

9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 8:38 p.m.
To: 9(2)(a)
Subject: FWD: Claim File
Attachments: Claim File

Hi 9(2)(a) supporting info as discussed. Regards Hugh

9(2)(a)

From: 9(2)(a)
Sent: Friday, 1 October 2010 8:28 p.m.
To: Hugh Cowan
Subject: Claim File
Attachments: Claim File Presentation 2.pptx

Hi Hugh

Attached is the PowerPoint presentation we discussed. The following commentary may help explain. I have stated the Scope Of Work is the old form but the information is the same. Hope this helps.

Slide No 1.

Front of the claim folder. The information on this front cover is gathered by the Loss Adjuster during their initial visit. The information entitled "Overall Description" is based on a visual inspection only. No other information is gathered to verify this info. The next box is most important. It is a compulsory field and identifies any hazards that may exist on the property. These can range from a small dog to a large ground rupture or structurally unsafe dwelling.

Slide No 2.

Rear cover of the claim file folder. It gives a visual indication of the areas of land insured under the EQC Act. The exclusions are also listed here.

Slide No 3.

Inside cover of the claim file folder. It details the excess that should be applied to every EQC claim.

Slide No 4.

Statement of claim check list. It is completed by the Loss Adjuster when attending the initial inspection. It is important to note every room is inspected during the initial inspection, regardless of the number of rooms reported as being damaged. It is preferable for the claimant to sign this form, and most do, however if a claimant does not wish to sign the form they are not pressured to do so.

Slide No 5.

Reverse of the statement of claim check list. It is filed out as per slide No 4.

Slide No 6

Sketch plan. Completed by the Estimator at the time of the initial inspection. The foot print of the building is sketched and rooms that are damaged detailed on the plan. Measurements are included on the sketch plan. North should be shown along with the street to locate the plan. This plan will not be to scale.

Slide No 7.

File Note. This document is in effect our first report. It provides brief information as to what has been inspected and any other information that helps the progress of the claim. Any additional information received during the life of the claim is provided by way of a file note. This data is then entered into our ClaimCenter program.

Slide No 8.

Scope of Works. Unfortunately this particular document has now been superseded. However the basic fields are the same. A description on the work required is detailed and the quantity of material is also included in this document. The early inspections included full costings of the scope of work, however it is now only going to show the description and quantities.

Slide No 9

The reverse of the scope of works form. This describes the P&G and Margins and gives information around these two items.

Regards

9(2)(a)



Claim Folder

Date: _____

Opened By: _____

Super ID: _____

Area/Loss Adjuster: _____

Claim Support ID: _____

Loss Adjuster File Ref: _____

Affix Label
Here

Overall Description

Property Information

Age	<input type="checkbox"/> <1935	<input type="checkbox"/> 1935-60	<input type="checkbox"/> 1960-1980	<input type="checkbox"/> Post 1980	<input type="checkbox"/> Under const
Bedrooms	<input type="checkbox"/> One	<input type="checkbox"/> Two	<input type="checkbox"/> Three	<input type="checkbox"/> Four	<input type="checkbox"/> Other
Footprint	<input type="checkbox"/> Rectangular	<input type="checkbox"/> L shape	<input type="checkbox"/> T shape	<input type="checkbox"/>	<input type="checkbox"/> Other
Foundations	<input type="checkbox"/> Wood Piles	<input type="checkbox"/> Concrete Piles	<input type="checkbox"/> Concrete Skirt	<input type="checkbox"/> Concrete Slab	<input type="checkbox"/> Other
Floors	<input type="checkbox"/> One	<input type="checkbox"/> Split Level (1_)	<input type="checkbox"/> Two	<input type="checkbox"/> Three	<input type="checkbox"/> Other
	<input type="checkbox"/> T & G	<input type="checkbox"/> Particle Board	<input type="checkbox"/> Concrete	<input type="checkbox"/>	<input type="checkbox"/> Other
Exterior Walls	<input type="checkbox"/> Weatherboard	<input type="checkbox"/> Fibrecement	<input type="checkbox"/> Brick Veneer	<input type="checkbox"/> Stucco	<input type="checkbox"/> Other
Roof	<input type="checkbox"/> Rolled Metal	<input type="checkbox"/> Concrete Tiles	<input type="checkbox"/> Clay Tiles	<input type="checkbox"/> Metal Tiles	<input type="checkbox"/> Other
Extras	<input type="checkbox"/> Int garage/shed	<input type="checkbox"/> Ext garage/shed	<input type="checkbox"/> Carport	<input type="checkbox"/> Paved drive	<input type="checkbox"/> Retaining Walls

Have you uplifted a Statement of Claim?

Hazard Information (Compulsory)

Claim Progress Check List

1st Claimant Contact	_____ / _____ / _____	Scope of Work Prepared
Statement of Claim Completed	_____ / _____ / _____	Scope of Work Costed
Estimator Engaged	Yes/No _____ / _____ / _____	Invoices Requested
Engineer Engaged	Yes/No _____ / _____ / _____	Name: _____
Valuer Engaged	Yes/No _____ / _____ / _____	Name: _____
Other Expert Engaged	Yes/No _____ / _____ / _____	Name: _____

ACE (Acceptable Claim Elements)

Is the loss covered under the Act Yes/No

Statement of Claim signed by Claimant Yes/No

All Experts Documentation on File Yes/No

Does the Documentation support your proposed settlement to claimant? Yes/No

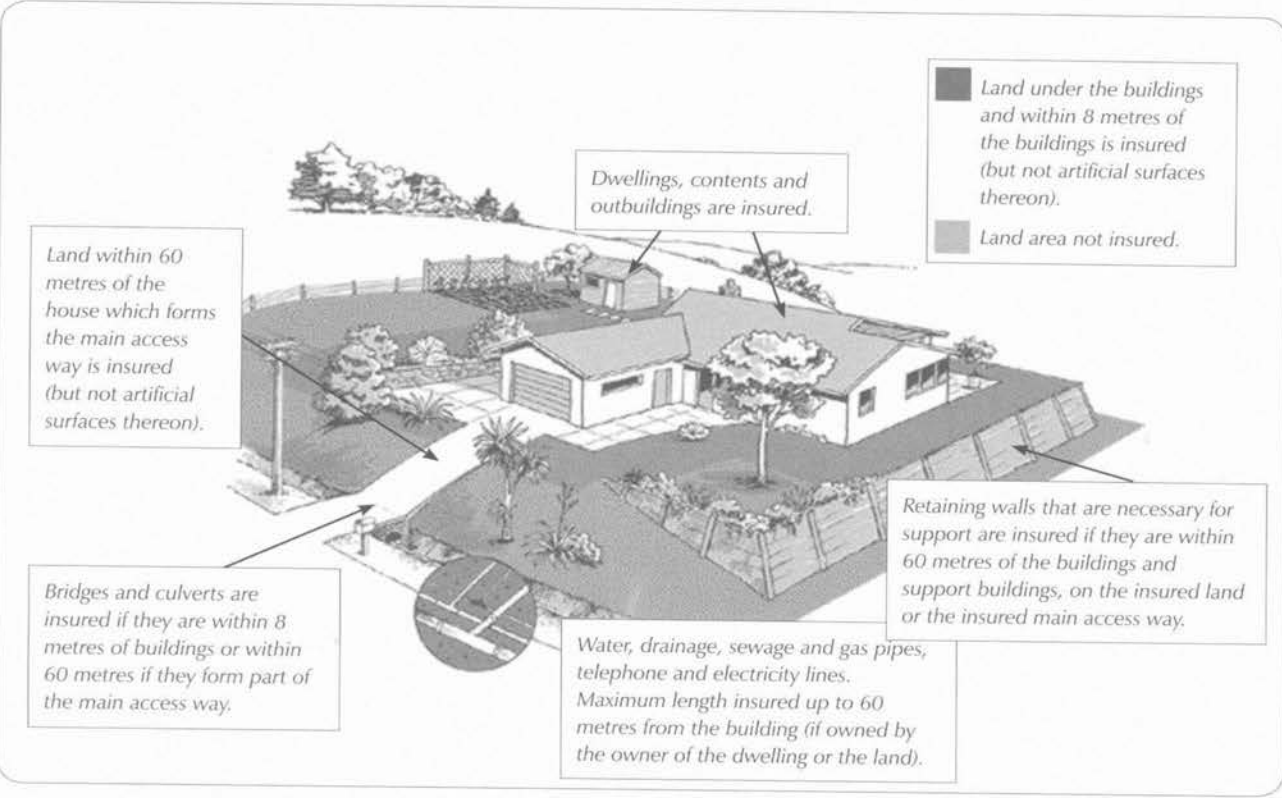
EQC Status Reports, Status Payment Reports, as applicable – one for every action taken. (If Status Report is done electronically, note that in the history sheet). Yes/No

Supporting documents – photos, engineer etc. reports, quotations, invoices etc. Yes/No

Affix Label
Here

EQCover Diagram Released under the Official Information Act 1982

A guide to property insured by the Earthquake Commission Act 1993.



Exclusions

Any items excluded by the applicable home and/or contents fire insurance policies.	Intangible property, for example, information stored on a computer.
Jewellery, precious stones, money, works of art, securities documents or stamps.	Motor vehicles, or the parts or accessories of a motor vehicle.
Trailers, or parts or accessories of a trailer.	Boats, or the parts or accessories of a boat.
Aircraft or anything in or on an aircraft.	Explosives.
Any bush, forest, tree, plant or lawn.	Growing crops (including fruit trees and vines) or cut crops in the open fields.
Animals, including livestock and pets.	Tennis courts, whether inside or outside and whatever the surface.
Jetties, wharves or landings.	Roads, streets, drives and paths.
Retaining walls, bridges or culverts more than 8 metres from your home, or on the main driveway, if they are more than 60 metres from your home.	Dams, breakwaters, moles, groynes, fences, poles or walls*.
Drains, channels, tunnels or cuttings*.	Reservoirs, swimming pools, baths, spa pools, tanks or water towers*.
Burglary, theft or vandalism following an earthquake or natural disaster.	Temporary accommodation expenses after an earthquake or natural disaster.

Note: Items marked * are covered if they are part of the residence. Some items may be covered by the insurance company, so it does not necessarily follow that they are not insured at all.

Dwelling & Contents Excess

Dwelling Excess	1%	Minimum \$200
Contents Excess		\$200
If claim is for both dwelling and contents, the following excess applies:-		
Claim under or equal to \$20,000		\$200
Claim over \$20,000		1% of claim amount
Maximum contents excess \$200		

Land Excess

If damage is to land, retaining wall, bridges or culverts, the following excess applies:-

Claim is under or equal to \$5,000	\$500
Claim over \$5,000 but under \$50,000	10% of claim amount
Claim equal to or greater than \$50,000	\$5,000

If there is more than one dwelling on the land then the **minimum** excess is multiplied by the number of dwellings (eg. 2 dwellings \$1,000, 4 dwellings \$2,000).

The maximum excess of \$5,000 still applies.

Imminent Loss Claims – Excess

Check details with EQC but as a guide, the excess will be 10% of the sum of the damaged/destroyed land, as valued, plus 10% of the value of the land at risk of imminent loss (min \$500, max \$5,000)

PLUS \$200 or 1%, whichever is the greater, for the removal of the imminent loss factor from any insured building/s.

For Land Damage and Imminent Loss Claims

- Is it **insured** land or buildings (or insured ancillary property) that has been damaged and/or may be under imminent threat **from the event**? Remember that if a natural disaster has occurred on adjacent land but still poses a threat to an insured house or its land then a valid claim may exist.
- Does the damage and/or imminent threat arise out of a natural disaster that has **already** occurred? If not, no imminent loss claim.
- Engage an engineer to inspect and report on cause, what is affected, how it is affected. Also whether there is imminent threat to insured land or buildings/structures and the extent the imminent threat poses to each of insured land and insured buildings/structures.
- Imminent threat must be likely to be realised within 12 calendar months/4 successive seasons from the event, if nothing is done.
- Engineer should also indicate possible repair remedy and estimate costs that could be involved separately for actual damage that has occurred to land and buildings and for repairs that would likely be necessary if the threat of imminent loss to land and/or buildings is realised.
- Ensure the engineer is specific as to areas 'destroyed' (cannot practically and economically be repaired), damaged (could be repaired subject to economic test) and area/extent of land/buildings' at imminent threat.
- When you have this detail engage an EQC approved valuer and have the areas involved valued and if this hasn't been done by the engineer already, have an EQC Estimator prepare costs to undertake repair remedies indicated by engineer.
- When you have all the valuations and details of costs for repair remedies then you should be in a position to advise EQC on the path to take for claim resolution.
- It could be the figures indicate further research is necessary to firm up on repair figures if settlement is based on these.
- Remember repair costs must include allowances for engineers fees, contingencies, margins and, of course, consent fees.
- **Only EQC can make the decision as to acceptance or otherwise of imminent loss threat claims.**



STATEMENT OF CLAIM CHECKLIST

EQC Reference: _____

LA: _____ ESTIMATOR _____

Room	Event Damage		Walls	Ceiling	Floor	Windows	Description of Damage
	YES	NO					
LOUNGE							
DINING ROOM							
KITCHEN							
FAMILY ROOM							
BEDROOM 1							
BEDROOM 2							
BEDROOM 3							
BEDROOM4							
OTHER							
OFFICE/STUDY							
RUMPUS							
HALLWAY(s)							
STAIRWELL							
TOILET 1							
TOILET 2							
LAUNDRY							
BATHROOM							
EN SUITE							

Item		Event Damage		Description of Damage	Appoint Engineer	
		YES	NO		YES	NO
CHIMNEY	Base					
	In ceiling cavity					
	Above roof					
	Fireplace					
FOUNDATIONS						
PILING						
SERVICES						
KITCHEN OVENS						
EXTERNAL WALLS	North					
	South					
	East					
	West					
OTHER STRUCTURES OUTBUILDINGS						
LAND & RETAINING WALLS <i>***Discuss*** with Contract Loss Adjuster</i>						

I confirm the rooms and areas listed above have been inspected by an EQC inspector.
 Damage caused by the event has been noted and to my knowledge there are no other areas of damage resulting from the event

SIGNATURE OF CLAIMANT: _____ DATED: _____

NOTES

The rates in the Repair Cost Database exclude Preliminary and General (P and G), contractors margin, professional fees and GST.

P and G costs relate to both a contractor's on site and off site costs. On site costs can be for site sheds, canteen, telephones, vehicles, tools and plant, management, insurance, surveying set-out costs, scaffolding, hoardings etc. Off site costs typically relate to head office costs such as rent, staff salaries, insurances, ACC, and accounts. For this type of work the allowance for P and G will vary between 5% and 15% depending on the amount of work, ease of access, and the size of the building contracting firm doing the work.

A normal addition for preliminaries for a small company would be in the region of 5% and a large company 10%. If there are specific or special identifiable items, such as cranes or concrete pumps, consider allowing for them by the addition of a lump sum.

Margin is the building contractor's addition for profit. Contractors allow 2% to 15% for margin depending on the size of the company, the size of the project and market conditions. A large contract with a large company would normally carry a smaller percentage. Smaller contractors tend to use higher margins. We recommend the addition for margin should be in the region of 6%-15% for the kind of work envisaged.

GST should be added at the appropriate level.

Small Works. Consider:

- Travelling time, which could be over more than one day,
- Sourcing and uplifting materials,
- Applying more than one coat (eg painting).

Allow a minimum of half a day (or even a full day) for labour.

Subcontracted Quoted Prices.

Do not allow P & G on quoted prices. These should be included in the quote.

9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 5:09 p.m.
To: Ian Simpson
Subject: FWD: Business New Zealand
Attachments: Business New Zealand

Ian, food for thought. This is the same guy I have thought of taking to Chile. . .

9(2)(a)

From: 9(2)(a)@med.govt.nz>
Sent: Friday, 1 October 2010 4:59 p.m.
To: Hugh Cowan
Cc: Hugh Cowan
Subject: Business New Zealand

Hugh,

Just whilst I'm remembering.

Can I recommend that Ian calls 9(2)(a) Business NZ regarding the RFP and what we're doing.

9(2)(a) could be a great advocate regarding supporting business/NZ issues, he can also be your worst enemy if we rub him up the wrong way. He's also very well networked and politically connected.

We managed to get to the point at MED where 9(2)(a) would get the press release/media release we were doing on our contract work and then Business NZ would then release a complementary press release/or be ready to answer media queries.

He could be a really good ally, it would need to be an Ian to him discussion. I have a good relationship with 9(2)(a) it should be CE to CE if you concur.

Regards

9(2)(a)

newzealand.govt.nz - connecting you to New Zealand central & local government services

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9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 5:07 p.m.
To: 9(2)(a)
Subject: RE: Business New Zealand

Will action. H.

--- original message ---

From: 9(2)(a)@med.govt.nz
Subject: Business New Zealand
Date: 1st October 2010
Time: 4:59:13 pm

Hugh,

Just whilst I'm remembering.

Can I recommend that Ian calls 9(2)(a) Business NZ regarding the RFP and what we're doing.

9(2)(a) could be a great advocate regarding supporting business/NZ issues, he can also be your worst enemy if we rub him up the wrong way. He's also very well networked and politically connected.

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9(2)(a)

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9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 5:06 p.m.
To: Ian Simpson
Subject: FWD: Support from 9(2)(a)
Attachments: Support from 9(2)(a)

Ian, you'll be pleased to put in a good word with 9(2)(a) in sure. 9(2)(a) has been terrific: competent, consistently supportive at just the right level, no other agendas, in short - ideal, and to achieve such rapport in next to no time, that's maturity. Cheers, Hugh

9(2)(a)

From: 9(2)(a)@med.govt.nz>
Sent: Friday, 1 October 2010 4:54 p.m.
To: Hugh Cowan; Hugh Cowan
Subject: Support from 9(2)(a)

Hi Hugh,

As I say MEDs instructions to me were to support EQC as much as needed.

It may be worthwhile you or Ian having a discussion with 9(2)(a) on whether that's worked for you (I know you said it has, but would help if 9(2)(a) knows that) and what you need going forward.

9(2)(a) wants to help you out, so it just helps to keep him sweet and also for him to make my direct manager OK about all this.

No rush at your/Ian's convenience.

Regards

9(2)(a)

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9(2)(a)

From: Hugh Cowan 9(2)(a)
Sent: Friday, 1 October 2010 4:06 p.m.
To: 9(2)(a)
Cc: Ian Simpson, 9(2)(a)
Subject: Re: Draft - Evaluation Model - EQC - RFP

9(2)(a)

Just acknowledging receipt of the spreadsheet, with further thanks for your excellent leadership around this so far!

regards
Hugh

On Fri, Oct 1, 2010 at 3:59 PM, 9(2)(a) <[redacted]@med.govt.nz> wrote:
CONFIDENTIAL

See attached proposed evaluation model for the RFP.

In summary, the weightings proposed are:

9(2)(i)

The spreadsheet details each RFP criteria, its link to relevant questions in section 10 and 11 of the RFP.

I propose that this evaluation is conducted as a group evaluation e.g. everyone in one room, reading each bid in turn and agreeing a group mark.

As there is no space at EQC from Tuesday, I am currently working to secure a room at MED on Bowen Street from Tuesday to Friday.

Proposed evaluators are (subject to Conflict of interest checks):

Hugh Cowan - EQC

9(2)(a)

Plus Possibly an EQC Board Member - To be confirmed by Ian

9(2)(a)

PA/Support

If you could come back to me with any thoughts etc on the attached/the above and we'll flex accordingly.

