



Spencer Park Main Reserve  
Workshop  
Qualitative Engineering Evaluation

Functional Location ID: PRK 0157 BLDG 024

Address: 100 Heyders Road

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Christchurch City Council

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# Executive Summary

This is a summary of the Qualitative Engineering Evaluation for the Spencer Park Main Reserve Workshop building and is based on the Detailed Engineering Evaluation Procedure document issued by the Engineering Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

<b>Building Details</b>	<b>Name</b>	Spencer Park Main Reserve Workshop			
<b>Building Location ID</b>	PRK 0157 BLDG 024			<b>Multiple Building Site</b>	Y
<b>Building Address</b>	100 Heyders Road			<b>No. of residential units</b>	0
<b>Soil Technical Category</b>	N/A	<b>Importance Level</b>	2	<b>Approximate Year Built</b>	1962
<b>Foot Print (m²)</b>	90	<b>Storeys above ground</b>	1	<b>Storeys below ground</b>	0
<b>Type of Construction</b>	Vertical board and batten timber structure founded on a concrete slab on grade cast to ground level, lightweight timber purlins and rafters				
<b>Qualitative L4 Report Results Summary</b>					
<b>Building Occupied</b>	Y	The Spencer Park Main Reserve Workshop is currently in use.			
<b>Suitable for Continued Occupancy</b>	Y	The Spencer Park Main Reserve Workshop is suitable for continued occupation.			
<b>Key Damage Summary</b>	Y	Refer to summary of building damage section 3.1 report body.			
<b>Critical Structural Weaknesses (CSW)</b>	N	There were no critical structural weaknesses found.			
<b>Levels Survey Results</b>	Y	Floor Levels are within tolerance.			
<b>Building %NBS From Analysis</b>	100%	Based on an analysis of bracing capacity and demand.			
<b>Qualitative L4 Report Recommendations</b>					
<b>Geotechnical Survey Required</b>	N	Geotechnical survey not required due to lack of observed ground damage on site.			
<b>Proceed to L5 Quantitative DEE</b>	N	A quantitative DEE is not required for this structure.			
<b>Approval</b>					
<b>Author Signature</b>			<b>Approver Signature</b>		
<b>Name</b>	Hugh Burnett		<b>Name</b>	Luis Castillo	
<b>Title</b>	Structural Engineer		<b>Title</b>	Senior Structural Engineer	

# 1 Introduction

## 1.1 General

On 2 April 2012 Aurecon engineers visited the Spencer Park Main Reserve Workshop to carry out a qualitative building damage assessment on behalf of Christchurch City Council. Detailed visual inspections were carried out to assess the damage caused by the earthquakes on 4 September 2010, 22 February 2011, 13 June 2011, 23 December 2011 and related aftershocks.

The scope of work included:

- Assessment of the nature and extent of the building damage.
- Visual assessment of the building strength particularly with respect to safety of occupants if the building is currently occupied.
- Assessment of requirements for detailed engineering evaluation including geotechnical investigation, level survey and any areas where linings and floor coverings need removal to expose structural damage.

This report outlines the results of our Qualitative Assessment of damage to the Spencer Park Main Reserve Workshop and is based on the Detailed Engineering Evaluation Procedure document issued by the Structural Advisory Group on 19 July 2011, visual inspections, available structural documentation and summary calculations as appropriate.

# 2 Description of the Building

## 2.1 Building Age and Configuration

Spencer Park Main Reserve Workshop was built circa 1962 and is a light weight, timber framed, single storey shed used predominantly as a workshop and for storage.

The approximate floor area of the building is 90 square metres. It is an importance level 2 structure in accordance with NZS 1170 Part 0: 2002.

## 2.2 Building Structural Systems Vertical and Horizontal

Spencer Park Main Reserve Workshop is a very simple structure. Its light weight profiled steel roof is supported on a timber framed roof that transfers loads to the load bearing timber framed walls. The walls are supported on concrete slab on grade foundations. The external walls are clad with profiled steel sheeting on one side. Lateral loads are resisted by the timber framed walls with timber diagonal blocking.

## 2.3 Reference Building Type

Spencer Park Main Reserve Workshop is a light weight timber framed shed typical of its age and style.



