Halswell Aquatic Centre – BBQ Shelter
Detailed Engineering Evaluation
BU 1691-006 EQ2
Qualitative Report

Prepared for Christchurch City Council (CCC)

By Beca Carter Hollings & Ferner Ltd (Beca)

8 February 2013

Revision History

Revision Nº	Prepared By	Description	Date
A	Andreas Trapezaris	Draft for CCC review	9 October 2012
B	Laura Chen	Building name change	17 October 2012
C	Andreas Trapezaris	Building age updated	23 November 2012
D	Andreas Trapezaris	Final	8 February 2013

Document Acceptance

Action	Name	Signed	Date
Prepared by	Andreas Trapezaris		9 October 2012
Reviewed by	Nicholas Charman		9 October 2012
Approved by	David Whittaker		9 October 2012
on behalf of	Beca Carter Hollings & Ferner Ltd		

Halswell Aquatic Centre, BBQ Shelter BU 1691-006 EQ2

Detailed Engineering Evaluation
Qualitative Report – SUMMARY
Version 1

Address
339 Halswell Road
Halswell
Christchurch

Background

This is a summary of the Qualitative report for the building structure, and is based on the document ‘Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings in Canterbury – Part 2 Evaluation Procedure’ (draft) issued by the Engineering Advisory Group (EAG) on 19 July 2011.

The BBQ Shelter structure is located at 339 Halswell Road, Halswell. The drawing available indicates the BBQ shelter was designed in 1998 and has an approximate floor area of 60m^2 including the awning. The BBQ Shelter is a single storey standalone timber frame structure with a pitched roof clad with lightweight metal sheeting over plywood. The southern walls are timber framed cladded with lightweight metal sheeting. The remainder of the structure is open and the floor is a concrete slab on grade.

Key Damage Observed

Visual inspections on 29 August 2012 indicate the building has suffered minor earthquake damage. The key damage observed includes:

- Splitting / Cracking of timber columns.
- Cracking of timber columns near connections.
- Cracking to concrete floor slab near column locations
- Minor movement between the timber ridge beam and column.

Critical Structural Weaknesses (CSW)

No potential Critical Structural Weaknesses have been identified during this Qualitative Assessment.

Indicative Building Strength (from Initial Evaluation Procedure and CSW assessment)

The building has been assessed to have a seismic capacity of 60%NBS using the NZSEE Initial Evaluation Procedure (IEP) and is therefore classified as potentially Earthquake Risk and Seismic Grade C.

Recommendations

In order that the owner can make an informed decision about the on-going use and occupancy of their building the following information is presented in line with the Department of Building and Housing document '*Guidance for engineers assessing the seismic performance of non-residential and multi-unit residential buildings in greater Christchurch'*, June 2012.

The building is considered to be earthquake risk, having an assessed capacity of between 34% and 67%NBS. The risk of collapse of an earthquake risk building is considered to be 5 to 10 times greater than that of an equivalent new building.

No significant damage or hazards were identified to the seismic or gravity load resisting system that would reduce its ability to resist further loads and therefore no restrictions on use or occupancy are recommended.

It is recommended that:

- A quantitative assessment could be undertaken on the building if there is any concern about the qualitative %NBS estimate.
- Repairs that would bring the building back to an "as new" condition are typically entitled under typical replacement insurance policies. We suggest you consult with your insurance advisor as to how you wish to proceed.
- Size of angle braces in the walls should be confirmed as part of the quantitative assessment.

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Appendices

1 Background

Beca Carter Hollings & Ferner Ltd (Beca) has been engaged by Christchurch City Council (CCC) to undertake a qualitative Detailed Engineering Evaluation (DEE) of the BBQ Shelter building at Halswell Aquatic Centre located at 339 Halswell Road, Halswell.

This report is a Qualitative Assessment of the building structure, and is based on the document 'Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings in Canterbury – Part 2 Evaluation Procedure' (draft) issued by the Engineering Advisory Group (EAG) on 19 July 2011.

A qualitative assessment involves inspections of the building, a desktop review of existing structural and geotechnical information, including existing drawings and calculations, if available and an assessment of the level of seismic capacity against current code using the Initial Evaluation Procedure (IEP).

The purpose of the assessment is to determine the likely building performance and damage patterns, to identify any potential Critical Structural Weaknesses or collapse hazards, and to make an initial assessment of the likely building strength in terms of percentage of New Building Standard (%NBS).

At the time of this report, no intrusive site investigation, detailed analysis, or modelling of the building structure has been carried out. The building description below is based on our visual inspections and partial drawings.

The format and content of this report follows a template provided by CCC, which is based on the EAG document.

2 Compliance

This section contains a brief summary of the requirements of the various statutes and authorities that control activities in relation to buildings in Christchurch at present.

2.1 Canterbury Earthquake Recovery Authority (CERA)

CERA was established on 28 March 2011 to take control of the recovery of Christchurch using powers established by the Canterbury Earthquake Recovery Act enacted on 18 April 2011. This act gives the Chief Executive Officer of CERA wide powers in relation to building safety, demolition and repair. Two relevant sections are:

Section 38 – Works

This section outlines a process in which the chief executive can give notice that a building is to be demolished and if the owner does not carry out the demolition, the chief executive can commission the demolition and recover the costs from the owner or by placing a charge on the owners' land.

Section 51 – Requiring Structural Survey

This section enables the chief executive to require a building owner, insurer or mortgagee carry out a full structural survey before the building is re-occupied.

We understand that CERA will require a detailed engineering evaluation to be carried out for all buildings (other than those exempt from the Earthquake Prone Building definition in the Building

Act). It is understood that CERA is adopting the Detailed Engineering Evaluation Procedure document (draft) issued by the Engineering Advisory Group on 19 July 2011, which sets out a methodology for both qualitative and quantitative assessments. We understand this report will be used in response to CERA Section 51.

