CHRISTCHURCH CITY COUNCIL
PRK_1128_BLDG_002 EQ2
Somerfield Park – Pavilion
59 Studholme Street, Somerfield

QUANTITATIVE ASSESSMENT REPORT

FINAL

- Rev C
- 21 January 2014

Christchurch City Council

PRK_1128_BLDG_002 EQ2
Somerfield Park – Pavilion
59 Studholme Street, Somerfield

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Contents

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	Signature	Date	Name	Title
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1. Executive Summary

1.1. Background

A quantitative assessment was carried out on building PRK_1128_BLDG_002 EQ2 located at Somerfield Park on 59 Studholme Street, Somerfield. The building is a masonry structure with a timber framed roof. It is currently utilised as a pavilion and toilet block. An aerial photograph illustrating the buildings location is shown below in Figure 1. Detailed descriptions outlining the buildings age and construction type are given in Section 5 of this report.

- **Figure 1: Aerial Photograph of Building PRK_1128_BLDG_002 EQ2 located at 59 Studholme Street**

This quantitative report for the building structure is based on the Engineering Advisory Group's "Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings" (draft) July 2011and our visual inspection carried out on 24 May 2012 and structural drawings.

1.2. Key Damage Observed

No structural damage was observed at the time of the inspection.

1.3. Critical Structural Weaknesses

No critical structural weaknesses have been identified.

1.4. Indicative Building Strength

As described in the Engineering Advisory Group's "Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings" (draft) July 2011 we have assessed the capacity of the building as a percentage of new building standard seismic resistance using the quantitative method. Our assessment included consideration of geotechnical conditions, existing earthquake damage to the building and structural engineering calculations to assess both strength and ductility/resilience.

The assessment was based on the following:

- On-site investigation to assess the extent of existing earthquake damage including limited intrusive investigation.
- Qualitative assessment of critical structural weaknesses (CSWs) based on review of available structural drawings and inspection where drawings were not available.
- A geotechnical desktop study.
- Assessment of the strength of the existing structures taking into account their current condition.

The building's original capacity has been assessed to be in the order of 35% NBS. No structural damage was observed during our site investigation. The post earthquake capacity is also in the order of 35% NBS. Since the building's seismic capacity is less than 67% NBS the building is classed as an earthquake risk building according to the NZSEE guidance[1]. It is worth noting that this assessment was made with only partial structural drawings and is accordingly limited.

1.5. Recommendations

Based on the findings of the assessment, we have provided recommendations for improvement of the structure since it is an earthquake prone building.

It is recommended that:

a) We consider that barriers around the building are not necessary.
b) Consideration be given to strengthening the building to 67% NBS.

[1] NZSEE 2006, *Assessment and Improvement of the Structural Performance of Buildings in Earthquakes*, p 17

2. Introduction

Sinclair Knight Merz was engaged by the Christchurch City Council to carry out a quantitative assessment of the seismic performance of PRK_1128_BLDG_002 EQ2 located at Somerfield Park on 59 Studholme Street, Somerfield.

The scope of this quantitative analysis includes the following:

- Analysis of the seismic load carrying capacity of the building compared with current seismic loading requirements or new building standard (NBS). It should be noted that this analysis considers the building in its damaged state where appropriate.
- Identify any critical structural weaknesses which may exist in the building and include these in the assessed %NBS of the structure.
- Preparation of a summary report outlining the areas of concern in the building as well as identifying strengthening concepts to 67%NBS for any areas which have insufficient capacity if the building is found to be an earthquake prone building.

The recommendations from the Engineering Advisory Group's "Guidance on Detailed Engineering Evaluation of Earthquake Affected Non-residential Buildings" (draft) July 2011 were followed to assess the likely performance of the structures in a seismic event relative to the new building standard (NBS). 100% NBS is equivalent to the strength of a building that fully complies with current codes. This includes a recent increase of the Christchurch seismic hazard factor from 0.22 to 0.3[2].

At the time of this report, no intrusive site investigation has been carried out, partial structural drawings were available. The partial structural drawings did not show all the structural details and is therefore accordingly limited, as assumptions had to be made where appropriate. The building description outlined in Section 5 is based on our visual inspection and partial structural drawings

[2] http://www.dbh.govt.nz/seismicity-info

3. Compliance

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

3.1. 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 anticipated that CERA will adopt the Detailed Engineering Evaluation Procedure document (draft) issued by the Structural Advisory Group on 19 July 2011. This document sets out a methodology for both qualitative and quantitative assessments.

