INITIAL SEISMIC ASSESSMENT
TAPORA COMMUNITY HALL
5 OKAHUKURA ROAD, TAPORA
AUCKLAND
FOR
AUCKLAND COUNCIL

12707-116

April 2023

Airey Consultants Ltd | Takapuna Office
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Engineering
Ingenuity

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Quality Assurance Statement	
Auckland Council - **Initial Seismic Assessment** **Tapora Community Hall** **5 Okahukura Road, Tapora**	**Prepared by:** Lichuan Jiang
	Reviewed by: M. Withers
Project Manager: M. Withers	**Approved for issue by:** M. Withers

Revision Schedule					
Rev. No.	Date	Description	Prepared by	Reviewed by	Approved by
--	13/04/2023	Draft	LJ	MW	MW
A	20/04/2023	Final	LJ	MW	MW
B	21/04/2023	Final	LJ	MW	MW

CONTENTS

ENGINEERING ASSESSMENT SUMMARY REPORT

1. Building Information	
Building Name/ Description	Tapora Community Hall
Street Address	5 Okahukura Road, Tapora , Auckland
Territorial Authority	Auckland Council
No. of Storeys	One storey
Area of Typical Floor (approx.)	354.9m^2
Year of Design (approx.)	1960s
NZ Standards designed to	N/A (no original design information available)
Structural System including Foundations	The structural systems are as follows: • The light-weight metal roof is supported by steel portal frames and unreinforced concrete block masonry walls (URM). • The foyer and toilet block are constructed with timber frame walls with external brick veneer. • The new extension at the south-west corner was constructed using timber frame wall and light-weight metal sheet roofing over timber rafters. • The steel portal frames and URM gable walls provide transverse lateral and gravity resistance for roof structure. • The foundation of the steel portals is 300x300 square concrete footing. • The foundations of the URM walls are assumed to be shallow reinforced concrete strip footings. • The floor was constructed with 140x45 timber joists at 450 centres over 100x70 timber bearers, which spans approximately 1.4m. • The timber bearer is supported by a 100x70 timber jack studs on shallow concrete footing. The base of timber jack stud is fixed with 2 wire ties. • There is no internal sub-floor bracing.
Does the building comprise a shared structural form or shares structural elements with any other adjacent titles?	No.
Key features of ground profile and identified geohazards	None. The building is founded on a gentle gradient site (<1:20).
Previous strengthening and/ or significant alteration	N/A.
Heritage Issues/ Status	The subject building is not listed as a heritage building.
Other Relevant Information	None.

2. Assessment Information	
Consulting Practice	Airey Consultants Ltd
CPEng Responsible, including: • Name • CPEng number • A statement of suitable skills and experience in the seismic assessment of existing buildings[1]	Manu Stroude Withers 248329 Practice Fields: Structural Experienced in seismic design and seismic assessments (ISA and DSA level) of existing buildings, including strengthening and retrofitting design. 5 years spent working in Christchurch post-CES. Carrying out seismic assessments and remediation design. Recently attended courses: - SESOC Simplified Lateral Mechanism Analysis (SLaMA) - SESOC Detailed seismic assessment of complex unreinforced masonry buildings - IPENZ Seminar – Seismic Assessments
Documentation reviewed, including: • date/ version of drawings/ calculations[2] previous seismic assessments	N/A.
Geotechnical Report(s)	Not available. The building is founded over an area of soil of Holocene river deposits of Tauranga Group, as inferred from the Institute of Geological and Nuclear Services, Geological web map, 2013. Soil type `D' inferred from map.
Date(s) Building Inspected and extent of inspection	2nd March 2023 Exterior and interior visual observations
Description of any structural testing undertaken and results summary	Non-intrusive scanning of the concrete masonry walls for reinforcement.
Previous Assessment Reports	None.
Other Relevant Information	None.

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[1] This should include reference to the engineer's Practice Field being in Structural Engineering, and commentary on experience in seismic assessment and recent relevant training

[2] Or justification of assumptions if no drawings were able to be obtained

3. Summary of Engineering Assessment Methodology and Key Parameters Used		
Occupancy Type(s) and Importance Level	Community hall 2 (Assumed, no post-disaster function)	
Site Subsoil Class	Soil type \`D’	
For an ISA:		
Summary of how Part B was applied, including: • Key parameters such as μ, S_p and F factors of IEP3 • Any supplementary specific calculations	$\mu = 1.0$	In the longitudinal direction: The unreinforced concrete masonry block wall & timber framed wall.
	$\mu = 1.0$	In the transverse direction: Steel portal frames & URM gable walls.
	Sp = 0.93	In the longitudinal direction (URM walls & timber frame walls) In the transverse direction (steel portal frames & URM gable wall)
	F = 0.71	In the transverse direction. There is a full-length triangle window above the north URM gable wall. There is a full-length triangle window above the north timber frame wall of the foyer and toilet block. (1-2 gridlines/7 gridlines =0.71)
	F = 0.88	In the longitudinal direction: Full opening is located on the east wall. This leads an eccentricity of the stiffness-distribution. The toilet block (wing) has a different hight from main building. ($1-31.6m^2/258m^2=0.88$, where the area of the foyer and toilet block is $31.6m^2$ and the total building area is $258\ m^2$.)
For a DSA:		
Summary of how Part C was applied, including: • the analysis methodology(s) used from C2 • other sections of Part C applied	N/A	
Other Relevant Information	N/A	

4. Assessment Outcomes

<table>
<tr><td>Assessment Status
(Draft or Final)</td><td colspan="2">Final</td></tr>
<tr><td>Assessed <i>%NBS</i> Rating</td><td colspan="2">19%NBS (IL2)</td></tr>
<tr><td>Seismic Grade and Relative Risk (from Table A3.1)</td><td colspan="2">‘Grade E’ Very High Risk</td></tr>
<tr><td><u>For an ISA:</u></td><td colspan="2"></td></tr>
<tr><td>Describe the Potential Critical Structural Weaknesses</td><td colspan="2">We have identified the following Potential Critical Structural Weaknesses:
• A full-length window on the URM gable wall which supports the roof.
• The distribution of the URM walls is significantly uneven.
• There are some large cracks on the north URM wall and brick veneer.
• Eccentric layout of the bracing in longitudinal direction. However, there is no information of the roof plane bracing.
• There is no bracing for the timber sub-floor.</td></tr>
<tr><td>Does the result reflect the building’s expected behaviour, or is more information/ analysis required?</td><td colspan="2">– a DSA is recommended.</td></tr>
<tr><td>If the results of this ISA are being used for earthquake prone decision purposes, <u>and</u> elements rating <34<i>%NBS</i> have been identified:</td><td>Engineering Statement of Structural Weaknesses and Location

NA.</td><td><i>Mode of Failure and Physical Consequence</i> Statement(s)

NA.</td></tr>
<tr><td>Recommendations
(<i>Optional for EPB purposes</i>)</td><td colspan="2">None.</td></tr>
</table>

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Airey
CIVIL. STRUCTURAL AND FIRE
ENGINEERS

Members of ACENZ

13th April 2023

Auckland Council
135 Albert Street,
Auckland 1010

Attn: Auckland Council Marae Infrastructure Program

Dear Sir/Madam

Initial Seismic Assessment of Building: Tapora Community Hall at 5 Okahukura Road, Tapora, Auckland.

We have now completed an Initial Seismic Assessment (ISA) of **Tapora Community Hall at 5 Okahukura Road, Tapora, Auckland** using the Initial Evaluation Procedure (IEP) as described in Part B of the guidance document, *The Seismic Assessment of Existing Buildings – Technical Guidance for Engineering Assessments*, dated July 2017 version 1. The assessment was carried out after completing a site visit on the 2nd March 2023.

Executive Summary

The final potential earthquake rating of the building is **19%NBS (IL2)**

The ISA is considered to provide a relatively quick, high-level and qualitative measure of the building's performance. A more reliable result will be obtained from a Detailed Seismic Assessment (DSA) and is recommended for this building. A DSA could find structural weaknesses not identified from the IEP, or it could find that identified potential CSWs have been addressed in the design of the building.

Introduction

This assessment is based on the IEP as defined by the Technical Guidance Documents for Engineering Assessments referenced above, and also meets the requirements of an engineering assessment as prescribed in the EPB methodology document.

Background to the IEP and Its Limitations

The IEP procedure was developed in 2006 by the New Zealand Society for Earthquake Engineering (NZSEE) and updated in 2017 to reflect experience with its application and also as a result of experience from the Canterbury earthquakes of 2010/11. It is a tool to assign a percentage of New Building Standard (*%NBS*) rating and associated grade to a building as part of an Initial Seismic Assessment of existing buildings.

The IEP enables territorial authorities, building owners and managers to review their building stock as part of an overall risk management process.

Characteristics and limitations of the IEP include:

- An IEP assessment is primarily concerned with life safety. It does not consider the susceptibility of the building to damage, and therefore to economic losses.
- It tends to be somewhat conservative, identifying some buildings as earthquake prone, or having a lower *%NBS* score, which subsequent detailed investigation may indicate is less than actual performance. However, there will be exceptions, particularly when critical structural weaknesses (CSWs) are present that have not been recognised from the level of investigation employed.
- An IEP can be undertaken with variable levels of available information, eg. exterior only inspection, structural drawings available or not, interior inspection, etc. The more information available, the more representative the IEP result is likely to be. The IEP records the information that has formed the basis of the assessment and consideration of this is important when determining the likely reliability of the result.
- It is an initial, first-stage review. Buildings or specific issues which the IEP process flags as being problematic or as potentially critical structural weaknesses need further detailed investigation and evaluation. A Detailed Seismic Assessment is recommended if the seismic status of a building is critical to any decision making.
- The IEP assumes that the buildings have been designed and built-in accordance with the building standard and good practice current at the time. In some instances, a building may include design features ahead of its time, leading to better than predicted performance. Conversely, some unidentified design or construction issues not picked up by the IEP process may result in the building performing not as well as predicted.
- It is a largely qualitative process, and should be undertaken or overseen by an experienced engineer. It involves considerable knowledge of the earthquake behaviour of buildings, and judgement as to key attributes and their effect on building performance. Consequently, it is possible that the *%NBS* derived for a building by independent experienced engineers may differ.
- An IEP may over-penalise some apparently critical features which could have been satisfactorily taken into account in the design.
- An IEP does not take into account the seismic performance of non-structural items such as ceiling, plant, services or general glazing that are not considered to present a significant life hazard.