The qualitative assessment includes a thorough visual inspection of the building coupled with a desktop review of available documentation such as drawings, specifications and IEP's. The quantitative assessment involves analytical calculation of the building's strength and may require non-destructive or destructive material testing, geotechnical testing and intrusive investigation.

It is anticipated that factors determining the extent of evaluation and strengthening level required will include:

- The importance level and occupancy of the building
- The placard status that was assigned during the state of emergency following the 22 February 2011 earthquake
- The age and structural type of the building
- Consideration of any Critical Structural Weaknesses
- The extent of any earthquake damage

2.2 Building Act

Several sections of the Building Act are relevant when considering structural requirements:

Section 112 – Alterations

This section requires that an existing building complies with the relevant sections of the Building Code to at least the extent that it did prior to any alteration. This effectively means that a building cannot be weakened as a result of an alteration (including partial demolition).

Section 115 – Change of Use

This section requires that the territorial authority (in this case Christchurch City Council (CCC)) be satisfied that the building with a new use complies with the relevant sections of the Building Code 'as near as is reasonably practicable'. Regarding seismic capacity 'as near as reasonably practicable' has previously been interpreted by CCC as achieving a minimum of 67%NBS however where practical achieving 100%NBS is desirable. The New Zealand Society for Earthquake Engineering (NZSEE) recommend a minimum of 67%NBS.

Section 121 – Dangerous Buildings

The definition of dangerous building in the Act was extended by the Canterbury Earthquake (Building Act) Order 2010, and it now defines a building as dangerous if:

- In the ordinary course of events (excluding the occurrence of an earthquake), the building is likely to cause injury or death or damage to other property; or
- In the event of fire, injury or death to any persons in the building or on other property is likely because of fire hazard or the occupancy of the building; or
- There is a risk that the building could collapse or otherwise cause injury or death as a result of earthquake shaking that is less than a 'moderate earthquake' (refer to Section 122 below); or
- There is a risk that that other property could collapse or otherwise cause injury or death; or
- A territorial authority has not been able to undertake an inspection to determine whether the building is dangerous.

Section 122 – Earthquake Prone Buildings

This section defines a building as earthquake prone if its ultimate capacity would be exceeded in a 'moderate earthquake' and it would be likely to collapse causing injury or death, or damage to other property. A moderate earthquake is defined by the building regulations as one that would generate ground shaking 33% of the shaking used to design an equivalent new building.

Section 124 – Powers of Territorial Authorities

This section gives the territorial authority the power to require strengthening work within specified timeframes or to close and prevent occupancy to any building defined as dangerous or earthquake prone.

Section 131 – Earthquake Prone Building Policy

This section requires the territorial authority to adopt a specific policy for earthquake prone, dangerous and insanitary buildings.

2.3 Christchurch City Council Policy

Christchurch City Council adopted their Earthquake Prone, Dangerous and Insanitary Building Policy in 2006. This policy was amended immediately following the Darfield Earthquake of the 4th September 2010.

The 2010 amendment includes the following:

- A process for identifying, categorising and prioritising Earthquake Prone Buildings, commencing on 1 July 2012;
- A strengthening target level of 67% of a new building for buildings that are Earthquake Prone;
- A timeframe of 15-30 years for Earthquake Prone Buildings to be strengthened; and,
- Repair works for buildings damaged by earthquakes will be required to comply with the above.

The council has stated their willingness to consider retrofit proposals on a case by case basis, considering the economic impact of such a retrofit.

It is understood that any building with a capacity of less than 33%NBS (including consideration of Critical Structural Weaknesses) will need to be strengthened to a target of 67%NBS of new building standard as recommended by the Policy.

If strengthening works are undertaken, a building consent will be required. A requirement of the consent will require upgrade of the building to comply 'as near as is reasonably practicable' with:

- The accessibility requirements of the Building Code.
- The fire requirements of the Building Code. This is likely to require a fire report to be submitted with the building consent application.

2.4 Building Code

The building code outlines performance standards for buildings and the Building Act requires that all new buildings comply with this code. Compliance Documents published by The Department of Building and Housing can be used to demonstrate compliance with the Building Code.

On 19 May 2011, Compliance Document B1: Structure was amended to include increased seismic design requirements for Canterbury as follows:

a. Hazard Factor increased from 0.22 to 0.3 (36% increase in the basic seismic design load)

b. Serviceability Return Period Factor increased from 0.25 to 0.33 (80% increase in the serviceability design loads when combined with the Hazard Factor increase)

The increase in the above factors has resulted in a reduction in the level of compliance of an existing building relative to a new building despite the capacity of the existing building not changing.

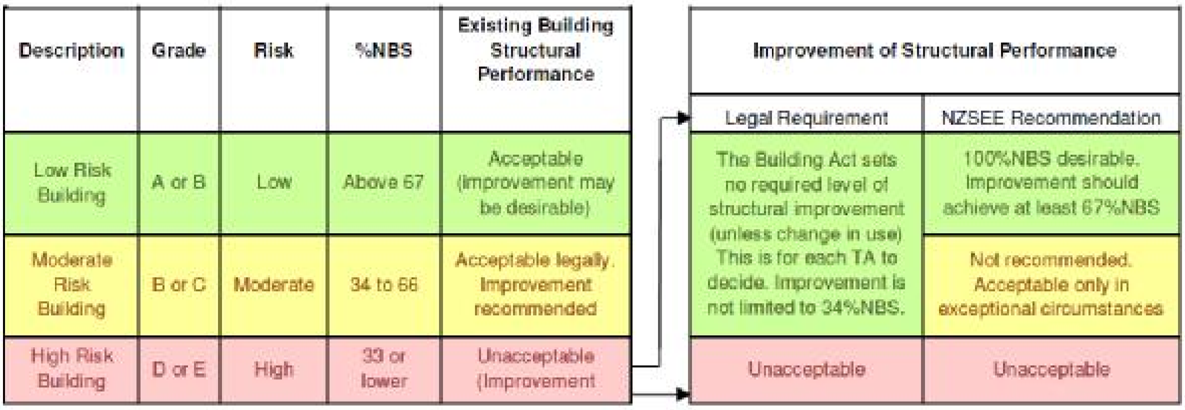
3 Earthquake Resistance Standards

For this assessment, the building's Ultimate Limit State earthquake resistance is compared with the current New Zealand Building Code requirements for a new building constructed on the site. This is expressed as a percentage of new building standard (%NBS). The new building standard load requirements have been determined in accordance with the current earthquake loading standard (NZS 1170.5:2004 Structural design actions - Earthquake actions - New Zealand).

