kestrel group

Hastings War Memorial Library

Seismic Risk Evaluation Report

20 December 2023

Contents

Document Status and Authorisation

Stage	Person	Date
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Final version following Hastings District Council review:	Dave Brunsdon	20 December 2023

1. Introduction

This seismic risk evaluation report summarises known seismic information on the Hastings District Library from the recent seismic assessment by consulting engineers WSP. The report provides a qualitative risk assessment which evaluates the current seismic risk to occupants and users of the building and people in surrounding areas.

The purpose of the report is to outline the current seismic risk profile to assist decision-making in relation to continued use while broader planning about the future of the building is undertaken.

Recommendations are made in relation to continued occupancy and any practical short-term risk mitigation measures. Key communications messages are also outlined.

This qualitative risk assessment is based on the 2021 BRANZ *Decision Framework for Managing Earthquake-prone Council Buildings*. This decision framework is summarised in Figure 1 on the following page, and the specific application of the framework to these buildings is summarised in the appended risk evaluation table.

The approach taken is also consistent with the risk information and key messages contained in MBIE's *Seismic Risk Guidance* document from July 2022.

2. Basis of this Report

Engineering assessment reports	Detailed Seismic Assessment by WSP – Final Report 13 December 2023
Peer Review	Silvester Clark – 27 November 2023
Kestrel inspection of the building	1 September 2023
Discussions with Hastings District Council	1 September and 31 October 2023
Other information as relevant	Nothing specific