The qualitative assessment is a desk-top and site inspection assessment. It is based on a thorough visual inspection of the building coupled with a review of available documentation such as drawings and specifications. The quantitative assessment involves analytical calculation of the buildings 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 and amount of damage
- The age and structural type of the building
- Consideration of any critical structural weaknesses
- The extent of any earthquake damage

3.2. Building Act

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

3.2.1. 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).

3.2.2. 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.

3.2.3. 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.

3.2.4. 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.

3.2.5. 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.

3.2.6. Section 131 – Earthquake Prone Building Policy

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

3.3. 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 on the 4th of 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. Council recognises that it may not be practicable for some repairs to meet that target. The council will work closely with building owners to achieve sensible, safe outcomes;
- 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.

We anticipate that any building with a capacity of less than 34% 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.

3.4. 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.

After the February Earthquake, 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.

4. Earthquake Resistance Standards

For this assessment, the building's 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).

The likely 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 buildings 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 2 below.

- **Figure 2: NZSEE Risk Classifications Extracted from table 2.2 of the NZSEE 2006 AISPBE Guidelines**

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

Table 1 below provides an indication of the risk of failure for an existing building with a given percentage NBS, relative to the risk of failure for a new building that has been designed to meet current Building Code criteria (the annual probability of exceedance specified by current earthquake design standards for a building of 'normal' importance is 1/500, or 0.2% in the next year, which is equivalent to 10% probability of exceedance in the next 50 years).

- **Table 1: %NBS compared to relative risk of failure**

Percentage of New Building Standard (%NBS)	Relative Risk (Approximate)
>100	<1 time
80-100	1-2 times
67-80	2-5 times
33-67	5-10 times
20-33	10-25 times
<20	>25 times

5. Building Details

5.1. Building Description

Building PRK_1128_BLDG_002 EQ2 is a single storey building that is used as a pavilion and toilet block at Somerfield Park. The building is constructed from partially reinforced masonry block walls with a timber framed roof, timber purlins and corrugated steel roof sheeting. The underside of the roof has been lined with plywood. The building has an internal concrete floor slab which is integral with the block wall footings. The walls have no internal linings. The roof extends out from the eastern wall of the building and is supported on steel posts.

The footprint of this building is approximately 15m x 7.5m and 3.7m high to the apex. The building was constructed in April 1970. Partial structural drawings were available for this building. These drawings show most of the structural members and the general layout of the building.

5.2. Gravity Load Resisting System

The timber roof framing spans between masonry walls which transmit gravity load to ground in bearing.

5.3. Seismic Load Resisting System

Lateral load on the structural is resisted through shear in the internal and perimeter masonry walls. The masonry walls span between perpendicular walls in out-of-plane flexure.

For the lateral analysis of this building the ‘along direction’ has been taken as north-south and the ‘across direction’ has been taken as east-west.

5.4. Building Damage

SKM undertook an inspection on 19 July 2012. A summary of the non-structural damage during the time of inspection is outlined below, with no structural damage noted:

1) Damage to paint at the top of the steel posts supporting the roof on the east side of the building. This damage indicates movement at this connection. Movement is acceptable at this connection as it is a “pinned” connection and no permanent deformation was noted.
2) Timber framing for the doors on the east side of the building had separated at the joints. Some permanent deformation was noted at these connections, however this does not appear to be affecting the function of the doors.
3) Pre-existing cracking was present in the external slab on the east side of the building. This cracking is likely to have been exacerbated by the recent earthquakes. No differential settlement of the slab sections was noted.

6. Available Information and Assumptions

6.1. Available Information

Following our inspection carried out on 19 July 2012, SKM carried out a seismic review on building PRK_1128_BLDG_002 EQ2 located at Somerfield Park. This review was undertaken using the available information which was as follows:

- SKM site measurements and inspection findings.
- Partial structural drawings.

6.2. Survey

There was no visible settlement of the structure, nor were there any significant ground movement issues around the building. The land adjacent to the site has been zoned as green, TC2 under the CERA Residential Technical Categories Map. Due to these factors we do not recommend that any survey be undertaken at this stage of the assessment.