## 2.4 Building Foundation System and Soil Conditions

The Spencer Park Main Reserve Workshop foundations, as discussed above, consist of concrete slab on grade. The land around Spencer Park has not been assigned a Technical Category zone by CERA. The nearest zoned land is Technical Category 3 (TC3) and is situated approximately 300m from the building. The site itself however shows no evidence of liquefaction from past earthquakes.

## 2.5 Available Structural Documentation and Inspection Priorities

No architectural drawings were available for the Spencer Park Main Reserve Workshop. Inspection priorities related to a review of potential damage to foundations and consideration of wall bracing adequacy.

## 2.6 Available Survey Information

We undertook a floor levels survey to establish the amount of settlement that has occurred. The results of the survey are presented on the attached drawings in Appendix A. All of the levels were taken on top of the existing floor coverings which will have introduced some variation.

The floor levels for the Spencer Park Main Reserve Workshop were found to be inside the recommended tolerances with slopes of up to 0.45% and a variation of 40mm over the floor plan.

# 3 Structural Investigation

## 3.1 Summary of Building Damage

The Spencer Park Main Reserve Workshop was in use at the time the damage assessment was carried out. No damage was noted.

## 3.2 Record of Intrusive Investigation

No intrusive investigation was carried out for Spencer Park Main Reserve Workshop as all critical areas could be visually inspected.

## 3.3 Damage Discussion

There was no noted damage to the building as a result of earthquakes. This is expected as buildings of this nature are flexible and have high inherent ductility. Furthermore, the lack of linings on this building allows the building to move without causing damage.



## 4 Building Review Summary

### 4.1 Building Review Statement

As noted no intrusive investigations were carried out for the Spencer Park Main Reserve Workshop. Given the lack of linings the majority of the structural system can be visually assessed by a simple external and internal inspection.

### 4.2 Critical Structural Weaknesses

No specific critical structural weaknesses were identified as part of the building qualitative assessment.

## 5 Building Strength (Refer to Appendix C for background information)

### 5.1 General

The Spencer Park Main Reserve Workshop, as discussed above, is a typical example of a timber framed shed. It is of a type of building that, due to its light weight, flexibility and natural ductility, has typically performed well, the Spencer Park Main Reserve Workshop is not an exception to this.

### 5.2 Initial %NBS Assessment

The Spencer Park Main Reserve Workshop would not have been subject to specific engineering design and the IEP process does not give a useful estimate of building capacity in terms of percentage of new building strength. Nevertheless an estimate of lateral load capacity can be made by adopting assumed values for strengths of existing materials and calculating the capacity of existing walls.

Selected assessment seismic parameters are tabulated in the Table below.

Table 1: Parameters used in the Seismic Assessment

Seismic Parameter	Quantity	Comment/Reference
Site Soil Class	D	NZS 1170.5:2004, Clause 3.1.3, Deep or Soft Soil
Site Hazard Factor, $Z$	0.30	DBH Info Sheet on Seismicity Changes (Effective 19 May 2011)
Return period Factor, $R_u$	1	NZS 1170.5:2004, Table 3.5
Ductility Factor in Transverse Direction, $\mu$	3	light weight timber framed walls
Ductility Factor in Longitudinal Direction, $\mu$	3	light weight timber framed walls

The seismic demand for the Spencer Park Main Reserve Workshop has been calculated based on current code requirements. The capacity of the existing walls in the building was calculated from assumed strengths of existing materials and the number and length of walls present for both the north-south and east-west directions. The seismic demand was then compared with the building capacity in these directions. The building was found to have a sufficient number and length of walls in both the north-south and east-west directions to achieve a capacity of 100% NBS.



### 5.3 Results Discussion

Basic analysis shows that the Spencer Park Main Reserve Workshop is capable of achieving seismic performance in line with the current code requirements. This is expected as lightweight single storey construction like that of Spencer Park Main Reserve Workshop produces a low seismic demand which when combined with an adequate number of well distributed walls providing seismic resistance produces a structure with good seismic performance and relatively good torsional stability.

## 6 Conclusions and Recommendations

The building itself has suffered no observed damage as a result of the earthquakes.

