Ascot Community Centre
Detailed Engineering Evaluation
BU 1306-003 EQ2
Qualitative Report

Prepared for Christchurch City Council (CCC)

By Beca Carter Hollings & Ferner Ltd (Beca)

14 June 2013

Revision History

Revision Nº	Prepared By	Description	Date
A	Andrew Sporn	Draft for CCC review	9 October 2012
B	Andrew Sporn	Final	14 June 2013

Document Acceptance

Action	Name	Signed	Date
Prepared by	Andrew Sporn		14 June 2013
Reviewed by	Nicholas Charman		14 June 2013
Approved by	David Whittaker		14 June 2013
on behalf of	Beca Carter Hollings & Ferner Ltd		

Ascot Community Centre
BU1306-003 EQ2

Detailed Engineering Evaluation
Qualitative Report – SUMMARY
Version 1

Address
12 Ascot Avenue,
Parklands, 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 Ascot Community Centre is located at 12 Ascot Avenue, Parklands, Christchurch. It is assumed to have been built in 1968 (from information contained in a newspaper article about the opening) and has an approximate floor area of 290m^2 internally. It is currently used as a multipurpose community hall. The building is generally rectangular in plan and the main structural system comprises of concrete masonry block walls and timber/steel roof framing. No structural drawings were obtained and no calculations were carried out.

Key Damage Observed

Visual inspections on 7 August 2012 indicate the building has suffered minor structural earthquake damage. The key damage observed includes:

- Cracking in the plasterboard ceiling panels.
- Minor cracking to the external concrete ground slab under the balustrade outside of the building.
- We understand that there was damage to the internal masonry block walls. This damage appears to have been repaired.

Critical Structural Weaknesses (CSW)

The following Critical Structural Weakness (CSW) was identified based on the structural inspection conducted on 7 August 2012:

- Site characteristics: significant liquefaction potential due to widespread liquefaction observed in the surrounding area.

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

The building has been assessed to have a seismic capacity of 36%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 potentially 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:

- Further efforts are made to obtain structural drawings.
- A verticality and level survey could be carried out to determine the extent of settlement of the building for insurance purposes.
- Based on the use of the building and the %NBS score we recommend a Quantitative Assessment is carried out to give a more reliable %NBS assessment.
- 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.

Table of Contents

Appendices

Appendix A - Photographs

Appendix B - CERA DEE Summary Data

Appendix C - Previous Reports and Assessments

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 Ascot Community Centre located at 12 Ascot Avenue, Parklands, Christchurch.

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. No drawings were available and hence this report is based on our visual inspection of the building only.

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.

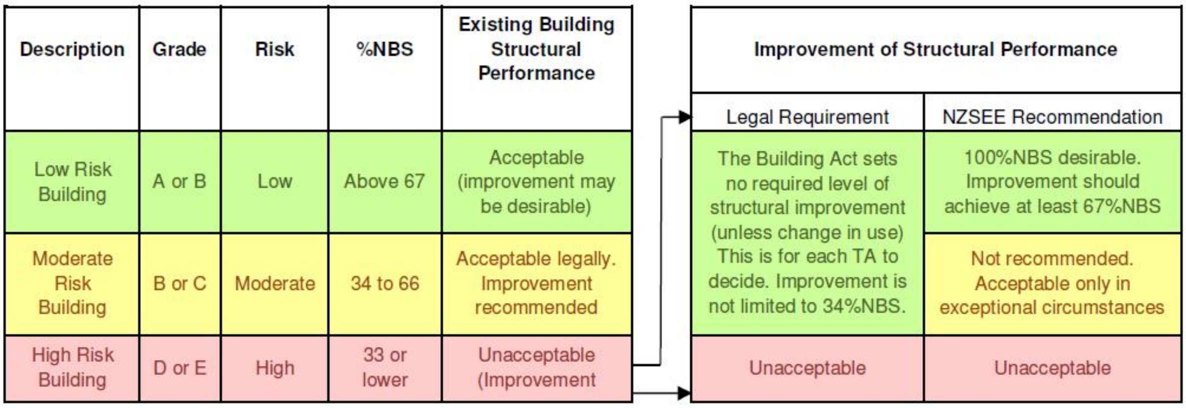
3 Earthquake Resistance Standards

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	Ascot Community Centre	
Street Address	12 Ascot Avenue, Parklands, Christchurch	
Age	44 years	Constructed in 1968. Based on a newspaper article about the opening of the building.
Description	The Ascot Community Centre is a multipurpose community space, surrounded by a golf course. The building is generally rectangular in plan and is a single storey structure with the main structural elements being concrete masonry walls.	
Building Footprint / Floor Area	26m x 11m, 290m^2 internally	
No. of storeys / basements	1 / No basement	
Occupancy / use	Multipurpose community centre	Importance Level 2 (capacity less than 300)
Construction	The main structural system is concrete masonry walls. Given the age of the building it is likely that the masonry is partially filled and lightly reinforced. The roofing consists of lightweight metal sheeting supported by timber/steel purlins and timber/steel rafters spanning between the external masonry walls.	Based on visual inspection. No drawings available. The roof structure was concealed by the ceiling.