6.3. Assumptions & Design Criteria

The assumptions and design criteria made in undertaking the assessment include:

- The building was built according to the drawings and according to good practice at the time. We have reviewed the building and from our visual inspection the structure appears to be built in accordance with the drawings.
- The soil on site is class D as described in AS/NZS1170.5:2004, Clause 3.1.3, Soft Soil. This is a conservative assumption based on our findings from the Desktop study. The ultimate bearing capacity on site is assumed to be 300kPa. Liquefaction does not need to be accounted for in the foundation design as our Desktop study established that the liquefaction risk appears low at this site. The latter two assumptions assume that the ground conditions classify as "good ground" as defined in NZS3604:2011.
- Standard design criteria for typical buildings as described in AS/NZS1170.0:2002:
  - 50 year design life, which is the default NZ Building Code design life.
  - Structure Importance Level 2. This level of importance is described as 'normal' with medium or considerable consequence for loss of human life, or considerable economic, social or environmental consequence of failure.
- The building has a short period less than 0.4 seconds.
- Site hazard factor, Z = 0.3, NZBC, Clause B1 Structure, Amendment 11 effective from 1 August 2011

- The following ductility criteria was used in the building:

- **Table 2: Assumed Building Ductility**

Ductility of Building in Current State	Ductility of Building in Strengthened State
1.25	1.25

The above ductility is based on code requirements at the time of design.

- The following material properties were used in the analyses:

- **Table 3: Material Properties**

Material	Nominal Strength	Structural Performance
Unfilled masonry blockwork	f_{mt} = 0.137MPa & f_c = 13.7MPa	S_p = 1.0
Concrete	f_c = 25MPa	S_p = 1.0
Steel reinforcing	F_y = 250 MPa	S_p = 1.0

The detailed engineering analysis is a post construction evaluation and therefore has the following limitations:

- It is not likely to pick up on any concealed construction errors (if they exist)
- Other possible issues that could affect the performance of the building such as corrosion and modifications to the structure will not be identified unless they are visible and have been specifically mentioned in this report.
- The detailed engineering evaluation deals only with the structural aspects of the structure. Other aspects such as building services are not covered.

6.4. The Detailed Engineering Evaluation (DEE) process

The DEE is a procedure written by the Department of Building and Housing's Engineering Advisory Group and grades buildings according to their likely performance in a seismic event. The procedure is not yet recognised by the NZ Building Code but is widely used and recognised by the Christchurch City Council as the preferred method for preliminary seismic investigations of buildings[3].

[3] http://resources.ccc.govt.nz/files/EarthquakeProneDangerousAndInsanitaryBuildingsPolicy2010.pdf

The procedure of the DEE is as follows:

1) Qualitative assessment procedure
    a. Determine the building's status following any rapid assessment that have been done
    b. Review any existing documentation that is available. This will give the engineer an understanding of how the building is expected to behave. If no documentation is available, site measurements may be required
    c. Review the foundations and any geotechnical information available. This will include determining the zoning of the land and the likely soil behaviour, a site investigation may be required
    d. Investigate possible Critical Structural Weaknesses (CSW) or collapse hazards
    e. Assess the original and post earthquake strength of the building (this assessment is subsequently superseded by the quantitative assessment)
2) Quantitative procedure
    a. Carry out a geotechnical investigation if required by the qualitative assessment
    b. Analyse the building according to current building codes and standards. Analysis accounts for damage to the building.

The DEE assessment ranks buildings according to how well they are likely to perform relative to a new building designed to current earthquake standards, as shown in Table 4. The building rank is indicated by the percent of the required new building standard (%NBS) strength that the building is considered to have. Earthquake prone buildings are defined as having less than 34% NBS strength which correlates to an increased risk of approximately 20 times that of 100% NBS[4]. Buildings that are identified to be earthquake prone are required by law to be strengthened within 30 years of the owner being notified that the building is potentially earthquake prone[5]. This timeframe is likely to be adjusted by CERA, refer to Table 6 below. This states that buildings which are earthquake prone but undamaged shall be strengthened within two years. We understand that the building does not need to be evacuated since the building has limited damage which will impact on the seismic capacity of the building. Notwithstanding the above, the building occupier may wish to evacuate the building until it is strengthened or propped on the basis of the limiting building capacity summarised in Table 5, the building occupier should ensure that they are meeting their requirements under the health and safety in employment act.