Experience to date is that the IEP is a useful tool to identify potential issues and expected overall performance of a building in an earthquake. However, the process and the associated *%NBS* rating and grade should be considered as only providing an indicative indication of the building’s compliance with current code requirements. A detailed investigation and analysis of the building will typically be required to provide a definitive assessment.

Basis for the Assessment

The information we have used for our IEP assessment includes:

- The Seismic Assessment of Existing Buildings
  Technical Guidelines for Engineering Assessments July 2017 (the Guidance Document)
  - ***Part A*** Assessment Objectives and Principles
  - ***Part B*** Initial Seismic Assessment

NZS 1170.0:2002	Structural design actions, Part 0: General Principles
NZS 1170.1:2002	Structural design actions, Part 1: Permanent, imposed, and other actions
NZS 1170.5:2004	Structural design actions, Part 5: Earthquake actions – New Zealand
NZS 3604:2011	Timber Framed Buildings
NZS 3101:Part 1:2006	Concrete Structures Standard
NZS 4230:2004	Design of reinforced concrete masonry structures
NZS 3404:1997	Steel Structure Standard

Available information from Auckland Council Property File:

- Tapora Hall- Floor Layout & Elevations Drawing in Auckland Council Property Files
- Site observation on the 2nd March 2023
  - External
  - Internal
- Institute of Geological and Nuclear Services, Geological web map, 2013
- Historic aerophotography 1965 from http:// retrolens.nz licensed by LINZ

The building is founded over an area of Holocene river deposits of Tauranga Group, as inferred from the Institute of Geological and Nuclear Services, Geological web map. Soil type `D’ inferred from map.

Building Description

The building located at 5 Okahukura Road, Tapora, is a single storey building of warehouse style construction. It was originally built in 1960s in accordance with interview of local people and the recorded historic aerophotography in 1965. It consists of a foyer and toilet block at the north side and a new extension constructed at the south-west corner.

The structural systems are as follows:

- The light-weight metal roof is supported by steel portal frames and unreinforced concrete block masonry walls (URM) at two ends. The height of the URM wall is 3.3m above ground floor level approximately.
- The foyer and toilet block are constructed with timber frame walls with external brick veneer.
- The new extension at the south-west corner was constructed with timber frame walls and timber rafters. The timber rafters are 290x45mm and spaced at approximately 900mm centres. The timber frame is 90mm thick. The lines and claddings are nailed to the frame at approximately 400mm spacings.
- The steel portal frames and URM gable walls provide transverse lateral and gravity resistance for the roof structure.
- The steel portal frames were constructed with 180x100mm British UB section. The rafters are fully welded to column. And the columns are fixed down to foundation with 2M12 bolts.
- The foundation of the steel portals is 300x300mm (B x W) square concrete footing.
- Foundations of the URM are assumed to be shallow reinforced concrete strip footings.
- The floor was constructed with a timber sub-floor structure. The wooden flooring is on 140x45mm timber joists at 450mm centres over 100x70mm timber bearers, which spans at 1.4m approximately.
- The timber bearer is supported by 100x70mm timber jack studs on concrete footing. The base of timber jack stud is fixed with 2 wire ties.

The light-weight roof structure is supported on the steel portal frames and the URM gable walls at each end. However, the load path between the roof frame and the URM wall is discontinued by the large window above the URM gable wall. This can cause the URM wall to fail under out-of-plane action, resulting in the collapse of the URM gable walls and the end bay of the roof. In addition to this the transfer of in-plane loads into the gable end walls relies on a concentrated load at the points of contact which may also be unreliable and needs a further investigation.

Furthermore, there are URM walls in the building's longitudinal direction that are expected to provide lateral resistance. However, due to the asymmetrical layout of these walls the lateral stability system in this direction depends on the roof bracing system to transfer the lateral load to these walls. Unfortunately, the roof brace was not able to be identified during the site visit. An insufficient roof bracing system can result in the failure of the roof structure and supporting shear walls. Further inspection under a DSA is required to confirm the viability of this system.

During the site inspection, a non-destructive scan was performed for the reinforcement of the concrete masonry block wall. The scan revealed the absence of vertical reinforced bars. Horizontal reinforced bars were identified at approximately 800mm centres. Additionally, a bond beam was detected at the top of the concrete masonry wall. Lintels at the head of openings were identified as well. This was typical construction practise in New Zealand in the 1960’s.

The building is founded on a gentle gradient site. the site is slightly sloped down from the eastern boundary to the western. The slope is approximately 1:40.

The subject building is not listed as a heritage building.

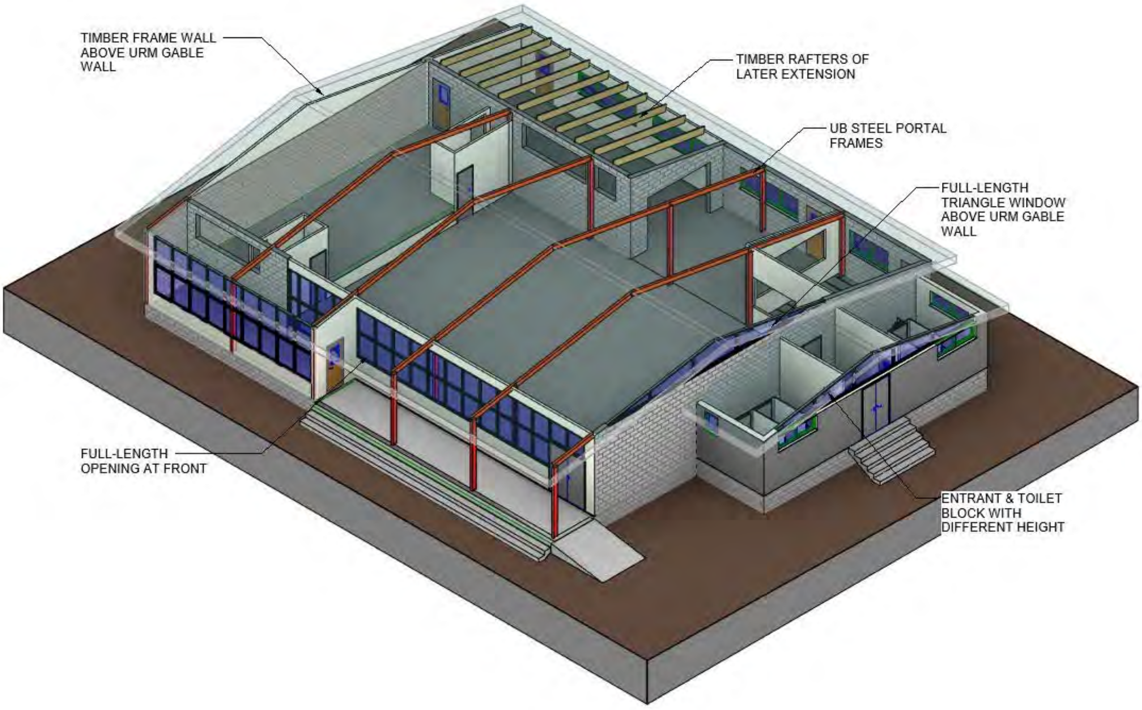

Figure 1. Isometric Drawing of The Building

IEP Assessment Results

Our IEP assessment of this building indicates the building can achieve 19%NBS (IL2) in the longitudinal direction and 20%NBS (IL2) in the transverse direction. The IEP assessment of this building therefore indicates an overall earthquake rating of 19%NBS (IL2)**,** corresponding to a **'Grade E' Very High Risk** building as defined by the NZSEE building grading scheme. This is below 34%NBS (one of the tests the TA will apply to determine the buildings earthquake-prone building status) and below the threshold for earthquake risk buildings (67%NBS) as recommended by the NZSEE.

The key assumptions made during our assessment are shown in Table 1 below. Refer also to the attached IEP assessment.

Table 1: IEP Assessment Results

IEP Item	Assumption	Justification
Date of Building Design	1960s	Auckland Council LIM documents
Subsoil Type	Soil type `D'	The building is founded over an area of Holocene river deposits of Tauranga Group, as inferred from the Institute of Geological and Nuclear Services, Geological web map.
Building Importance Level	2	NZS1170.0:2002 Table 3.2 Importance Levels for Building Types – New Zealand Structures
Ductility of Structure	1.0 1.0	In the longitudinal direction: • URM and timber frame walls. In the transverse direction: • Steel portal frames and URM gable walls.
Plan Irregularity Factor, A	0.7 1.0	Large openings on the east wall. Entrant foyer & toilet block has different building height. A new extension room at south-west corner.
Vertical Irregularity Factor, B	1.0	N/A
Short Columns Factor, C	1.0	N/A
Pounding Factor, D	1.0	N/A
Site Characteristic	1.0	N/A
F Factor	0.88 0.71	**In the longitudinal direction:** Full opening is located on the east wall. due to the extensive windows this generates an eccentricity of the stiffness-distribution. The toilet block (wing) has a different hight from main building. **In the transverse direction.** There is a full-length triangle window above the north URM gable wall. There is a full-length triangle window above the north timber frame wall of the foyer and toilet block.

IEP Grades and Relative Risk

Table 2 taken from the Technical Guidelines referred to earlier provides the basis for a proposed grading system for existing buildings, as one way of interpreting the %NBS rating.

The building has been classified by the IEP as a Grade E building and is therefore considered to be a 'Grade E' Very High Risk.