No consideration has been given at this stage to checking the level of compliance against the increased Serviceability Limit State requirements.

The likely ultimate capacity of this building has been derived in accordance with the New Zealand Society for Earthquake Engineering (NZSEE) guidelines 'Assessment and Improvement of the Structural Performance of Buildings in Earthquakes' (AISPBE), 2006. These guidelines provide an Initial Evaluation Procedure that assesses a building's capacity based on a comparison of loading codes from when the building was designed and currently. It is a quick high-level procedure that can be used when undertaking a Qualitative analysis of a building. The guidelines also provide guidance on calculating a modified Ultimate Limit State capacity of the building which is much more accurate and can be used when undertaking a Quantitative analysis.

The New Zealand Society for Earthquake Engineering has proposed a way for classifying earthquake risk for existing buildings in terms of %NBS and this is shown in Figure 3.1 below.



Description	Grade	Risk	%NBS	Existing Building Structural Performance	Improvement of Structural Performance	
					Legal Requirement	NZSEE Recommendation
Low Risk Building	A or B	Low	Above 67	Acceptable (improvement may be desirable)	The Building Act sets no required level of structural improvement (unless change in use) This is for each TA to decide. Improvement is not limited to 34%NBS.	100%NBS desirable. Improvement should achieve at least 67%NBS
Moderate Risk Building	B or C	Moderate	34 to 66	Acceptable legally. Improvement recommended		Not recommended. Acceptable only in exceptional circumstances
High Risk Building	D or E	High	33 or lower	Unacceptable (Improvement	Unacceptable	Unacceptable

Figure 3.1: NZSEE Risk Classifications Extracted from table 2.2 of the NZSEE 2006 AISPBE Guidelines

Table 3.1 below compares the percentage NBS to the relative risk of the building failing in a seismic event with a 10% risk of exceedance in 50 years (i.e. on average 0.2% in any year). It is noted that the current seismic risk in Christchurch results in a 6% risk of exceedance in the next year.

Table 3.1: %NBS compared to relative risk of failure

Building Grade	Percentage of New Building Standard (%NBS)	Approx. Risk Relative to a New Building
A+	>100	<1
A	80-100	1-2 times
B	67-80	2-5 times
C	33-67	5-10 times
D	20-33	10-25 times
E	<20	>25 times

4 Building Description

4.1 General

Summary information about the building is given in the following table.

Table 4.1: Building Summary Information

Item	Details	Comment
Building name	BBQ Shelter at Halswell Aquatic Centre	
Street Address	339 Halswell Road, Halswell	
Age	Year built: 1998	From drawings available.
Description	Timber framed shelter with lightweight metal roof cladding and timber columns. Half of the walls are clad with lightweight metal cladding.	
Building Footprint / Floor Area	Approx. $60m^2$ (6m x 10m)	
No. of storeys / basements	Single storey, no basement.	
Occupancy / use	Storage	Importance Level 2.
Construction	Timber	Based on visual inspection.
Gravity load resisting system	Gravity loads from the roof are resisted by timber rafters and transferred to timber beams and columns around the perimeter and down the centreline of the building.	
Seismic load resisting system	The lateral loads are likely resisted by a combination of cantilever columns and metal angle braces in the end walls and back wall. The plywood sheeting in the roof will transfer the lateral loads from the roof to the columns.	Drawing indicates metal angle braces in walls and strip bracing in the roof.

Item	Details	Comment
Foundation system	Slab on grade with cantilever timber columns embedded in concrete piles.	
Stair system	No stairs.	
Other notable features	Open along the northern face.	
External works	Concrete footpath, grassed areas, trees and swimming pools.	
Construction information	Drawing by Ross Maguire Architects dated May 1998.	
Likely design standard	NZS 4203: 1992	Inferred from date noted on drawing.
Heritage status	Not heritage listed	
Other	May be wind governed.	

4.2 Structural 'Hot-spots'

- Connections between timber elements.
- Potentially non-ductile timber lateral load resisting system.

5 Site Investigations

5.1 Previous Assessments

The building had a Level 2 rapid assessment undertaken following the February 2011 and June 2011 earthquake events (refer to Appendix D).

5.2 Level 4 Damage Inspection

Visual inspections as part of the Level 4 damage assessment were undertaken on 29 August 2012.

6 Damage Assessment

6.1 Damage Summary

The table below provides a summary of damage observed during our inspection. Refer to Appendix A for photographs.

Table 6.1: Damage Summary

Damage type	Unknown	Minor	Moderate	Major	Comment
Settlement of foundations	✓				None observed during visual inspection. Level survey may be required to confirm.
Tilt of building	✓				None observed during visual inspection. Verticality survey may be required to confirm.
Liquefaction	✓				None observed during visual inspection. The aerial reconnaissance on 24 Feb 2011 shows that liquefaction occurred on neighbouring sites, where the extent was considered minor.
Settlement of external ground	✓				None observed during visual inspection.
Lateral spread / ground cracks		✓			Minor cracks observed in concrete slab near column locations.
Frame		✓			Cracking and splitting of timber columns near connections and at base of columns. Splitting of the base of the column may have been existing prior to the earthquakes. Minor movement at a ridge beam to column connection.
Bracing					No damage observed during visual inspection
Cladding /envelope					No damage observed during visual inspection.
Building services	✓				No inspections of services were carried out.
Other					

6.2 Surrounding Buildings

The Halswell Aquatic Centre has a number of other buildings on the site (See Site Layout in Appendix A), however there are no adjacent structures that are close enough that may affect the BBQ Shelter during an earthquake.