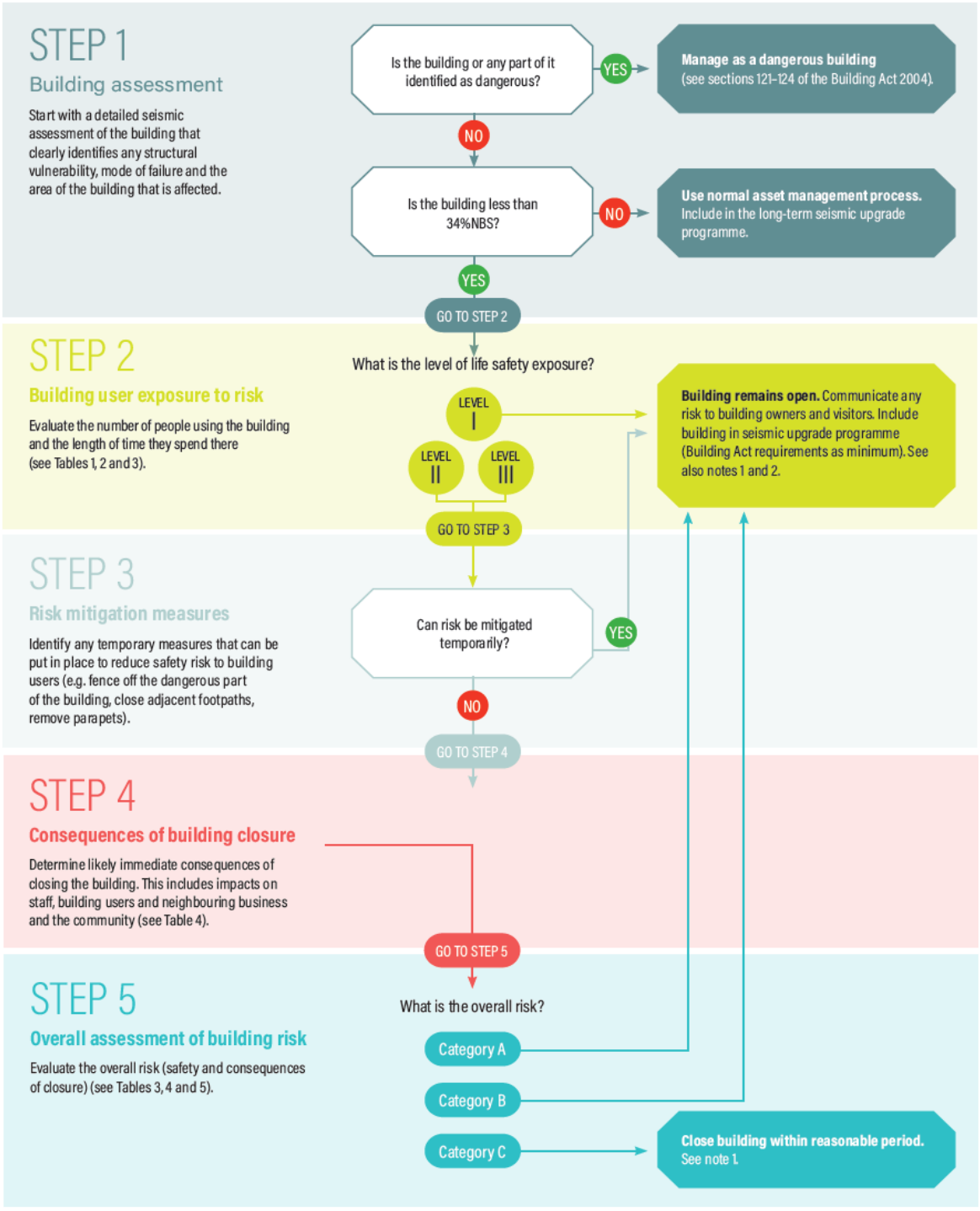

Figure 1: Overview of the BRANZ Decision Framework process

3. Overview of Building

Date of construction	The building comprises two seismically separated sections. The original section was constructed in 1957, and the extension section was constructed in 1992.
Number of storeys	Original section – two storeys, including a mezzanine floor around three sides, and the original single storey war memorial tower. Extension section – a single storey wing with a two storey central extension including mezzanine floor.
MBIE EPB Profile Category	The original section falls within MBIE Profile Category B as a potentially earthquake prone building. Its overall height is equivalent to three or more storeys (12m) in height, constructed prior to 1976.
Primary structure	Original section - reinforced concrete walls and frames with steel roof trusses and mezzanine floor framing. Extension section – steel framing with concrete masonry walls to the two storey central section.
Secondary structure (incl. heavy non-structural elements)	Brick veneer to the original section.
Current Usage	Main library for the district. The upstairs floor in the original section is used for small community gatherings and educational presentations.
Importance Level	Importance Level 2 (IL2) - groups of less than 300 people meeting in any one section of the building.

4. Summary of Seismic Assessment

Form and date of assessment	Detailed Seismic Assessment by WSP dated 13 December 2023
Rating and Critical Structural Weaknesses	The overall rating for the building is 20%NBS (IL2). The component scores and identified Critical Structural Weaknesses are summarised as follows: **Original section** • 20%NBS for the connections between the steel roof trusses and some truss members **Extension section** • 20%NBS for the connection between the end connections of the mezzanine floor beams to the structural walls
Earthquake prone status/ council notification and expiry date	The DSA has not yet been forwarded to the regulatory team within Council. Once the buildings are confirmed as being earthquake-prone, a period of 15 years will apply for remediation work.

5. Evaluation of Current Seismic Risk

Current usage characteristics	Maximum number of people at any one time:	Up to a maximum of 100 people in the original library section (at the time of a gathering in the south-west end of the mezzanine) Approximate maximum of 100 people in the Wing Extension
	Average number of people in building at any one time:	Staff in offices and in library – 20 Library visitors – 80 These numbers are across both buildings, so the overall average is ~50 per building
	Average weekly usage time (person hours per week):	Approx 1,000 person hours per week (for each building)

Summary of main structural vulnerabilities	Original section: • The roof truss connections to the side walls have much less strength than required by current codes • Other parts of the structure have only moderate strength compared to current code requirements Library extension: • Steelwork connections in certain locations have much less strength than required by current codes • Other parts of the structure have only moderate strength compared to current code requirements Neither of the buildings or any part of them are identified as dangerous in terms of the Building Act.
Outline of possible failure modes	In the event of a large earthquake, the following failure modes are possible: Original section: • Failure of the roof truss connections to the side walls could lead to loss of support for central sections of the roof Library extension: • Sections of the structure could separate, leading to local loss of support to sections of the mezzanine floor
Summary of strengthening options	Not currently presented or under consideration.
Interim risk mitigation options	The size of the building and nature of the identified vulnerabilities to various parts of the structure mean that there are limited opportunities for local interim mitigation work.
Seismic Hazard Zone	The building is located in an area of High Seismic Hazard. This is influenced by the proximity of the Hikurangi Subduction Zone – the interface whether the Pacific and Australian plates meet. The likelihood of a fault rupture occurring on this interface and generating an earthquake of greater than Magnitude 8 is 26% in the next 50 years. An earthquake of this magnitude would cause significant damage to the Library buildings. The likelihood of an earthquake of this scale occurring in any given year, or over a 5 to 10 year period, is correspondingly much lower.