Item	Details	Comment
Gravity load resisting system	The gravity loads from the roof are supported by timber/steel purlins spanning between steel rafters which transmit the load into load bearing concrete masonry walls. Gravity loads from the floor are supported by a concrete slab on grade.	No drawings available.
Seismic load resisting system	The lateral loads in both directions are resisted by the partially filled concrete masonry shear walls. The lateral load from the walls is transmitted into the foundations. It is unknown if there is a concealed roof diaphragm (e.g. timber sarking) or bracing to transmit lateral load from the roof to the walls. Some areas appear to have a fixed plasterboard ceiling which may act as a roof diaphragm.	No drawings available.
Foundation system	Unknown, but assumed to be shallow foundations with a concrete slab on grade.	No drawings available.
Stair system	No stairs	
Other notable features		
External works	Paved and landscaped courtyard.	
Construction information	Visual inspections	No drawings available.
Likely design standard	NZSS 1900 Chapter 8:1965	Inferred from age of building.
Heritage status	Not heritage listed	
Other		

4.2 Structural 'Hot-spots'

- Connections between the roof diaphragm and the walls.
- Shear strength of masonry walls.
- Out of plane capacity of masonry block walls.

5 Site Investigations

5.1 Previous Assessments

The building had a level 2 rapid assessment undertaken following June 2011 earthquake (refer to Appendix C). The June 2011 Rapid Assessment notes that repair works were in progress at the time of the inspection. It is therefore likely that some of the damage caused by the earthquakes is no longer visible.

5.2 Level 4 Damage Inspection

Visual inspections as part of the level 4 damage assessment were undertaken on 7 August 2012. Photographs were taken as a record of inspection.

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 of the observed damage. As noted in Section 5.1 some earthquake damage repair work has been completed.

Table 6.1: Damage Summary

Damage type	Unknown	Minor	Moderate	Major	Comment
settlement of foundations	ü				None observed during visual inspection. Level survey may be required to confirm.
tilt of building	ü				None observed during visual inspection. Verticality survey may be required to confirm.
liquefaction	ü				No liquefaction was observed during visual inspection. Aerial photographs taken on 24 February 2011 show there was a high degree of liquefaction observed in the area surrounding the site (refer Appendix A)
settlement of external ground	ü				None observed during visual inspection.
lateral spread / ground cracks	ü				None observed during visual inspection.
frame					No damage observed during visual inspection.
masonry walls					No damage observed during visual inspection. The previous level two assessment noted damage to the masonry walls with repairs underway at the time of the level 2 inspection.
cracking to concrete floors		ü			Minor cracking was observed in the concrete path outside the building.
bracing	ü				Roof bracing, if present, was obscured by the fixed ceiling.
precast flooring seating					Not Applicable
stairs					Not Applicable
cladding /envelope		ü			Minor damage was observed in the ceiling plasterboard lining.
internal fit out					No damage was observed during visual inspection.

Damage type	Unknown	Minor	Moderate	Major	Comment
building services	ü				Building services were not inspected.
other					Not Applicable

6.2 Surrounding Buildings

The Ascot Community Centre is adjacent to a golf course and is not in close proximity to any other buildings.

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

Other than minor localised cracking in the plasterboard ceiling no superstructure damage was observed during our visual inspection and therefore we believe the structural capacity has not been materially affected.

7 Generic Issues

The following generic issues referred to in Appendix A of the EAG guideline document have been identified as applicable to the Ascot Community Centre:

Partially Filled Concrete Masonry Walls

- Inadequate shear and/or flexural strength of the concrete masonry walls.
- Inadequate connection of roof diaphragm to the walls.

8 Critical Structural Weaknesses

Based on the inspection of the building conducted on 7 August 2012 the following Critical Structural Weakness (CSW) was observed.

8.1 Site Characteristics

Based on the aerial reconnaissance on 24 February 2011 evidence of liquefaction was visible on the site. Consequently a significant site characteristic factor of 0.7 representing significant liquefaction was used to assess the %NBS in the IEP assessment of the building.