6.3 Residual Displacements and General Observations

No evidence of permanent settlement or displacements were observed during our visual inspection, however a global settlement survey may reveal movement that could be described as damage under insurance entitlement.

6.4 Implication of Damage

Based on our visual inspection the structure appears to have incurred minor damage only and therefore we believe the structural capacity has not been materially affected.

7 Generic Issues

Generic issues referred to in Appendix A of the EAG guideline document are not applicable to the timber framed BBQ Shelter structure.

8 Critical Structural Weaknesses

No Critical Structural Weaknesses (CSWs) have been identified for the BBQ Shelter.

9 Geotechnical Consideration

No Geotechnical information was available for this site. During the inspection, any damage to the surrounding ground was noted and any affect to the structure was considered.

10 Survey

No level or verticality surveys were carried out as there was no evidence of settlement or displacement observed during the inspection. CCC may wish to undertake a level survey as part of insurance entitlement considerations.

11 Initial Capacity Assessment

11.1 %NBS Assessment

The building has had its seismic capacity assessed using the Initial Evaluation Procedure based on the drawing available and visual assessment of the structural system. The building's capacity is expressed as a percentage of New Building Standard (%NBS) and is in the order of that shown below in Table 11.1. With only minor earthquake damage these capacities are subject to confirmation by a quantitative analysis which is more detailed. The post-damage capacity is considered to be the same as the original capacity.

Table 11.1: Indicative Building Capacities

System	Direction	Seismic Performance in *%NBS*	Notes
Cantilevering timber columns and metal angle braces	Longitudinal	60%	NZSEE Initial Evaluation Procedure. IL2, Z=0.3
Cantilevering timber columns and metal angle braces	Transverse	60%	NZSEE Initial Evaluation Procedure. IL2, Z=0.3

11.2 Seismic Parameters

The seismic design parameters based on current design requirements from NZS 1170:2004 and the NZBC clause B1 for this building are:

- Site soil class: D – NZS 1170.5:2004, Clause 3.1.3, Soft Soil
- Site hazard factor, Z = 0.3 – NZBC, Clause B1 Structure, Amendment 11 effective from 19 May 2011
- Return period factor Ru = 1 – NZS 1170.5:2004, Table 3.5, Importance level 2 structure with a 50 year design life.
- Near fault factor N (T,D) = 1 – NZS 1170.5:2004, Clause 3.1.6, Distance more than 20 km from fault line.

11.3 Expected Structural Ductility Factor

The lateral load resisting system in both directions has been assumed to have a ductility factor of 1.0.

11.4 Discussion of results

Based on the assessment results, the BBQ Shelter is potentially Earthquake Risk as the result is less than 67%NBS and greater than 33%NBS and is Seismic Grade C. This assessment is qualitative and based on the NZSEE IEP only. Some assumptions have been made such as the adequacy of connections between the roof and walls/columns.

12 Initial Conclusions

- The building has been assessed to have a seismic capacity of 60%NBS and is therefore potentially Earthquake Risk.
- No Critical Structural Weaknesses have been identified.
- Minor earthquake damage was observed during the visual inspection.

13 Recommendations

13.1 Occupancy

In order that the owner can make an informed decision about the on-going use and occupancy of their building the following information is presented in line with the Department of Building and Housing document '*Guidance for engineers assessing the seismic performance of non-residential and multi-unit residential buildings in greater Christchurch*', June 2012.

The building is considered to be earthquake risk, having an assessed capacity of between 34% and 67%NBS. The risk of collapse of an earthquake risk building is considered to be 5 to 10 times greater than that of an equivalent new building.

No significant damage or hazards were identified to the seismic or gravity load resisting system that would reduce its ability to resist further loads and therefore no restrictions on use or occupancy are recommended.

13.2 Further Investigations, Survey or Geotechnical Work

It is recommended that:

- A quantitative assessment could be undertaken on the building if there is any concern about the qualitative %NBS estimate.
- Size of angle braces in the walls should be confirmed as part of the quantitative assessment.

13.3 Damage Reinstatement

Repairs that would bring the building back to an “as new” condition are typically entitled under typical replacement insurance policies. We suggest you consult with your insurance advisor as to how you wish to proceed.

14 Design Features Report

Repairs will be required to reinstate the existing structural system. No new load paths are expected. A repair methodology has not been prepared at this stage

15 Limitations

The following limitations apply to this engagement:

- Beca and its employees and agents are not able to give any warranty or guarantee that all defects, damage, conditions or qualities have been identified.
- Inspections are primarily limited to visible structural components. Appropriate locations for invasive inspection, if required, will be based on damage patterns observed in visible elements, and review of the construction drawings and structural system. As such, there will be concealed structural elements that will not be directly inspected.
- The inspections are limited to building structural components only.
- Inspection of building services, pipework, pavement, and fire safety systems is excluded from the scope of this report.
- Inspection of the glazing system, linings, carpets, claddings, finishes, suspended ceilings, partitions, tenant fit-out, or the general water tightness envelope is excluded from the scope of this report.
- The preliminary assessment of the lateral load capacity of the building is limited by the completeness and accuracy of the drawings provided. Assumptions have been made in respect of the geotechnical conditions at the site and any aspects or material properties not clear on the drawings. Where these assumptions are considered material to the outcome further investigations may be recommended. It is noted the assessment has not been exhaustive, our analysis and calculations have focused on representative areas only to determine the level of provision made. At this stage we have not undertaken any checks of the gravity system, wind load capacity, or foundations.

- The information in this report provides a snapshot of building damage at the time the detailed inspection was carried out. Additional inspections required as a result of significant aftershocks are outside the scope of this work.