4 NZSEE 2006, *Assessment and Improvement of the Structural Performance of Buildings in Earthquakes*, p 2-2

5 http://resources.ccc.govt.nz/files/EarthquakeProneDangerousAndInsanitaryBuildingsPolicy2010.pdf

- **Table 4: DEE Risk Classifications**

Description	Grade	Risk	%NBS	Structural performance
Low risk building	A+	Low	> 100	Acceptable. Improvement may be desirable.
	A		100 to 80	
	B		80 to 67	
Moderate risk building	C	Moderate	67 to 33	Acceptable legally. Improvement recommended.
High risk building	D	High	33 to 20	Unacceptable. Improvement required.
	E		< 20	

The DEE method rates buildings based on the plans (if available) and other information known about the building and some more subjective parameters associated with how the building is detailed and so it is possible that %NBS derived from different engineers may differ.

This assessment describes only the likely seismic Ultimate Limit State (ULS) performance of the building. The ULS is the level of earthquake that can be resisted by the building without catastrophic failure. The DEE does also consider Serviceability Limit State (SLS) performance of the building and or the level of earthquake that would start to cause damage to the building but this result is secondary to the ULS performance.

The NZ Building Code describes that the relevant codes for NBS are primarily:

- AS/NZS 1170 Structural Design Actions
- NZS 3101:2006 Concrete Structures Standard
- NZS 3404:1997 Steel Structures Standard
- NZS4230:2004 Design of Reinforced Concrete Masonry Structures
- NZS 3603:1993 Timber Structures Standard
- NZS 3604:2011 Timber Framed Buildings

7. Results and Discussions

7.1. Critical Structural Weaknesses

No critical structural weaknesses for the building were observed during our visual inspection.

7.2. Analysis Results

The equivalent static force method was used to analyse the seismic capacity of the building. The results of the analysis are reported in the following table as %NBS. The results below are calculated for the building in its current state and are broken down into seismic resisting elements.

(%NBS = the reliable strength / new building standards)

- **Table 5: DEE Results**

Seismic Resisting Element	Action	Seismic Rating %NBS
Masonry walls in out-of-plane action	Bending	35%
Masonry wall top ring beam	Bending	36%
Masonry wall vertical supports at reinforced doorways	Bending	73%
Masonry wall in in-plane action	Shear	76%
Foundation	Overturning	78%
Masonry wall base connection to ground slab	Shear	91%

The table shows the masonry walls in out-of-plane flexure is the element governing the building's capacity at 35% NBS.

7.3. Recommendations

The quantitative assessment carried out on building PRK_1128_BLDG_002 EQ2 indicates that the building has a seismic capacity less than 67% of NBS and is therefore classed as being an earthquake risk and in the category of 'Moderate Risk Buildings' according to the NZSEE guidelines[6].

[6] NZSEE 2006, *Assessment and Improvement of the Structural Performance of Buildings in Earthquakes*, p 17

8. Conclusion

A quantitative assessment was carried out on building PRK_1128_BLDG_002 EQ2 located at Somerfield Park on 59 Studholme Street, Somerfield. This assessment concluded that the building has a capacity of the order of 35% and is classified as an earthquake risk. This is limited by the capacity of the masonry walls in out of plane bending.

Table 6: Quantitative Assessment Summary

Grade	Risk	%NBS	Structural performance
D	High	35	Acceptable legally. Improvement recommended.

It is recommended that:

1) We consider that barriers around the building are not necessary.
2) Consideration be given to strengthening the building to 67% NBS.

9. Limitation Statement

This report has been prepared on behalf of, and for the exclusive use of, SKM's client, and is subject to, and issued in accordance with, the provisions of the contract between SKM and the Client. It is not possible to make a proper assessment of this report without a clear understanding of the terms of engagement under which it has been prepared, including the scope of the instructions and directions given to, and the assumptions made by, SKM. The report may not address issues which would need to be considered for another party if that party's particular circumstances, requirements and experience were known and, further, may make assumptions about matters of which a third party is not aware. No responsibility or liability to any third party is accepted for any loss or damage whatsoever arising out of the use of or reliance on this report by any third party.

Without limiting any of the above, in the event of any liability, SKM's liability, whether under the law of contract, tort, statute, equity or otherwise, is limited in as set out in the terms of the engagement with the Client.

It is not within SKM's scope or responsibility to identify the presence of asbestos, nor the responsibility of SKM to identify possible sources of asbestos. Therefore for any property pre-dating 1989, the presence of asbestos materials should be considered when costing remedial measures or possible demolition.

Should there be any further significant earthquake event, of a magnitude 5 or greater, it will be necessary to conduct a follow-up investigation, as the observations, conclusions and recommendations of this report may no longer apply Earthquake of a lower magnitude may also cause damage, and SKM should be advised immediately if further damage is visible or suspected.