Regards

9(2)(a)

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9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 3:33 p.m.
To: Ian Simpson
Subject: peer review delivery

Ian, the peer review will be delivered to me by 3.00pm, Monday. Regards Hugh

9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 3:21 p.m.
To: 9(2)(a)
Subject: FWD: RE: EQC Workshop 8.30am Tuesday 5th October
Attachments: RE: EQC Workshop 8.30am Tuesday 5th October

Hi 9(2)(a) sharing brief exchange with Ian re staged engagement with sector reps (Ian refers to early discussion with me). Leave you to mull. All about timing and context I suspect. How output of your group efforts will inform recovery works remains to be agreed.

9(2)(a)

From: Ian Simpson
Sent: Friday, 1 October 2010 2:43 p.m.
To: Hugh Cowan
Subject: RE: EQC Workshop 8.30am Tuesday 5th October

Hugh,

Looks good. Are we still thinking about arranging a session with IPENZ and the insurers, or has the game moved on?

Cheers,

Ian.

-----Original Message-----

From: Hugh Cowan
Sent: Friday, 1 October 2010 12:48 p.m.
To: Ian Simpson
Subject: FWD: EQC Workshop 8.30am Tuesday 5th October

Ian, for your info. No action required. Key sectors and actors involved. If this goes well, EQC will be in strong position to brief reinsurers as well as recovery commission. Regards Hugh

9(2)(a)

From: Hugh Cowan 9(2)(a)
Sent: Friday, 1 October 2010 3:10 p.m.
To: 9(2)(a)
Cc: Hugh Cowan; 9(2)(a)
Subject: Re: FW: Peer review - TOR

9(2)(a)

Thanks for the call and update.

I am happy to confirm a delivery time to EQC of 3.00pm, Monday.

regards
Hugh

On Fri, Oct 1, 2010 at 2:43 PM, 9(2)(a) wrote:
Hi Hugh

Further to our discussions yesterday, and the field activity yesterday, the review team have conferred this afternoon and agreed on an approach to the review reporting. Can you please advise of the required delivery time on Monday. FYI, I have attached a slightly amended TOR which as you can see we have also sent to 9(2)(a) his agreement.

Regards

9(2)(a)

From: 9(2)(a)
Sent: Friday, 1 October 2010 2:38 p.m.
To: 9(2)(a)
Cc: 9(2)(a)
Subject: FW: Peer review - TOR

9(2)(a) as noted in Hugh's email yesterday we are into the review - we propose a couple of very minor changes to the TOR as attached. Are you happy with these?

9(2)(a)

NOTICE: This email, if it relates to a specific contract, is sent on behalf of the 9(2)(ba)(i) which entered into the contract. Please contact the sender if you are unsure of the contracting 9(2)(ba)(i) or visit our web page 9(2)(ba)(i) for further information on the 9(2)(ba)(i). If this email relates to a specific contract, by responding you agree that, regardless of its terms, this email and the response by you will be a valid communication for the purposes of that contract, and may bind the parties accordingly. This e-mail together with any attachments is confidential, may be subject to legal privilege and may contain proprietary information, including information protected by copyright. If you are not the intended recipient, please do not copy, use or disclose this e-mail; please notify us immediately by return e-mail and then delete this e-mail.

9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 2:47 p.m.
To: Ian Simpson
Subject: RE: EQC Workshop 8.30am Tuesday 5th October

I think we should regard this as the first move, or an early move in the same game. I will discuss with 9(2)(a) but pls do share any ideas or intel that you have re timing or politics. Cheers hugh

--- original message ---

From: "Ian Simpson" 9(2)(a)
Subject: RE: EQC Workshop 8.30am Tuesday 5th October
Date: 1st October 2010
Time: 2:43:05 pm

Hugh,

Looks good. Are we still thinking about arranging a session with IPENZ and the insurers, or has the game moved on?

Cheers,

Ian.

-----Original Message-----

From: Hugh Cowan
Sent: Friday, 1 October 2010 12:48 p.m.
To: Ian Simpson
Subject: FWD: EQC Workshop 8.30am Tuesday 5th October

Ian, for your info. No action required. Key sectors and actors involved. If this goes well, EQC will be in strong position to brief reinsurers as well as recovery commission. Regards Hugh

9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 2:29 p.m.
To: 9(2)(a)
Subject: FWD: Response to EQC RFP
Attachments: Response to EQC RFP

Sorry sent twice to 9(2)(a) issued 9(2)(a) on previous. Hugh

9(2)(a)

From: 9(2)(a)
Sent: Friday, 1 October 2010 2:26 p.m.
To: Hugh Cowan
Cc: 9(2)(a)
Subject: Response to EQC RFP
Attachments: Attachment withheld under 9(2)(i)

Dear Hugh

Please find attached our response to your invitation to participate in EQC's RFP process regarding the Canterbury Earthquake recovery. The letter is addressed to your Chief Executive Ian Simpson however we have been advised by your office that all correspondence is to be sent directly to you. We respectfully request that the letter be brought to the attention of your Chief Executive.

Thanks & regards

9(2)(a)

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9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 2:28 p.m.
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Attachments: Response to EQC RFP

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9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 1:45 p.m.
To: 9(2)(a)
Subject: RE: EPB Guideline Document - Progress Report

Thanks 9(2)(a) will review over the weekend. Regards Hugh

--- original message ---

From: 9(2)(a) <[redacted]@dbh.govt.nz>
Subject: EPB Guideline Document - Progress Report
Date: 1st October 2010
Time: 1:41:40 pm

Dear Colleagues

Yes, the Darfield earthquake has affected things. But we must publish this document by the end of October at the latest.

Attached is the latest version, tidied up courtesy of 9(2)(a), a freelance Word expert.

Things to notice:

1.

The EQC Foreword is 100% my fault. It is up to EQC to decide on its inclusion and the wording. I think there should be one from EQC 2.

We are waiting for material from 9(2)(a) (I have written her section but she has not reviewed it yet.) 3.

The Presentation slides (Section 6.3) will be printed from electronic pdf files (or sent as separate files for electronic purposes) A sample is attached.

It is shaping up well and almost there. 9(2)(a) if there is anything we can do to help please let me know. We need your material.

Please let me have any comments / suggestions for the next version.

Kind regards

9(2)(a)

Department of Building and Housing
Te Tari Kaupapa Whare

9(2)(a)

Level 6, 86 Customhouse Quay
PO Box 10 729, Wellington, New Zealand
Web: <http://www.dbh.govt.nz><<http://www.dbh.govt.nz/>>

9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 1:15 p.m.
To: 9(2)(a)
Subject: RE: NZSEE Bulletin Publication

9(2)(a) certainly it should be possible to have Chile in for Jan. Pls plan on that basis. Cheers Hugh. Ps many thanks for service to our ops in Chch. I left instruction to obtain invoicing details for you. Trust that has been settled.

--- original message ---

From: 9(2)(a) >
Subject: NZSEE Bulletin Publication
Date: 1st October 2010
Time: 1:08:01 pm

Good afternoon,

Had a discussion this morning with 9(2)(a) re the December 2010, March 2011 & June 2011 Bulletins.

With the Darfield Canterbury EQ and the demands that has put on everybody, the activities of the Society have slowed somewhat ! (or speeded up as the case may be).

To take the pressure off Hugh and 9(2)(a) in particular, it is proposed that 9(2)(a) compile a December issue from papers that he already has available. 9(2)(a) will also write an editorial outlining the issues of the Chile and Darfield Eqs and explain that a large proportion of the membership, let alone the management, are fully committed on other tasks, and outline the possible format of the next three bulletin.

It is noted that the September 2010 Bulletin is with 9(2)(a) and will be printed by Caxton in the next week or so. Posting out will be about the middle of October.

Hugh, can you please give us a ³heads up² as to if you could make the Chile report available by say mid January 2011 to 9(2)(a) it could then make up the March 2011 Bulletin.

The next issue, June 2011, could be devoted to The Darfield Canterbury earthquake. Even that may be a bit too tight. However, from the Clearinghouse etc, I will identify topic heads and possible authors. I would hope to get that out for comment by 15th October.

Please comment.

Regards,

9(2)(a)

for NZSEE

9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 12:48 p.m.
To: Ian Simpson
Subject: FWD: EQC Workshop 8.30am Tuesday 5th October
Attachments: EQC Workshop 8.30am Tuesday 5th October

Ian, for your info. No action required. Key sectors and actors involved. If this goes well, EQC will be in strong position to brief reinsurers as well as recovery commission. Regards Hugh

9(2)(a)

From: David Brundson
Sent: Friday, 1 October 2010 12:39 p.m.
To: [REDACTED]
Cc: Hugh Cowan 9(2)(a)
Subject: EQC Workshop 8.30am Tuesday 5th October
Attachments: Agenda for EQC Engineering Advisory Group Workshop 20101005.doc

Thank you for being willing to attend next Tuesday's workshop at EQC's Operations Base in Christchurch.

The details for the workshop are provided in the attached agenda, along with the context and objectives of the workshop.

Can I request that this notification and the agenda NOT be forwarded or shared with others. As you will appreciate, this engineering discussion is just one part of a wider and rapidly moving process that has a number of sensitivities associated with it, and therefore requires careful management. You have been specifically nominated to attend this workshop for your technical knowledge and contribution into a small working group, as well as any sectors or organisations that you represent. We will discuss communications issues and strategies at the workshop.

Please contact me if you have any questions ahead of Tuesday.

Kind regards
Dave

--
Dave Brundson - Director
db@kestrel.co.nz - 9(2)(a)
Wellington Office - P 04 499 4433 - F 04 499 4445
Kestrel Group - Risk, Continuity and Emergency Management - www.kestrel.co.nz

EQC Engineering Advisory Group on House Repairs and Reconstruction Following the Canterbury Earthquake

Workshop Agenda

Workshop Details

Date and Time: **8.30 to 12.00, Tuesday 5 October**

Venue: EQC Operations Base, 11 Deans Avenue (cnr Deans Avenue and Lester Lane)

Participants

EQC	George Hooper Dave Brunson	BRANZ	Roger Shelton
Tonkin & Taylor	Nick Rogers John Leeves	SESOC/ Consulting Engs	John Hare John Snook Barry Brown
Dept Bldg & Housing	Mike Stannard	Remediation Specialist	Rob Robinson

Workshop Context

This workshop forms part of a wider process to confirm appropriate structural engineering approaches to repair and reconstruction, mobilise suitable engineering resources in support of EQC operations, and consolidate and communicate the technical objectives and processes to the affected local authorities and to the wider construction sector.

Workshop Objectives and Outcomes

1. Establish the guiding principles with respect to performance objectives of repaired and reconstructed houses in future events
2. Form a consensus view on what is practically achievable from available remediation techniques for each of the principal modes of distress in the different land damage zones
3. Confirm the recommended foundation systems for reconstructed (new) dwelling units in the different land damage zones

Workshop Agenda

8.30 Introductions and Workshop Objectives

8.40 Summary of land damage zones and land remediation options

- *What is known and not known (not yet decided) about the way forward*

9.00 Guiding principles with respect to performance objectives of repaired and reconstructed houses in future events

10.00 Review of available remediation techniques for each of the principal modes of distress in the different land damage zones

- *Summary of observations and recommendations from 30 Sept and 1 Oct by BRANZ and T&T*

11.00 Appropriate foundation systems for reconstructed (new) dwelling units in the different land damage zones

11.30 Other Issues

11.45 Next Steps

12.00 Summary of Action Points and Closure

9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 11:59 a.m.
To: 9(2)(a)
Subject: FWD: FW: Tenders for Quake Repair Project Office
Attachments: FW: Tenders for Quake Repair Project Office

9(2)(a)

From: 9(2)(a)
Sent: Friday, 1 October 2010 11:32 a.m.
To: Hugh Cowan
Cc: 9(2)(a)@med.govt.nz
Subject: FW: Tenders for Quake Repair Project Office

From: 9(2)(a)
Sent: Friday, October 01, 2010 11:07 AM
To: 9(2)(a)
Subject: Tenders for Quake Repair Project Office

Hi 9(2)(a)

Thanks for your time earlier today in relation to the above. I would very much appreciate if you can advise how the list of prospective suppliers was prepared as I was disappointed that 9(2)(i) were not on the list, despite the very strong project management capability and track record in NZ and offshore.

Best regards,

9(2)(a)

9(2)(a)

Auckland, New Zealand.

9(2)(a)

9(2)(a)

 Please consider the environment before printing this e-mail

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9(2)(a)

From: Hugh Cowan 9(2)(a)
Sent: Friday, 1 October 2010 11:03 a.m.
To: 9(2)(a)
Cc: Hugh Cowan; Ian Simpson; 9(2)(a)
Subject: Re: URGENT - RFP QUESTIONS
Attachments: BECA_QUERIES.XLS

9(2)(a)

My comments included. I also checked these with 9(2)(a) Please call if me if not clear.

regards
Hugh

On Fri, Oct 1, 2010 at 9:56 AM, 9(2)(a) @med.govt.nz> wrote:
Hi,

See attached highlighted in red, outstanding questions.

We gave (on a best endeavours basis) that we would answer those by noon today.

The questions are EQC oriented on your processes etc, so I don't really know the answer to many of them. Using common sense I have put in a draft answer where I can.

Can you get back to me soon as, preferably by 11.30am today?

Thanks

9(2)(a)

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EARTHQUAKE COMMISSION - RFP - REINSTATEMENT PROJECT MANAGEMENT

QUESTIONS LOG - RFP (SEE NEXT TAB FOR RFP CLARIFICATIONS)

9(2)(i)



9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 8:11 a.m.
To: 9(2)(a); Ian Simpson
Cc: @chapmantripp.com
Subject: RE: Managing Conflicts of Interest

Ian, 9(2)(a) sorry to say I am not well enough to come in today. But I am willing to join meetings by phone and monitor email. 9(2)(a) feel free to call anytime. Hugh

--- original message ---

From: 9(2)(a)@med.govt.nz
Subject: Managing Conflicts of Interest
Date: 30th September 2010
Time: 9:06:59 pm

As discussed yesterday we need to mobilise the evaluation panel to meet from Tuesday.

To assist, following our discussion yesterday, see MED Quick Guide to managing conflicts of interest

[http://www.med.govt.nz/upload/73186/Quick Guide - Conflicts of Interest 24 JUNE 2010 FINISHED \(2\).pdf](http://www.med.govt.nz/upload/73186/Quick%20Guide%20-%20Conflicts%20of%20Interest%2024%20JUNE%202010%20FINISHED%20(2).pdf) <[http://www.med.govt.nz/upload/73186/Quick Guide - Conflicts of Interest 24 JUNE 2010 FINISHED \(2\).pdf](http://www.med.govt.nz/upload/73186/Quick Guide - Conflicts of Interest 24 JUNE 2010 FINISHED (2).pdf)>

Note MED has published a whole series of guides/tools/templates/routine condition of contracts to support agencies procurement practices.

These may be useful for EQC given the amount of ad-hoc procurement your having to deal with.

Regards

9(2)(a)

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9(2)(a)

From: Hugh Cowan
Sent: Friday, 1 October 2010 10:23 p.m.
To: 9(2)(a)
Subject: RE: FW: EQC - RFP - Update Questions & Answers

Sure 9(2)(a) is this an Australian firm with no local presence? One would have thought they could arrange for local delivery of a document without being disadvantaged by early compilation. Perhaps I am missing something here. Thanks for the heads up. Hugh

--- original message ---

From: 9(2)(a)@med.govt.nz
Subject: FW: EQC - RFP - Update Questions & Answers
Date: 1st October 2010
Time: 10:06:08 pm

FYI - I am at MED first thing on Monday morning. May I suggest that the two of you agree a position on this and advise 9(2)(a) soon as on Monday morning.

Regards

9(2)(a)

From: 9(2)(a)
Sent: Friday, 1 October 2010 9:59 p.m.
To: 9(2)(a)
Subject: Re: EQC - RFP - Update Questions & Answers

Thanks 9(2)(a) question was on the back of the phone conference this week I recall an acceptance of PDF submissions due to short time frame. Also our location is an issue for us to deliver hardcopy by Monday. Appreciate your position thanks for your reply.

9(2)(a)

From: 9(2)(a)@med.govt.nz
To: 9(2)(a)
Cc: 9(2)(a)@chapmantripp.com; Hugh Cowan <hacowan@eqc.govt.nz>
Sent: Fri Oct 01 18:53:12 2010
Subject: FW: EQC - RFP - Update Questions & Answers

9(2)(a)

Regarding your questions. See RFP clarifications 2 and 3 attached.

You will note the requirement to deliver original copies the same day. I will discuss this with Hugh and 9(2)(a) but you will appreciate this

question arrived after the closing time and relates to a question we have clarified before.

Regards

9(2)(a)

On behalf of EQC

From: 9(2)(a)
Sent: Friday, 1 October 2010 5:20 p.m.
To: 9(2)(a)
Subject: Re: EQC - RFP - Update Questions & Answers

Hi 9(2)(a)
Confirming we will submit conforming RFP with an additional alternate repair model. Can you confirm if the deadline is 12pm as well as acceptance of PDF format. We are unable to deliver hardcopies.

Regards

9(2)(a)

From: 9(2)(a)
Sent: Friday, 1 October 2010 11:34 a.m.
To: 9(2)(a)

9(2)(a)

Cc: 9(2)(a)@chapmantripp.com; Hugh Cowan
Subject: EQC - RFP - Update Questions & Answers
Importance: High

Please see attached updated questions and answers log.

I would be grateful if you could advise me if it your intention to submit an RFP by the due date. Just so we plan resources here.

Regards

9(2)(a)

On behalf of EQC

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9(2)(a)

From: Hugh Cowan
Sent: Saturday, 2 October 2010 4:23 p.m.
To: 9(2)(a)
Subject: RE: EPB Guideline Document - Progress Report
Attachments: Foreword by New Zealand Earthquake Commission_v2.doc

9(2)(a)

Many thanks for all your hard work on this document. I have attached a revised version of the "EQC forward" with a few suggestions – it looks radically altered only because I switched the ordering of a couple of paras. The key snippet I wanted to add was a reference to our research facilitation and education mandate, without which readers might not understand our involvement – we must be vigilant in our defence of EQC's unique mandate which in this area extends (rightly!) well beyond the parameters of our insurance scheme and its entitlements....

Let me know if you agree with my suggestions or have other amendments. I will then get Ian's sign off and an electronic signature...

Cheers
Hugh

From: 9(2)(a) @dbh.govt.nz]

Sent: Friday, 1 October 2010 1:41 p.m.

To: 9(2)(a) Hugh Cowan; 9(2)(a)

9(2)(a)

Cc: 9(2)(a)
Subject: EPB Guideline Document - Progress Report

Dear Colleagues

Yes, the Darfield earthquake has affected things. But we must publish this document by the end of October at the latest.

Attached is the latest version, tidied up courtesy of 9(2)(a) a freelance Word expert.

Things to notice:

1. The EQC Foreword is 100% my fault. It is up to EQC to decide on its inclusion and the wording. I think there should be one from EQC
2. We are waiting for material from 9(2)(a) (I have written her section but she has not reviewed it yet.)
3. The Presentation slides (Section 6.3) will be printed from electronic pdf files (or sent as separate files for electronic purposes) A sample is attached.

It is shaping up well and almost there. 9(2)(a) if there is anything we can do to help please let me know. We need your material.

Please let me have any comments / suggestions for the next version.

Kind regards

9(2)(a)

Department of Building and Housing
Te Tari Kaupapa Whare

9(2)(a)

Level 6, 86 Customhouse Quay
PO Box 10 729, Wellington, New Zealand
Web: <http://www.dbh.govt.nz>

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Foreword by New Zealand Earthquake Commission (EQC)

The ~~Darfield~~ 4 September, 2010 Darfield earthquake that affected the Christchurch, Kaiapoi and Selwyn areas was an important reminder of the effects of earthquake on our buildings, infrastructure, businesses, personal lives, economies and communities. The 2004 Building Act has caused territorial authorities to develop policies on earthquake-prone buildings and encourages them to take action to reduce and remove the danger from the most vulnerable buildings. The aim is to reduce earthquake risk over time.