The land below the Spencer Park Main Reserve Workshop has not been assigned a Technical Category zone by CERA. Although there is no evidence of liquefaction at the site, the nearest zoned land is TC3 and approximately 300m from the building. **The levels survey carried out showed that the floor levels were within allowable tolerances.**

As there is no evidence of damage to the land surrounding the site at 100 Heyders Road, a **geotechnical investigation is not thought to be required at this point.**

The building is currently occupied and in use and in our opinion the Spencer Park Main Reserve Workshop **is considered suitable for continued occupation.**



## 7 Explanatory Statement

The inspections of the building discussed in this report have been undertaken to assess structural earthquake damage. No analysis has been undertaken to assess the strength of the building or to determine whether or not it complies with the relevant building codes, except to the extent that Aurecon expressly indicates otherwise in the report. Aurecon has not made any assessment of structural stability or building safety in connection with future aftershocks or earthquakes – which have the potential to damage the building and to jeopardise the safety of those either inside or adjacent to the building, except to the extent that Aurecon expressly indicates otherwise in the report.

This report is necessarily limited by the restricted ability to carry out inspections due to potential structural instabilities/safety considerations, and the time available to carry out such inspections. The report does not address defects that are not reasonably discoverable on visual inspection, including defects in inaccessible places and latent defects. Where site inspections were made, they were restricted to external inspections and, where practicable, limited internal visual inspections.

To carry out the structural review, existing building drawings were obtained (where available) from the Christchurch City Council records. We have assumed that the building has been constructed in accordance with the drawings.

While this report may assist the client in assessing whether the building should be repaired, strengthened, or replaced that decision is the sole responsibility of the client.

This review has been prepared by Aurecon at the request of its client and is exclusively for the client's use. It is not possible to make a proper assessment of this review 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 Aurecon. The report will 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, Aurecon's liability, whether under the law of contract, tort, statute, equity or otherwise, is limited as set out in the terms of the engagement with the client.




# Appendices



# Appendix A

## Photos and Levels Survey

### 2 April 2012 – Spencer Park Main Reserve Workshop Site Photographs

<p>General view of spencer park site.</p>	
<p>Aerial photograph of the Spencer Park Main Reserve Workshop.</p>	
<p>Northern elevation of the Spencer Park Main Reserve Workshop.</p>	

<p>Eastern elevation of the Spencer Park Main Reserve Workshop.</p>	
<p>Southern elevation of the Spencer Park Main Reserve Workshop.</p>	
<p>Internal view of the Spencer Park Main Reserve Workshop.</p>	
<p>Internal view of the Spencer Park Main Reserve Workshop.</p>	

# Appendix B

## References

1. Department of Building and Housing (DBH), “Revised Guidance on Repairing and Rebuilding Houses Affected by the Canterbury Earthquake Sequence”, November 2011
2. New Zealand Society for Earthquake Engineering (NZSEE), “Assessment and Improvement of the Structural Performance of Buildings in Earthquakes”, April 2012
3. Standards New Zealand, “AS/NZS 1170 Part 0, Structural Design Actions: General Principles”, 2002
4. Standards New Zealand, “AS/NZS 1170 Part 1, Structural Design Actions: Permanent, imposed and other actions”, 2002
5. Standards New Zealand, “NZS 1170 Part 5, Structural Design Actions: Earthquake Actions – New Zealand”, 2004
6. Standards New Zealand, “NZS 3101 Part 1, The Design of Concrete Structures”, 2006
7. Standards New Zealand, “NZS 3404 Part 1, Steel Structures Standard”, 1997
8. Standards New Zealand, “NZS 3603, Timber Structures Standard”, 1993
9. Standards New Zealand, “NZS 3604, Timber Framed Structures”, 2011
10. Standards New Zealand, “NZS 4229, Concrete Masonry Buildings Not Requiring Specific Engineering Design”, 1999
11. Standards New Zealand, “NZS 4230, Design of Reinforced Concrete Masonry Structures”, 2004

# Appendix C

## Strength Assessment Explanation

### New building standard (NBS)

New building standard (NBS) is the term used with reference to the earthquake standard that would apply to a new building of similar type and use if the building was designed to meet the latest design Codes of Practice. If the strength of a building is less than this level, then its strength is expressed as a percentage of NBS.