10. Appendix 1 – CERA Standardised Report Form

Detailed Engineering Evaluation Summary Data V1.11

Location

Building Name:	Somerfield Park Pavilion/Toilets	Reviewer:	J Carter
	Unit / No: / Street	CPEng No:	1017618
Building Address:	59 Studholme St, Somerfield	Company:	SKM
Legal Description:		Company project number:	ZB01276.114
		Company phone number:	03 940 4900
	Degrees / Min / Sec		
GPS south:		Date of submission:	21-Jan
GPS east:		Inspection Date:	24/05/2012
		Revision:	C
Building Unique Identifier (CCC):	PRK_1128_BLDG_002	Is there a full report with this summary?	yes

Site

Site slope:	flat	Max retaining height (m):	
Soil type:		Soil Profile (if available):	
Site Class (to NZS1170.5):	D		
Proximity to waterway (m, if <100m):		If Ground improvement on site, describe:	
Proximity to clifftop (m, if < 100m):			
Proximity to cliff base (m,if <100m):		Approx site elevation (m):	

Building

No. of storeys above ground:	1	single storey = 1	Ground floor elevation (Absolute) (m):	
Ground floor split?	no		Ground floor elevation above ground (m):	
Storeys below ground	0			
Foundation type:	strip footings		if Foundation type is other, describe:	Strip footings integral with slab
Building height (m):	3.50		height from ground to level of uppermost seismic mass (for IEP only) (m):	3
Floor footprint area (approx):				
Age of Building (years):	42		Date of design:	1965-1976
Strengthening present?	no		If so, when (year)?	
			And what load level (%g)?	
Use (ground floor):	other (specify)		Brief strengthening description:	
Use (upper floors):				
Use notes (if required):	Amenities			
Importance level (to NZS1170.5):	IL2			

Gravity Structure

Gravity System:	load bearing walls		
Roof:	timber framed	rafter type, purlin type and cladding	Timber rafters, timber purlins, and corrugated steel roof sheeting
Floors:	concrete flat slab	slab thickness (mm)	100
Beams:			
Columns:			
Walls:	partially filled concrete masonry	thickness (mm)	200

Lateral load resisting structure

Lateral system along:	partially filled CMU	**Note: Define along and across in detailed report!**	note total length of wall at ground (m):	15
Ductility assumed, μ:	1.25		wall thickness (m):	0.2
Period along:		0.40 from parameters in sheet	estimate or calculation?	
Total deflection (ULS) (mm):			estimate or calculation?	
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	
Lateral system across:	partially filled CMU		note total length of wall at ground (m):	6.8
Ductility assumed, μ:	1.25		wall thickness (m):	0.2
Period across:		0.40 from parameters in sheet	estimate or calculation?	
Total deflection (ULS) (mm):			estimate or calculation?	
maximum interstorey deflection (ULS) (mm):			estimate or calculation?	

Separations:

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

Non-structural elements

Stairs:			
Wall cladding:			
Roof Cladding:	Metal	describe	Corrugated steel sheeting
Glazing:			
Ceilings:			
Services(list):			

Available documentation

Architectural	none	original designer name/date	
Structural	partial	original designer name/date	CCC, City Engineers Department 1970
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:	1	Describe damage:	
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:	0%	Describe how damage ratio arrived at:	
	Describe (summary):	No structural damage was noted to the building at the time of the inspection		
Across	Damage ratio:	0%		
	Describe (summary):	No structural damage was noted to the building at the time of the inspection		
Diaphragms	Damage?:	no	Describe:	
CSWs:	Damage?:	no	Describe:	
Pounding:	Damage?:	no	Describe:	
Non-structural:	Damage?:	yes	Describe:	

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

Recommendations

Level of repair/strengthening required:	significant structural and strengthening	Describe:	Repair of damaged paint at the top of the steel posts, replacement of damaged timber door framing and repair of cracks in the external concrete slab. Strengthening to the masonry walls and the masonry ring beam
Building Consent required:	yes	Describe:	
Interim occupancy recommendations:	full occupancy	Describe:	

Along	Assessed %NBS before:	35%	%NBS from IEP below	If IEP not used, please detail assessment methodology:	Quantitative Assessment (refer to SKM report)
	Assessed %NBS after:	35%			
Across	Assessed %NBS before:	35%	%NBS from IEP below		
	Assessed %NBS after:	35%			