~~As territorial authorities come to review their earthquake-prone building policies, they should take full advantage of this guidance document. Moreover they should embody in their policies the clear lessons from the Gisborne and Darfield earthquakes. In particular there is a need to give a high priority to unreinforced masonry buildings and elements. Their threat to life and limb was all too evident in the Darfield earthquake.~~

The ~~Earthquake Commission~~ Earthquake Commission provides insurance on residential properties throughout New Zealand, and ~~this~~ which gives provides a financial cushion to the impact of earthquakes on those properties. Unfortunately it does not cover the business and community disruption that occurs when buildings are damaged in earthquakes. ~~The more action that can be taken to reduce the physical impacts of earthquakes, the less will be the impact on the communities affected.~~ EQC also fosters research and public education in relevant areas of natural hazards science and engineering, offering a connection between scientific progress and resilience within the community. The more action that can be taken to reduce the physical impacts of earthquakes, the less will be the impact on the communities affected.

~~As territorial authorities come to review their earthquake-prone building policies, we hope they will take full advantage of this guidance document and embody in their policies the clear lessons from the 2007 Gisborne and 2010 Darfield earthquakes. In particular there is a need to give a high priority to unreinforced masonry buildings and elements. Their threat to life and limb was all too evident in the Darfield earthquake.~~

The Earthquake Commission commends the Department of Building and Housing on this initiative, and Local Government New Zealand for its endorsement. We thank all those who have contributed to this guidance material and hope that it will prove beneficial, not ~~just~~ only to territorial authorities in reviewing their policies, but to their communities at that time in the future when a major earthquake strikes.

Ian Simpson
Chief Executive
New Zealand Earthquake Commission

Comment [Redacted] 9(2)(a) 9(2)(a)

9(2)(a)

From: Hugh Cowan
Sent: Saturday, 2 October 2010 1:50 p.m.
To: David Brundson
Subject: draft TOR for you
Attachments: Letter_Kestrel.doc

Dave,

Grateful if you would review attached and identify any gaps, thanks.

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI - 9(2)(a)

Ref:

2 October 2010

Dave Brunndon
Kestrel Group
PO Box 5050
Wellington

Dear Dave,

As previously discussed, there is a likely need for numbers of structural engineers to support EQC's lead geotechnical engineers, Tonkin & Taylor, and insurance loss adjusters as they assess the many significantly damaged residential buildings following the 4 September 2010 Canterbury earthquake.

EQC is seeking a better understanding of where these structural engineers will be sourced from, the adequacy and appropriateness of these resources and how they will be briefed. EQC is also wishing to understand how this process will dovetail with the structural engineers being engaged by private insurers for dealing with cases that exceed the EQC cap. An associated, but broader issue is how the wider scientific, geotechnical and structural engineering professions, with whom EQC has a long-standing relationship through research facilitation, can best be engaged to inform decision-making criteria and repair techniques for the reinstatement of damaged homes in areas of significant liquefaction and ground damage.

EQC wishes to commission pragmatic and focused advice to facilitate effective use of relevant knowledge and efficient use of expertise. We anticipate that the interactions and methods adopted and data gathered in the course of such work may assist not only EQC with its decision-making, but potentially that of other agencies including private insurers and local authorities involved in earthquake recovery in Canterbury.

Since early September, you have assisted me with preliminary efforts in support of these objectives and I would like to confirm your continued assistance to EQC. We see the duties associated with this work as:

- a) Assisting me with Terms of Reference.
- b) Assisting me with a strategy to accomplish the broad objectives outlined above, including selection of sector and discipline expertise; liaising with key groups and individuals, keeping me informed of progress and in particular any impediments being encountered.
- c) Reviewing and advising EQC on the outputs of formal technical discussions, workshops and ad-hoc interactions, ensuring that reports and recommendations are completed to meet agreed timelines and terms of reference.

- d) Reporting to the Executive Management Team and/or the Board of the Commission in support of your advice, if required.

I hope this letter provides you with a sufficiently clear idea of what is expected. We have already discussed elements of the scope of work, which take us from 15 September to the end of October.

Please let me know if you have any further queries. I would appreciate your confirmation that you can continue this work for EQC, and a proposal including indicative costs for your involvement.

Yours sincerely

Hugh Cowan
Research Manager

9(2)(a)

From: Hugh Cowan
Sent: Saturday, 2 October 2010 3:39 p.m.
To: 9(2)(a)
Subject: Letter to format
Attachments: Letter_Kestrel.doc

Hi 9(2)(a)

Grateful if you would format the attached letter, print for my signature on Monday 4 Oct., then scan as PDF and send to 9(2)(a)

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI: 9(2)(a)

Ref:

2 October 2010

Dave Brunson
Kestrel Group
PO Box 5050
Wellington

Dear Dave,

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Yours sincerely

Hugh Cowan
Research Manager

9(2)(a)

From: Hugh Cowan
Sent: Saturday, 2 October 2010 12:44 p.m.
To: 9(2)(a)
Subject: FWD: RE: Greeting from Boston and some follow up questions on EQC liquefaction indemnity
Attachments: RE: Greeting from Boston and some follow up questions on EQC liquefaction indemnity

9(2)(a) can you provide insight here? Cheers Hugh

9(2)(a)

From: 9(2)(a)
Sent: Saturday, 2 October 2010 12:32 p.m.
To: Hugh Cowan
Subject: RE: Greeting from Boston and some follow up questions on EQC liquefaction indemnity

9(2)(a) may have some comment but all we have is market value

Sent from Telecom's XT mobile network.
Faster in more places.

Hugh Cowan wrote:

9(2)(a) – is there an authoritative source for property averages?

H.

From: 9(2)(a)
Sent: Saturday, 2 October 2010 10:17 a.m.
To: Hugh Cowan; 9(2)(a)
Subject: RE: Greeting from Boston and some follow up questions on EQC liquefaction indemnity

Hugh and 9(2)(a)

An quick question, I learnt from my trip about the average replacement cost of dwellings in Christchurch, one source said it is 280k and another said 350k. Which one do you think is closer to reality? Or you might have a different opinion?

Thanks 9(2)(a)

From: Hugh Cowan [<mailto:HACowan@eqc.govt.nz>]
Sent: Monday, September 27, 2010 8:19 PM
To: 9(2)(a)
Subject: RE: Greeting from Boston and some follow up questions on EQC liquefaction indemnity

Thanks **9(2)(a)** and hello again **9(2)(b)** will draft a reply to your questions in the next few days but will not promise a response before Friday due to commitments.

regards

Hugh Cowan

Research Manage

Marija Bakulich

From: Hugh Cowan
Sent: Saturday, 2 October 2010 11:26 a.m.
To: 9(2)(a)
Subject: FW: Greeting from Boston and some follow up questions on EQC liquefaction indemnity

9(2)(a) is there an authoritative source for property averages?

H.

From: 9(2)(a)
Sent: Saturday, 2 October 2010 10:17 a.m.
To: Hugh Cowan; 9(2)(a)
Subject: RE: Greeting from Boston and some follow up questions on EQC liquefaction indemnity

Hugh and 9(2)(a)

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Thanks 9(2)(a)

From: Hugh Cowan [mailto:HACowan@eqc.govt.nz]
Sent: Monday, September 27, 2010 8:19 PM
To: 9(2)(a)
Subject: RE: Greeting from Boston and some follow up questions on EQC liquefaction indemnity

Thanks 9(2)(a) and hello again 9(2)(a) I'll draft a reply to your questions in the next few days but will not promise a response before Friday due to commitments.

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI: 9(2)(a)

From: 9(2)(a)@tonkin.co.nz
Sent: Tuesday, 28 September 2010 12:44 p.m.
To: 9(2)(a)
Cc: Hugh Cowan
Subject: RE: Greeting from Boston and some follow up questions on EQC liquefaction indemnity

Hi again, and thank you for your interest.

I can answer your first question, but I'm unsure how the indemnity calculations work, so I have forwarded this email to Hugh Cowan at EQC who will have a better idea of where EQC is heading with these issues.

At present, our land damage categories are:

Significant	Significant liquefaction land damage (major lateral spreading)
Major	Major liquefaction land damage (major settlements and minor lateral spread)
Moderate	Moderate liquefaction land damage (moderate settlements)
Minor	Minor land damage (no surface evidence of liquefaction)
Structural	Structural shaking damage only (no obvious land damage)

Regards,

9(2)(a)

Geotechnical Engineer

Tonkin & Taylor Ltd.
151 Kilmore St, PO Box 13055, Christchurch 8141, New Zealand

9(2)(a)

Project: Chch EQ
T&T Ref: 51731.100

From: 9(2)(a)
Sent: Tuesday, 28 September 2010 11:56 a.m.
To: 9(2)(a)
Subject: Greeting from Boston and some follow up questions on EQC liquefaction indemnity

Hi, 9(2)(a)

This is 9(2)(a) the EERI reconnaissance member from Boston, whom you and your colleague had kindly met us to explain how EQC was processing liquefaction and lateral spreading related damage and indemnity.

First of all, I would like to express my appreciation again for your help out of your extremely busy schedule during our visit, and here is a photo showing the scene taken by my colleague.

Secondly, I am having several follow-up questions for clarification. It is highly appreciated if you can provide some comments so that I will have verified information for EERI Christchurch Quake reconnaissance report, and you will be acknowledged as a resource.

Here are my questions,

1. EQC had classified FIVE liquefaction and lateral spreading damage state according to its impact on dwelling damage, that I only recorded THREE, which are a) large lateral spreading, b) heavy liquefaction induced settlement and c) moderate liquefaction induced settlement. Could you kindly let me know the official language of such FIVE damage states?
2. Has EQC decided the indemnity calculation for land damage? What are the average rural and urban dwelling land size? And what is the maximum indemnity for such an average land size?
3. How the indemnity is calculated given a liquefaction damage state and actual land size?
4. Is the indemnity calculated separately if a dwelling have both liquefaction and shaking damage? How?
5. In case a dwelling was damaged due to liquefaction, and the owner decides to demolish and rebuild it, what is the EQC indemnity?
6. In case a dwelling was damaged due to liquefaction, and the owner decides to demolish but without rebuilding it, what is the indemnity?

- 7. In case a dwelling was damaged due to liquefaction, and the owner decides to abandon it (leave as it is) and relocate to an another dwelling, what is the indemnity?

Some of the questions are quick tricky and difficult to answer, but they are kind of practical and important for people to understand New Zealand insurance system and implication on future earthquake insurance policy. Sorry for the complexity, and thanks in advance. Please feel free to let me know if it needs any clarification.

Best regards

9(2)(a)

Research and Modeling
 131 Dartmouth St
 Boston, MA 02116

9(2)(a)

Tonkin & Taylor: <http://www.tonkin.co.nz>

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9(2)(a)

From: Hugh Cowan
Sent: Saturday, 2 October 2010 11:25 a.m.
To: 9(2)(a)
Subject: RE: EQC - RFP - Update Questions & Answers

I would also assume this does not need to be copied to others, and thanks 9(2)(a) for passing on the suggestion.

Regards
Hugh

From: 9(2)(a)@med.govt.nz]
Sent: Saturday, 2 October 2010 11:20 a.m.
To: 9(2)(a) Hugh Cowan
Subject: FW: EQC - RFP - Update Questions & Answers
Importance: High

I'm assuming this doesn't need to be copied to all the other bidders? as it relates to an earlier question, the answer hasn't changes in policy terms, we've just given him a helpful hint (thanks to 9(2)(a) and his lateral thinking).

If you think otherwise let me know and I'll copy the response to all bidders.

Regards

Chris

From: 9(2)(a)
Sent: Saturday, 2 October 2010 11:17 a.m.
To: 9(2)(a)
Cc: Hugh Cowan; 9(2)(a)
Subject: RE: EQC - RFP - Update Questions & Answers
Importance: High

Hi 9(2)(a)

I've checked with Hugh and 9(2)(a)

You need to submit your RFP by e-mail as per the clarification.

In terms of the original, may we suggest that you get someone local in Wellington to print for you and get it to us by end of Monday.

If you don't know anyone that can do this for you in Wellington, suggest you contact the office of the Australian High Commission in Wellington. I assume they would assist an Australian based company bidding for a large contract for the New Zealand Government.

see: www.australia.org.nz

They are on 72-76 Hobson Street, Thorndon, Wellington:

Tel: +64 4 473 6411 or Fax +64 4 498 7135

Hope that helps

Regards

9(2)(a)

On behalf of EQC

From: 9(2)(a)
Sent: Friday, 1 October 2010 9:59 p.m.
To: 9(2)(a)
Subject: Re: EQC - RFP - Update Questions & Answers

Thanks 9(2)(a) question was on the back of the phone conference this week I recall an acceptance of PDF submissions due to short time frame. Also our location is an issue for us to deliver hardcopy by Monday. Appreciate your position thanks for your reply.

9(2)(a)

From: 9(2)(a)@med.govt.nz>
To: 9(2)(a)
Cc: 9(2)(a)@chapmantripp.com>; Hugh Cowan <hacowan@eqc.govt.nz>
Sent: Fri Oct 01 18:53:12 2010
Subject: FW: EQC - RFP - Update Questions & Answers

9(2)(a)

Regarding your questions. See RFP clarifications 2 and 3 attached.

You will note the requirement to deliver original copies the same day. I will discuss this with Hugh and 9(2)(a) but you will appreciate this question arrived after the closing time and relates to a question we have clarified before.

Regards

9(2)(a)

On behalf of EQC

From: 9(2)(a)
Sent: Friday, 1 October 2010 5:20 p.m.
To: 9(2)(a)
Subject: Re: EQC - RFP - Update Questions & Answers

H 9(2)(a)
Confirming we will submit conforming RFP with an additional alternate repair model. Can you confirm if the deadline is 12pm as well as acceptance of PDF format. We are unable to deliver hardcopies.

Regards

9(2)(a)

From: 9(2)(a)
Sent: Friday, 1 October 2010 11:34 a.m.
To: 9(2)(a)
9(2)(a)

Cc: 9(2)(a)@chapmantripp.com; Hugh Cowan
Subject: EQC - RFP - Update Questions & Answers
Importance: High

Please see attached updated questions and answers log.

I would be grateful if you could advise me if it your intention to submit an RFP by the due date. Just so we plan resources here.

Regards

9(2)(a)

On behalf of EQC

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9(2)(a)

From: Hugh Cowan
Sent: Saturday, 2 October 2010 9:18 a.m.
To: 9(2)(a)
Cc: Hugh Cowan
Subject: RE: Late Question - Request from 9(2)(i) to only send e-mail version

9(2)(a) would you like to make the helpful suggestion now? Otherwise I can do so on Mon am. I agree we should do no more. Lack of lateral thinking me thinks. ...hugh

--- original message ---

From: 9(2)(a)@chapmantripp.com>
Subject: RE: Late Question - Request from 9(2)(i) to only send e-mail version
Date: 2nd October 2010
Time: 8:35:39 am

No, but we could helpfully suggest that they send the email to someone in Wgn who can print it. It shouldn't be one of us but we can give some ideas if they don't. Perhaps even the Australian embassy trade division if they don't have someone with a presence here.

9(2)(a)

From: 9(2)(a)@med.govt.nz]
Sent: Friday, October 01, 2010 9:42 PM
To: 9(2)(a)
Cc: Hugh Cowan; Hugh Cowan
Subject: Late Question - Request from 9(2)(i) to only send e-mail version

See below.

In the RFP clarifications, we had said that we would accept e-mail versions providing the original follows on the same day.

Do you think we can change this so late in the piece or not?

Regards

9(2)(a)

From: 9(2)(a)
Sent: Friday, 1 October 2010 5:20 p.m.
To: 9(2)(a)
Subject: Re: EQC - RFP - Update Questions & Answers

H 9(2)(a)

Confirming we will submit conforming RFP with an additional alternate repair model. Can you confirm if the deadline is 12pm as well as acceptance of PDF format. We are unable to deliver hardcopies.

Regards

9(2)(a)

From: 9(2)(a)@med.govt.nz>

To: 9(2)(a)

9(2)(a)

Cc: 9(2)(a)@chapmantripp.com 9(2)(a)@chapmantripp.com; Hugh Cowan <hacowan@eqc.govt.nz>

Sent: Fri Oct 01 08:34:24 2010

Subject: EQC - RFP - Update Questions & Answers

Please see attached updated questions and answers log.

I would be grateful if you could advise me if it your intention to submit an RFP by the due date. Just so we plan resources here.

Regards

9(2)(a)

On behalf of EQC

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9(2)(a)

From: Hugh Cowan
Sent: Sunday, 3 October 2010 7:56 p.m.
To: David Brunsdon
Subject: RE: FW: EQC Workshop 8.30am Tuesday 5th October

Dave, if you could get 9(2)(a) along I think that would be a coup and advance our interests in general. I would hesitate before endorsing others. Why dont you try Plan A and revert if that doesnt fly?

--- original message ---

From: "Dave Brunsdon" <db@kestrel.co.nz>
Subject: FW: EQC Workshop 8.30am Tuesday 5th October
Date: 3rd October 2010
Time: 7:28:17 pm

Hi Hugh

Here is positive response from person who I've invited to Tues workshop at 9(2)(a) recommendation, but haven't yet met.

His suggestion about a person from the wider insurance industry is interesting, as per our conversation yesterday. I don't know if 9(2)(a) is in town, or how helpful 9(2)(a) would be.

My instinct is to keep it as an EQC show, unless I could get 9(2)(a) there on his own. Your thoughts?

Thanks
Dave

From: 9(2)(a)
Sent: Sunday, 3 October 2010 18:11
To: Dave Brunsdon, 9(2)(a)
Subject: Re: EQC Workshop 8.30am Tuesday 5th October

Dear Dave

Thank you for the invitation to Tuesday's meeting which I will be pleased to attend.

I note your comments below with regard to sensitivity and understand that, however, I do think it is important that guidance is given to all professionals on what to say. As time passes, it seems natural that public/client anxiety increases as people seek answers on their property investments.

Even if the guidance is to continue saying "I do not know" it would be prudent to reinforce this to all those who are involved in dealing with situations.

Thank you for the offer of inviting 9(2)(a) to the CSG Meeting on Wednesday and for your intended attendance. That will be valuable.

In response to several requests from CSG members, we have been endeavouring to get a representative from the wider insurance industry to attend and update us...what is your advice on this? Nothing is arranged yet so if you recommend that we don't proceed with an insurance rep, that is fine

I look forward to seeing you on Tuesday and will accept any guidance you can provide to structural engineers, geotechnical engineers and architects, all of whom will be present on Wednesday evening

Regards

9(2)(a)

From: Dave Brunson <db@kestrel.co.nz>

Organization: Kestrel Group Limited

Date: Fri, 1 Oct 2010 12:49:48 +1300

To: 9(2)(a)

Subject: FW: EQC Workshop 8.30am Tuesday 5th October

9(2)(a)

Notwithstanding my comment below, I am comfortable with you briefing 9(2)(a) 9(2)(a) that the workshop is being held.

9(2)(a)

I'm sorry I haven't managed to connect with you before issuing this agenda - it sounds like you are working in the outer reaches of the region! I hope you can attend, and would like to have a chat with you when it suits you.