### Earthquake Prone Buildings

A building can be considered to be earthquake prone if its strength is less than one third of the strength to which an equivalent new building would be designed, that is, less than 33%NBS (as defined by the New Zealand Building Act). If the building strength exceeds 33%NBS but is less than 67%NBS the building is considered at risk.

### Christchurch City Council Earthquake Prone Building Policy 2010

The Christchurch City Council (CCC) already had in place an Earthquake Prone Building Policy (EPB Policy) requiring all earthquake-prone buildings to be strengthened within a timeframe varying from 15 to 30 years. The level to which the buildings were required to be strengthened was 33%NBS.

As a result of the 4 September 2010 Canterbury earthquake the CCC raised the level that a building was required to be strengthened to from 33% to 67% NBS but qualified this as a target level and noted that the actual strengthening level for each building will be determined in conjunction with the owners on a building-by-building basis. Factors that will be taken into account by the Council in determining the strengthening level include the cost of strengthening, the use to which the building is put, the level of danger posed by the building, and the extent of damage and repair involved.

Irrespective of strengthening level, the threshold level that triggers a requirement to strengthen is 33%NBS.

As part of any building consent application fire and disabled access provisions will need to be assessed.

### Christchurch Seismicity

The level of seismicity within the current New Zealand loading code (AS/NZS 1170) is related to the seismic zone factor. The zone factor varies depending on the location of the building within NZ. Prior to the 22<sup>nd</sup> February 2011 earthquake the zone factor for Christchurch was 0.22. Following the earthquake the seismic zone factor (level of seismicity) in the Christchurch and surrounding areas has been increased to 0.3. This is a 36% increase.

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 C1 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 C1: NZSEE Risk Classifications Extracted from table 2.2 of the NZSEE 2006 AISPBE Guidelines

Table C1 below compares the percentage NBS to the relative risk of the building failing in a seismic event with a 10% probability of exceedance in 50 years (i.e. 0.2% in the next year). It is noted that the current seismic risk in Christchurch results in a 6% probability of exceedance in the next year.

Table C1: Relative Risk of Building Failure In A

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



# Appendix D

## Background and Legal Framework

### Background

Aurecon has been engaged by the Christchurch City Council (CCC) to undertake a detailed engineering evaluation of the building

This report is a Qualitative Assessment of the building structure, and is based on the Detailed Engineering Evaluation Procedure document (draft) issued by the Structural Advisory Group on 19 July 2011.

A qualitative assessment involves inspections of the building and a desktop review of existing structural and geotechnical information, including existing drawings and calculations, if available.

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).

### 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.

### 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

## 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.

## 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.

We anticipate 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.

## 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:

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

# Appendix E

## Standard Reporting Spread Sheet

## Detailed Engineering Evaluation Summary Data

V1.11

Location		Review	
Building Name	Lean Resource Workshop	Reviewer	Simon Manning
Building Address	Simon Park	CPing No.	130361
Legal Description	22 44484	Company	Autcon
		Company project number	200000
		Company phone number	06 466 5861
GPS south	43 20 02.77	Date of submission	8/04/2014
GPS east	172 42 19.56	Inspection Date	2/04/2015
Building Unique Identifier (CCK)	CRK 0167 BL/D3 024	Revision	2
		Is there a full report with this summary	Yes

Site		Max retaining height (m)	
Site slope	flat		0
Soil type	mixed	Soil Profile (if available)	
Site Class (to NZS1170.5)	2		
Proximity to waterway (m, if <100m)		If Ground improvement on site, describe	
Proximity to cliff top (m, if <100m)			
Proximity to cliff base (m, if <100m)		Approx site elevation (m)	1.00

Building		single storey = 1	
No. of storeys above ground	1	Ground floor elevation (Absolute) (m)	1.01
Ground floor split	0	Ground floor elevation above ground (m)	0.01
Storeys below ground	0		
Foundation type	mat slab	If Foundation type is other, describe	
Building height (m)	3.00	height from ground to level of uppermost seismic mass (for IEP only) (m)	
Floor footprint area (sqm)	50	Date of design	1965-1976
Age of Building (years)	50		
Strengthening present	no	If so, when (year)	
Use (ground floor)	other (specify)	And what load level (kg/m <sup>2</sup> )	
Use (upper floors)	Storage and Workshop	Brief strengthening description	
Importance level (to NZS1170.5)	2		