Table 2: Relative Earthquake Risk

Building Grade	Percentage of New Building Strength (*%NBS*)	Approx. Risk Relative to a New Building	Life-safety Risk Description
A+	>100	<1	low risk
A	80 to 100	1 to 2 times	low risk
B	67 to 79	2 to 5 times	low or medium risk
C	34 to 66	5 to 10 times	medium risk
D	20 to 33	10 to 25 times	HIGH RISK
E	<20	More than 25 times	VERY HIGH RISK

The NZSEE (which provides authoritative advice to the legislation makers and should be considered to represent the consensus view of New Zealand structural engineers) classifies a building achieving less than 34*%NBS* as “high risk” and required strengthening under the Earthquake Prone Building legislation.

Seismic Restraint of Non-Structural Items

During an earthquake, the safety of people can be put at risk due to non-structural items falling on them. These items should be adequately seismically restrained, where possible, as specified by NZS 4219:2009 “The Seismic Performance of Engineering Systems in Buildings”.

An assessment has not been made of the fixings of the timber frame wall above the concrete masonry wall. An assessment has not been made of the bracing of the ceilings, in-ceiling ducting, services and plant or contents either. We have also not checked whether tall or heavy furniture has been seismically restrained. These issues are outside the scope of this initial assessment but could be the subject of another investigation.

Conclusion and Recommendation

Our ISA assessment for this building, carried out using the IEP, indicates an overall score of **19%NBS (IL2)** which corresponds to a ‘Grade E’ Very High Risk building, as defined by the NZSEE building grading scheme. This is above the threshold for earthquake-prone buildings (34*%NBS)* as defined by the NZSEE and therefore does not require strengthening.

The ISA is considered to provide a relatively quick, high-level and qualitative measure of the building’s performance. In order to confirm the seismic performance of this building with more reliability you may wish to request a DSA. A DSA is likely to focus on the issues listed in Table 3 below.

Table 3: List of the issues identified

Issue	Recommendation and Requirement
A full-length window is on the URM gable walls supporting roof.	The URM wall is weak at out-of-plane action. Checking both in-plane and out-of-plane strength of the URM wall is required in the DSA. Strengthening of the URM wall and the top fixing if required. Further assessment of the localised fixing points at each end of the gable wall also requires further investigation.
The other non-loadbearing URM walls	The non-load bearing URM walls are not structural members. However, they are the structural parts that poses a significant life safety hazard in accordance with Table A4.1 of MBIE guidance.
The URM walls distribution is significantly uneven.	This may introduce a significant out-of-plane action to the steel portal frames if the building lacks a sufficient roof bracing system.
There are some large cracks on the north URM wall and brick veneer.	The diagonal zag cracks are close to the corner of building and developed from the first opening on the wall. Such crack usually occurs due to the differential ground settlement across the building. An insufficient depth and stiffness of the foundation across the expansive site soil are two main causes of this phenomenon. A geotechnical investigation is recommended to assess this.
There is no information of the roof bracing.	No roof bracing information for the building was available. A destructive inspection is recommended to confirm the roof bracing system.
Steel portal frame strength and restraints	The UB section used is from a British Standard which was common practise in this construction period in New Zealand. A DSA would consider the appropriate yield strength of the steel from this generation and other salient details, and also ensure fly bracing was installed where required. There is no web stiffeners for some of knee connection of the portal frame. A DSA shall check and strengthen the connection as required.
Timber sub-floor bracing	The timber sub-floor of the hall and stage is 11 x 19m (B x W) approximately and without internal bracing being evident. Hence the only bracing restraint is offered by the perimeter URM foundation wall. A DSA would identify if design of a braced piles system was required.

Table 4 below details the prerequisite site investigation work that is required to be undertaken before a DSA is able to be carried out.

Table 4: Prerequisite site investigation work required for DSA

Investigation work	Contractor	Requirement
Geotechnical investigation	Geotechnical engineer	Establish geotechnical properties of site for DSA calculations, typically: • Soil strength parameters • Site subsoil class in accordance with NZS1170.5:2004 • Expansive class if any

We would recommend that a full DSA report is carried out on this building.

The below Table 5 gives our recommendations for strengthening the building to achieve 67%NBS which are shown in Appendix F.

Table 5: Strengthening recommendations for Tapora Community Hall to achieve 67%NBS

Element	Direction	Strengthening recommendations
Roof bracing and wall bracing	Longitudinal	A further inspection is required after the ceiling space is opened and the roof frame is exposed. Roof bracings are required between the URM gable walls and steel portal frames. Also strengthening the roof frame fixing for the lateral loading path if required. Check the localised connection of gable end walls to transfer in plane loads.
The face loaded URM walls	Longitudinal	Option 1: Timber strong back from ground to roof level to be fixed and support the existing wall. Option 2: install top beam for the cantilevered block work (assuming that the steel portal frame and roof frame have sufficient capacity). Strengthen the top fixing of the URM walls.
Cracks on URM walls and veneer	Transversal & Longitudinal	Repair the cracks. Provide underpinning to the foundation if required.

We trust this letter and initial seismic assessment meets your current requirements. We would be pleased to discuss further with you any issues raised in this report.

Please do not hesitate to contact us if you would like clarification of any aspect of this letter.

Prepared by:

Lichuan Jiang

Lichuan Jiang
Structural Engineer
BEng, MBA(Hons)

Reviewed & approved by:

Manu Withers
Director
BE CMEngNZ CPEng IntPE(NZ)

Encl: **IEP Assessment**

Appendix:

A Site Locality and the Historic Aerophotography
B Floor Plan and Elevation Drawings
C Photographs
D Geological Information
E Design Options to Upgrade to 34% and 67%NBS
F NZBC Section C: Clause A3 and Table 1.2

Initial Evaluation Procedure (IEP) Assessment - Completed for Auckland Council

WARNING!! *This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in the "The Seismic Assessment of Existing Buildings" Technical Guidelines for Engineering Assessments, July 2017. This spreadsheet must be read in conjunction with the limitations set out in the accompanying report, and should not be relied on by any party for any other purpose. Detailed inspections and engineering calculations, or engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.*

Street Number & Name:	**5 Okahukura Road, Tapora**	**Job No.:**	**12707/116**
AKA:		**By:**	**L.J**
Name of building:	**Tapora Community Hall**	**Date:**	**3/03/2023**
City:	**Auckland**	**Revision No.:**	**-**

Table IEP-1 Initial Evaluation Procedure Step 1

Step 1 - General Information

1.1 Photos (attach sufficient to describe building)

Refer Appendix C.

NOTE: THERE ARE MORE PHOTOS ON PAGE 1a ATTACHED

1.2 Sketches (plans etc, show items of interest)

Refer Appendix B. for the plan drawings

NOTE: THERE ARE MORE SKETCHES ON PAGE 1a ATTACHED

1.3 List relevant features (Note: only 10 lines of text will print in this box. If further text required use Page 1a)

Please refer to the assessment summary.

1.4 Note information sources

Tick as appropriate

Visual Inspection of Exterior	☑	**Specifications**	☐
Visual Inspection of Interior	☑	**Geotechnical Reports**	☐
Drawings (note type)	☐	**Other (list)**	☐

Please refer to the assessment summary.

Initial Evaluation Procedure (IEP) Assessment - Completed for Auckland Council

Street Number & Name:	**5 Okahukura Road, Tapora**	**Job No.:**	**12707/116**
AKA:		**By:**	**L.J**
Name of building:	**Tapora Community Hall**	**Date:**	**3/03/2023**
City:	**Auckland**	**Revision No.:**	**-**

Table IEP-2 Initial Evaluation Procedure Step 2

Step 2 - Determination of *(%NBS)* $_b$

(Baseline *(%NBS)* for particular building - refer Section B5)

2.1 Determine nominal *(%NBS)* = *(%NBS)* $_{nom}$

a) Building Strengthening Data

	Longitudinal	Transverse
Tick if building is known to have been strengthened in this direction	☐	☐
If strengthened, enter percentage of code the building has been strengthened to	N/A	N/A

b) Year of Design/Strengthening, Building Type and Seismic Zone

	Longitudinal	Transverse
Pre 1935	○	○
1935-1965	○	○
1965-1976	●	●
1976-1984	○	○
1984-1992	○	○
1992-2004	○	○
2004-2011	○	○
Post Aug 2011	○	○
Building Type:	Public Buildings	Public Buildings
Seismic Zone:	Zone C	Zone C

c) Soil Type

	Longitudinal	Transverse
From NZS1170.5:2004, Cl 3.1.3 :	D Soft Soil	D Soft Soil
From NZS4203:1992, Cl 4.6.2.2 : **(for 1992 to 2004 and only if known)**	**Not applicable**	**Not applicable**

d) Estimate Period, *T*

Comment:

steel portal frames + concrete masonry block gable wall (URM) + timber frame extensions

		Longitudinal	Transverse
	h_n =	2.9	3.4 m
	A_c =	1.55	1.00 m^2
Moment Resisting Concrete Frames:	$T = \max\{0.09h_n^{0.75}, 0.4\}$	○	○
Moment Resisting Steel Frames:	$T = \max\{0.14h_n^{0.75}, 0.4\}$	○	●
Eccentrically Braced Steel Frames:	$T = \max\{0.08h_n^{0.75}, 0.4\}$	○	○
All Other Frame Structures:	$T = \max\{0.06h_n^{0.75}, 0.4\}$	○	○
Concrete Shear Walls	$T = \max\{0.09h_n^{0.75}/ A_c^{0.5}, 0.4\}$	○	○
Masonry Shear Walls:	$T \leq 0.4\text{sec}$	●	○
User Defined (input Period):		○	○
	T:	0.40	0.40

Where h_n = height in metres from the base of the structure to the uppermost seismic weight or mass.