This report is of defined scope and is for reliance by CCC only, and only for this commission. Beca should be consulted where any question regarding the interpretation or completeness of our inspection or reporting arises.

Appendix A

Photographs

Figure A1: Site Plan (BBQ Shelter indicated)

Photo 1: External view of the building with awning.

Photo 2: Internal view with the southern wall linings shown.

Photo 3: Timber column embedded into concrete slab.

Damage Description: Splitting/ Cracking of timber columns. Hairline cracks in concrete slab

Photo 4: Typical column/beam connection

Damage Description: Splitting /Cracking of timber column near connection.

Photo 5: Ridge beam and rafter typical connection.

Damage Description: Ridge beam connection movement.

Appendix B

CERA DEE Summary Data

Detailed Engineering Evaluation Summary Data V1.11

Location

Building Name: BBQ Shelter
Unit No: Street
Building Address: Halswell Aquatic Centre 339 Halswell Road
Legal Description:
Degrees Min Sec
GPS south:
GPS east:
Building Unique Identifier (CCC): BU 1691-006 EQ2

Reviewer: David Whittaker
CPEng No: 123089
Company: Beca
Company project number: 5323355
Company phone number: 03 3663521
Date of submission:
Inspection Date: 29/08/2012
Revision: B
Is there a full report with this summary? yes

Site

Site slope: flat
Soil type:
Site Class (to NZS1170.5): D
Proximity to waterway (m, if <100m):
Proximity to clifftop (m, if < 100m):
Proximity to cliff base (m,if <100m):

Max retaining height (m): 0
Soil Profile (if available): Unknown
If Ground improvement on site, describe:
Approx site elevation (m): 0.00

Building

No. of storeys above ground: 1 single storey = 1
Ground floor split? no
Storeys below ground 0
Foundation type: other (describe)
Building height (m): 3.50
Floor footprint area (approx): 60
Age of Building (years): 14

Ground floor elevation (Absolute) (m):
Ground floor elevation above ground (m): 0.00
if Foundation type is other, describe: Post holes assumed with slab on grade
height from ground to level of uppermost seismic mass (for IEP only) (m): 3.5
Date of design: 1992-2004

Strengthening present? no
If so, when (year)?
And what load level (%g)?
Brief strengthening description:

Use (ground floor): other (specify)
Use (upper floors):
Use notes (if required): swimming club shelter
Importance level (to NZS1170.5): IL2

Gravity Structure

Gravity System: frame system
Roof: timber framed
Floors: concrete flat slab
Beams: timber
Columns: timber
Walls: non-load bearing

rafter type, purlin type and cladding Timber rafters, plywood, metal sheeting
slab thickness (mm) Slab on grade
type
typical dimensions (mm x mm)
0

Lateral load resisting structure

Lateral system along: other (note)
Ductility assumed, μ: 1.00
Period along: 0.40 0.00
Total deflection (ULS) (mm):
maximum interstorey deflection (ULS) (mm):

Note: Define along and across in detailed report!

describe system cantilevering timber posts and metal angle braces
estimate or calculation? estimated
estimate or calculation?
estimate or calculation?

Lateral system across: other (note)
Ductility assumed, μ: 1.00
Period across: 0.40 0.00
Total deflection (ULS) (mm):
maximum interstorey deflection (ULS) (mm):

describe system cantilevering timber posts and metal angle braces
estimate or calculation? estimated
estimate or calculation?
estimate or calculation?

Separations:

north (mm):
east (mm):
south (mm):
west (mm):

leave blank if not relevant

Non-structural elements

Stairs: None
Wall cladding: other light describe Lightweight metal
Roof Cladding: Metal describe Lightweight metal
Glazing: other (specify) None
Ceilings: none Plywood sheeting above rafters
Services(list):

Available documentation

Architectural none original designer name/date
Structural none original designer name/date
Mechanical none original designer name/date
Electrical none original designer name/date
Geotech report none original designer name/date

Damage

Site: (refer DEE Table 4-2)
Site performance: Good
Describe damage: No site damage was observed

Settlement: none observed notes (if applicable):
Differential settlement: none observed notes (if applicable):
Liquefaction: none apparent notes (if applicable):
Lateral Spread: none apparent notes (if applicable):
Differential lateral spread: none apparent notes (if applicable):
Ground cracks: none apparent notes (if applicable):
Damage to area: none apparent notes (if applicable):

Building:
Current Placard Status: green

Along Damage ratio:
Describe (summary):
Describe how damage ratio arrived at: No significant damage

Across Damage ratio:
Describe (summary):

$$Damage\_Ratio = \frac{(\%NBS(before) - \%NBS(after))}{\%NBS(before)}$$

Diaphragms Damage?: no Describe:
CSWs: Damage?: no Describe:
Pounding: Damage?: no Describe:
Non-structural: Damage?: no Describe:

Recommendations

Level of repair/strengthening required: minor structural Describe: Column splitting/cracking
Building Consent required: no Describe:
Interim occupancy recommendations: full occupancy Describe:

Along Assessed %NBS before: 0% 60% %NBS from IEP below
Assessed %NBS after: 0%
If IEP not used, please detail assessment methodology:

Across Assessed %NBS before: 0% 60% %NBS from IEP below
Assessed %NBS after: 0%

IEP **Use of this method is not mandatory - more detailed analysis may give a different answer, which would take precedence. Do not fill in fields if not using IEP.**

Period of design of building (from above): 1992-2004

h_n from above: 3.5m

Seismic Zone, if designed between 1965 and 1992: B

not required for this age of building: D soft soil
Design Soil type from NZS4203:1992, cl 4.6.2.2: b) Intermediate