9 Geotechnical Consideration

No geotechnical information was available for this site. During the inspection, any damage to the surrounding pavement 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 assumed age, visually determined construction type and assessed 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. A factor of 2.5 has been selected for the F factor as the building is a simple single storey structure and no damage other than cracking in the plasterboard ceiling was observed during the inspection (and minor cracking to internal blockwalls which had been repaired prior to inspection). 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
Partially filled, reinforced, concrete masonry shear walls.	Longitudinal	36%	NZSEE Initial Evaluation Procedure. IL 2, Z=0.3.
Partially filled, reinforced, concrete masonry shear walls.	Transverse	36%	NZSEE Initial Evaluation Procedure. IL 2, Z=0.3.

11.2 Seismic Parameters

The seismic design parameters based on current design requirements from NZS1170:2004 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 is partially filled, lightly reinforced concrete masonry shear walls which have been assumed to have a ductility factor of 1.25 in the IEP assessment.

11.4 Discussion of results

Based on the IEP results, the Ascot Community Centre is considered potentially Earthquake Risk and Seismic Grade C as the IEP result is between 33%NBS and 67%NBS. This assessment is qualitative and based on the NZSEE IEP only.

12 Initial Conclusions

- Minor structural earthquake damage observed.
- The building has been assessed to have a seismic capacity of 36%NBS and is therefore classified as potentially Earthquake Risk.
- A Critical Structural Weakness has been identified but its impact on the structure is not considered significant.

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 potentially 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 verticality and level survey could be carried out to determine the extent of settlement of the building for insurance purposes.
- Given the community use of the building a quantitative assessment should be undertaken to give a more reliable assessment of %NBS.
- Further efforts are made to obtain structural drawings.

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 1: Site layout

Photo 1: External view of the building

Photo 2: Liquefaction of areas surrounding site (aerial photo taken 24 February 2011)

Photo 3: Internal view of the building

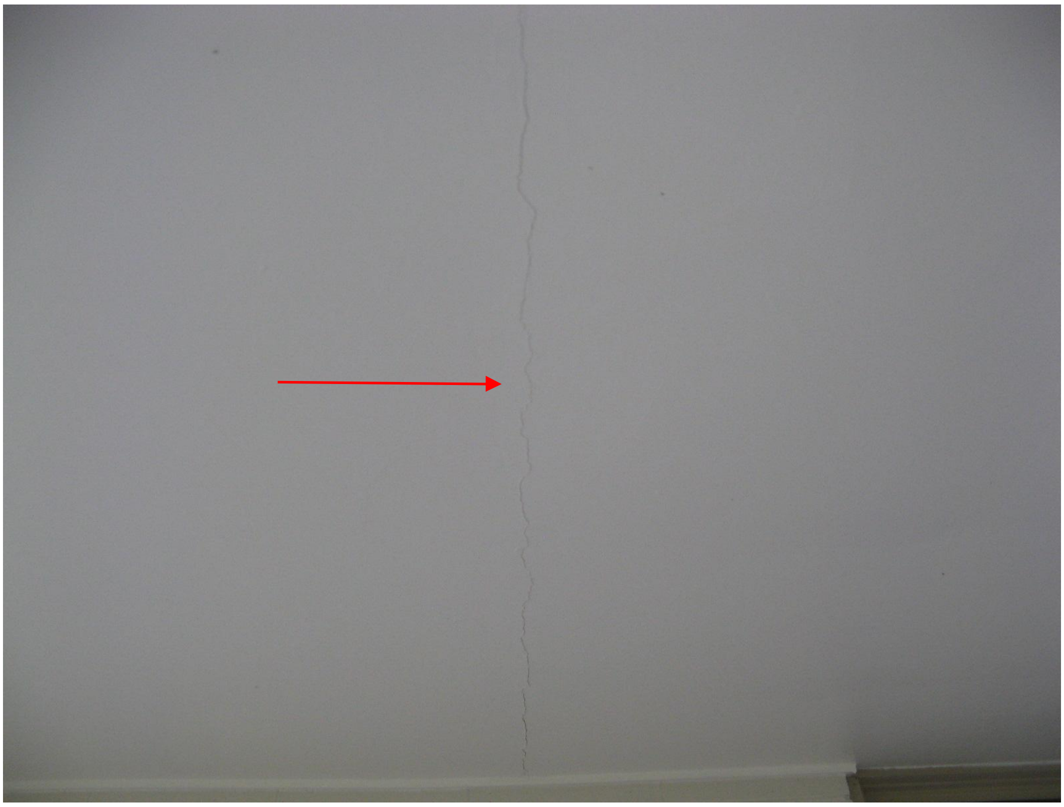


Photo 4: Damage to plasterboard ceiling

Damage: Minor cracking (<1mm) to plasterboard ceiling panels.