			Longitudinal	Transverse
e) Factor A:	Strengthening factor determined using result from (a) above (set to 1.0 if not strengthened)	**Factor A:**	1.00	1.00
f) Factor B:	Determined from NZSEE Guidelines Figure 3A.1 using results (a) to (e) above	**Factor B:**	0.04	0.04
g) Factor C:	For reinforced concrete buildings designed between 1976-84 Factor C = 1.2, otherwise take as 1.0.	**Factor C:**	1.00	1.00
h) Factor D:	For buildings designed prior to 1935 Factor D = 0.8 except for Wellington and Napier (1931-1935) where Factor D may be taken as 1.0, otherwise take as 1.0.	**Factor D:**	1.00	1.00
(%NBS) $_{nom}$ **= AxBxCxD**		***(%NBS)*** $_{nom}$	4%	4%

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Street Number & Name:	**5 Okahukura Road, Tapora**	**Job No.:**	**12707/116**
AKA:		**By:**	**L.J**
Name of building:	**Tapora Community Hall**	**Date:**	**3/03/2023**
City:	**Auckland**	**Revision No.:**	**-**

Table IEP-2 Initial Evaluation Procedure Step 2 continued

2.2 Near Fault Scaling Factor, Factor E

If $T \leq$ 1.5sec, Factor E = 1

			Longitudinal	**Transverse**
a) Near Fault Factor, *N(T,D)* (from NZS1170.5:2004, Cl 3.1.6)		**N(T,D):**	1	1
b) Factor E	= 1/N(T,D)	**Factor E:**	1.00	1.00

2.3 Hazard Scaling Factor, Factor F

a) Hazard Factor, *Z*, for site

Location: Auckland **Refer right for user-defined locations**

Z = 0.13 (from NZS1170.5:2004, Table 3.3)

Z_{1992} = 0.6 (NZS4203:1992 Zone Factor from accompanying Figure 3.5(b))

Z_{2004} = 0.13 (from NZS1170.5:2004, Table 3.3)

b) Factor F

For pre 1992 = $1/Z$

For 1992-2011 = Z_{1992}/Z

For post 2011 = Z_{2004}/Z

		Longitudinal	Transverse
	Factor F:	7.69	7.69

2.4 Return Period Scaling Factor, Factor G

a) Design Importance Level, I

(Set to 1 if not known. For buildings designed prior to 1965 and known to be designed as a public building set to 1.25. For buildings designed 1965-1976 and known to be designed as a public building set to 1.33 for Zone A or 1.2 for Zone B. For 1976-1984 set I value.)

b) Design Risk Factor, R_o

(set to 1.0 if other than 1976-2004, or not known)

c) Return Period Factor, R

(from NZS1170.0:2004 Building Importance Level)

d) Factor G = IR_o/R

		Longitudinal	Transverse
a)	I =	1	1
b)	R_o =	1	1
c)	*Choose Importance Level*	○ 1 ● 2 ○ 3 ○ 4	○ 1 ● 2 ○ 3 ○ 4
c)	R =	1.0	1.0
d)	**Factor G:**	1.00	1.00

2.5 Ductility Scaling Factor, Factor H

a) Available Displacement Ductility Within Existing Structure

Comment:

b) Factor H

		Longitudinal	Transverse
a)	μ =	1.00	1.00
b)		k_μ	k_μ
For pre 1976 (maximum of 2)	=	1.00	1.00
For 1976 onwards	=	1	1
	Factor H:	1.00	1.00

(where kμ is NZS1170.5:2004 Inelastic Spectrum Scaling Factor, from accompanying Table 3.3)

2.6 Structural Performance Scaling Factor, Factor I

a) Structural Performance Factor, S_p

(from accompanying Figure 3.4)

Tick if light timber-framed construction in this direction

b) Structural Performance Scaling Factor = $1/S_p$

		Longitudinal	Transverse
Tick if light timber-framed construction in this direction		☐	☐
a)	S_p =	1.00	1.00
b)	**Factor I:**	1.00	1.00

Note Factor B values for 1992 to 2004 have been multiplied by 0.67 to account for Sp in this period

	Longitudinal	Transverse
2.7 Baseline *%NBS* for Building, *(%NBS)*$_b$ (equals **(*%NBS*)$_{nom}$ x E x F x G x H x I**)	**31%**	**31%**

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Name of building:	**Tapora Community Hall**	**Date:**	**3/03/2023**
City:	**Auckland**	**Revision No.:**	**-**

Table IEP-3 Initial Evaluation Procedure Step 3

Step 3 - Assessment of Performance Achievement Ratio (PAR)

(Refer Appendix B - Section B3.2)

a) Longitudinal Direction

potential CSWs **Effect on Structural Performance** **Factors**
(Choose a value - Do not interpolate)

3.1 Plan Irregularity

Effect on Structural Performance ○ *Severe* ● *Significant* ○ *Insignificant* **Factor A** 0.7

The entrant foyer and toilet block at front side has differeent height, a new extension room at south-west corner, the length of the concrete block masonry wall at two sides is significant.

3.2 Vertical Irregularity

Effect on Structural Performance ○ *Severe* ○ *Significant* ● *Insignificant* **Factor B** 1.0

Comment

3.3 Short Columns

Effect on Structural Performance ○ *Severe* ○ *Significant* ● *Insignificant* **Factor C** 1.0

Comment

3.4 Pounding Potential

(Estimate D1 and D2 and set D = the lower of the two, or 1.0 if no potential for pounding, or consequences are considered to be minimal)

a) Factor D1: - Pounding Effect

Note:
Values given assume the building has a frame structure. For stiff buildings (eg shear walls), the effect of pounding may be reduced by taking the coefficient to the right of the value applicable to frame buildings.

Factor D1 For Longitudinal Direction: 1.0

Table for Selection of Factor D1	Severe	Significant	Insignificant
Separation	0<Sep<.005H	.005<Sep<.01H	Sep>.01H
Alignment of Floors within 20% of Storey Height	○ 1	○ 1	● 1
Alignment of Floors not within 20% of Storey Height	○ 0.4	○ 0.7	○ 0.8

Comment

b) Factor D2: - Height Difference Effect

Factor D2 For Longitudinal Direction: 1.0

Table for Selection of Factor D2	Severe	Significant	Insignificant
	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

Comment

Factor D 1.0

3.5 Site Characteristics - *Stability, landslide threat, liquefaction etc as it affects the structural performance from a life-safety perspective*

Effect on Structural Performance ○ *Severe* ○ *Significant* ● *Insignificant* **Factor E** 1.0

Comment

3.6 Other Factors - *for allowance of all other relevant characterstics of the building*

For ≤ 3 storeys - Maximum value 2.5
otherwise - Maximum value 1.5.
No minimum.

Factor F 0.9

Record rationale for choice of Factor F:

Full opening is located on the east wall. This leads an eccentricity of the stiffness-distribution.
The toilet block (area = 31.6m^2) has a different hight from main building (area = 258m^2). 1-32.6/258=0.88

PAR

3.7 Performance Achievement Ratio (PAR)
(equals **A x B x C x D x E x F**)

Longitudinal **0.62**

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Initial Evaluation Procedure (IEP) Assessment - Completed for Auckland Council

Street Number & Name:	**5 Okahukura Road, Tapora**	**Job No.:**	**12707/116**
AKA:		**By:**	**L.J**
Name of building:	**Tapora Community Hall**	**Date:**	**3/03/2023**
City:	**Auckland**	**Revision No.:**	**-**

Table IEP-3 Initial Evaluation Procedure Step 3

Step 3 - Assessment of Performance Achievement Ratio (PAR)

(Refer Appendix B - Section B3.2)

b) Transverse Direction

Factors

potential CSWs

Effect on Structural Performance
(Choose a value - Do not interpolate)

3.1 Plan Irregularity

Effect on Structural Performance ○ *Severe* ○ *Significant* ● *Insignificant* **Factor A** 1.0

URM gable wall and steel portal frames at middle

3.2 Vertical Irregularity

Effect on Structural Performance ○ *Severe* ○ *Significant* ● *Insignificant* **Factor B** 1.0

Comment

3.3 Short Columns

Effect on Structural Performance ○ *Severe* ○ *Significant* ● *Insignificant* **Factor C** 1.0

Comment

3.4 Pounding Potential

(Estimate D1 and D2 and set D = the lower of the two, or 1.0 if no potential for pounding, or consequences are considered to be minimal)

a) Factor D1: - Pounding Effect

Note:
Values given assume the building has a frame structure. For stiff buildings (eg shear walls), the effect of pounding may be reduced by taking the coefficient to the right of the value applicable to frame buildings.

Factor D1 For Transverse Direction: 1.0

Table for Selection of Factor D1	Severe	Significant	Insignificant
Separation	0<Sep<.005H	.005<Sep<.01H	Sep>.01H
Alignment of Floors within 20% of Storey Height	○ 1	○ 1	● 1
Alignment of Floors not within 20% of Storey Height	○ 0.4	○ 0.7	○ 0.8

Comment

b) Factor D2: - Height Difference Effect

Factor D2 For Transverse Direction: 1.0

Table for Selection of Factor D2	Severe	Significant	Insignificant
	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

Comment

Factor D 1.0

3.5 Site Characteristics - *Stability, landslide threat, liquefaction etc as it affects the structural performance from a life-safety perspective*

Effect on Structural Performance ○ *Severe* ○ *Significant* ● *Insignificant* **Factor E** 1.0

Comment

3.6 Other Factors - *for allowance of all other relevant characterstics of the building*

For ≤ 3 storeys - Maximum value 2.5
otherwise - Maximum value 1.5.
No minimum.