I'd also like to have a chat with you about the CSG meeting that I understand is scheduled for next Weds. There is some sensitivity as to what is discussed with respect to house reconstruction matters. I heard from 9(2)(a) 9(2)(a) what he is intending to cover, and indicated to him that some of the detail might be getting a little ahead of the wider political game at present. But I agree that structural engineers in ChCh do need a good briefing on the situation, and I have suggested to 9(2)(a) 9(2)(a) that he may wish to talk at the meeting. Would this be of value? I am also aiming to attend, as possibly 9(2)(a) 9(2)(a) from DBH also.

Cheers

Dave

From: Dave Brunsdon [mailto:db@kestrel.co.nz]

Sent: Friday, 1 October 2010 12:39

9(2)(a)

Cc: Hugh Cowan (hacowan@eqc.govt.nz); 9(2)(a)

9(2)(a)

Subject: EQC Workshop 8.30am Tuesday 5th October

Thank you for being willing to attend next Tuesday's workshop at EQC's Operations Base in Christchurch.

The details for the workshop are provided in the attached agenda, along with the context and objectives of the workshop.

Can I request that this notification and the agenda NOT be forwarded or shared with others. As you will appreciate, this engineering discussion is just one part of a wider and rapidly moving process that has a number of sensitivities associated with it, and therefore requires careful management. You have been specifically nominated to attend this workshop for your technical knowledge and contribution into a small working group, as well as any sectors or organisations that you represent. We will discuss communications issues and strategies at the workshop.

Please contact me if you have any questions ahead of Tuesday.

Kind regards

Dave

--

Dave Brunsdon - Director

db@kestrel.co.nz - 9(2)(a)

Wellington Office - P 04 499 4433 - F 04 499 4445

Kestrel Group - Risk, Continuity and Emergency Management -

www.kestrel.co.nz <<http://www.kestrel.co.nz/>> <<http://www.kestrel.co.nz/>>

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 11:26 p.m.
To: 9(2)(a)
Subject: RE: EPB Guideline Document - Progress Report

Ha 9(2)(a) enigmatic as usual. Glad to have been of modest assistance. We'll get back to you ;)

--- original message ---

From: 9(2)(a)
Subject: RE: EPB Guideline Document - Progress Report
Date: 4th October 2010
Time: 10:05:27 pm

Hugh

I was going to say it needed no change - and it doesn't! But true to form, I thought that the adjustments below put things in slightly better order.
Insurance not enough therefore support mitigation.

Foreword by New Zealand Earthquake Commission (EQC)

The 4 September, 2010 Darfield earthquake that affected the Christchurch, Kaiapoi and Selwyn areas was an important reminder of the effects of earthquake on our buildings, infrastructure, businesses, personal lives, economies and communities. The 2004 Building Act has caused territorial authorities to develop policies on earthquake-prone buildings and encourages them to take action to reduce and remove the danger from the most vulnerable buildings. The aim is to reduce earthquake risk over time.

In addition to providing residential property insurance, the Earthquake Commission (EQC) fosters research and public education in relevant areas of natural hazards science and engineering, offering a connection between scientific progress and resilience within the community.

The insurance on residential properties offered by EQC throughout New Zealand, provides a financial cushion to the impact of earthquakes on those properties. Unfortunately it does not cover the business and community disruption that occurs when buildings are damaged in earthquakes. Thus, the more action that can be taken to reduce the physical impacts of earthquakes, the less will be the impact on the communities affected.

As territorial authorities come to review their earthquake-prone building policies, we hope they will take full advantage of this guidance document and embody in their policies the clear lessons from the 2007 Gisborne and 2010 Darfield earthquakes. In particular there is a need to give a high priority to unreinforced masonry buildings and elements. Their threat to life and limb was all too evident in the Darfield earthquake.

The Earthquake Commission commends the Department of Building and Housing on this initiative and Local Government New Zealand for its endorsement. We thank all those who have contributed to this guidance material and hope that it will prove beneficial, not only to territorial authorities in reviewing their policies, but to their communities at that time in the future when a major earthquake strikes.

I think there is a week or two before we need sign-off, so if Ian has comments changes that will be fine. It is your foreword after all!

Regards

9(2)(a)

From: Hugh Cowan [mailto:HACowan@eqc.govt.nz]
Sent: Monday, 4 October 2010 4:06 p.m.
To: 9(2)(a)
Subject: FW: EPB Guideline Document - Progress Report

9(2)(a)

As discussed.

H.

From: Hugh Cowan
Sent: Saturday, 2 October 2010 4:23 p.m.
To: 9(2)(a)
Subject: RE: EPB Guideline Document - Progress Report

9(2)(a)

Many thanks for all your hard work on this document. I have attached a revised version of the "EQC forward" with a few suggestions - it looks radically altered only because I switched the ordering of a couple of paras. The key snippet I wanted to add was a reference to our research facilitation and education mandate, without which readers might not understand our involvement - we must be vigilant in our defence of EQC's unique mandate which in this area extends (rightly!) well beyond the parameters of our insurance scheme and its entitlements....

Let me know if you agree with my suggestions or have other amendments. I will then get Ian's sign off and an electronic signature...

Cheers

Hugh

From: 9(2)(a) [redacted]@dbh.govt.nz]

Sent: Friday, 1 October 2010 1:41 p.m.

To: 9(2)(a) [redacted] Hugh Cowan 9(2)(a) [redacted]

9(2)(a) [redacted]

Cc: 9(2)(a) [redacted]

Subject: EPB Guideline Document - Progress Report

Dear Colleagues

Yes, the Darfield earthquake has affected things. But we must publish this document by the end of October at the latest.

Attached is the latest version, tidied up courtesy of 9(2)(a) [redacted], a freelance Word expert.

Things to notice:

1. The EQC Foreword is 100% my fault. It is up to EQC to decide on its inclusion and the wording. I think there should be one from EQC
2. We are waiting for material from 9(2)(a) [redacted] 9(2)(a) [redacted] (I have written her section but she has not reviewed it yet.)
3. The Presentation slides (Section 6.3) will be printed from electronic pdf files (or sent as separate files for electronic purposes) A sample is attached.

It is shaping up well and almost there. 9(2)(a) [redacted] if there is anything we can do to help please let me know. We need your material.

Please let me have any comments / suggestions for the next version.

Kind regards

9(2)(a)

Department of Building and Housing

Te Tari Kaupapa Whare

DDI: 9(2)(a)

Mob

Fax:

Level 6, 86 Customhouse Quay

PO Box 10 729, Wellington, New Zealand

Web: <http://www.dbh.govt.nz> <<http://www.dbh.govt.nz/>>

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9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 10:26 p.m.
To: 9(2)(a)
Subject: FWD: RE: CCC infrastructure Recovery Works
Attachments: RE: CCC infrastructure Recovery Works

9(2)(a) just occurs that this is relevant to you too. Have not checked long lists embedded so not sure if you already have it. Hugh

9(2)(a)

From: 9(2)(a)
Sent: Monday, 4 October 2010 7:08 p.m.
To: Hugh Cowan
Subject: RE: CCC infrastructure Recovery Works

You have just answered my question.

I will follow up as soon as possible.

9(2)(a)

NZ Earthquake Commission
Phone 9(2)(a)
Email: 9(2)(a)

-----Original Message-----

From: Hugh Cowan [mailto:HACowan@eqc.govt.nz]
Sent: Monday, 4 October 2010 5:39 p.m.
To: 9(2)(a)
Subject: FW: CCC infrastructure Recovery Works

9(2)(a)

I concur with Ian - the first thing is to find out more and let (me) know. Your role is key...

Cheers
Hugh

-----Original Message-----

From: Ian Simpson
Sent: Monday, 4 October 2010 3:09 p.m.
To: Hugh Cowan
Subject: FW: CCC infrastructure Recovery Works

I suggest this is a job for 9(2)(a)

-----Original Message-----

From: 9(2)(a) [mailto:9(2)(a)@tonkin.co.nz]
Sent: Monday, 4 October 2010 2:51 p.m.
To: 9(2)(a); Ian Simpson; 9(2)(a)
Subject: FW: CCC infrastructure Recovery Works

How does this sit with the EQC RFP?

-----Original Message-----

From: 9(2)(a) [mailto:9(2)(a)@ccc.govt.nz]
Sent: Thursday, 30 September 2010 11:43 a.m.
To: 9(2)(a)
9(2)(a)

9(2)(a)

Cc: 9(2)(a)

Subject: CCC infrastructure Recovery Works

Dear all

Re: CCC Infrastructure Recovery Works

Firstly, please let me take this opportunity to thank you for your support and offers of support to Christchurch City over the last few weeks.

This email is to advise you of the process and procurement strategy that that Christchurch City Council (Council) is considering moving forward with, in relation to the infrastructure recovery works following the earthquake of September 4, 2010.

This email is a follow on from previous meetings and communications that have been held with Council staff over the past three weeks.

Council is currently developing a procurement strategy that meets the following objectives:

1. Contractors are in the community in the shortest possible timeframe.
The aim is to provide confidence to the community that Christchurch will be fixed in as short a period of time as possible.
2. Enough resource is procured to ensure that works are completed in the shortest possible time frames.
3. The local contracting market is utilised to its maximum extent.
4. Work and resources are coordinated with other local authorities to ensure conflict of priorities does not arise across the wider region.

Council is looking to agree this strategy as soon as possible, subject to discussions with our Insurers, NZTA and Elected Members. It is anticipated that these clearances will be received promptly.

At present Council is considering two different approaches that will run in parallel to reinstate the City's infrastructure.

The first is a zone based approach for areas that have suffered significant damage to all asset types. This will require the development of collaborative teams and it is envisaged that they will be lead by a Head Contractor responsible for all design, project management and construction for that area. It should be noted that Council expects to play a significant role in the development of the collaborative teams to ensure fair and equitable allocation of work across the market.

The second approach is a more linear model, where Council will undertake design and package work as considered appropriate for construction by agreed contractors. These works will separate from and outside the collaborative teams discussed in the first model. It is expected that all facilities/building work will follow this second model.

9(2)(1)

We are working with these companies to refine the zone based delivery model.
We will provide you with further information as we have it.

Should you have any queries, please email them to [9\(2\)\(a\).@ccc.govt.nz](mailto:9(2)(a).@ccc.govt.nz).

9(2)(a)

Capital Programme Group

DDI 9(2)(a)
Fax
Mobile
Web www.ccc.govt.nz <<http://www.ccc.govt.nz/>>

Christchurch City Council
DMC House, 518 Colombo St, Christchurch, 8013 PO Box 237, Christchurch, 8140

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Christchurch City Council
<http://www.ccc.govt.nz>

Tonkin & Taylor: <http://www.tonkin.co.nz>

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9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 6:49 p.m.
To: Ian Simpson; Michael Wintringham
Subject: Tonkin and Taylor reporting

Ian 9(2)(a)

I will be involved in the tender evaluations tomorrow so here's a note on my impressions of the peer review of T&Ts original work:

Much as expected the review confirms that the fundamentals of the T&T analysis of damage are soundly based, as are those behind the technical scoping of remediation options.

Refinements to cost estimates are suggested indicating a need to probe T&T further on these assumptions.

Similarly, there is a need for more systematic (i.e. suburb by suburb) questioning about timeframes (and therefore social and financial costs) associated with the implementation of different options

It is suggested that more analysis is required of the comparison of GeoNet-recorded ground motions with design spectra for standards. I would agree, but this is really broader work that must advance the science and methodology for modelling liquefaction. Peak ground acceleration (PGA) alone is not a reliable predictor of damage, but is used widely by engineers as a proxy for understanding or estimating seismic demand. A more sophisticated approach is warranted and the first-class GeoNet data set together with other information offer ample opportunity to raise the bar. We have initiated moves to encourage focused work on this topic through the Natural Hazards Research Platform. Meanwhile, T&T with their access to GNS Science expertise, will be adequately supported for all subsequent work required.

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI 9(2)(a)

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 6:20 p.m.
To: 9(2)(a)
Subject: Tonkin&Taylor reporting
Attachments: Peer Review Commentary on T&T's Preliminary Report to Earthquake Commission.pdf

9(2)(a)

As discussed.

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI 9(2)(a)

Peer Review Commentary on T&T's Preliminary Report to Earthquake Commission

Executive Summary

Methodologies and Processes:

On the whole, the Peer Review Team find that the work undertaken to date and Report and Briefing Paper generated by T&T provide a reasonable basis on which to consider forward actions for the domestic houses affected by liquefaction in the 4 September 2010 Darfield Earthquake.

The methodology of capturing the ground damage since the earthquake has been structured and is likely to provide consistent results. The damage categories are a useful guide to the varying levels of damage sustained in the earthquake at a qualitative level. These categories could be further refined with the use of survey data to allow quantitative measurement of ground deformation (we understand from T&T that this is now underway).

A number of damaged sections were viewed and were found to be adequately classified in accordance with the criteria. Therefore, the resulting damage maps are likely to be a fair representation of the damage sustained by the earthquake.

An important issue would be for T&T to report on the likely effects of the Darfield earthquake relative to the understood level of shaking implied in the structural design standard for residential houses (noting that current NZ Code's and Bylaws do not specifically define the standard of seismic resistance; this means that for options A to D would require future codification to quantify liquefaction effects).

Information currently available from GeoNet on ground shaking intensity suggests that the intensity of ground shaking in the areas of the eastern suburbs of Christchurch was significantly less than the domestic building design level. In the Kaiapoi area, records from a single location indicate that the ground shaking was more severe in this area and was probably at the design level adopted for buildings.

Treatment Options:

A number of treatment options have been presented by T&T. Each of the options has merit and if utilised in appropriate situations will likely lead to a higher resilience to liquefaction in future earthquakes. The documentation should be extended to include an assessment of the total number of houses affected in each area.

We note that many of the options (namely A to D) will likely have repercussions nationwide in terms of subdivision and redevelopment land design standards. These options will need much more detailed considerations before they could be applied.

It would be useful for T&T to compile a more concise summary table stating advantages and disadvantages with totalised cost estimates, including comments raised by the Peer Review team in terms of the nationwide effects to assist the EQC in deciding the acceptability of the various options for addressing the land and dwelling damage.

Cost Estimates:

The cost estimating approach used by T&T is based on their recent contract experience for the actual mitigation options and from direct discussion with contractors. This approach given the time constraints and uncertainties is considered appropriate.

Recommendations:

It is recommended that in moving forward that the following considerations are made:

- Option analysis moves from a generalised scenario to specific treatment of suburbs and that costs are developed on that basis.
- Realistic timeframes for full reconstruction of neighbourhoods are provided for consideration.
- Options for neighbourhoods reflect the known pre-earthquake condition of the soils and therefore the likely depth of liquefiable deposits in specific areas. When available, post earthquake investigations can then be used for further refinement of options and costs.

All of the mitigation options presented, except Option G, provide varying additional levels of resilience to the land against liquefaction and all provide an alternative solution to abandonment (Option A). In our opinion, the land is now in a no worse state than prior to the earthquake (a degree of compaction in the sandy soils is likely to have occurred). However, the surficial soil has been damaged and will require repair. Therefore, in all of the options presented the houses could be rebuilt on the affected land with a satisfactory level of assurance that the geotechnical risks faced by home owners are no greater than prior to the earthquake.

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Peer Review Panel

9(2)(ba)(i)

1 Review Background

1.1 Peer Review Scope

The Terms of Reference for this review are attached. For convenience, the key questions from the Terms of Reference are quoted at the start of subsequent sections within this peer review report.

1.2 Documents Reviewed

The following documents were provided by Tonkin & Taylor (T&T) and form part of this review:

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We note that the documents presented are focussed only on damage to residential land from liquefaction.

1.3 Briefing Provided by T&T

The Panel was escorted around a number of liquefaction damaged areas by 9(2)(a). The objective of the field visit was to illustrate the ground damage noted on the T&T maps with the actual field conditions of a number of properties (e.g. "black", "red" and "orange" zones). Selected portions of the following areas were viewed by the Panel:

- Dallington
- Avonside
- Bexley
- South Kaiapoi – Courtney Drive area
- North Kaiapoi

At the invitation of two house owners the damage to the interior of their houses was also viewed to obtain an appreciation of how the ground deformation affected the structural performance of the dwellings.

9(2)(ba)(i)

2 Review Objective 1: Damage Mapping

Assessment of the methodologies and processes employed by Tonkin and Taylor (T&T) in their assessments of the nature of the land damage following the Darfield Earthquake, and the damage state estimates arrived at, including local ground damage mapping activity and the criteria applied to damage categorizations.

2.1 Scope

T&T's effort to date has been focused on the worst affected areas of liquefaction ground damage in Christchurch and south-eastern Waimakariri District. With further work, other aspects of earthquake related ground damage should also be reported on, including: fault rupture damage; regional deformation; rockfall; ground cracking, densification, subsidence, landslip and alteration to the hydrological network. Notwithstanding this, it is prudent to continue with more detailed liquefaction and lateral spreading mapping as this has had the greatest damage to the residential properties.

2.2 Earthquake Classification

The reports provide a reasonable description of the earthquake and the resulting aftershocks. Nonetheless, there is a key aspect of the earthquake classification which requires greater emphasis that being the relationship of the Darfield Earthquake to the design code requirements. This has been raised by T&T as requiring additional work, but the Panel see it as a fundamental question which should be quantified before decisions on remedial options are made.

9(2)(a) [REDACTED] has commented "*For the inner city region the records which best represent are probably Christchurch Hospital, Botanic Gardens, and Cathedral College. These show the spectra are at some 70% of design value for structures with periods under 1.5 seconds but for that for periods of above 1 second the level rises to over 100% of design value especially in the approximate north south direction.*" (NZSEE clearing house, nzsee.org.nz).

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Mechanisms for the onset of liquefaction are complex and further investigations and analyses are required before firm conclusions can be made on whether more widespread liquefaction would have occurred in a higher level of shaking i.e. at the design level.

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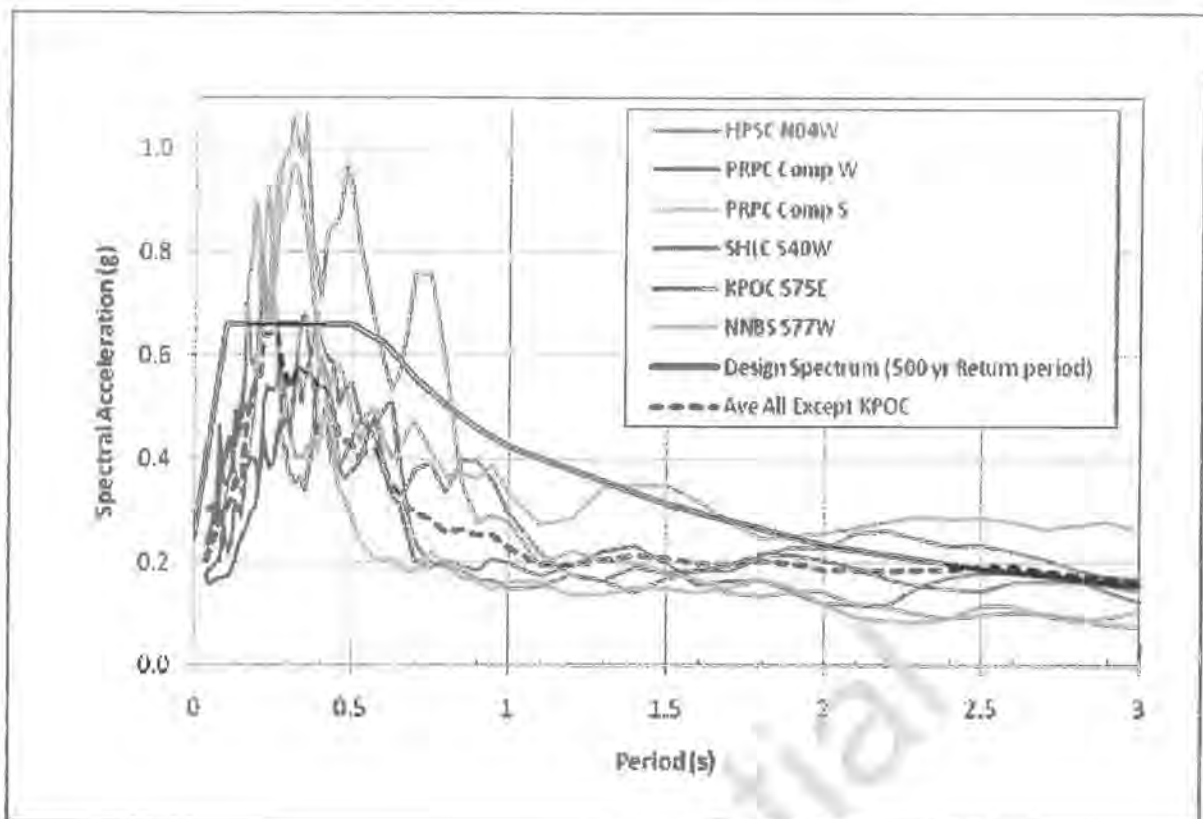


Figure 1: Comparison of response spectra from accelerograms recorded near some of the areas that liquefied in East Christchurch and Kaiapoi with the NZS 1170.5, 500 year return period design spectrum for Christchurch City. HPSC = Hulverstone Drive Pumping Station. PRPC = Pages Road Pumping Station. SHLC = Shirley Library. KPOC = Kaiapoi North School. NNBS = New Brighton School.