Photo 5: External concrete pavement

Damage: Minor cracking to concrete slab.

Appendix B

CERA DEE Summary Data

Detailed Engineering Evaluation Summary Data V1.11

Location

Building Name: Ascot Community Centre
Unit No: Street
Building Address: 12 Ascot Avenue, Parklands
Legal Description:
Degrees Min Sec
GPS south:
GPS east:
Building Unique Identifier (CCC): BU 1306-003

Reviewer: David Whittaker
CPEng No: 123089
Company: Beca
Company project number: 5323355
Company phone number: 03 3663521
Date of submission: 14/06/2013
Inspection Date: 7/08/2012
Revision: A
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: N/A
Approx site elevation (m):

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): 5.00
Floor footprint area (approx): 290
Age of Building (years): 44

Ground floor elevation (Absolute) (m):
Ground floor elevation above ground (m): 0.00
if Foundation type is other, describe: Shallow Foundations
height from ground to level of uppermost seismic mass (for IEP only) (m): 5
Date of design: 1965-1976

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): General purpose community centre
Importance level (to NZS1170.5): IL2

Gravity Structure

Gravity System: load bearing walls
Roof: steel framed — rafter type, purlin type and cladding:
Floors: other (note) — describe sytem: Shallow foundations
Beams: timber — type:
Columns: load bearing walls — typical dimensions (mm x mm):
Walls: partially filled concrete masonry — thickness (mm):

Lateral load resisting structure

Lateral system along: partially filled CMU
Ductility assumed, μ: 1.25
Period along: 0.40 #### enter height above at H31
Total deflection (ULS) (mm):
maximum interstorey deflection (ULS) (mm):

Note: Define along and across in detailed report!

note total length of wall at ground (m): 26
estimate or calculation? estimated
estimate or calculation?
estimate or calculation?

Lateral system across: partially filled CMU
Ductility assumed, μ: 1.25
Period across: 0.40 #### enter height above at H31
Total deflection (ULS) (mm):
maximum interstorey deflection (ULS) (mm):

note total length of wall at ground (m): 11
estimate or calculation? estimated
estimate or calculation?
estimate or calculation?

Separations:

north (mm): leave blank if not relevant
east (mm):
south (mm):
west (mm):

Non-structural elements

Stairs: none
Wall cladding: exposed structure — describe Concrete masonry walls
Roof Cladding: Metal — describe Lightweight metal sheeting
Glazing: timber frames
Ceilings: plaster, fixed
Services(list): Electrical, Plumbing

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:
Settlement: none observed — notes (if applicable):
Differential settlement: none observed — notes (if applicable):
Liquefaction: 2-5 m³/100m² — notes (if applicable): Aerial photos showed liquefaction occurred in surrounding area
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: 0%
Describe (summary):
Describe how damage ratio arrived at: Damage not considered to have reduced capacity

Across Damage ratio: 0%
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?: yes — Describe: Minor cracking to plasterboard ceilings

Recommendations

Level of repair/strengthening required: minor structural — Describe: Repair cracking to plasterboard
Building Consent required: no — Describe:
Interim occupancy recommendations: full occupancy — Describe:

Along Assessed %NBS before e'quakes: 36% 36% %NBS from IEP below
Assessed %NBS after e'quakes: 36%

If IEP not used, please detail assessment methodology:

Across Assessed %NBS before e'quakes: 36% 36% %NBS from IEP below
Assessed %NBS after e'quakes: 36%

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): 1965-1976

h_n from above: 5m

Seismic Zone, if designed between 1965 and 1992: B

not required for this age of building
not required for this age of building

	along	across
Period (from above):	0.4	0.4
(%NBS)nom from Fig 3.3:	5.0%	5.0%

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)$_{nom}$:	**5%**	**5%**

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:** 3.333333333

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)	1.25	1.25
Ductility scaling factor: =1 from 1976 onwards; or =$k\mu$, if pre-1976, fromTable 3.3:	1.14	1.14
Ductiity Scaling Factor, **Factor D**:	1.14	1.14

2.6 Structural Performance Scaling Factor:

Sp:	0.925	0.925
Structural Performance Scaling Factor **Factor E**:	1.081081081	1.081081081