Factor F 0.71

Record rationale for choice of Factor F:

Triangle windows on the galbe walls (both of main building and toilet block) to break the lateral load path from the roof.
That is 2 grids of 7 grids. 1-2/7=0.7

PAR

3.7 Performance Achievement Ratio (PAR)
(equals **A x B x C x D x E x F**)

Transverse **0.71**

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Initial Evaluation Procedure (IEP) Assessment - Completed for Auckland Council

Street Number & Name:	5 Okahukura Road, Tapora	**Job No.:**	12707/116
AKA:		**By:**	L.J
Name of building:	Tapora Community Hall	**Date:**	3/03/2023
City:	Auckland	**Revision No.:**	-

Table IEP-4 Initial Evaluation Procedure Steps 4, 5, 6 and 7

Step 4 - Percentage of New Building Standard *(%NBS)*

		Longitudinal	Transverse
4.1	**Assessed Baseline *%NBS (%NBS)*$_b$** (from Table IEP - 1)	31%	31%
4.2	**Performance Achievement Ratio (PAR)** (from Table IEP - 2)	0.62	0.71
4.3	**PAR x Baseline *(%NBS)*$_b$**	19%	20%
4.4	**Percentage New Building Standard *(%NBS)* - Seismic Rating** (Use lower of two values from Step 4.3)		19%

Step 5 - Is *%NBS* < 34?

YES

Step 6 - Potentially Earthquake Risk (is *%NBS* < 67)?

YES

Step 7 - Provisional Grading for Seismic Risk based on IEP

Seismic Grade E

Additional Comments (items of note affecting IEP based seismic rating)

1. The Playgroup Room is an extnesion with timber frame wall to the original building.
2. There is no information of the roof bracing becuase the celing space is not accessible.

Relationship between Grade and *%NBS* :

Grade:	A+	A	B	C	D	E
%NBS:	> 100	100 to 80	79 to 67	66 to 34	< 34 to 20	< 20

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Street Number & Name:	5 Okahukura Road, Tapora	**Job No.:**	12707/116
AKA:		**By:**	L.J
Name of building:	Tapora Community Hall	**Date:**	3/03/2023
City:	Auckland	**Revision No.:**	-

Table IEP-5 Initial Evaluation Procedure Step 8

Step 8 - Identification of potential Severe Structural Weaknesses (SSWs) that could result in significant risk to a significant number of occupants

8.1	**Number of storeys above ground level**	1
8.2	**Presence of heavy concrete floors and/or concrete roof? (Y/N)**	N

Potential Severe Structural Weaknesses (SSWs):

Note: Options that are greyed out are not applicable and need not be considered.

Occupancy not considered to be significant - no further consideration required

Risk not considered to be significant - no further consideration required

The following potential Severe Structural Weaknesses (SSWs) have been identified in the building that could result in significant risk to a significant number of occupants:

1. None identified

2. Weak or soft storey (except top storey)

3. Brittle columns and/or beam-column joints the deformations of which are not constrained by other structural elements

4. Flat slab buildings with lateral capacity reliant on low ductility slab-to-column connections

5. No identifiable connection between primary structure and diaphragms

6. Ledge and gap stairs

IEP Assessment Confirmed by **Signature**

Manu Stroude Withers **Name**

248329 **CPEng. No**

WARNING!! *This initial evaluation has been carried out solely as an initial seismic assessment of the building following the procedure set out in "The Seismic Assessment of Existing Buildings" Technical Guidelines for Engineering Assessments, July 2017. This spreadsheet must be read in conjunction with the limitations set out in the accompanying report, and should not be relied on by any party for any other purpose. Detailed inspections and engineering calculations, or engineering judgements based on them, have not been undertaken, and these may lead to a different result or seismic grade.*

Initial Evaluation Procedure (IEP) Assessment - Completed for Auckland Council

Street Number & Name:	**5 Okahukura Road, Tapora**	**Job No.:**	**12707/116**
AKA:		**By:**	**L.J**
Name of building:	**Tapora Community Hall**	**Date:**	**3/03/2023**
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Table IEP-1a Additional Photos and Sketches

Add any additional photographs, notes or sketches required below:

Note: print this page separately

Refer to the appendixes

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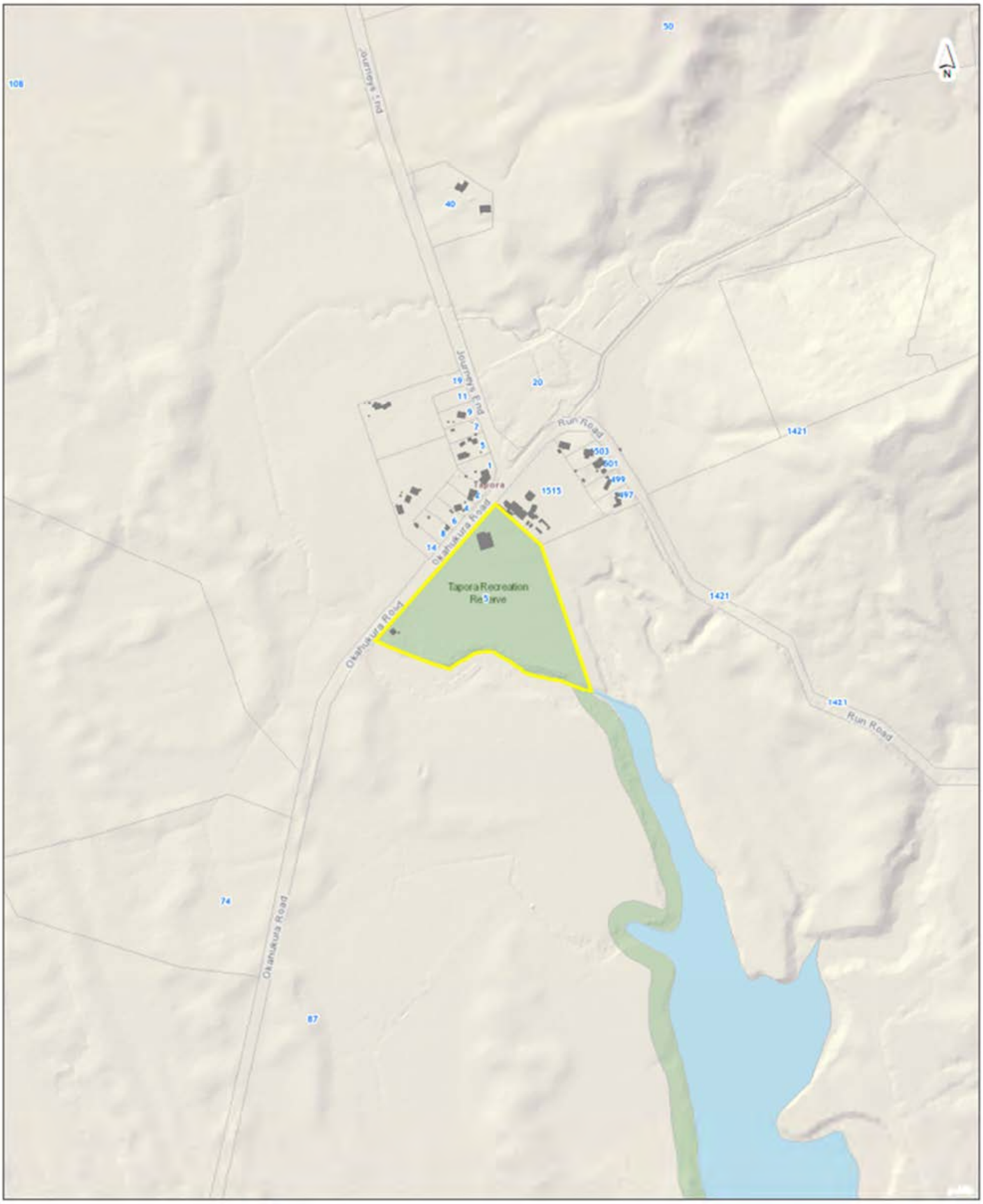
APPENDIX A – Site Locality and the Historic Aerophotography

Auckland Council **Map**



Scale @ A3
= 1:5,000

Date Printed:
17/11/2022

The building assessed

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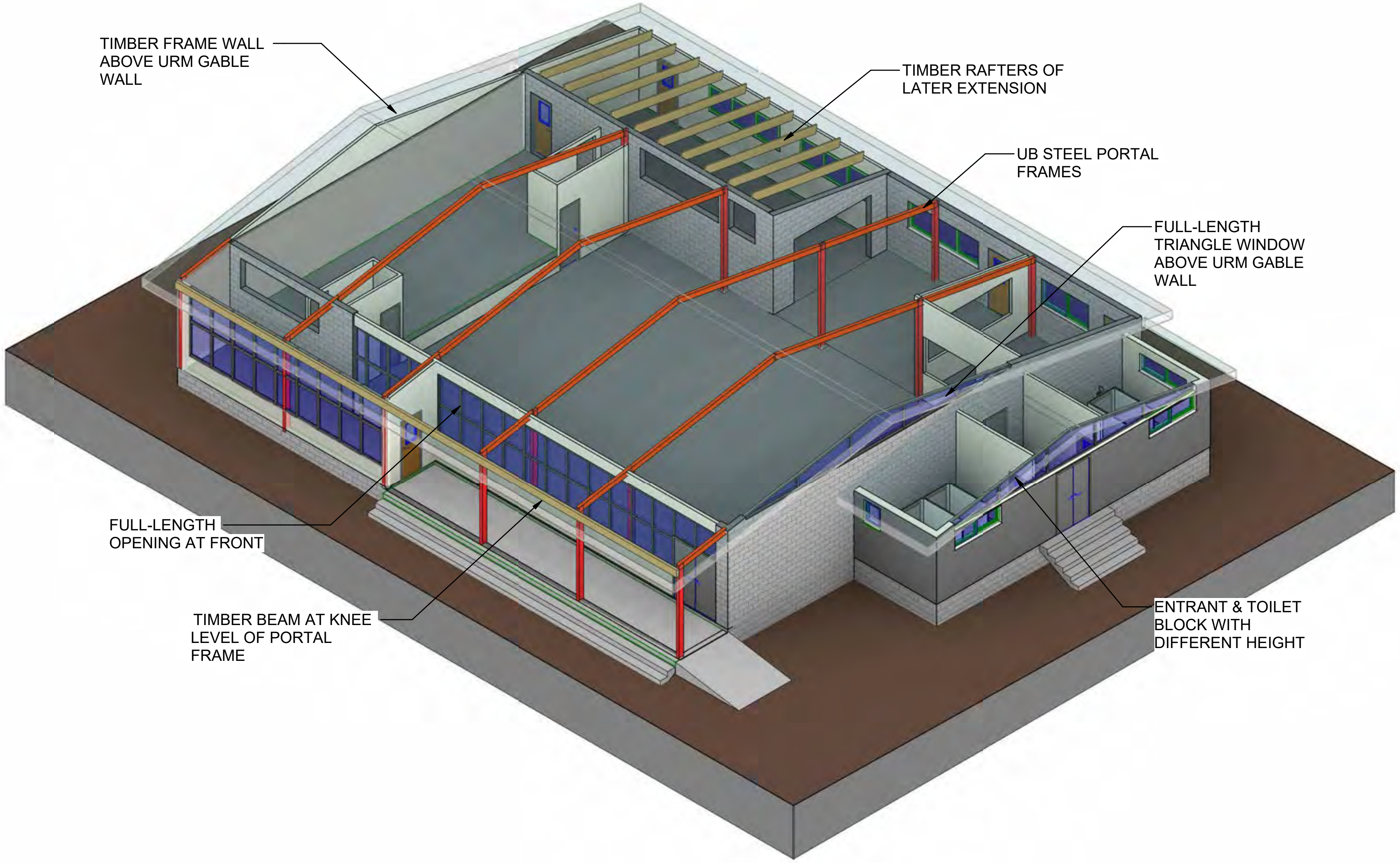
APPENDIX B – Floor Plan and Elevation Drawings



