2011 10:10 am	SSJ264 14-Feb-2011 10:50 am	SSJ265 14-Feb-2011 10:55 am	SSJ266 14-Feb-2011 11:40 pm	SSJ267 14-Feb-2011 11:45 am
Lab Number:		868488.20	868488.24	868488.25	868488.26	868488.27
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	200	105	71	4	27
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.18	< 0.10	< 0.10	< 0.10
Total Recoverable Chromium	mg/kg dry wt	186	146	151	133	30
Total Recoverable Copper	mg/kg dry wt	240	61	76	24	31
Total Recoverable Lead	mg/kg dry wt	2.4	24	5.1	14.9	3.5
Total Recoverable Nickel	mg/kg dry wt	< 2	48	7	46	5
Total Recoverable Zinc	mg/kg dry wt	13	64	28	33	27

Sample Name:		SSJ268 14-Feb-2011 12:10 pm	SSJ269 14-Feb-2011 12:15 pm	SSJ272 14-Feb-2011 1:35 pm	SSJ273 14-Feb-2011 1:40 pm	
Lab Number:		868488.28	868488.29	868488.32	868488.33	
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Recoverable Arsenic	mg/kg dry wt	20	43	3	50	-
Total Recoverable Cadmium	mg/kg dry wt	< 0.10	0.25	< 0.10	< 0.10	-
Total Recoverable Chromium	mg/kg dry wt	135	330	20	128	-
Total Recoverable Copper	mg/kg dry wt	30	250	9	75	-
Total Recoverable Lead	mg/kg dry wt	11.9	5.2	10.0	14.4	-
Total Recoverable Nickel	mg/kg dry wt	45	4	9	12	-
Total Recoverable Zinc	mg/kg dry wt	32	21	23	44	-

Sample Type: Aqueous						
Sample Name:		SWJ274 14-Feb-2011 1:55 pm				
Lab Number:		868488.34				
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn						
Total Arsenic	g/m^3	0.147	-	-	-	-
Total Cadmium	g/m^3	< 0.000053	-	-	-	-
Total Chromium	g/m^3	0.028	-	-	-	-
Total Copper	g/m^3	0.0143	-	-	-	-
Total Lead	g/m^3	0.00039	-	-	-	-
Total Nickel	g/m^3	0.0051	-	-	-	-
Total Zinc	g/m^3	0.0058	-	-	-	-

Analyst's Comments

Appendix No.1 - Total Petroleum Hydrocarbon Chromatograms

Appendix No.2 - Chain of Custody

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Samples
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	1-2, 7-10, 14-17, 20, 24-29, 32-33
Heavy metal screen level As,Cd,Cr,Cu,Ni,Pb,Zn	Dried sample, <2mm fraction. Nitric/Hydrochloric acid digestion, ICP-MS, screen level.	-	1-2, 7-10, 14-17, 20, 24-29, 32-33
BTEX in Soil by Headspace GC-MS	Solvent extraction, Headspace GC-MS analysis US EPA 8260B. Tested on as received sample	-	8, 10, 15-16
Total Petroleum Hydrocarbons in Soil	Sonication extraction in DCM, Silica cleanup, GC-FID analysis US EPA 8015B/MfE Petroleum Industry Guidelines. Tested on as received sample	-	8, 10, 15-16
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. US EPA 3550.	0.10 g/100g as rcvd	8, 10, 15-16
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1-2, 7-10, 14-17, 20, 24-29, 32-33

Sample Type: Aqueous

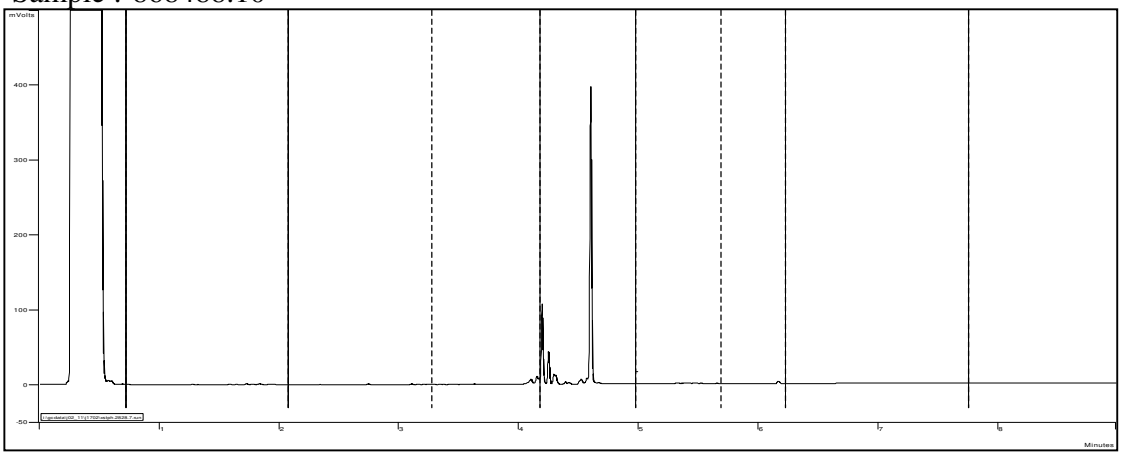
Test	Method Description	Default Detection Limit	Samples
Heavy metals, totals, trace As,Cd,Cr,Cu,Ni,Pb,Zn	Nitric acid digestion, ICP-MS, trace level	-	34
Total Digestion	Boiling nitric acid digestion. APHA 3030 E 21st ed. 2005.	-	34