2.7 Baseline %NBS, (NBS%)$_b$ = (%NBS)$_{nom}$ x A x B x C x D x E

%NBS$_b$:	**21%**	**21%**

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

3.1. Plan Irregularity, factor A: 1

3.2. Vertical irregularity, Factor B: 1

3.3. Short columns, Factor C: 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 significant 0.7

3.6. Other factors, Factor F

	Along	Across
For ≤ 3 storeys, max value =2.5, otherwise max valule =1.5, no minimum	2.5	2.5

Rationale for choice of F factor, if not 1: Simple single storey structure, only minor damage sustained

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)	**1.75**	**1.75**
4.3 PAR x (%NBS)b: PAR x Baselline %NBS:	**36%**	**36%**

4.4 Percentage New Building Standard (%NBS), (before) **36%**

Official Use only:

Accepted By:
Date:

Appendix C

Previous Reports and Assessments

Christchurch Eq. RAPID Assessment Form - LEVEL 1

Inspector Initials: RB.
Territorial Authority: Christchurch City
Date of Inspection: 18/6/2011
Time: 12-15pm
Exterior Only ☐
Exterior and Interior ☑

Building Name: Ascot Community Ctr.
Short Name: SU 1306-003.0
Address: 193 Travis Rd.
GPS Co-ordinates: S° E°
Contact Name:
Contact Phone:
Storeys at and above ground level: 1
Below ground level: 0
Total gross floor area (m²): 300-400.
Year built: 1968.
No of residential Units:
Photo Taken: [✓ Yes] No

Type of Construction

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

Primary Occupancy

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

Investigate the building for the conditions listed below:

Overall Hazards / Damage	Minor/None	Moderate	Severe	Comments
Collapse, partial collapse, off foundation	☑	☐	☐	
Building or storey leaning	☑	☐	☐	
Wall or other structural damage	☑	☐	☐	damage to internal masonry wall from Feb quake.
Overhead falling hazard	☑	☐	☐	
Ground movement, settlement, slips	☑	☐	☐	
Neighbouring building hazard	☑	☐	☐	
Other	☑	☐	☐	

Choose a posting based on the 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.

INSPECTED *GREEN* ☐ RESTRICTED USE *YELLOW* ☐ UNSAFE *RED* ☐

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):
☐ Level 2 or detailed engineering evaluation recommended
☐ Structural ☐ Geotechnical ☐ Other:
☐ Other recommendations:

Estimated Overall Building Damage (Exclude Contents)

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

Sign here on completion
Date & Time: 18/6/2011
ID: 70494
CPEng

Inspection ID __________ *(Office Use Only)*

Christchurch Eq RAPID Assessment Form - LEVEL 2

Inspector Initials
Territorial Authority Christchurch City

Date
Time

Final Posting (e.g. UNSAFE)

Building Name
Short Name
Address

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	☐	☐	☐	
Wall or other structural damage	☐	☐	☐	
Overhead falling hazard	☐	☐	☐	
Ground movement, settlement, slips	☐	☐	☐	
Neighbouring building hazard	☐	☐	☐	
Electrical, gas, sewerage, water, hazmats	☐	☐	☐	

Record any existing placard on this building:

Existing Placard Type (e.g. UNSAFE)

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:

Estimated Overall Building Damage (Exclude Contents)

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

Sign here on completion

Date & Time
ID

Inspection ID: ________ *(Office Use Only)*

PRUP1 :

Structural Hazards/ Damage	Minor/None	Moderate	Severe	Comments
Foundations	☑	☐	☐	
Roofs, floors (vertical load)	☑	☐	☐	
Columns, pilasters, corbels	☑	☐	☐	
Diaphragms, horizontal bracing	☑	☐	☐	
Pre-cast connections	☑	☐	☐	
Beam	☑	☐	☐	
Non-structural Hazards / Damage				
Parapets, ornamentation	☑	☐	☐	
Cladding, glazing	☑	☐	☐	
Ceilings, light fixtures	☑	☑	☐	minor repair works in
Interior walls, partitions	☑	☑	☐	process to block walls
Elevators	☑	☐	☐	+ ceilings.
Stairs/ Exits	☑	☐	☐	
Utilities (eg. gas, electricity, water)	☑	☐	☐	
Other	☑	☐	☐	
Geotechnical Hazards / Damage				
Slope failure, debris	☑	☐	☐	
Ground movement, fissures	☑	☐	☐	
Soil bulging, liquefaction	☑	☐	☐	liquefaction on street nearby.

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]	→ in process of repairs
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	

Inspection ID: __________ *(Office Use Only)*

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

Recommendations for Repair and Reconstruction or Demolition (Optional)