1 ISOMETRIC STRUCTURAL VIEW

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5 Okahukura Road, Tapora

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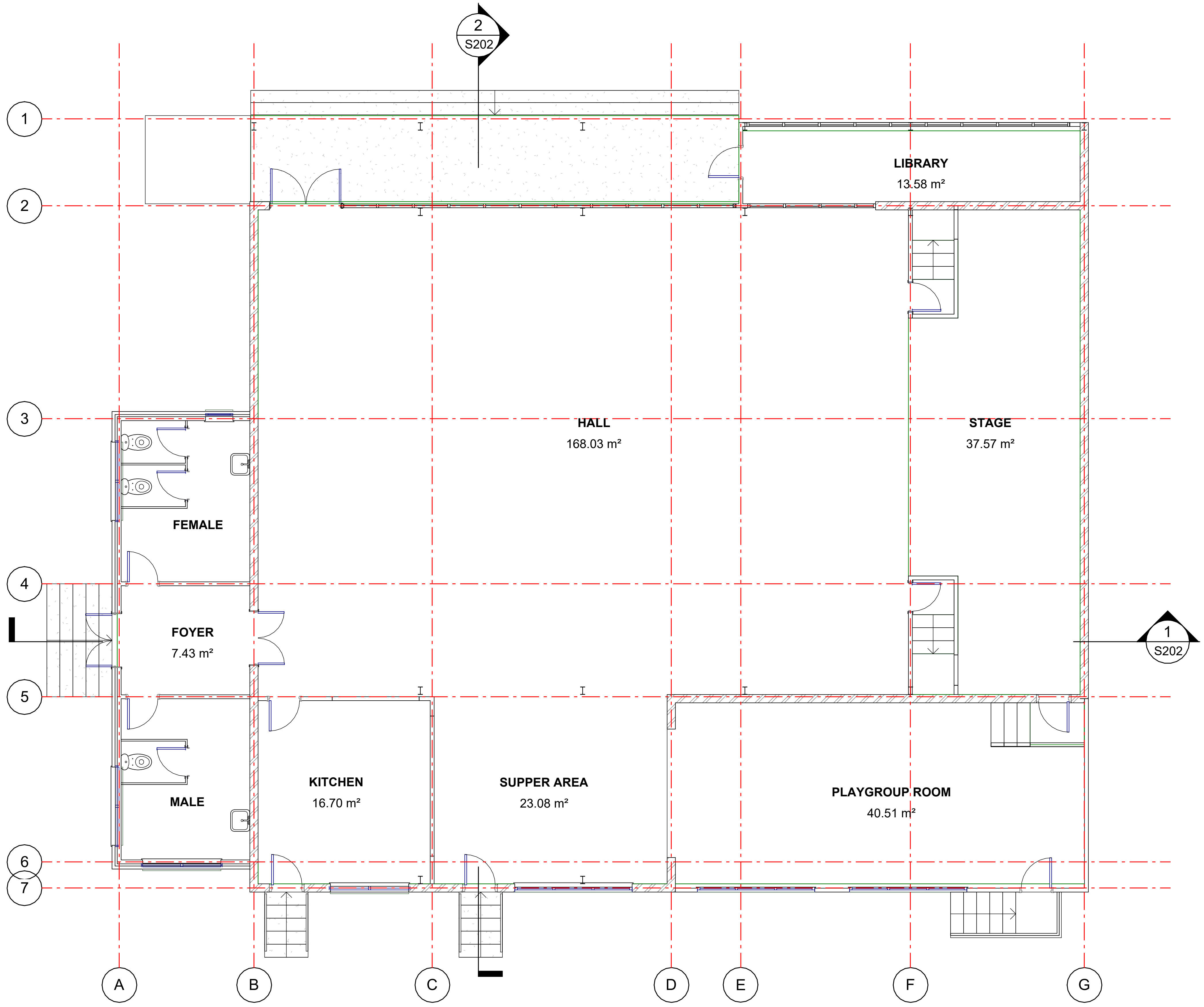

1 GROUND FLOOR PLAN

1 : 100

LEGENDS:

▨	CONCRETE BLOCK MASONRY WALL
═	TIMBER FRAME WALL
I	COLUMN

ROOM SCHEDULE			
Room Name	**Area**	**Occupancy**	**Comments**
HALL	168.03 m²	168	
STAGE	37.57 m²	47	
LIBRARY	13.58 m²	3	
PLAYGROUP ROOM	40.51 m²	11	
KITCHEN	16.70 m²	2	
FOYER	7.43 m²	8	
FEMALE	10.98 m²		
MALE	10.98 m²		
SUPPER AREA	23.08 m²	18	
- TOTAL	328.87 m²	257	

NOTE:
THE NUMBER OF OCCUPANTS FOR THE TABLE IS CALCULATED IN ACCORDANCE WITH TABLE 1.2 C/AS2 OF NZBC. IT MUST BE CONFIRMED WITH A FIRE ENGINEER TO DETERMINE THE BUILDING IMPORTANCE LEVEL.

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GROUND FLOOR PLAN

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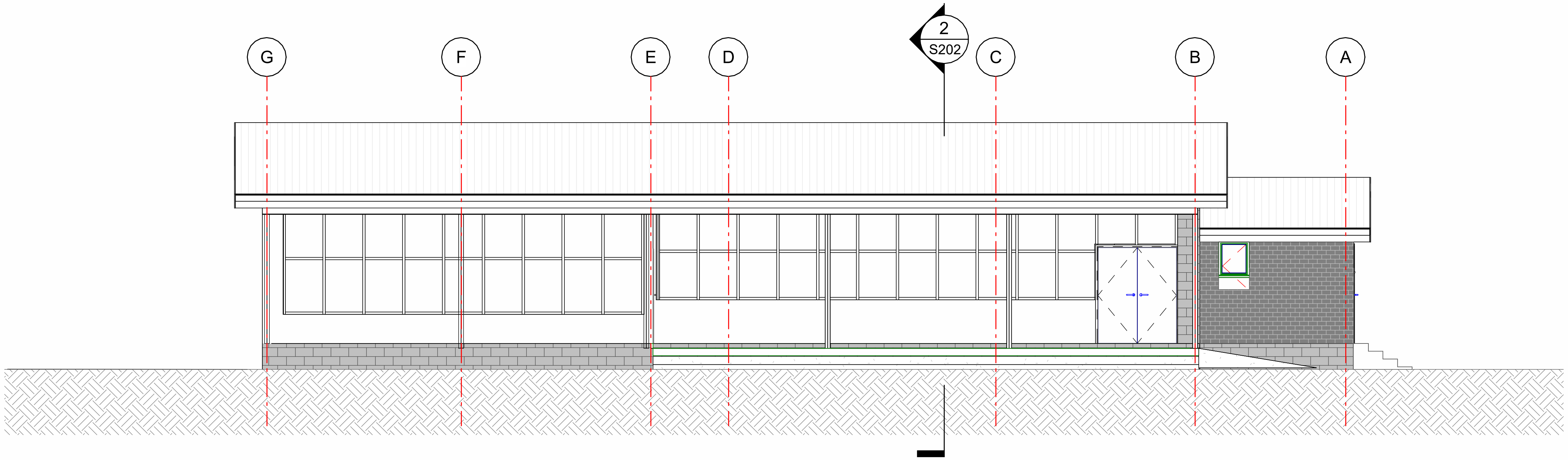
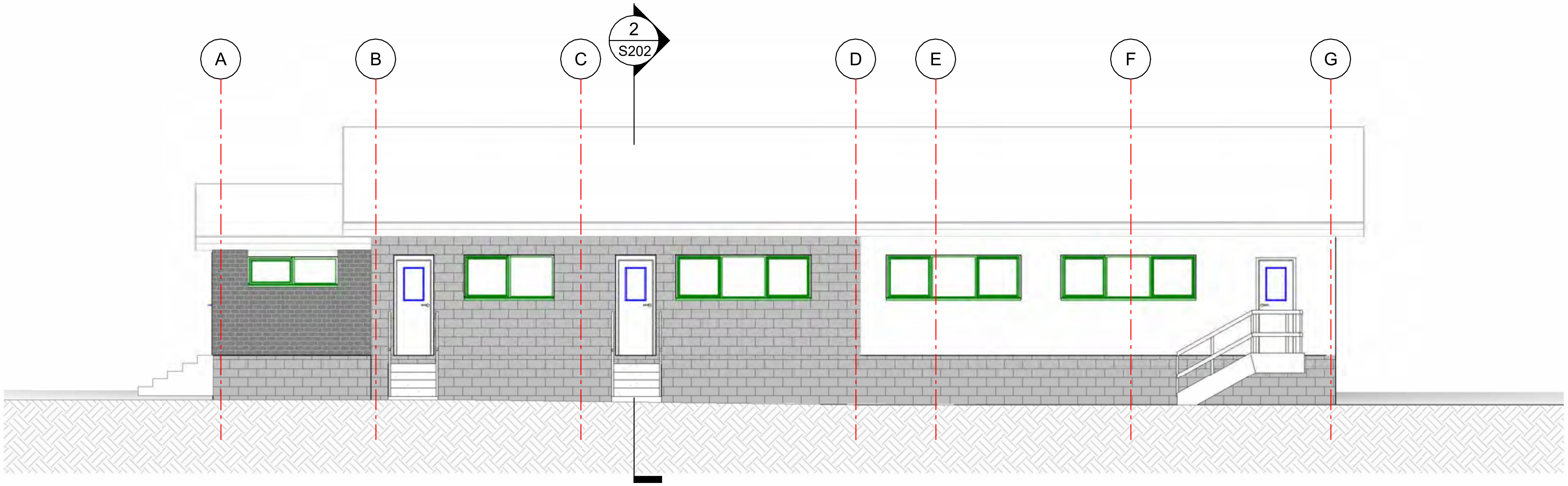