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:	22.3%	22.3%

Note:1 for specifically design public buildings, to the code of the day: pre-1965 = 1.25; 1965-1976, Zone A =1.33; 1965-1976, Zone B = 1.2; all else 1.0: 1.00
Note 2: for RC buildings designed between 1976-1984, use 1.2: 1.0
Note 3: for buildngs designed prior to 1935 use 0.8, except in Wellington (1.0): 1.0

	along	across
Final $(\%NBS)_{nom}$:	**22%**	**22%**

2.2 Near Fault Scaling Factor

Near Fault scaling factor, from NZS1170.5, cl 3.1.6: 1.00

	along	across
Near Fault scaling factor (1/N(T,D), **Factor A**:	1	1

2.3 Hazard Scaling Factor

Hazard factor Z for site from AS1170.5, Table 3.3: 0.30
Z_{1992}, from NZS4203:1992: 0.8
Hazard scaling factor, **Factor B:** 2.666666667

2.4 Return Period Scaling Factor

Building Importance level (from above): 2
Return Period Scaling factor from Table 3.1, **Factor C**: 1.00

2.5 Ductility Scaling Factor

	along	across
Assessed ductility (less than max in Table 3.2)	1.00	1.00
Ductility scaling factor: =1 from 1976 onwards; or =kμ, if pre-1976, fromTable 3.3:	1.00	1.00
Ductiity Scaling Factor, **Factor D**:	1.00	1.00

2.6 Structural Performance Scaling Factor:

	along	across
Sp:	1.000	1.000
Structural Performance Scaling Factor **Factor E**:	1	1

	along	across
2.7 Baseline %NBS, $(NBS\%)_b = (\%NBS)_{nom} \times A \times B \times C \times D \times E$ $\%NBS_b$:	**60%**	**60%**

Global Critical Structural Weaknesses: (refer to NZSEE IEP Table 3.4)

3.1. Plan Irregularity, factor A:	insignificant	1
3.2. Vertical irregularity, Factor B:	insignificant	1
3.3. Short columns, Factor C:	insignificant	1

3.4. Pounding potential
Pounding effect D1, from Table to right: 1.0
Height Difference effect D2, from Table to right: 1.0

Therefore, Factor D: 1

Table for selection of D1	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Alignment of floors within 20% of H	**0.7**	**0.8**	**1**
Alignment of floors not within 20% of H	**0.4**	**0.7**	**0.8**

Table for Selection of D2	Severe	Significant	Insignificant/none
Separation	0<sep<.005H	.005<sep<.01H	Sep>.01H
Height difference > 4 storeys	0.4	0.7	1
Height difference 2 to 4 storeys	0.7	0.9	1
Height difference < 2 storeys	1	1	1

3.5. Site Characteristics: insignificant 1

3.6. Other factors, Factor F

	Along	Across
For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum	1.0	1.0
Rationale for choice of F factor, if not 1		

Detail Critical Structural Weaknesses: (refer to DEE Procedure section 6)
List any:
Refer also section 6.3.1 of DEE for discussion of F factor modification for other critical structural weaknesses

3.7. Overall Performance Achievement ratio (PAR)	**1.00**	**1.00**
4.3 PAR x (%NBS)b: PAR x Baselline %NBS:	**60%**	**60%**

4.4 Percentage New Building Standard (%NBS), (before): **60%**

Official Use only:

Accepted By:
Date:

Appendix C

Previous Reports and Assessments

Christchurch Eq RAPID Assessment Form - LEVEL 2

Inspector Initials: MK
Territorial Authority: Christchurch City
Date: 21/06/2011
Time: 9:30
Final Posting (e.g. UNSAFE): ~~Y1~~ G2

Building Name: HALSWELL POOL
Short Name: BBQ SHELTER
Address: BU 1691-006 EQ2

GPS Co-ordinates: S° E°
Contact Name:
Contact Phone:
Storeys at and above ground level: Below ground level:
Total gross floor area (m²): Year built:
No of residential Units:
Photo Taken: Yes No

Type of Construction

- ☑ Timber frame
- ☐ Steel frame
- ☐ Tilt-up concrete
- ☐ Concrete frame
- ☐ RC frame with masonry infill
- ☐ Concrete shear wall
- ☐ Unreinforced masonry
- ☐ Reinforced masonry
- ☐ Confined masonry
- ☐ Other:

Primary Occupancy

- ☐ Dwelling
- ☐ Other residential
- ☐ Public assembly
- ☐ School
- ☐ Religious
- ☐ Commercial/ Offices
- ☐ Industrial
- ☐ Government
- ☐ Heritage Listed
- ☐ Other

Investigate the building for the conditions listed on page 1 and 2, and check the appropriate column. A sketch may be added on page 3

Overall Hazards / Damage	Minor/None	Moderate	Severe	Comments
Collapse, partial collapse, off foundation	☑	☐	☐	
Building or storey leaning	☑	☐	☐	* Timber
Wall or other structural damage	☐	☑	☐	column cracking in misc
Overhead falling hazard	☑	☐	☐	locations
Ground movement, settlement, slips	☑	☐	☐	
Neighbouring building hazard	☐	☐	☐	
Electrical, gas, sewerage, water, hazmats	☐ N/A	☐	☐	

Record any existing placard on this building:
Existing Placard Type (e.g. UNSAFE): GREEN (COMPLEX)

Choose a new posting based on the new evaluation and team judgement. Severe conditions affecting the whole building are grounds for an UNSAFE posting. Localised Severe and overall Moderate conditions may require a RESTRICTED USE. Place INSPECTED placard at main entrance. Post all other placards at every significant entrance. Transfer the chosen posting to the top of this page.

INSPECTED *GREEN*: G1 [✓ G2]
RESTRICTED USE *YELLOW*: Y1 Y2
UNSAFE *RED*: R1 R2 R3

Record any restriction on use or entry:

Further Action Recommended:

Tick the boxes below only if further actions are recommended

- ☐ Barricades are needed (state location):
- ☑ Detailed engineering evaluation recommended
  - ☑ Structural ☐ Geotechnical ☐ Other:
- ☐ Other recommendations:

Minor connection detail upgrade.