Intended time frame for seismic risk to be addressed	Not yet determined – when HDC issue the Earthquake Prone Building notice, a period of 15 years will apply.

6. Impacts of Closure

Ability to use other facilities	The ability to set up and run a comparable library facility elsewhere in Hastings would appear to be limited.
Effects on the community	Closure of the library (even with an alternative set of arrangements) would adversely impact on the community's ability to access the range of services provided by the library.
Costs and economic impacts	Closure of the library would involve the direct cost of establishing an alternative service, and for the storage of books and other material not able to be displayed at alternative smaller facilities. There would also be costs associated with leaving from and returning to the building. It is noted that closure and limited relocation may well be required when strengthening work is undertaken, and hence these costs are likely to be incurred at some stage.

7. Summary and Recommendations

Occupancy recommendations	The likelihood of an earthquake of sufficient magnitude to cause structural failure to parts of the building over the next few years while plans for strengthening are being developed is considered very low. It is therefore considered that continued occupancy and use of the building is appropriate while plans for strengthening the building are being developed and implemented. An indicative timeline should however be developed and actively monitored.
Required actions	Staff and regular users of the building should be briefed on the seismic status of the building, including a refresh of the earthquake drills and evacuation process. This should be included in the induction of new staff. People accessing the building should be briefed through Council's EPB notices (when issued) that should be placed immediately adjacent to all entrances. Prior to receiving the EPB notices, the Council may wish to prepare and display its own risk notification placards.
Key communications messages	The building has a low seismic rating due to the presence of structural weaknesses in certain sections. The building is not dangerous in terms of the Building Act, or in any imminent risk of failure in a moderate earthquake. The likelihood of an earthquake large enough to cause structural failure occurring in any given year, or over a 5 to 10 year period, is considered low. In the unlikely event of an earthquake occurring, people should stay inside the building and not leave the building until after all shaking has ceased and the all-clear to exit the building has been given. Refer to the occupancy recommendations above.
Annual monitoring	There should be an annual review which revisits the condition of the building, verifies that the EPB notices are effectively displayed and provides a written update on progress with planning for the seismic remediation of the building.

Appendix:

Application of the BRANZ Decision Framework for Managing Earthquake-prone Council Buildings

Appendix: Application of the BRANZ Decision Framework for Managing Earthquake-prone Council Buildings

With reference to Figure 1

Step	Considerations	Information / Comments
Step 1 **Building assessment and further examination of key vulnerabilities**	Seismic assessment is a Detailed Seismic Assessment?	Yes
	Report status and nature of review undertaken?	Detailed Seismic Assessment report with peer review
	Have all the secondary structural and heavy non-structural elements been identified?	Yes
	What are the structural elements of the building that score less than 34%NBS?	Original building • Connections of the roof trusses to the side walls - 20%NBS (IL2) • Ties to the brick cladding of the perimeter walls - 20%NBS (IL2) • Concrete moment frames (end walls) – 25%NBS (IL2) • Roof perimeter beam - 25%NBS (IL2) Library extension • Connections of mezzanine beams to main structure – 20%NBS (IL2)
	What are the modes of failure and the area of the building that is affected?	Original building Failure of the roof truss connections to the side walls could lead to loss of support for sections of the roof Library extension building Sections of the structure could separate, leading to local loss of support to flooring
	Are there other seismic vulnerabilities that score above 34%NBS?	Yes, other elements and connections score between 35 and 67%NBS
	Is the building or any part of it identified as dangerous in terms of the Building Act?	No
	Other considerations	Heritage considerations for the painting in the War Memorial Tower.