2.3 Relationship between Geology and Damage

Beca have produced liquefaction susceptibility maps and liquefaction ground damage maps for both Christchurch and the eastern side of the Waimakariri District for Environment Canterbury as a joint project with the respective councils prior to the Darfield Earthquake.

The extent of liquefaction and consequential ground damage experienced in the Darfield Earthquake was not unexpected. However, the specific locations of liquefaction did not always coincide with the predicted distribution of liquefiable soils. This in some part will relate to the characteristics of this particular earthquake, but will also relate to the details and quality of the ground information used in the prediction models. T&T correctly note *"That some of these areas did not liquefy in the recent earthquake does not mean that they are not at risk under future earthquake events. Every earthquake is different, as is the ground response."*

2.4 Damage Assessment Process

In general we find that the land damage assessment process to be reasonable given the restraints on resources and time. As stated by T&T it is important to remember that while there may not have been liquefaction evidence on particular lots, it is possible that liquefaction may have occurred beneath its dwelling. The categories used to describe the land damage (Black, Red, Orange, Green, Blue) are useful. However, some caution may need to be applied to their more subjective names (Significant, Major, Moderate, Minor, Structural). For more detailed work it would be useful to apply some quantitative measures against such categories, e.g. surveyed amount of lateral spreading, measurements of subsidence (where previous surveyed data is available), width and depth of fissures, volumes and/or depth of sand ejected etc. The New Zealand Geotechnical

Society "*Guideline for the identification, assessment and mitigation of liquefaction hazards*" should also be used in the classification of liquefaction features.

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3 Review Objective 2: Remedial Options

Review of the efficacy of the various treatment options presented, and their practicability given the nature of the ground damage observed, and the criterion that ground treatment options should seek to ensure that the probable risk of damage following remediation will be no more than that prior to the damage event.

Relating to the latter part of this brief, the probable risk of damage will be no more than that prior to the earthquake event. It is possible that the land will be in a more stable state due to minor densification compared to the pre-earthquake condition. One exception to this is the existence of fissures induced by lateral spreading and the lower elevation land due to subsidence.

In general terms, the options proposed by T&T are practical. One of the important considerations in evaluating the options is the time to effect the option. Options that require deep treatment of the soil will likely take many months to complete (in particular Option B). More equipment would need to be sourced from overseas and would take time to mobilize. Given the residential nature of the environment, a construction programme would be restricted to an 8-10 hour weekday rather than 24 hour / seven day operation that would provide more economic performance. These aspects should be discussed in more detail in the options report.

Another consideration is the environmental impact such as dust, noise and vibration, which will need to be considered for each option.

3.1 Option A (complete abandonment)

- This option could have significant and far reaching ramifications for NZ nationwide. It would imply in New Zealand that future housing development would not be permitted where liquefaction may lead to ground deformations, no matter how infrequent the risk is. Significant areas of metropolitan New Zealand would be devalued as a consequence of adopting this option.
- This option has significant ramifications on the residents affected and in the past it has been demonstrated that relocation of communities is difficult to achieve.

3.2 Option B (complete treatment)

- An implication of this option is that all land developed or land to be re-developed in the future which is assessed to be subject to liquefaction will need to be treated to resist liquefaction/lateral spreading in a suitable design level earthquake.
- The treatment would take many months to complete before rebuilding could commence.
- The option will likely require all the services to be reconstructed or re-laid (e.g. sewer, stormwater). During reconstruction, services connected to these would need to be disconnected for a time and this may affect Green zone housing.

3.3 Option C (perimeter treatment plus piling)

- Comments in terms of the implications this option would have nationwide in terms of new design standards for housing land. This would affect all new development and re-development or extensions on land susceptible to liquefaction.
- The zone of treatment has been assumed by T&T to be 10m deep. However, it will be variable and in some places will be much shallower, and could be deeper in some areas. The treatment width of 40m is likely to be conservative. Lesser widths have been used in design to limit lateral spreading movements. However, until detailed analysis is undertaken, it is prudent to use this T&T proposed width for cost estimation.

- The use of piles to support the houses will not negate the risk of future subsidence due to liquefaction that could still affect buried services. Significant damage may still occur to residential driveways, gardens and fences, and streets and services in another earthquake.
- The house foundations / pile caps would increase the cost of reconstructing the houses or constructing new houses.

3.4 Option D (perimeter treatment plus shallow treatment)

- Refer to comments in Section 3.3 above on the perimeter treatment.
- Similarly this option would have nationwide effects on new development and redevelopment albeit to a lesser degree.
- The partial depth treatment afforded in this option for the Orange zone will provide some benefit through the reduction in the depth of liquefiable deposits. However, it is unlikely to eliminate ground settlement, fissures and sand boils during subsequent liquefaction. The thicker raft of non-liquefiable soil created may result in fissures being more widely spread, but it is unlikely to prevent large deformations beneath dwellings.

3.5 Option E (perimeter treatment only)

- Refer to comments in Section 3.3 above on the perimeter treatment.
- This option has precedents with the recent Pegasus subdivision where the District Plan rules requires a serviceability limit of 250mm of lateral movement for 150 year return period earthquake.
- Our preference would be to change the term "waffle floor slab" and replace with structural floor system capable of withstanding differential settlement (such as a waffle floor system) in order that other structural alternatives are not discouraged.

3.6 Options F1, F2, F3 (partial abandonment plus various treatments)

- These are sub options of the other options already discussed above. Refer to Sections 3.1, 3.3 and 3.4.

3.7 Options G (no deep ground treatments)

- We agree with T&T's statement "*Option G is the most equitable as it returns the land back to the pre earthquake situation for everyone, it is the quickest solution with the least disruption and the least cost. However the most traumatised those in the black and red zones may not accept the status quo. Council, insurers and financial institutions may also not agree to consent and provide ongoing cover.*"
- However, this option will require further studies to assess what was the Darfield Earthquake shaking levels compared to an "understood" subdivision land design standard, i.e. was it above such a standard or below. If the intensity of recent shaking was significantly less than the design return period then the issues of insurance, mortgage lending, property value, professional liability and public perception of risk may become critical considerations which could weigh strongly against this option.
- This option would fall short of current best practise for new housing development. Where there is a significant risk of soil liquefaction and lateral spreading in a design level earthquake soil improvement work is now considered necessary by professional engineers advising developers. For example, ground improvement undertaken at the Pegasus Town development to limit lateral spreading.
- There would be difficulty in meeting building code requirements for house foundations. For example, the provisions for NZS 3604 (Timber Framed Buildings) apply only for building sites where the foundations are supported on "good ground". One of the several requirements for "good ground" is that the PIM and site observations show no indications or records of land slips

having occurred in the immediate vicinity. (Lateral spreading could be interpreted as a land slip). NZS 4229 (Concrete Masonry Buildings Not Requiring Specific Engineering Design) has a similar requirement for "good ground".

- There may not be specific cost associated with this option where the house requires rebuilding as the normal earthworks associated with the construction of the new dwellings are likely to include levelling the ground surface. However, if the section level needs to be raised for flood mitigation purposes then fill may be required to be imported to the site and the house rebuilt.

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4 Review Objective 3: Cost Estimate

Examine the cost estimating approach and construction plan/execution strategy adopted by Tonkin and Taylor as the basis for their cost estimates of the different remediation options, and report as to whether the approaches used are appropriate for the level of information presented, and estimated costing accuracy (nominally plus or minus 30 percent).

Our comments are based on the T&T report and their email dated 1/10/10. It needs to be emphasized that the T&T estimates are preliminary, based on conceptual options developed for a 'typical' scenario, and we would expect there to be variations as the options are developed in more detail on a suburb by suburb basis.

The cost estimating approach reflects the time constraints and uncertainties in defining the options and it appears to have been carried out in an appropriate way. The outturn cost estimates (unit rates x areas) are considered to be more realistic than the unit rates in isolation, especially if the treated areas were reduced.

4.1 Specific comments on the Options

- The maximum stone column rate (\$300/m²) could be higher, up to \$500/m² based on Beca experience elsewhere for smaller scale projects.
- Alternative treatments e.g. vibrocompaction or dynamic compaction, undertaken below a zone of excavation and replacement, may cost \$100/m² to \$200/m². Vibrocompaction will not be as effective in silty soils. Dynamic compaction may not be effective below approximately 5m depth. Therefore, these solutions may not be practical for all situations.
- The assumption that other ground improvement options (such as dynamic compaction, EQ drains, driven timber poles, or vibrocompaction) are approximately 1/3 to 2/3 the cost of stone columns may prove optimistic.
- Option G rates may be higher (\$10 – 15/m²) if there is a need to import fill to compensate for liquefaction induced settlement in ground level (refer also to Page 10 comments).
- Rates for piling (to support houses) could be higher, up to \$120/m² depending on various factors, including the pile design criteria such as lateral loads and negative skin friction.
- A rate of \$100/m² to \$140/m² is an appropriate cost for a new sub-division on the outskirts of Christchurch. Section sizes for modern subdivisions may be smaller than historical ones.
- The assumption that in the Orange zone one third of the properties would need to be demolished, one third would need extensive repair and one third would require only minor repair needs to be better established. We presume that at this stage it is a "ball-park" estimate.
- Further clarifications on the estimated costs is necessary e.g. whether the costs include investigation, design, preliminary & general contractor's items, construction monitoring, compliance, environmental mitigation, escalation etc.. Similarly it should be made clear whether consequential costs are allowed for, e.g. to construct the perimeter works will require the replacement of roads, sewers, services, etc. If considered appropriate this could be allowed for by adding a percentage on to the base costs.

5 Review Objective 5: Review Commentary

Provide an opinion on the criteria applied to the options analysis and whether other considerations should form part of future decision making.

Commentary has been provided in the preceding sections of this report on the criteria applied by T&T to date. In general we have found that procedures undertaken to date and the criteria applied to options to be adequate. We have provided some points of discussion that should be useful to T&T in moving forward with their investigations. Specific points to focus on include:

- Assess in detail the effect of the Darfield earthquake relative to the understood land design level (which is not specified in NZ Code's or local Bylaw's) which may be based on the structural level of 475 years return period.
- A summary would also be required on the total number of houses affected by liquefaction and lateral spreading for each zones.
- It would be helpful if all of the issues and impacts associated with each option were summarised in a single table to enable easier comparison; factored with the number of houses affected a total cost estimate should also be compiled. That the social consequences be more specifically defined for each of the options presented.
- That realistic timeframes are developed for remedial options (including land repair, house rebuilding, landscaping, services repair) such that the consequences can be better understood and perceptions of the community can be more effectively managed.
- Clarity on the definition of "land damage" under the Act. Once this has been clarified then the viable options are likely to be clearer. Liquefied soils, with the exception of deformations, fissures and boils at the ground surface, could be classified as not damaged and therefore deep remedial treatment not required, unless other manifestations of land damage become apparent.
- T&T should move to complete the local mapping of the ground damage as soon as practical, and before evidence is obliterated.
- A separate parallel task of measuring the ground deformation in quantitative terms should begin with the aim to marry the two data sets and provide a higher level of confidence to the decisions being made.
- More commentary is required on long linear communities such as Pines Beach, how these will be treated and what the costs will likely be. These may differ significantly from those such as Dallington where larger areas of the community can be enhanced using minimal edge treatments.

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9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 6:05 p.m.
To: 9(2)(a)
Subject: RE: EQC Report
Attachments: Peer Review Commentary on T&T's Preliminary Report to Earthquake Commission.pdf

9(2)(a)

Certainly. As attached.

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI 9(2)(a)

From: 9(2)(a) [mailto:9(2)(a)@tonkin.co.nz]
Sent: Monday, 4 October 2010 5:52 p.m.
To: Hugh Cowan
Subject: RE: EQC Report

No worries...can we please have a copy of the final review document?

From: Hugh Cowan [mailto:HACowan@eqc.govt.nz]
Sent: Monday, 4 October 2010 5:41 p.m.
To: 9(2)(a)
Subject: FW: EQC Report

9(2)(a)

On previous send, I used a dud address for you.

Regards
Hugh

From: Hugh Cowan
Sent: Monday, 4 October 2010 5:32 p.m.
To: 9(2)(a)
Cc: 9(2)(a)@tonkin.co.nz
Subject: RE: EQC Report

9(2)(a)

Indeed, thanks to 9(2)(a) and his team also. They are doing a fine job under immense pressure.

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI +9(2)(a)

From: 9(2)(a)
Sent: Monday, 4 October 2010 5:25 p.m.
To: Hugh Cowan
Subject: RE: EQC Report

Hugh,

Thank you for your feedback, and I do hope that you have found it useful. We must also acknowledge the efforts of T&T in allowing access and providing comments to us at short notice.

Regards

9(2)(a)

From: Hugh Cowan [mailto:HACowan@eqc.govt.nz]
Sent: Monday, 4 October 2010 5:17 p.m.
To: 9(2)(a)
Cc: 9(2)(a)
Subject: RE: EQC Report

Dear All,

Thank you for quick work under pressure. Much appreciated. I am happy to accept the report and I am sure it will usefully inform the work that lies ahead.

I also note the points raised about the comparison of recorded ground motions with design spectra and suggest that in general, there is a need to advance the science/methodology for modelling liquefaction. PGA alone is not a reliable predictor of damage (in the broadest sense) and this event should provide ample opportunity for new work to improve our understanding and methods. At some point EQC will no doubt sponsor workshop(s) on these and related topics and I hope some or all of you may participate.

Meanwhile, thanks again for your help with this important work.

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI +9(2)(a)

:9(2)(a)

Sent: Monday, 4 October 2010 3:00 p.m.

To: Hugh Cowan

Cc: 9(2)(a)

Subject: FW: EQC Report

Hi Hugh,

Please find attached the peer review report prepared by 9(2)(ba)(i) This report has been reviewed by T&T and their comments considered.

Regards

9(2)(a)

NOTICE: This email, if it relates to a specific contract, is sent on behalf of the 9(2)(ba)(i) which entered into the contract. Please contact the sender if you are unsure of the contracting 9(2)(ba)(i) or visit our web page 9(2)(ba)(i) for further information on the 9(2)(ba)(i). If this email relates to a specific contract, by responding you agree that, regardless of its terms, this email and the response by you will be a valid communication for the purposes of that contract, and may bind the parties accordingly.

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Peer Review Commentary on T&T's Preliminary Report to Earthquake Commission

Executive Summary

Methodologies and Processes:

On the whole, the Peer Review Team find that the work undertaken to date and Report and Briefing Paper generated by T&T provide a reasonable basis on which to consider forward actions for the domestic houses affected by liquefaction in the 4 September 2010 Darfield Earthquake.

The methodology of capturing the ground damage since the earthquake has been structured and is likely to provide consistent results. The damage categories are a useful guide to the varying levels of damage sustained in the earthquake at a qualitative level. These categories could be further refined with the use of survey data to allow quantitative measurement of ground deformation (we understand from T&T that this is now underway).

A number of damaged sections were viewed and were found to be adequately classified in accordance with the criteria. Therefore, the resulting damage maps are likely to be a fair representation of the damage sustained by the earthquake.

An important issue would be for T&T to report on the likely effects of the Darfield earthquake relative to the understood level of shaking implied in the structural design standard for residential houses (noting that current NZ Code's and Bylaws do not specifically define the standard of seismic resistance; this means that for options A to D would require future codification to quantify liquefaction effects).

Information currently available from GeoNet on ground shaking intensity suggests that the intensity of ground shaking in the areas of the eastern suburbs of Christchurch was significantly less than the domestic building design level. In the Kaiapoi area, records from a single location indicate that the ground shaking was more severe in this area and was probably at the design level adopted for buildings.

Treatment Options:

A number of treatment options have been presented by T&T. Each of the options has merit and if utilised in appropriate situations will likely lead to a higher resilience to liquefaction in future earthquakes. The documentation should be extended to include an assessment of the total number of houses affected in each area.

We note that many of the options (namely A to D) will likely have repercussions nationwide in terms of subdivision and redevelopment land design standards. These options will need much more detailed considerations before they could be applied.

It would be useful for T&T to compile a more concise summary table stating advantages and disadvantages with totalised cost estimates, including comments raised by the Peer Review team in terms of the nationwide effects to assist the EQC in deciding the acceptability of the various options for addressing the land and dwelling damage.

Cost Estimates:

The cost estimating approach used by T&T is based on their recent contract experience for the actual mitigation options and from direct discussion with contractors. This approach given the time constraints and uncertainties is considered appropriate.

Recommendations:

It is recommended that in moving forward that the following considerations are made:

- Option analysis moves from a generalised scenario to specific treatment of suburbs and that costs are developed on that basis.
- Realistic timeframes for full reconstruction of neighbourhoods are provided for consideration.
- Options for neighbourhoods reflect the known pre-earthquake condition of the soils and therefore the likely depth of liquefiable deposits in specific areas. When available, post earthquake investigations can then be used for further refinement of options and costs.

All of the mitigation options presented, except Option G, provide varying additional levels of resilience to the land against liquefaction and all provide an alternative solution to abandonment (Option A). In our opinion, the land is now in a no worse state than prior to the earthquake (a degree of compaction in the sandy soils is likely to have occurred). However, the surficial soil has been damaged and will require repair. Therefore, in all of the options presented the houses could be rebuilt on the affected land with a satisfactory level of assurance that the geotechnical risks faced by home owners are no greater than prior to the earthquake.

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9(2)(ba)(i)

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Mechanisms for the onset of liquefaction are complex and further investigations and analyses are required before firm conclusions can be made on whether more widespread liquefaction would have occurred in a higher level of shaking i.e. at the design level.

The report/paper provide a reasonable representation of the geological setting of the ground providing the background conditions where damage was recorded. As indicated by T&T the ground can vary significantly over short distances and often does. This accounts for the small pockets of liquefaction that have been observed across Christchurch City and the eastern side of Waimakariri District.