Estimated Overall Building Damage (Exclude Contents)

- None ☐
- 0-1 % ☐
- 2-10 % ☑
- 11-30 % ☐
- 31-60 % ☐
- 61-99 % ☐
- 100 % ☐

Sign here on completion: Koclozska
Date & Time: 22/06/11
ID

Inspection ID: ________ *(Office Use Only)*

PRUP1:

Structural Hazards/ Damage	Minor/None	Moderate	Severe	Comments
Foundations	☑	☐	☐	
Roofs, floors (vertical load)	☑	☐	☐	
Columns, pilasters, corbels	☐	☑	☐	cracked column
Diaphragms, horizontal bracing	☑	☐	☐	
Pre-cast connections	☐ N/A	☐	☐	
Beam	☑	☐	☐	
Non-structural Hazards / Damage				
Parapets, ornamentation	☑	☐	☐	
Cladding, glazing	☑	☐	☐	
Ceilings, light fixtures	☑	☐	☐	
Interior walls, partitions	☐ N/A	☐	☐	
Elevators	☐ N/A	☐	☐	
Stairs/ Exits	☐ N/A	☐	☐	
Utilities (eg. gas, electricity, water) not checked	☐	☐	☐	
Other	☐	☐	☐	
Geotechnical Hazards / Damage				
Slope failure, debris	☑	☐	☐	
Ground movement, fissures	☑	☐	☐	
Soil bulging, liquefaction	☑	☐	☐	

General Comment ____________________

Usability Category

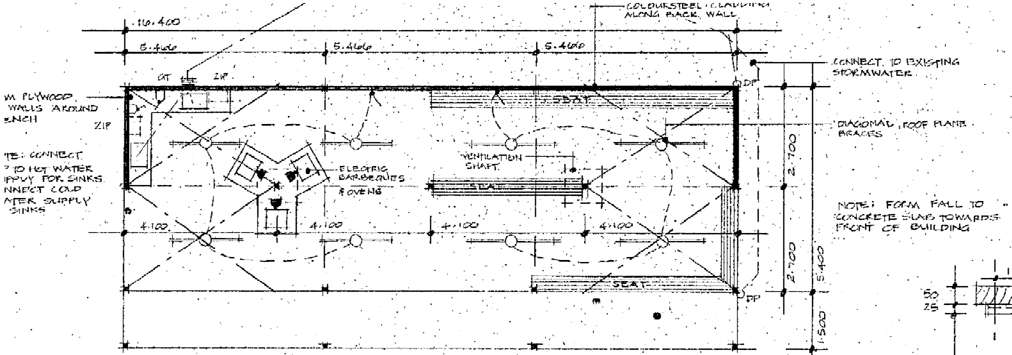
Damage Intensity	Posting	Usability Category	Remarks
Light damage *Low risk*	Inspected (Green)	G1. Occupiable, no immediate further investigation required	
		[✓ G2.] Occupiable, repairs required	The rafter beam to column connection needs repair.
Medium damage *Medium risk*	Restricted Use (Yellow)	Y1 Short term entry	
		Y2. No entry to parts until repaired or demolished	
Heavy damage *High risk*	Unsafe (Red)	R1. Significant damage: repairs, strengthening possible	
		R2. Severe damage: demolition likely	
		R3. At risk from adjacent premises or from ground failure	

Sketch (optional)
Provide a sketch of the entire building or damage points. Indicate damage points.

Recommendations for Repair and Reconstruction or Demolition (Optional)

Appendix D

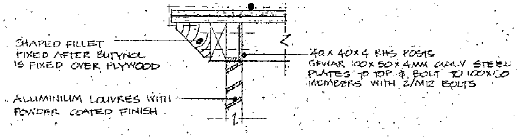
Drawings



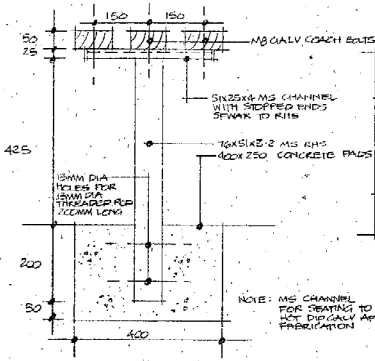
PLAN
SCALE: 1:100

ELECTRICAL KEY

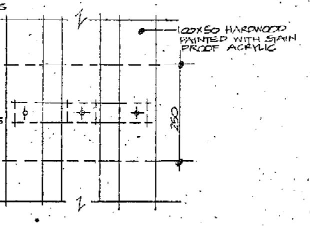
─○─	1500MM DOUBLE FLUORESENT LIGHT OUTLET
△	DOUBLE SWITCHED SOCKET OUTLET, BENCH MOUNTED
▲	FIXED SOCKET OUTLET FOR EACH BARBEQUE