1 EAST ELEVATION

1 : 100



2 WEST ELEVATION

1 : 100

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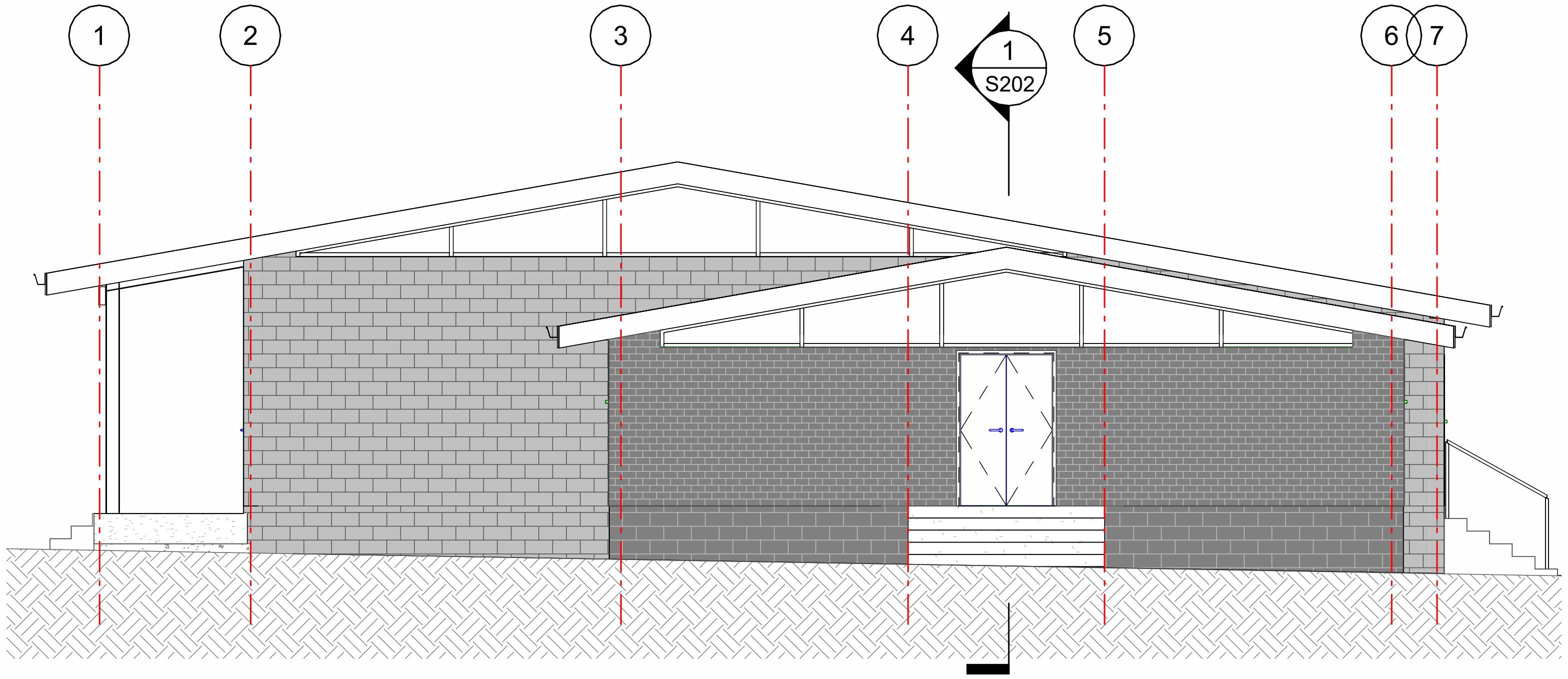
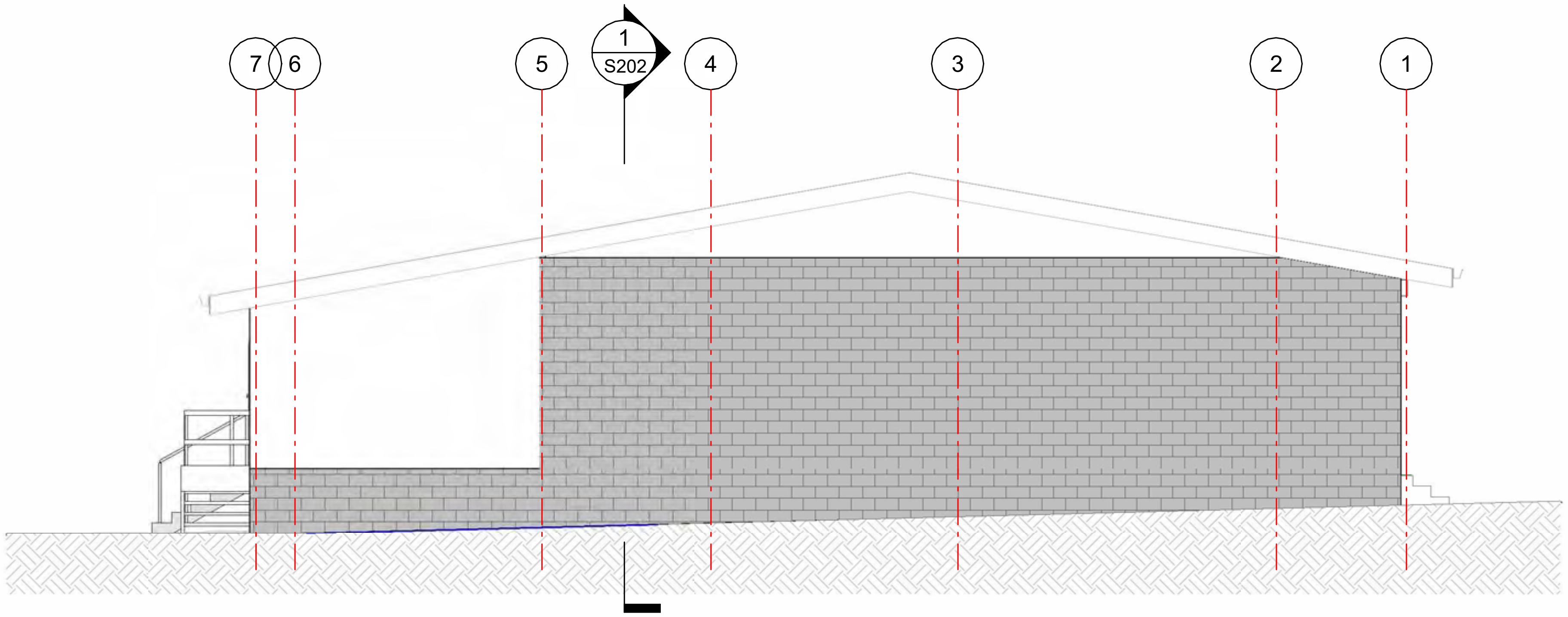