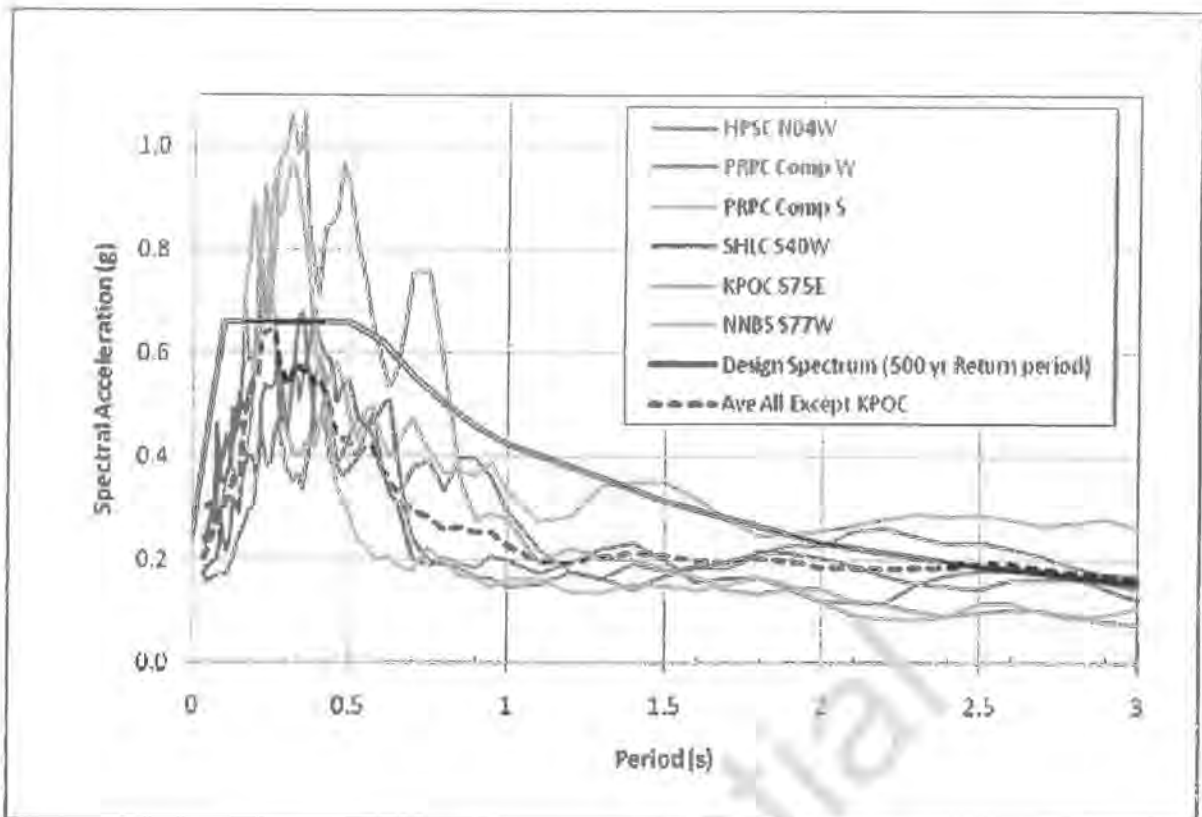


Figure 1: Comparison of response spectra from accelerograms recorded near some of the areas that liquefied in East Christchurch and Kaiapoi with the NZS 1170.5, 500 year return period design spectrum for Christchurch City. HPSC = Hulverstone Drive Pumping Station. PRPC = Pages Road Pumping Station. SHLC = Shirley Library. KPOC = Kaiapoi North School. NNBS = New Brighton School.

2.3 Relationship between Geology and Damage

Beca have produced liquefaction susceptibility maps and liquefaction ground damage maps for both Christchurch and the eastern side of the Waimakariri District for Environment Canterbury as a joint project with the respective councils prior to the Darfield Earthquake.

The extent of liquefaction and consequential ground damage experienced in the Darfield Earthquake was not unexpected. However, the specific locations of liquefaction did not always coincide with the predicted distribution of liquefiable soils. This in some part will relate to the characteristics of this particular earthquake, but will also relate to the details and quality of the ground information used in the prediction models. T&T correctly note *"That some of these areas did not liquefy in the recent earthquake does not mean that they are not at risk under future earthquake events. Every earthquake is different, as is the ground response."*

2.4 Damage Assessment Process

In general we find that the land damage assessment process to be reasonable given the restraints on resources and time. As stated by T&T it is important to remember that while there may not have been liquefaction evidence on particular lots, it is possible that liquefaction may have occurred beneath its dwelling. The categories used to describe the land damage (Black, Red, Orange, Green, Blue) are useful. However, some caution may need to be applied to their more subjective names (Significant, Major, Moderate, Minor, Structural). For more detailed work it would be useful to apply some quantitative measures against such categories, e.g. surveyed amount of lateral spreading, measurements of subsidence (where previous surveyed data is available), width and depth of fissures, volumes and/or depth of sand ejected etc. The New Zealand Geotechnical

Society "Guideline for the identification, assessment and mitigation of liquefaction hazards" should also be used in the classification of liquefaction features.

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3 Review Objective 2: Remedial Options

Review of the efficacy of the various treatment options presented, and their practicability given the nature of the ground damage observed, and the criterion that ground treatment options should seek to ensure that the probable risk of damage following remediation will be no more than that prior to the damage event.

Relating to the latter part of this brief, the probable risk of damage will be no more than that prior to the earthquake event. It is possible that the land will be in a more stable state due to minor densification compared to the pre-earthquake condition. One exception to this is the existence of fissures induced by lateral spreading and the lower elevation land due to subsidence.

In general terms, the options proposed by T&T are practical. One of the important considerations in evaluating the options is the time to effect the option. Options that require deep treatment of the soil will likely take many months to complete (in particular Option B). More equipment would need to be sourced from overseas and would take time to mobilize. Given the residential nature of the environment, a construction programme would be restricted to an 8-10 hour weekday rather than 24 hour / seven day operation that would provide more economic performance. These aspects should be discussed in more detail in the options report.

Another consideration is the environmental impact such as dust, noise and vibration, which will need to be considered for each option.

3.1 Option A (complete abandonment)

- This option could have significant and far reaching ramifications for NZ nationwide. It would imply in New Zealand that future housing development would not be permitted where liquefaction may lead to ground deformations, no matter how infrequent the risk is. Significant areas of metropolitan New Zealand would be devalued as a consequence of adopting this option.
- This option has significant ramifications on the residents affected and in the past it has been demonstrated that relocation of communities is difficult to achieve.

3.2 Option B (complete treatment)

- An implication of this option is that all land developed or land to be re-developed in the future which is assessed to be subject to liquefaction will need to be treated to resist liquefaction/lateral spreading in a suitable design level earthquake.
- The treatment would take many months to complete before rebuilding could commence.
- The option will likely require all the services to be reconstructed or re-laid (e.g. sewer, stormwater). During reconstruction, services connected to these would need to be disconnected for a time and this may affect Green zone housing.

3.3 Option C (perimeter treatment plus piling)

- Comments in terms of the implications this option would have nationwide in terms of new design standards for housing land. This would affect all new development and re-development or extensions on land susceptible to liquefaction.
- The zone of treatment has been assumed by T&T to be 10m deep. However, it will be variable and in some places will be much shallower, and could be deeper in some areas. The treatment width of 40m is likely to be conservative. Lesser widths have been used in design to limit lateral spreading movements. However, until detailed analysis is undertaken, it is prudent to use this T&T proposed width for cost estimation.

- The use of piles to support the houses will not negate the risk of future subsidence due to liquefaction that could still affect buried services. Significant damage may still occur to residential driveways, gardens and fences, and streets and services in another earthquake.
- The house foundations / pile caps would increase the cost of reconstructing the houses or constructing new houses.

3.4 Option D (perimeter treatment plus shallow treatment)

- Refer to comments in Section 3.3 above on the perimeter treatment.
- Similarly this option would have nationwide effects on new development and redevelopment albeit to a lesser degree.
- The partial depth treatment afforded in this option for the Orange zone will provide some benefit through the reduction in the depth of liquefiable deposits. However, it is unlikely to eliminate ground settlement, fissures and sand boils during subsequent liquefaction. The thicker raft of non-liquefiable soil created may result in fissures being more widely spread, but it is unlikely to prevent large deformations beneath dwellings.

3.5 Option E (perimeter treatment only)

- Refer to comments in Section 3.3 above on the perimeter treatment.
- This option has precedents with the recent Pegasus subdivision where the District Plan rules requires a serviceability limit of 250mm of lateral movement for 150 year return period earthquake.
- Our preference would be to change the term "waffle floor slab" and replace with structural floor system capable of withstanding differential settlement (such as a waffle floor system) in order that other structural alternatives are not discouraged.

3.6 Options F1, F2, F3 (partial abandonment plus various treatments)

- These are sub options of the other options already discussed above. Refer to Sections 3.1, 3.3 and 3.4.

3.7 Options G (no deep ground treatments)

- We agree with T&T's statement "*Option G is the most equitable as it returns the land back to the pre earthquake situation for everyone, it is the quickest solution with the least disruption and the least cost. However the most traumatised those in the black and red zones may not accept the status quo. Council, insurers and financial institutions may also not agree to consent and provide ongoing cover*".
- However, this option will require further studies to assess what was the Darfield Earthquake shaking levels compared to an "understood" subdivision land design standard, i.e. was it above such a standard or below. If the intensity of recent shaking was significantly less than the design return period then the issues of insurance, mortgage lending, property value, professional liability and public perception of risk may become critical considerations which could weigh strongly against this option.
- This option would fall short of current best practise for new housing development. Where there is a significant risk of soil liquefaction and lateral spreading in a design level earthquake soil improvement work is now considered necessary by professional engineers advising developers. For example, ground improvement undertaken at the Pegasus Town development to limit lateral spreading.
- There would be difficulty in meeting building code requirements for house foundations. For example, the provisions for NZS 3604 (Timber Framed Buildings) apply only for building sites where the foundations are supported on "good ground". One of the several requirements for "good ground" is that the PIM and site observations show no indications or records of land slips

having occurred in the immediate vicinity. (Lateral spreading could be interpreted as a land slip). NZS 4229 (Concrete Masonry Buildings Not Requiring Specific Engineering Design) has a similar requirement for "good ground".

- There may not be specific cost associated with this option where the house requires rebuilding as the normal earthworks associated with the construction of the new dwellings are likely to include levelling the ground surface. However, if the section level needs to be raised for flood mitigation purposes then fill may be required to be imported to the site and the house rebuilt.

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4 Review Objective 3: Cost Estimate

Examine the cost estimating approach and construction plan/execution strategy adopted by Tonkin and Taylor as the basis for their cost estimates of the different remediation options, and report as to whether the approaches used are appropriate for the level of information presented, and estimated costing accuracy (nominally plus or minus 30 percent).

Our comments are based on the T&T report and their email dated 1/10/10. It needs to be emphasized that the T&T estimates are preliminary, based on conceptual options developed for a 'typical' scenario, and we would expect there to be variations as the options are developed in more detail on a suburb by suburb basis.

The cost estimating approach reflects the time constraints and uncertainties in defining the options and it appears to have been carried out in an appropriate way. The outturn cost estimates (unit rates x areas) are considered to be more realistic than the unit rates in isolation, especially if the treated areas were reduced.

4.1 Specific comments on the Options

- The maximum stone column rate (\$300/m²) could be higher, up to \$500/m² based on Beca experience elsewhere for smaller scale projects.
- Alternative treatments e.g. vibrocompaction or dynamic compaction, undertaken below a zone of excavation and replacement, may cost \$100/m² to \$200/m². Vibrocompaction will not be as effective in silty soils. Dynamic compaction may not be effective below approximately 5m depth. Therefore, these solutions may not be practical for all situations.
- The assumption that other ground improvement options (such as dynamic compaction, EQ drains, driven timber poles, or vibrocompaction) are approximately 1/3 to 2/3 the cost of stone columns may prove optimistic.
- Option G rates may be higher (\$10 – 15/m²) if there is a need to import fill to compensate for liquefaction induced settlement in ground level (refer also to Page 10 comments).
- Rates for piling (to support houses) could be higher, up to \$120/m² depending on various factors, including the pile design criteria such as lateral loads and negative skin friction.
- A rate of \$100/m² to \$140/m² is an appropriate cost for a new sub-division on the outskirts of Christchurch. Section sizes for modern subdivisions may be smaller than historical ones.
- The assumption that in the Orange zone one third of the properties would need to be demolished, one third would need extensive repair and one third would require only minor repair needs to be better established. We presume that at this stage it is a "ball-park" estimate.
- Further clarifications on the estimated costs is necessary e.g. whether the costs include investigation, design, preliminary & general contractor's items, construction monitoring, compliance, environmental mitigation, escalation etc.. Similarly it should be made clear whether consequential costs are allowed for, e.g. to construct the perimeter works will require the replacement of roads, sewers, services, etc. If considered appropriate this could be allowed for by adding a percentage on to the base costs.

5 Review Objective 5: Review Commentary

Provide an opinion on the criteria applied to the options analysis and whether other considerations should form part of future decision making.

Commentary has been provided in the preceding sections of this report on the criteria applied by T&T to date. In general we have found that procedures undertaken to date and the criteria applied to options to be adequate. We have provided some points of discussion that should be useful to T&T in moving forward with their investigations. Specific points to focus on include:

- Assess in detail the effect of the Darfield earthquake relative to the understood land design level (which is not specified in NZ Code's or local Bylaw's) which may be based on the structural level of 475 years return period.
- A summary would also be requires on the total number of houses affected by liquefaction and lateral spreading for each zones.
- It would be helpful if all of the issues and impacts associated with each option were summarised in a single table to enable easier comparison; factored with the number of houses affected a total cost estimate should also be compiled. That the social consequences be more specifically defined for each of the options presented.
- That realistic timeframes are developed for remedial options (including land repair, house rebuilding, landscaping, services repair) such that the consequences can be better understood and perceptions of the community can be more effectively managed.
- Clarity on the definition of "land damage" under the Act. Once this has been clarified then the viable options are likely to be clearer. Liquefied soils, with the exception of deformations, fissures and boils at the ground surface, could be classified as not damaged and therefore deep remedial treatment not required, unless other manifestations of land damage become apparent.
- T&T should move to complete the local mapping of the ground damage as soon as practical, and before evidence is obliterated.
- A separate parallel task of measuring the ground deformation in quantitative terms should begin with the aim to marry the two data sets and provide a higher level of confidence to the decisions being made.
- More commentary is required on long linear communities such as Pines Beach, how these will be treated and what the costs will likely be. These may differ significantly from those such as Dallington where larger areas of the community can be enhanced using minimal edge treatments.

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9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 5:18 p.m.
To: 9(2)(a)
Subject: FW: Canterbury earthquake recovery issues

9(2)(a) for your info

Cheers
Hugh

From: 9(2)(a)
Sent: Monday, 4 October 2010 5:15 p.m.
To: 9(2)(a)
Cc: Hugh Cowan; 9(2)(a)
Subject: Canterbury earthquake recovery issues

Hello 9(2)(a)

It was good to touch base with you just now regarding the above. I understand that you have been engaged by the Insurance Council to act as liaison person regarding recovery issues. The Councils affected and the DBH is keen that everything possible is done to minimise the time and hassle involved in obtaining building consents for the rehabilitation work. I hope that we will be able to keep in touch with ideas to promote this end – hence this email.

With EQC managing the \$10 to 100,000 claims and insurers managing (or being responsible for) claims over \$100,000, there is an important co-ordination role between the two parties. This will particularly be the case for properties on land that may require overall remedial measures (beyond the boundaries of the properties) – as I am sure you realise.

I should explain that I am a 9(2)(a) the Department of Building and Housing. At present, DBH have assigned me to help CCC (and SDC and WDC as necessary) in any way I can, but essentially around the consenting processes. I plan to be in Christchurch until 15 October on this assignment. Independently of that,

9(2)(a)

I hope it will be possible to meet you when you visit. In the meantime please do not hesitate to call or email me on any issue

Regards

9(2)(a)

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 4:06 p.m.
To: 9(2)(a)
Subject: FW: EPB Guideline Document - Progress Report
Attachments: Foreword by New Zealand Earthquake Commission_v2.doc

9(2)(a)

As discussed.

H.

From: Hugh Cowan
Sent: Saturday, 2 October 2010 4:23 p.m.
To: 9(2)(a)
Subject: RE: EPB Guideline Document - Progress Report

9(2)(a)

Many thanks for all your hard work on this document. I have attached a revised version of the "EQC forward" with a few suggestions – it looks radically altered only because I switched the ordering of a couple of paras. The key snippet I wanted to add was a reference to our research facilitation and education mandate, without which readers might not understand our involvement – we must be vigilant in our defence of EQC's unique mandate which in this area extends (rightly!) well beyond the parameters of our insurance scheme and its entitlements....

Let me know if you agree with my suggestions or have other amendments. I will then get Ian's sign off and an electronic signature...

Cheers
Hugh

From: 9(2)(a)@dbh.govt.nz]

Sent: Friday, 1 October 2010 1:41 p.m.

To: 9(2)(a) Hugh Cowan; 9(2)(a)

9(2)(a)

Cc: 9(2)(a)
Subject: EPB Guideline Document - Progress Report

Dear Colleagues

Yes, the Darfield earthquake has affected things. But we must publish this document by the end of October at the latest.

Attached is the latest version, tidied up courtesy of 9(2)(a) a freelance Word expert.

Things to notice:

1. The EQC Foreword is 100% my fault. It is up to EQC to decide on its inclusion and the wording. I think there should be one from EQC
2. We are waiting for material from 9(2)(a) (I have written her section but she has not reviewed it yet.)

3. The Presentation slides (Section 6.3) will be printed from electronic pdf files (or sent as separate files for electronic purposes) A sample is attached.

It is shaping up well and almost there. 9(2)(a) if there is anything we can do to help please let me know. We need your material.

Please let me have any comments / suggestions for the next version.

Kind regards

9(2)(a)

Department of Building and Housing
Te Tari Kaupapa Whare

9(2)(a)

Level 6, 86 Customhouse Quay
PO Box 10 729, Wellington, New Zealand
Web: <http://www.dbh.govt.nz>

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Foreword by New Zealand Earthquake Commission (EQC)

The ~~Darfield~~ 4 September, 2010 ~~Darfield~~ earthquake that affected the Christchurch, Kaiapoi and Selwyn areas was an important reminder of the effects of earthquake on our buildings, infrastructure, businesses, personal lives, economics and communities. The 2004 Building Act has caused territorial authorities to develop policies on earthquake-prone buildings and encourages them to take action to reduce and remove the danger from the most vulnerable buildings. The aim is to reduce earthquake risk over time.

~~As territorial authorities come to review their earthquake-prone building policies, they should take full advantage of this guidance document. Moreover they should embody in their policies the clear lessons from the Gisborne and Darfield earthquakes. In particular there is a need to give a high priority to unreinforced masonry buildings and elements. Their threat to life and limb was all too evident in the Darfield earthquake.~~

~~The Earthquake Commission~~ Earthquake Commission provides insurance on residential properties throughout New Zealand, and ~~this which gives~~ provides a financial cushion to the impact of earthquakes on those properties. Unfortunately it does not cover the business and community disruption that occurs when buildings are damaged in earthquakes. ~~The more action that can be taken to reduce the physical impacts of earthquakes, the less will be the impact on the communities affected.~~ EQC also fosters research and public education in relevant areas of natural hazards science and engineering, offering a connection between scientific progress and resilience within the community. ~~The more action that can be taken to reduce the physical impacts of earthquakes, the less will be the impact on the communities affected.~~

~~As territorial authorities come to review their earthquake-prone building policies, we hope they will take full advantage of this guidance document and embody in their policies the clear lessons from the 2007 Gisborne and 2010 Darfield earthquakes. In particular there is a need to give a high priority to unreinforced masonry buildings and elements. Their threat to life and limb was all too evident in the Darfield earthquake.~~

The Earthquake Commission commends the Department of Building and Housing on this initiative, and Local Government New Zealand for its endorsement. We thank all those who have contributed to this guidance material and hope that it will prove beneficial, not just ~~only~~ to territorial authorities in reviewing their policies, but to their communities at that time in the future when a major earthquake strikes.