Gravity Structure		describe system	
Gravity System	load bearing walls	slab thickness (mm)	
Roof	other (specify)	typical dimensions (mm x mm)	
Floors	concrete flat slab		
Beams	timber		
Columns	timber		
Walls	con-load bearing		

Lateral load resisting structure		Note: Define along and across in detailed report	
Lateral system along	lightweight timber framed walls	note typical wall length (m)	
Ductility assumed in:		estimate or calculation	estimated
Period alone	3.00	estimate or calculation	estimated
Total deflection (ULS) (mm)	0.40	estimate or calculation	estimated
maximum interstorey deflection (ULS) (mm)			
Lateral system across	lightweight timber framed walls	note typical wall length (m)	
Ductility assumed in:	3.00	estimate or calculation	estimated
Period across	0.40	estimate or calculation	estimated
Total deflection (ULS) (mm)		estimate or calculation	estimated
maximum interstorey deflection (ULS) (mm)			

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

Non-structural elements		describe	
Stairs	timber		
Wall cladding	coloured metal		
Roof Cladding	metal		
Chimney	timber frames		
Ceilings	concrete		
Services(s)	other		

Available documentation		original designer name/date	
Architectural	none		
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		Describe damage	
Site	Good		None
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 arrive	none apparent	notes (if applicable)	

Building		Current Placard Status	
Along	Green		
Damage ratio	0%	Describe how damage ratio arrived at	
Describe (summary):			
Across	0%	Damage Ratio = $\frac{(\%NBS \text{ (before)} - \%NBS \text{ (after)})}{\%NBS \text{ (before)}}$	
Describe (summary):			
Diaphragms	Damage?	Describe	
CSWs	Damage?	Describe	
Pounding	Damage?	Describe	
Non-structural:	Damage?	Describe	

Recommendations		Describe	
Level of repair/strengthening required	none		
Building Consent required	no	Describe	
Interim occupancy recommendations	full occupancy	Describe	
Along	Assessed %NBS before: 100% Assessed %NBS after: 100%	If IEP not used, please detail assessment methodology	Direct Assessment
Across	Assessed %NBS before: 100% Assessed %NBS after: 100%		

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 <sub>s</sub> from above: m	
Seismic Zone, if designed between 1965 and 1992		not required for this age of building	
		not required for this age of building	
Period (from above):	along 0.4	across 0.4	
(%NBS) from Fig 3.3			
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			
Note 2: for RC buildings designed between 1976-1984, use 1.4			
Note 3: for buildings designed prior to 1935 use 0.8, exceed in Wellington (1.0)			
Final (%NBS)	along 0%	across 0%	
2.2 Near Fault Scaling Factor	Near Fault scaling factor, from NZS1170.5, cl 3.1.6	along 1.00	
		across 1	
2.3 Hazard Scaling Factor	Hazard factor Z for site from AS1170.5, Table 3.3	along 1	
	2=, from NZS4203:1992	across 0.0000	
2.4 Return Period Scaling Factor	Building Importance level (from above)	2	
	Return Period Scaling factor from Table 3.1, Factor C		
2.5 Ductility Scaling Factor	Assessed ductility (less than max in Table 3.3)	along 1.00	
	Ductility scaling factor: =1 from 1978 onwards; or =h <sub>s</sub> , if pre-1976, from Table 3.3	across 1.00	
	Ductility Scaling Factor, Factor D	along 0.00	
		across 0.00	
2.6 Structural Performance Scaling Factor:	Sp	1.000	
	Structural Performance Scaling Factor, Factor E	1	
2.7 Baseline (%NBS, (%NBS)) = (%NBS) × A × B × C × D × E	%NBS	0.0000	
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	
3.5 Site Characteristics	1		
3.6 Other factors, Factor F	For ≤ 3 storeys, max value =2.5, otherwise max value =1.5, no minimum 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)	0.00	0.00	
4.3 PAR x (%NBS):	PAR x Baseline %NBS	0.0000	
4.4 Percentage New Building Standard (%NBS), (before)		0.0000	



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