Step	Considerations				Information / Comments
Step 2 **Exposure of people to building risk**	**Table 1: Life Safety Risk Exposure**				
		High	Moderate	Low	
	Maximum number of people in building at any time	>100	10 - 100	<10	A maximum of approximately 100 people in the original library and 100 people in the wing
	Average number of people in building at any one time	>50	5 - 50	<5	Staff: 20 (full-time), plus additional part-time Public in the library areas (average): Up to 80 in total Overall average = 100, or ~50 per building (allow greater in original section) Other typical gatherings: included in maxima above
	Average user time in building (duration of use)	Over 8 hours a day	2 - 8 hours a day	<2 hours	Staff: Average time in building up to 8 hours/ day Public: Average time in building <1 hour. Combined average 2 – 8 hours/ day
	Average weekly usage (person-hours per week)	>2,000	50 - 2,000	<50	Staff: approx. 700 person-hours/ week (mix of part-time and full-time and variable weekly depending on needs such as events) Public coming into space 5,970 (October figures /31) @1 hour per person x 6 days = 1,200 person-hours/ week (includes groups etc) Total = 1,700 across both buildings, or up to say 1,000 person hours per building

Exposure to people outside the building	Risk of collapse onto high-use footpath (>100 people per hours); risk of collapse onto neighbouring structure	Risk of collapse on to adjacent moderate use footpath (5-100 people per hour)	Risk to low-use footpath (<5 people per hour)	External exposure: Low (adjacent to building)
	Rating = High			

Table 2: Period of Exposure

		Likely period until strengthening commenced			
		Long	Medium	Short	
Seismic hazard zone	High	>3 years	1 - 3 years	<1 year	High seismic hazard zone. No project established to remediate, noting that the complexity of the project is expected to take more than 3 years to scope and fund.
	Medium	>6 years	2 - 6 years	<2 years	
	Low	>9 Years	3 - 9 years	<3 years	
		Category = Long			

Step	Considerations	Information / Comments
Step 2 (continued)	**Table 3: Degree of exposure**	*Combines the results from Tables 1 and 2*

Exposure to risk (from Table 1)	Period of exposure (from Table 2)		
	Short	Medium	Long
Low	I	I	II
Moderate	I	II	III
High	I	III	III
	Rating = III		

Step 3 **Risk mitigation measures**	The size of the building and nature of the identified vulnerabilities to various parts of the structure mean that there are limited opportunities for local interim mitigation work.

Step	Considerations	Information / Comments

Table 4: Consequence of closure

	High	Moderate	Low	
Ability to deliver services by other means	Service cannot be delivered through alternative means	Service can be partially delivered outside of the building	Service easily delivered through other means	The ability to set up and run a comparable library facility elsewhere in Hastings would appear to be limited. Closure of the library (even with an alternative set of arrangements) would adversely impact on the community's ability to access the range of services provided by the library.
Impact on vulnerable communities (homeless, disabled, high needs, children, elderly)	Vulnerable community significantly impacted as they cannot be easily catered for	Vulnerable community impacted but services/ amenities can be found nearby	Limited or no vulnerable community use the building/ services	
Impact on neighbouring businesses	Neighbouring businesses significantly impacted by direct loss of customers	Neighbouring business affected by reduced foot traffic	Limited or no impact on neighbouring businesses	
Impact on staff	Significant numbers of staff affected by closure	Some staff notably impacted by building closure	Few or no staff impacted	Staff would be impacted by the operation of the library from alternative premises
	Category: Moderate			

Step 4

Consequence of building closure

<table>
<tr><th>Step</th><th>Considerations</th><th>Information / Comments</th></tr>
<tr><td rowspan="5"><u>Step 5</u>

Overall assessment of building risk</td><td colspan="4">Table 5: Overall occupancy assessment</td><td rowspan="2"></td></tr>
<tr><td></td><td colspan="3">Consequence of closure (from Table 4)</td></tr>
<tr><td>Degree of exposure to risk (Table 3)</td><td>High</td><td>Moderate</td><td>Low</td></tr>
<tr><td>II</td><td>A</td><td>B</td><td>B</td><td rowspan="2">Overall risk rating : B - remain open</td></tr>
<tr><td>III</td><td>B</td><td>B</td><td>C</td></tr>
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