Ian Simpson
Chief Executive
New Zealand Earthquake Commission

Comment [9(2)(a)] Drafted by [9(2)(a)]

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 3:55 p.m.
To: 9(2)(a)
Subject: FW: URGENTS

Hi 9(2)(a)

I know you are super-busy but a goodwill call to 9(2)(a) would be helpful I think. Like many folk she and her colleagues at IPENZ have been working hard believing that they were/are adding value to the recovery effort...

From: 9(2)(a) [mailto:9(2)(a)@ipenz.org.nz]
Sent: Monday, 4 October 2010 2:35 p.m.
To: Hugh Cowan
Subject: RE: URGENTS

Didn't hear back from anyone at all unfortunately Hugh

Ciao

9(2)(a)

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 Please consider the environment before printing this email.

From: Hugh Cowan [mailto:HACowan@eqc.govt.nz]
Sent: Monday, October 04, 2010 2:27 PM
To: 9(2)(a)
Subject: RE: URGENTS

Hi 9(2)(a)

I have been preoccupied with other matters during the previous few days (and continuing) but would like to know if any good came of my enquiries following the concerns you raised last week. Cheers, Hugh

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9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 3:53 p.m.
To: Michael Wintringham
Subject: FW: EQC Report
Attachments: Peer Review Commentary on T&T's Preliminary Report to Earthquake Commission.pdf

From: 9(2)(a)
Sent: Monday, 4 October 2010 3:00 p.m.
To: Hugh Cowan
Cc: 9(2)(a)
Subject: FW: EQC Report

Hi Hugh,

Please find attached the peer review report prepared by 9(2)(ba)(i) This report has been reviewed by T&T and their comments considered.

Regards

9(2)(a)

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Peer Review Commentary on T&T's Preliminary Report to Earthquake Commission

Executive Summary

Methodologies and Processes:

On the whole, the Peer Review Team find that the work undertaken to date and Report and Briefing Paper generated by T&T provide a reasonable basis on which to consider forward actions for the domestic houses affected by liquefaction in the 4 September 2010 Darfield Earthquake.

The methodology of capturing the ground damage since the earthquake has been structured and is likely to provide consistent results. The damage categories are a useful guide to the varying levels of damage sustained in the earthquake at a qualitative level. These categories could be further refined with the use of survey data to allow quantitative measurement of ground deformation (we understand from T&T that this is now underway).

A number of damaged sections were viewed and were found to be adequately classified in accordance with the criteria. Therefore, the resulting damage maps are likely to be a fair representation of the damage sustained by the earthquake.

An important issue would be for T&T to report on the likely effects of the Darfield earthquake relative to the understood level of shaking implied in the structural design standard for residential houses (noting that current NZ Code's and Bylaws do not specifically define the standard of seismic resistance; this means that for options A to D would require future codification to quantify liquefaction effects).

Information currently available from GeoNet on ground shaking intensity suggests that the intensity of ground shaking in the areas of the eastern suburbs of Christchurch was significantly less than the domestic building design level. In the Kaiapoi area, records from a single location indicate that the ground shaking was more severe in this area and was probably at the design level adopted for buildings.

Treatment Options:

A number of treatment options have been presented by T&T. Each of the options has merit and if utilised in appropriate situations will likely lead to a higher resilience to liquefaction in future earthquakes. The documentation should be extended to include an assessment of the total number of houses affected in each area.

We note that many of the options (namely A to D) will likely have repercussions nationwide in terms of subdivision and redevelopment land design standards. These options will need much more detailed considerations before they could be applied.

It would be useful for T&T to compile a more concise summary table stating advantages and disadvantages with totalised cost estimates, including comments raised by the Peer Review team in terms of the nationwide effects to assist the EQC in deciding the acceptability of the various options for addressing the land and dwelling damage.

Cost Estimates:

The cost estimating approach used by T&T is based on their recent contract experience for the actual mitigation options and from direct discussion with contractors. This approach given the time constraints and uncertainties is considered appropriate.

Recommendations:

It is recommended that in moving forward that the following considerations are made:

- Option analysis moves from a generalised scenario to specific treatment of suburbs and that costs are developed on that basis.
- Realistic timeframes for full reconstruction of neighbourhoods are provided for consideration.
- Options for neighbourhoods reflect the known pre-earthquake condition of the soils and therefore the likely depth of liquefiable deposits in specific areas. When available, post earthquake investigations can then be used for further refinement of options and costs.

All of the mitigation options presented, except Option G, provide varying additional levels of resilience to the land against liquefaction and all provide an alternative solution to abandonment (Option A). In our opinion, the land is now in a no worse state than prior to the earthquake (a degree of compaction in the sandy soils is likely to have occurred). However, the surficial soil has been damaged and will require repair. Therefore, in all of the options presented the houses could be rebuilt on the affected land with a satisfactory level of assurance that the geotechnical risks faced by home owners are no greater than prior to the earthquake.

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Peer Review Panel



1 Review Background

1.1 Peer Review Scope

The Terms of Reference for this review are attached. For convenience, the key questions from the Terms of Reference are quoted at the start of subsequent sections within this peer review report.

1.2 Documents Reviewed

The following documents were provided by Tonkin & Taylor (T&T) and form part of this review:

- Tonkin & Taylor Ltd (2010), *"Preliminary Assessment of Natural Disaster (Earthquake) Land Damage arising from the Darfield Earthquake of 4 September 2010"*, Prepared for Earthquake Commission, September 2010, T&T Ref: 51731. Referred to as the 15 September 2010 Report.
- Tonkin & Taylor Ltd (2010), untitled document of 8 pages, undated. Referred as the 21 September 2010 Paper.

In addition to these two documents, 9(2)(a) of T&T delivered a power point presentation (dated 19 September 2010) of their work to the Panel. 9(2)(a) confirmed that the content of the presentation was included in the two above documents, with the exception that the presentation *"does go into more detail on a particular option (E), but this is not part of the review"*.

We note that the documents presented are focussed only on damage to residential land from liquefaction.

1.3 Briefing Provided by T&T

The Panel was escorted around a number of liquefaction damaged areas by 9(2)(a). The objective of the field visit was to illustrate the ground damage noted on the T&T maps with the actual field conditions of a number of properties (e.g. "black", "red" and "orange" zones). Selected portions of the following areas were viewed by the Panel:

- Dallington
- Avonside
- Bexley
- South Kaiapoi – Courtney Drive area
- North Kaiapoi

At the invitation of two house owners the damage to the interior of their houses was also viewed to obtain an appreciation of how the ground deformation affected the structural performance of the dwellings.

2 Review Objective 1: Damage Mapping

Assessment of the methodologies and processes employed by Tonkin and Taylor (T&T) in their assessments of the nature of the land damage following the Darfield Earthquake, and the damage state estimates arrived at, including local ground damage mapping activity and the criteria applied to damage categorizations.

2.1 Scope

T&T's effort to date has been focused on the worst affected areas of liquefaction ground damage in Christchurch and south-eastern Waimakariri District. With further work, other aspects of earthquake related ground damage should also be reported on, including: fault rupture damage; regional deformation; rockfall; ground cracking, densification, subsidence, landslip and alteration to the hydrological network. Notwithstanding this, it is prudent to continue with more detailed liquefaction and lateral spreading mapping as this has had the greatest damage to the residential properties.

2.2 Earthquake Classification

The reports provide a reasonable description of the earthquake and the resulting aftershocks. Nonetheless, there is a key aspect of the earthquake classification which requires greater emphasis that being the relationship of the Darfield Earthquake to the design code requirements. This has been raised by T&T as requiring additional work, but the Panel see it as a fundamental question which should be quantified before decisions on remedial options are made.

9(2)(a) has commented "*For the inner city region the records which best represent are probably Christchurch Hospital, Botanic Gardens, and Cathedral College. These show the spectra are at some 70% of design value for structures with periods under 1.5 seconds but for that for periods of above 1 second the level rises to over 100% of design value especially in the approximate north south direction.*" (NZSEE clearing house, nzsee.org.nz).

The Panel has compared some of the response spectra from acceleration records from recording sites near the areas that liquefied in Dallington, Avonside, Bexley and Kaiapoi with the NZS 1170.5 design spectrum for a 500 year return period event. This comparison is shown in Figure 1 below. With the exception of the PRPC site, the spectrum with the largest response values from the two horizontal records is shown. At the PRPC site both spectra had similar maximum response values and both are shown. With the exception of the Kaiapoi spectrum (KPOC site) the spectral accelerations are generally less than the design spectrum in the short period range (important for liquefaction initiation). Overall, the estimate of about 70% of design value would appear to apply to the ground motions in the Dallington, Avonside and Bexley areas. The Kaiapoi spectrum showed spectral accelerations comparable to the 500 year return period design level.

Mechanisms for the onset of liquefaction are complex and further investigations and analyses are required before firm conclusions can be made on whether more widespread liquefaction would have occurred in a higher level of shaking i.e. at the design level.

The report/paper provide a reasonable representation of the geological setting of the ground providing the background conditions where damage was recorded. As indicated by T&T the ground can vary significantly over short distances and often does. This accounts for the small pockets of liquefaction that have been observed across Christchurch City and the eastern side of Waimakariri District.

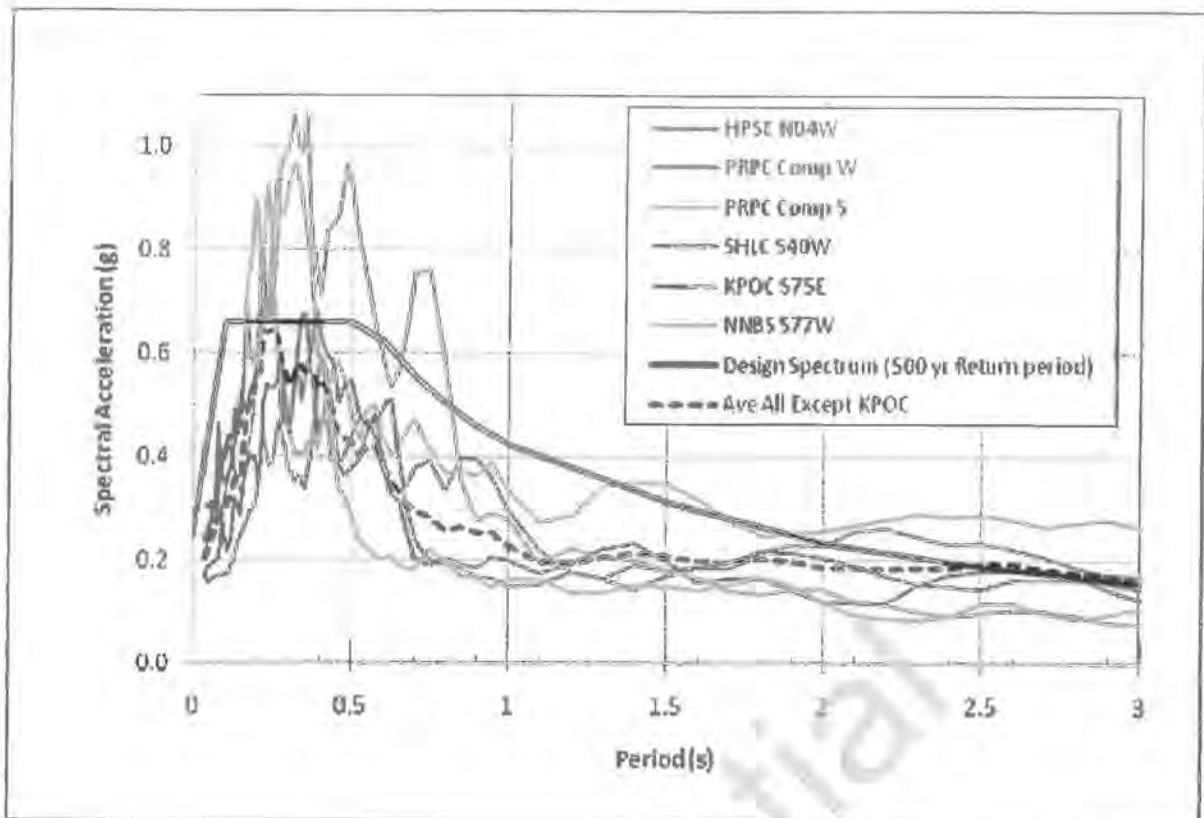


Figure 1: Comparison of response spectra from accelerograms recorded near some of the areas that liquefied in East Christchurch and Kaiapoi with the NZS 1170.5, 500 year return period design spectrum for Christchurch City. HPSC = Hulverstone Drive Pumping Station. PRPC = Pages Road Pumping Station. SHLC = Shirley Library. KPOC = Kaiapoi North School. NNBS = New Brighton School.

2.3 Relationship between Geology and Damage

Beca have produced liquefaction susceptibility maps and liquefaction ground damage maps for both Christchurch and the eastern side of the Waimakariri District for Environment Canterbury as a joint project with the respective councils prior to the Darfield Earthquake.

The extent of liquefaction and consequential ground damage experienced in the Darfield Earthquake was not unexpected. However, the specific locations of liquefaction did not always coincide with the predicted distribution of liquefiable soils. This in some part will relate to the characteristics of this particular earthquake, but will also relate to the details and quality of the ground information used in the prediction models. T&T correctly note *"That some of these areas did not liquefy in the recent earthquake does not mean that they are not at risk under future earthquake events. Every earthquake is different, as is the ground response."*

2.4 Damage Assessment Process

In general we find that the land damage assessment process to be reasonable given the restraints on resources and time. As stated by T&T it is important to remember that while there may not have been liquefaction evidence on particular lots, it is possible that liquefaction may have occurred beneath its dwelling. The categories used to describe the land damage (Black, Red, Orange, Green, Blue) are useful. However, some caution may need to be applied to their more subjective names (Significant, Major, Moderate, Minor, Structural). For more detailed work it would be useful to apply some quantitative measures against such categories, e.g. surveyed amount of lateral spreading, measurements of subsidence (where previous surveyed data is available), width and depth of fissures, volumes and/or depth of sand ejected etc. The New Zealand Geotechnical

Society "*Guideline for the identification, assessment and mitigation of liquefaction hazards*" should also be used in the classification of liquefaction features.

Confidential

3 Review Objective 2: Remedial Options

Review of the efficacy of the various treatment options presented, and their practicability given the nature of the ground damage observed, and the criterion that ground treatment options should seek to ensure that the probable risk of damage following remediation will be no more than that prior to the damage event.

Relating to the latter part of this brief, the probable risk of damage will be no more than that prior to the earthquake event. It is possible that the land will be in a more stable state due to minor densification compared to the pre-earthquake condition. One exception to this is the existence of fissures induced by lateral spreading and the lower elevation land due to subsidence.

In general terms, the options proposed by T&T are practical. One of the important considerations in evaluating the options is the time to effect the option. Options that require deep treatment of the soil will likely take many months to complete (in particular Option B). More equipment would need to be sourced from overseas and would take time to mobilize. Given the residential nature of the environment, a construction programme would be restricted to an 8-10 hour weekday rather than 24 hour / seven day operation that would provide more economic performance. These aspects should be discussed in more detail in the options report.

Another consideration is the environmental impact such as dust, noise and vibration, which will need to be considered for each option.

3.1 Option A (complete abandonment)

- This option could have significant and far reaching ramifications for NZ nationwide. It would imply in New Zealand that future housing development would not be permitted where liquefaction may lead to ground deformations, no matter how infrequent the risk is. Significant areas of metropolitan New Zealand would be devalued as a consequence of adopting this option.
- This option has significant ramifications on the residents affected and in the past it has been demonstrated that relocation of communities is difficult to achieve.

3.2 Option B (complete treatment)

- An implication of this option is that all land developed or land to be re-developed in the future which is assessed to be subject to liquefaction will need to be treated to resist liquefaction/lateral spreading in a suitable design level earthquake.
- The treatment would take many months to complete before rebuilding could commence.
- The option will likely require all the services to be reconstructed or re-laid (e.g. sewer, stormwater). During reconstruction, services connected to these would need to be disconnected for a time and this may affect Green zone housing.

3.3 Option C (perimeter treatment plus piling)

- Comments in terms of the implications this option would have nationwide in terms of new design standards for housing land. This would affect all new development and re-development or extensions on land susceptible to liquefaction.
- The zone of treatment has been assumed by T&T to be 10m deep. However, it will be variable and in some places will be much shallower, and could be deeper in some areas. The treatment width of 40m is likely to be conservative. Lesser widths have been used in design to limit lateral spreading movements. However, until detailed analysis is undertaken, it is prudent to use this T&T proposed width for cost estimation.

- The use of piles to support the houses will not negate the risk of future subsidence due to liquefaction that could still affect buried services. Significant damage may still occur to residential driveways, gardens and fences, and streets and services in another earthquake.
- The house foundations / pile caps would increase the cost of reconstructing the houses or constructing new houses.

3.4 Option D (perimeter treatment plus shallow treatment)

- Refer to comments in Section 3.3 above on the perimeter treatment.
- Similarly this option would have nationwide effects on new development and redevelopment albeit to a lesser degree.
- The partial depth treatment afforded in this option for the Orange zone will provide some benefit through the reduction in the depth of liquefiable deposits. However, it is unlikely to eliminate ground settlement, fissures and sand boils during subsequent liquefaction. The thicker raft of non-liquefiable soil created may result in fissures being more widely spread, but it is unlikely to prevent large deformations beneath dwellings.

3.5 Option E (perimeter treatment only)

- Refer to comments in Section 3.3 above on the perimeter treatment.
- This option has precedents with the recent Pegasus subdivision where the District Plan rules requires a serviceability limit of 250mm of lateral movement for 150 year return period earthquake.
- Our preference would be to change the term "waffle floor slab" and replace with structural floor system capable of withstanding differential settlement (such as a waffle floor system) in order that other structural alternatives are not discouraged.

3.6 Options F1, F2, F3 (partial abandonment plus various treatments)

- These are sub options of the other options already discussed above. Refer to Sections 3.1, 3.3 and 3.4.

3.7 Options G (no deep ground treatments)

- We agree with T&T's statement *"Option G is the most equitable as it returns the land back to the pre earthquake situation for everyone, it is the quickest solution with the least disruption and the least cost. However the most traumatised those in the black and red zones may not accept the status quo. Council, insurers and financial institutions may also not agree to consent and provide ongoing cover."*
- However, this option will require further studies to assess what was the Darfield Earthquake shaking levels compared to an "understood" subdivision land design standard, i.e. was it above such a standard or below. If the intensity of recent shaking was significantly less than the design return period then the issues of insurance, mortgage lending, property value, professional liability and public perception of risk may become critical considerations which could weigh strongly against this option.
- This option would fall short of current best practise for new housing development. Where there is a significant risk of soil liquefaction and lateral spreading in a design level earthquake soil improvement work is now considered necessary by professional engineers advising developers. For example, ground improvement undertaken at the Pegasus Town development to limit lateral spreading.
- There would be difficulty in meeting building code requirements for house foundations. For example, the provisions for NZS 3604 (Timber Framed Buildings) apply only for building sites where the foundations are supported on "good ground". One of the several requirements for "good ground" is that the PIM and site observations show no indications or records of land slips

having occurred in the immediate vicinity. (Lateral spreading could be interpreted as a land slip). NZS 4229 (Concrete Masonry Buildings Not Requiring Specific Engineering Design) has a similar requirement for "good ground".