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental Division

Sample : 868488.10



C7 C10 C15 C20 C25 C30 C34 C44

URS

CHAIN OF CUSTODY AND SAMPLE RECEIPT DOCUMENTATION

FROM:	TO:
URS New Zealand Limited URS Centre, Level 6 13-15 College Hill PO Box 821 Auckland Ph: (09) 355 1300 Fax (09) 355 1333	R J Hill Laboratories Limited 1 Clyde Street Hamilton Ph: (07) 858 2000 URS Client: Confidential
RESULTS ATTENTION: Emma Trembath PROJECT NO: 42117001 PURCHASE ORDER NO: 25743 SAMPLER(S): Aaron Thorburn	LAB QUOTE NO: ☐ 30443 Normal Priority ☐ 30833 High Priority ☐ 30481 Urgent Priority ☑ Special Quote RESULTS REQUIRED BY: 43622 Special Quote

ANALYSES REQUIRED

SAMPLE ID	MATRIX	DATE/TIME	COMMENTS	CONTAINERS	Heavy Metal Screen	TPH and BTEX	Cold Hold	Heavy Metals
SSJ241	Soil	11-Feb-11			X			
SSJ242	Soil	11-Feb-11			X			
SSJ243	Soil	11-Feb-11					X	
SSJ244	Soil	11-Feb-11					X	
SSJ245	Soil	11-Feb-11					X	
SSJ246	Soil	11-Feb-11					X	
SSJ247	Soil	11-Feb-11			X			
SSJ248	Soil	11-Feb-11			X	X		
SSJ249	Soil	11-Feb-11			X			
SSJ250	Soil	11-Feb-11			X	X		
SSJ251	Soil	11-Feb-11					X	
SSJ252	Soil	11-Feb-11					X	
SSJ253	Soil	14-Feb-11					X	
SSJ254	Soil	14-Feb-11			X			
SSJ255	Soil	14-Feb-11			X	X		
SSJ256	Soil	14-Feb-11			X	X		
SSJ257	Soil	14-Feb-11			X			
SSJ258	Soil	14-Feb-11					X	
SSJ259	Soil	14-Feb-11					X	
SSJ260	Soil	14-Feb-11			X			
SSJ261	Soil	14-Feb-11					X	
SSJ262	Soil	14-Feb-11					X	
SSJ263	Soil	14-Feb-11					X	
SSJ264	Soil	14-Feb-11			X			
SSJ265	Soil	14-Feb-11			X			
SSJ266	Soil	14-Feb-11			X			
SSJ267	Soil	14-Feb-11			X			
SSJ268	Soil	14-Feb-11			X			
SSJ269	Soil	14-Feb-11			X			
SSJ270	Soil	14-Feb-11					X	
SSJ271	Soil	14-Feb-11					X	
SSJ272	Soil	14-Feb-11			X			
SSJ273	Soil	14-Feb-11			X			
SWJ274	Water	14-Feb-11						X
Total No. of Sample Bottles:				Including:	0	Blank or Duplicate Samples		

RELINQUISHED BY	RECEIVED BY	METHOD OF SHIPMENT
NAME: DATE: 11/02/2011	NAME: C.Neg DATE: 16/2/11	URS RECEPTION
COMPANY: URS NEW ZEALAND LTD TIME:	COMPANY: Hills Laboratories TIME:	HILLS DOCKET

SAMPLE RECEIPT DATA

PLEASE COMPLETE THIS SECTION (CIRCLE AS APPROPRIATE) AND RETURN FAX A COPY IMMEDIATELY AFTER RECEIVING SAMPLES)

ALL SAMPLES AND ASSOCIATED DOCUMENTATION WERE RECEIVED IN GOOD ORDER	YES / NO	PLEASE CONTACT THE LABORATORY	CUSTODY SEAL INTACT: YES / NO / NA SAMPLES CHILLED: YES / NO / NA Temp: 10.9 °C LABORATORY BATCH NO:

SPECIAL HANDLING/STORAGE OR DISPOSAL INSTRUCTIONS:	REPORTING
CAUTION - SAMPLES MAY CONTAIN HAZARDOUS SUBSTANCES	REPORT FORMAT: FAX ☐ LETTER ☐ EMAIL ☑ DISK ☐ EMAIL ADDRESS: Emma.Trebath@urscorp.com

INTERNAL USE - URS WORK INSTRUCTIONS AND CHECKLIST OVERLEAF

E-MAIL

Time Received 16-Feb-2011 3 14 40 pm
Job No 868488
No of Samples 34 No of Fractions 123
0318684886

FEB 16 2011 PM3:07