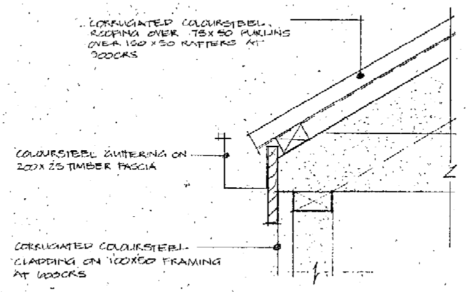
① VENTILATION SHAFT ROOF
SCALE: 1:10



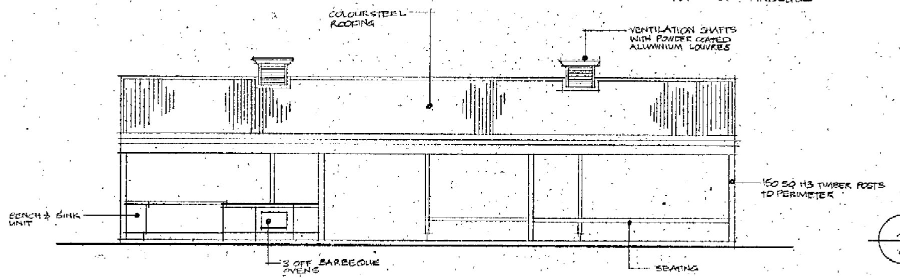
② SEAT DETAIL
SCALE: 1:10



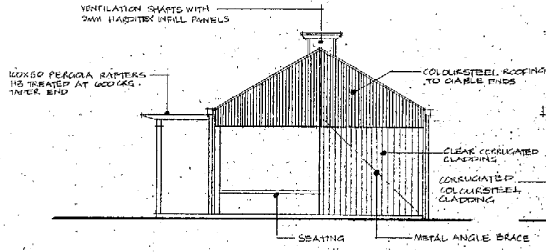
SEAT PLAN
SCALE: 1:10



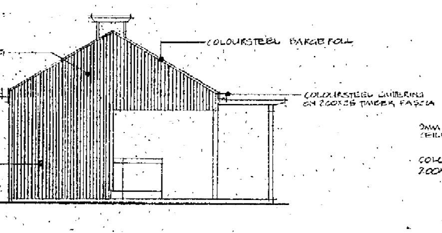
③ EAVE DETAIL
SCALE: 1:10



NORTH EAST ELEVATION
SCALE: 1:100



NORTH WEST ELEVATION
SCALE: 1:100



SOUTH EAST ELEVATION
SCALE: 1:100

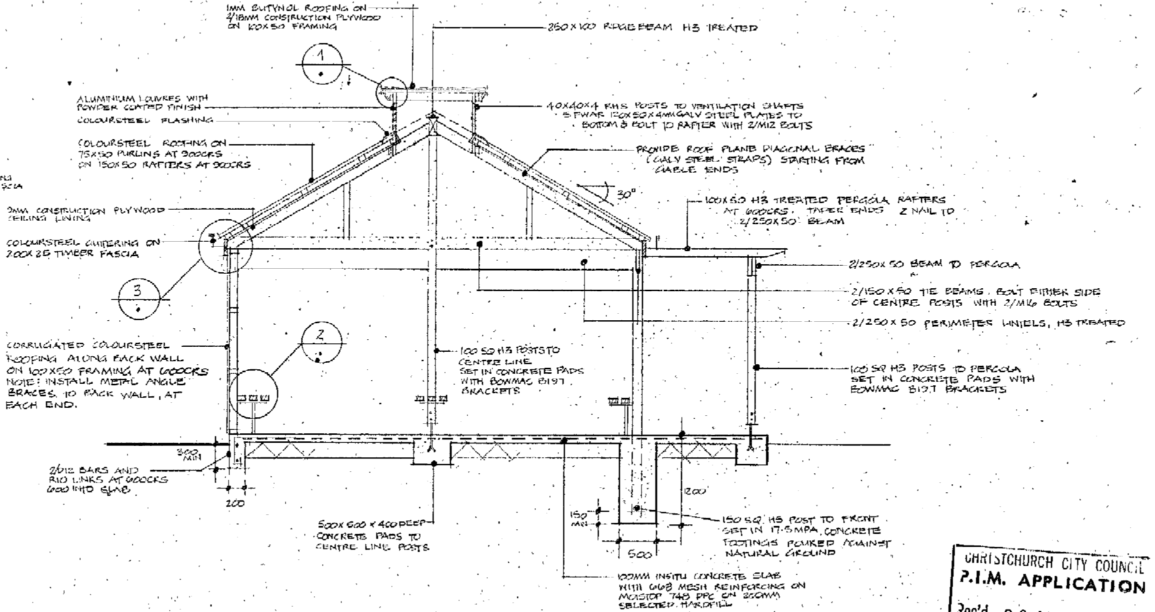
SPECIFICATION NOTE:

COMPLIANCE:
ALL WORK OF ALL TRADES AND ALL MATERIALS PROPRIETRY ITEMS APPLIANCES METHODS OF INSTALLATION AND CONSTRUCTION OF EVERY ITEM CONTAINED IN THIS CONTRACT MUST MEET THE REQUIREMENTS OF THE NEW ZEALAND BUILDING CODE AND IN PARTICULAR SECTIONS G12 & G13.

OTHER:

- ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH GOOD TRADE PRACTICE BY SKILLED TRADESPEOPLE
- ALL VARIATIONS SHALL BE IN WRITING ONLY
- ALL MATERIALS WHETHER ON SITE OR NOT SHALL BE COVERED BY INSURANCE. THE MAIN CONTRACTOR SHALL TAKE OUT AN ALL RISKS INSURANCE POLICY WHICH SHALL INDEMNIFY THE OWNERS AGAINST ANY CLAIM RELATING TO THE CONTRACT
- THE MAIN CONTRACTOR SHALL ARRANGE ALL INSPECTIONS AS NECESSARY. ALL FEES SHALL BE PAID BY OWNERS
- CO OPERATE WITH OWNERS & MAINTAIN SECURITY AT ALL TIMES.
- ALL CONTRACTORS SHALL TAKE ALL REASONABLE PRECAUTIONS TO PROTECT THE FINISHED SURFACES OF OTHER TRADES.

CONSULTING ENGINEER:
BRIAN SPENCE
BLS CONSULTING
HEYWARDS RD
KAIAPOI
PH 327 8002



SECTION
SCALE: 1:50

CHRISTCHURCH CITY COUNCIL
P.I.M. APPLICATION
Rec'd 22 MAY 1998
Civic Offices
PROJECT No. 9800383

BCP

HALSWELL SWIMMING POOL
BARBEQUE PAVILION

ROSS MAGUIRE
ARCHITECTS

CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING ANY
DO NOT SCALE OFF THIS DRAWING

DATE: MAY 1998
SCALES: 1:100, 1:50, 1:10

1