- There may not be specific cost associated with this option where the house requires rebuilding as the normal earthworks associated with the construction of the new dwellings are likely to include levelling the ground surface. However, if the section level needs to be raised for flood mitigation purposes then fill may be required to be imported to the site and the house rebuilt.

Confidential

4 Review Objective 3: Cost Estimate

Examine the cost estimating approach and construction plan/execution strategy adopted by Tonkin and Taylor as the basis for their cost estimates of the different remediation options, and report as to whether the approaches used are appropriate for the level of information presented, and estimated costing accuracy (nominally plus or minus 30 percent).

Our comments are based on the T&T report and their email dated 1/10/10. It needs to be emphasized that the T&T estimates are preliminary, based on conceptual options developed for a 'typical' scenario, and we would expect there to be variations as the options are developed in more detail on a suburb by suburb basis.

The cost estimating approach reflects the time constraints and uncertainties in defining the options and it appears to have been carried out in an appropriate way. The outturn cost estimates (unit rates x areas) are considered to be more realistic than the unit rates in isolation, especially if the treated areas were reduced.

4.1 Specific comments on the Options

- The maximum stone column rate (\$300/m²) could be higher, up to \$500/m² based on Beca experience elsewhere for smaller scale projects.
- Alternative treatments e.g. vibrocompaction or dynamic compaction, undertaken below a zone of excavation and replacement, may cost \$100/m² to \$200/m². Vibrocompaction will not be as effective in silty soils. Dynamic compaction may not be effective below approximately 5m depth. Therefore, these solutions may not be practical for all situations.
- The assumption that other ground improvement options (such as dynamic compaction, EQ drains, driven timber poles, or vibrocompaction) are approximately 1/3 to 2/3 the cost of stone columns may prove optimistic.
- Option G rates may be higher (\$10 – 15/m²) if there is a need to import fill to compensate for liquefaction induced settlement in ground level (refer also to Page 10 comments).
- Rates for piling (to support houses) could be higher, up to \$120/m² depending on various factors, including the pile design criteria such as lateral loads and negative skin friction.
- A rate of \$100/m² to \$140/m² is an appropriate cost for a new sub-division on the outskirts of Christchurch. Section sizes for modern subdivisions may be smaller than historical ones.
- The assumption that in the Orange zone one third of the properties would need to be demolished, one third would need extensive repair and one third would require only minor repair needs to be better established. We presume that at this stage it is a "ball-park" estimate.
- Further clarifications on the estimated costs is necessary e.g. whether the costs include investigation, design, preliminary & general contractor's items, construction monitoring, compliance, environmental mitigation, escalation etc.. Similarly it should be made clear whether consequential costs are allowed for, e.g. to construct the perimeter works will require the replacement of roads, sewers, services, etc. If considered appropriate this could be allowed for by adding a percentage on to the base costs.

5 Review Objective 5: Review Commentary

Provide an opinion on the criteria applied to the options analysis and whether other considerations should form part of future decision making.

Commentary has been provided in the preceding sections of this report on the criteria applied by T&T to date. In general we have found that procedures undertaken to date and the criteria applied to options to be adequate. We have provided some points of discussion that should be useful to T&T in moving forward with their investigations. Specific points to focus on include:

- Assess in detail the effect of the Darfield earthquake relative to the understood land design level (which is not specified in NZ Code's or local Bylaw's) which may be based on the structural level of 475 years return period.
- A summary would also be requires on the total number of houses affected by liquefaction and lateral spreading for each zones.
- It would be helpful if all of the issues and impacts associated with each option were summarised in a single table to enable easier comparison; factored with the number of houses affected a total cost estimate should also be compiled. That the social consequences be more specifically defined for each of the options presented.
- That realistic timeframes are developed for remedial options (including land repair, house rebuilding, landscaping, services repair) such that the consequences can be better understood and perceptions of the community can be more effectively managed.
- Clarity on the definition of "land damage" under the Act. Once this has been clarified then the viable options are likely to be clearer. Liquefied soils, with the exception of deformations, fissures and boils at the ground surface, could be classified as not damaged and therefore deep remedial treatment not required, unless other manifestations of land damage become apparent.
- T&T should move to complete the local mapping of the ground damage as soon as practical, and before evidence is obliterated.
- A separate parallel task of measuring the ground deformation in quantitative terms should begin with the aim to marry the two data sets and provide a higher level of confidence to the decisions being made.
- More commentary is required on long linear communities such as Pines Beach, how these will be treated and what the costs will likely be. These may differ significantly from those such as Dallington where larger areas of the community can be enhanced using minimal edge treatments.

Notice to Reader/User of this Report

This peer review report has been prepared solely for the benefit of EQC as our client with respect to the particular brief given to us, and data or opinions in it may not be used in other contexts, by any other party or for any other purpose. This report is based on the sources of information listed in this report. This report therefore relies entirely on the accuracy and completeness of the information prepared by others. 9(2)(ba)(i) cannot be held responsible for any misrepresentation, incompleteness, or inaccuracies provided within that information.

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Confidential

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 2:56 p.m.
To: 9(2)(a)
Subject: FW: data question

Hi 9(2)(a)

I have not responded to this enquiry because I am frankly too busy and the question is too general. Grateful if you would find an appropriate door to put it through and respond on my behalf. Thanks - if you can. If for any reason you cannot or do not wish to then let me know. Cheers, Hugh

-----Original Message-----

From: Reception3 On Behalf Of EQC Info
Sent: Monday, 4 October 2010 2:48 p.m.
To: Hugh Cowan
Subject: FW: data question

Hello,

I am a researcher at the University of Canterbury. We are designing some research projects following the large earthquake in Canterbury. Could you please put me in contact with the research/data team?

Thanks, 9(2)(a)

9(2)(a)

Department of Geography
GeoHealth Laboratory
University of Canterbury

9(2)(a)

[http://www.canterbury.ac.nz/spark/Researcher.aspx? 9\(2\)\(a\)](http://www.canterbury.ac.nz/spark/Researcher.aspx?9(2)(a))

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Please refer to <http://www.canterbury.ac.nz/emaildisclaimer> for more information.

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 1:34 p.m.
To: 9(2)(a)
Cc: 9(2)(a)
Subject: RE: 9(2)(i) RFP attached

Dear 9(2)(a)

Acknowledging (late) receipt of your proposal and confirming that we will accept the proposal, marked late, in accordance with section 5.9 of the RFP. Thank you for submitting a proposal to EQC.
regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI +9(2)(a)

From: 9(2)(a)
Sent: Monday, 4 October 2010 12:44 p.m.
To: 9(2)(a) @med.govt.nz; Hugh Cowan
Subject: 9(2)(i) RFP attached

Good morning

Please find attached our submission with supporting appendix attachments 1,2,3,4 and 5. I hope you accept the deadline has passed. Daylight saving kicked in here on Sunday night and threw the send schedule out by 1-hour.

Hard copy docs will be couriered to you by COB today.

Kind regards

9(2)(i)

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 12:48 p.m.
To: 9(2)(a)
Subject: FWD: 9(2)(i) RFP attached
Attachments: Attachment withheld under 9(2)(i)

Hi 9(2)(a) this just arrived. I will be back in the office within 30 mins. Cheers hugh

9(2)(a)

From: 9(2)(a)
Sent: Monday, 4 October 2010 12:44 p.m.
To: 9(2)(a) @med.govt.nz; Hugh Cowan
Subject: 9(2)(i) RFP attached
Attachments: Attachments withheld under 9(2)(i)

Good morning

Please find attached our submission with supporting appendix attachments 1,2,3,4 and 5. I hope you accept the deadline has passed. Daylight saving kicked in here on Sunday night and threw the send schedule out by 1-hour.

Hard copy docs will be couriered to you by COB today.

Kind regards

9(2)(i)

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 12:06 p.m.
To: 9(2)(a)
Cc:
Subject: RE: EQC - RFP

9(2)(a)

Hard copies will be accepted after 12 noon per the RFP and clarification note, provided they are received today.

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI 9(2)(a)

From: 9(2)(a)
Sent: Monday, 4 October 2010 11:58 a.m.
To: Hugh Cowan
Cc: 9(2)(a)
Subject: EQC - RFP

Hugh Cowan

Please find attached 9(2)(i) submission due in your office at 12 noon today. Our apologies an unforeseen circumstance has occurred and 9(2)(i) Wellington are frantically trying to rectify the problem to get 7 hard copies to you.

Appendices will be attached to our hard copies as these are too large to send via email.

Again our apologies.

Kind regards

9(2)(i)

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9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 12:03 p.m.
To: 9(2)(a)
Subject: FW: EQC - email ready files.

Copy for your info

From: Hugh Cowan
Sent: Monday, 4 October 2010 11:08 a.m.
To: 9(2)(a)
Cc: Ian Simpson
Subject: RE: EQC - email ready files.

9(2)(a)

Acknowledging that we have received your email ready files. Thank you for your proposal,

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI +9(2)(a)

From: 9(2)(a)
Sent: Monday, 4 October 2010 11:03 a.m.
To: Hugh Cowan
Cc: Ian Simpson
Subject: FW: EQC - email ready files.
Importance: High

Hugh,

Attached is Fletcher Construction's response to the Request for Proposal CE001 – Reinstatement Project Management.

Hard copies will be delivered to your office in Wellington by midday.

Should you have any queries please contact me.

Can you please acknowledge receipt by return email.

Regards,

9(2)(a)

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 12:03 p.m.
To: 9(2)(a)
Cc:
Subject: RE: Request for Proposal

9(2)(a)

Acknowledging receipt of your email ready document. Thank you for submitting a proposal.

regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI 9(2)(a)

From: 9(2)(a)
Sent: Monday, 4 October 2010 11:55 a.m.
To: Hugh Cowan
Subject: Request for Proposal

Please find attached our joint proposal for the Earthquake Commission.
We will have original copies to you by 12.30.

Regards

9(2)(a)

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9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 11:50 a.m.
To: 9(2)(a)
Cc:
Subject: RE: Request for Proposal CE001 For Reinstatement Project Management

9(2)(a)

Acknowledging receipt and successful opening of your email ready documents. Thank you for submitting your proposal.
regards

Hugh Cowan
Research Manager
Earthquake Commission
Level 20, Majestic Centre
100 Willis Street, P.O. Box 790
Wellington, New Zealand
DDI 9(2)(a)

From: 9(2)(a)
Sent: Monday, 4 October 2010 11:44 a.m.
To: Hugh Cowan
Cc: 9(2)(a)
Subject: Request for Proposal CE001 For Reinstatement Project Management
Importance: High

Hugh,

It is my pleasure to present a soft copy of the 9(2)(a) proposal to lead the Reinstatement Project Management for EQC.

It comprises two files:

1. Signed copy of the RFP response; and
2. Folder of CVs for the individuals named in the response.

Please can you confirm it has made it successfully through the email system and you are able to open the attachments.

Seven hard copies of the document will be delivered to the EQC office this afternoon as promised.

Very best regards,

9(2)(a)

(Copying 9(2)(a) just in case you are still off sick)

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 10:13 a.m.
To: 9(2)(a)
Subject: RE: Claims Conference Presentations due
Attachments: Hugh_bio notes.doc; HughCowan.jpg

Hi 9(2)(a)

Bio notes and a photo for you.

Cheers
Hugh

From: 9(2)(a)@theinstitute.com.au]
Sent: Monday, 4 October 2010 9:53 a.m.
To: 9(2)(a)
Subject: Claims Conference Presentations due
Importance: High

Morning all

Can I please ask that you send you powerpoint presentations for the upcoming Claims conference along with your photo and bio notes through as soon as possible.

I will be collating and taking these to the printers at 1.30pm today.

Thank you and regards

9(2)(a)

Australian and New Zealand Institute of Insurance and Finance (ANZIIF)

Level 1 143 Nelson Street, Auckland, New Zealand
Phone 9(2)(a)
Mobile
Fax

Email 9(2)(a)@theinstitute.com.au

Web www.theinstitute.com.au

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This email has been scanned by the MessageLabs Email Security System.

Hugh Cowan

Hugh Cowan is Research Manager for the New Zealand Earthquake Commission. His role is to facilitate connections between scientific progress and community resilience to natural hazard risk through EQC's investment in relevant areas of natural disaster science, engineering and planning.

Hugh was appointed to the executive management team of the Earthquake Commission in 2005, following five years as Director of New Zealand's geophysical monitoring network "GeoNet" with the research organisation GNS Science.

In prior years he operated a successful independent consultancy, based in Panama, Central America having earlier worked with Scandinavian organisations on geological hazard studies in northern Europe, the Middle East and the Americas, while employed by NORSAR, Norway.

Hugh is a member of the NZ Institute of Directors, the American Geophysical Union and the NZ Society for Earthquake Engineering (NZSEE). He has led NZSEE post-earthquake and tsunami impact missions to Colombia (1999), Thailand (2005), and central Chile (2010).

Qualifications

Bachelor of Science – Victoria University of Wellington, 1983

Master of Science (First Class Hons) – University of Canterbury - 1989

Doctor of Philosophy – University of Canterbury - 1992

9(2)(a)

From: Hugh Cowan
Sent: Monday, 4 October 2010 8:40 a.m.
To: 9(2)(a)
Subject: RE: URGENT - 9(2)(a)

Thanks 9(2)(a) dont worry, we certainly wont be promulgating opinions like that. More later Regards, Hugh

--- original message ---

From: '9(2)(a)' <9(2)(a)@eqc.govt.nz>
Subject: RE: URGENT - 9(2)(a)
Date: 4th October 2010
Time: 8:35:52 am

A draft has gone to Ian and I will chase this along. The reply will go out today.

Hey had a good talk with 9(2)(a) of T&T on Saturday. This was in regard to a committee set up in regard to structural issues that includes insurers etc.

He expressed concerns about a statement by one particular engineer that getting a house back to 80% of its pre-loss state would be good enough for EQC and insurers. (9(2)(a) believe).

I am afraid that under insurance law and under the Act this is most definitely not the case.

Under the Act and any contract of insurance there are requirements, spelt out and enforceable. These have been subject to case law and precedents set.

The basic premise of indemnity is that a claimant/insured is returned to no better but no worse than the pre-loss state. The Act is stricter – our Replacement Value is defined as “as new”.

Some claimants /insured will be happy that their dwellings are repaired to within say 90% of how it was but I can tell you now that there will be a fair proportion to whom a repair to within 80/90% will not be acceptable and the law is behind them. If an insurer repairs using EQC cap money upon the advice of an engineer like the one who suggested the above and the result is not acceptable to the insured person it will have to be redone appropriately and this will be at greater cost and may even mean the house should have been demolished and rebuilt.

I have 9(2)(a) of Chapman Tripp in the office tomorrow to go through a few bits and pieces. Would you like some confirmation of this from him for the purposes of this committee? I am down in Chch on Wednesday and Thursday and will see you then as well.

I would be very worried if we have potential advisors to the repair of Christchurch talking in this way. Things will turn to custard very quickly...

9(2)(a)

Earthquake Commission

MOBILE: 9(2)(a)

DDI:

FAX:

From: 9(2)(a)

Sent: Monday, 4 October 2010 8:19 a.m.

To: 9(2)(a)

Subject: FW: URGENT -9(2)(a)

Importance: High

Hi 9(2)(a)

Good to meet you on Thursday.

I had Lianne Dalziel ring me on this again. Did we issue a response that I can inform her about?

Thanks 9(2)(a)

9(2)(a)

NZ Earthquake Commission

Phone: 9(2)(a)

Email: 9(2)(a)

From: Lianne Dalziel -

Sent: Thursday, 30 September 2010 8:32 a.m.

To: 9(2)(a)

Subject: FW: URGENT -9(2)(a)

Importance: High

I will ring you about this - Lianne

From: Lianne Dalziel MP
Sent: Thursday, 30 September 2010 8:25 a.m.
To: 9(2)(a)
Subject: FW: URGENT 9(2)(a)
Importance: High

From: 9(2)(a)
Sent: Wednesday, 29 September 2010 8:16 p.m.
To: info@eqc.govt.nz; 9(2)(a)@eqc.govt.nz; claims@eqc.govt.nz
Cc: Bob.Parker@ccc.govt.nz; john.key@national.org.nz; Lianne Dalziel MP; aaron.gilmore@national.org.nz;
9(2)(a)@ccc.govt.nz; gerry.brownlee@national.org.nz; bill.english@national.org.nz
Subject: URGENT - 9(2)(a)
Importance: High

URGENT - EQC please forward this email to 9(2)(a) and Ian Simpson

After the Earthquake in Christchurch on Saturday 11 September we, along with all of our neighbours were visited by two people from EQC. In our case – both males, one a loss adjuster was from Timaru and a builder from Palmerston North.

We and our neighbours were advised “your house is a total economic loss” and you will be receiving the full amount from EQC of \$115,000 (including GST and at the new rate). We were asked, and supplied a bank deposit slip for these funds to be paid into. We were advised that payment would be made “next week”. The contents cover was to be made on top of this making a total amount of \$138,000 including GST.

We were also advised that our area was being looked at on a “global basis”. This “global View” was also restated at street meetings (2) held by 9(2)(a) from EQC and reiterated by the EQC representative in a public meeting in the Bexley area chaired by Lianne Dalziel. We were clearly advised that our house and all our immediate neighbours’ houses would be demolished to allow remediation of the land or clearance if the land is unable to be built on again.

We signed a form regarding the above which we were advised we would be posted a copy of!! We are still waiting!!!!

All of our neighbours were told the same thing on the same day. As I have finance background and am the 9(2)(a) 9(2)(a) I found the statement regarding payment to our bank account rather strange, given that I know many residents will have mortgages and the money is required to be paid to the Mortgagor in the first instance.

Ok – we can live with that bit of misinformation given the circumstances – however I now consider it was a pretty dumb thing to say!!

Since that time we have been proactive about telling our neighbours to "sit tight" as the situation is huge and it all takes time.

Yesterday, 28 September, 2010, we were again visited by EQC – unannounced. Despite having previously given all our contact details. As my husband was home at the time he let both people (one male, one female) into the house. They were from Tonkin and Taylor, and Geotech engineers on behalf of EQC looking at the land and our house.

Reflecting on this further visit later that evening – both of us could not understand why, given the huge waiting list for EQC inspectors to visit other properties that EQC would be back in our area revisiting houses that had previously been inspected by EQC – or someone on behalf of EQC.

Today, my husband noticed them in the area again and stopped to clarify further;

He was advised that:

We were misinformed on the 11 September and not all the information that we were given was correct.

That each house was now being assessed individually with respect to the land.

Do you realise that people in our area have MADE DECISIONS BASED ON WHAT THEY WERE TOLD ON 11 September!!! For example, obtained rental properties.

We are frankly annoyed and upset that we have spent so much time defending the council and the government and advising everyone we know "to give it time". If you made a mistake with information on 11 September WHY THE HELL HAVE WE NOT HEARD ABOUT IT BEFORE.

Please do not fob us off with a return email telling us you are sorting things out. The lack of factual information is appalling and in no way fair or reasonable.

We want some answers as to what bit of the above is correct or not! And we want those answers now – not next week or next month.

I have directed this email to EQC but "cc" a number of people into it. If you have been "cc in" please, if you have information then please contact us urgently – we would really appreciate it, as would our neighbours.

EQC – you need to communicate clearly and authoritatively to residents, preferably in writing, or alternatively hold a public meeting in the area and distribute flyers containing all the information required.

Yours sincerely

9(2)(a)



Phone:

9(2)(a)