1 NORTH ELEVATION

1 : 100



2 SOUTH ELEVATION

1 : 100

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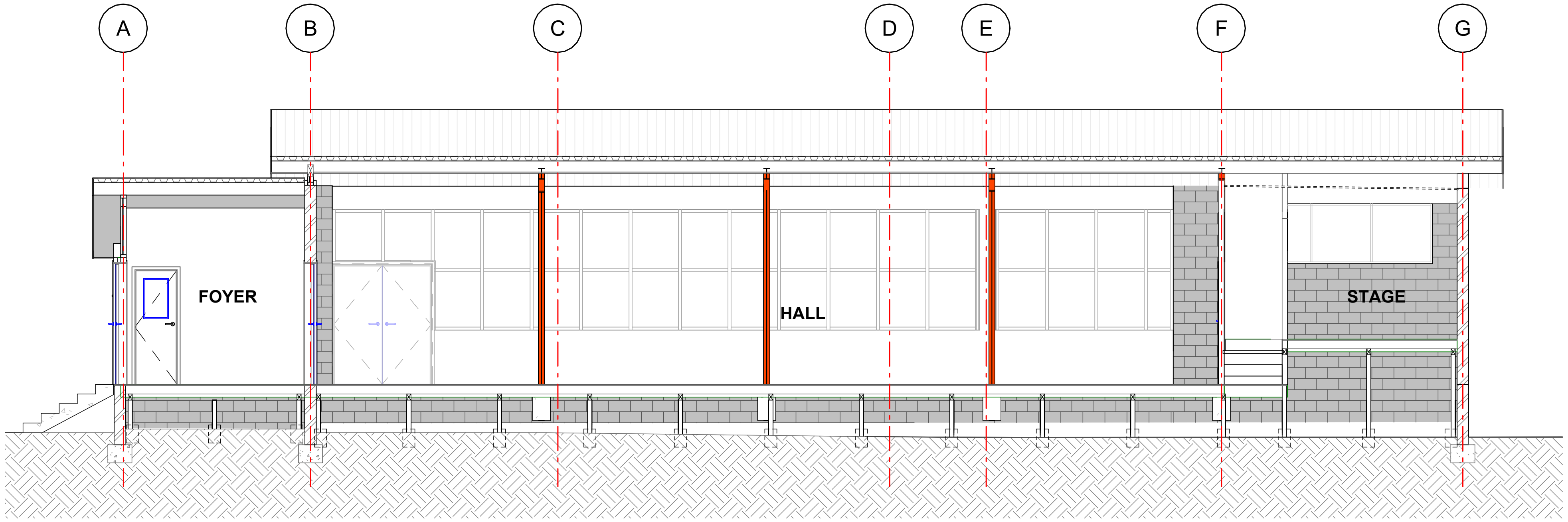
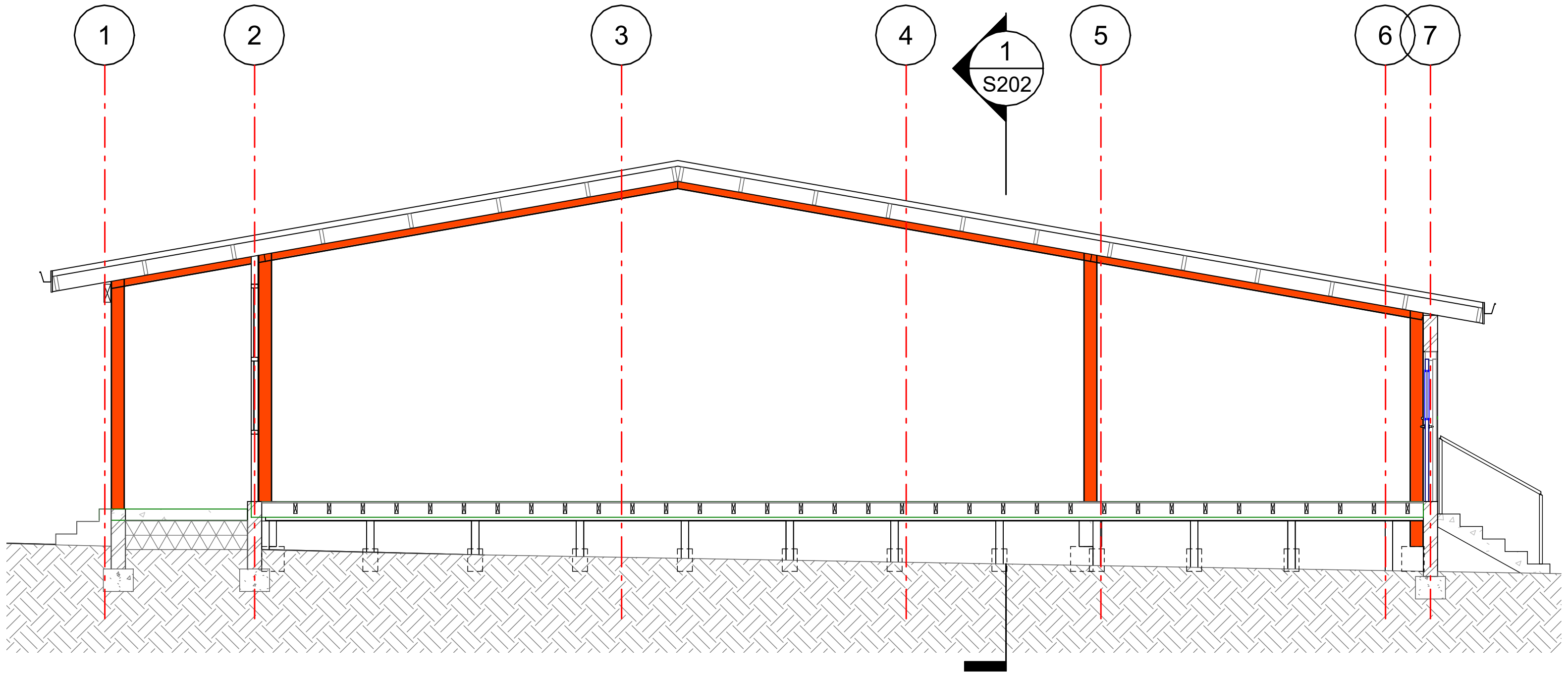


1
S101
LONG SECTION
1 : 100



2
S101
CROSS SECTION
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SECTIONS

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Appendix C - Photographs

1. Exterior of the building (East)

2. West elevation.

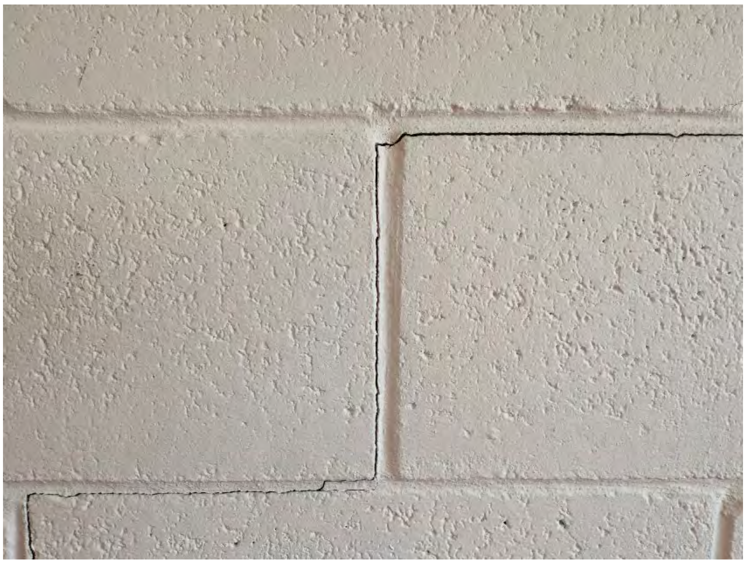
3. Crack on the brick veneer (The foyer & toilet block)

4. Entrant foyer & toilet block (North)

5. Large gap of the brick venner joint to the block wall

6. Sub-floor beneath the stage

	7. Sub-floor beneath the hall
	8. The base connection of the UB portal frame in the sub-floor
	9. The stage

	10. The interior view of the hall and steel portal frames (middle span)
	11. The full-length triangle window above the unreinfored concrete block masonry (URM) gable wall
	12. Crack on the URM gable wall

	13. Crack at top of the internal concrete block wall (URM) of the play group room
	14. Exposed steel portal frame (side span) of the east corridor
	14. the brocken concrete block and the UB steel column is corroded at the east-south corner (exterior)

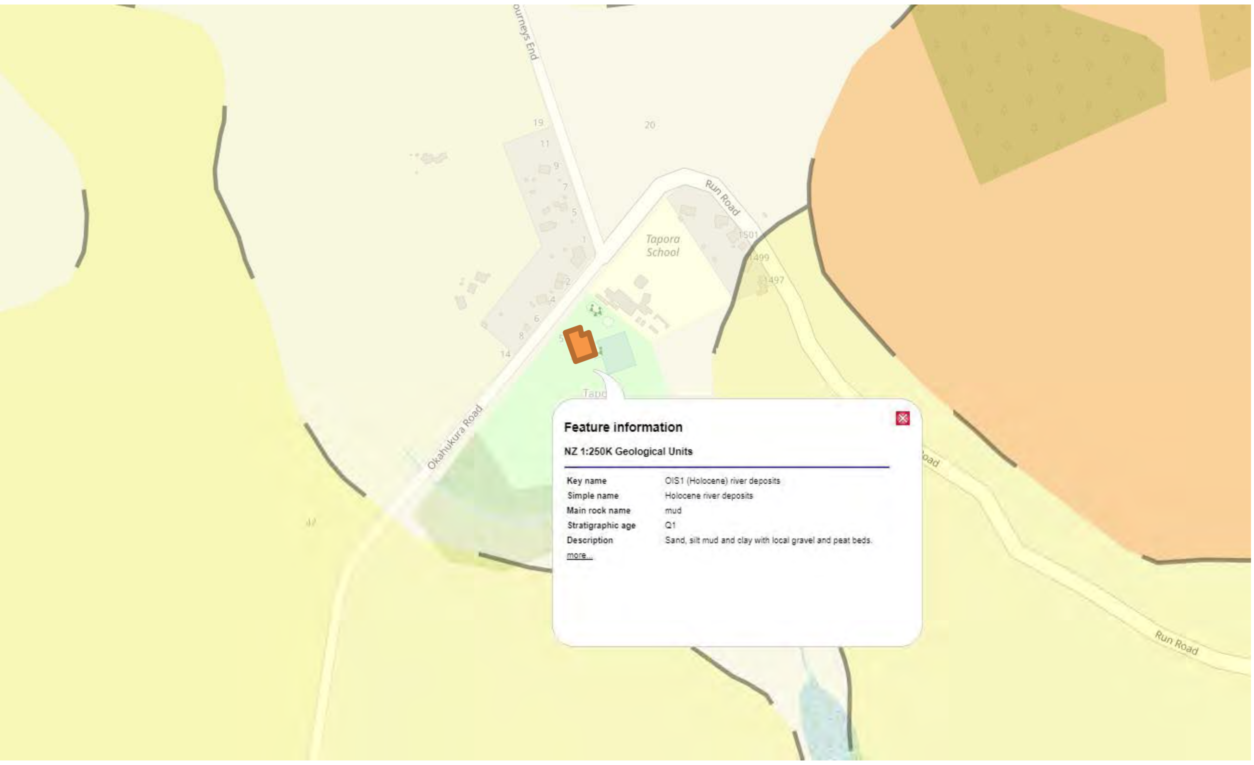
APPENDIX D – Geological Information

GEOLOGICAL SUMMARY OF SITE

Source: Institute of Geological and Nuclear Sciences Limited – Geological web map - 2013

Geological Map

The geological maps indicate that the site is in general underlain by Holocene river deposits of Tauranga Group.



Feature information

NZ 1:250K Geological Units

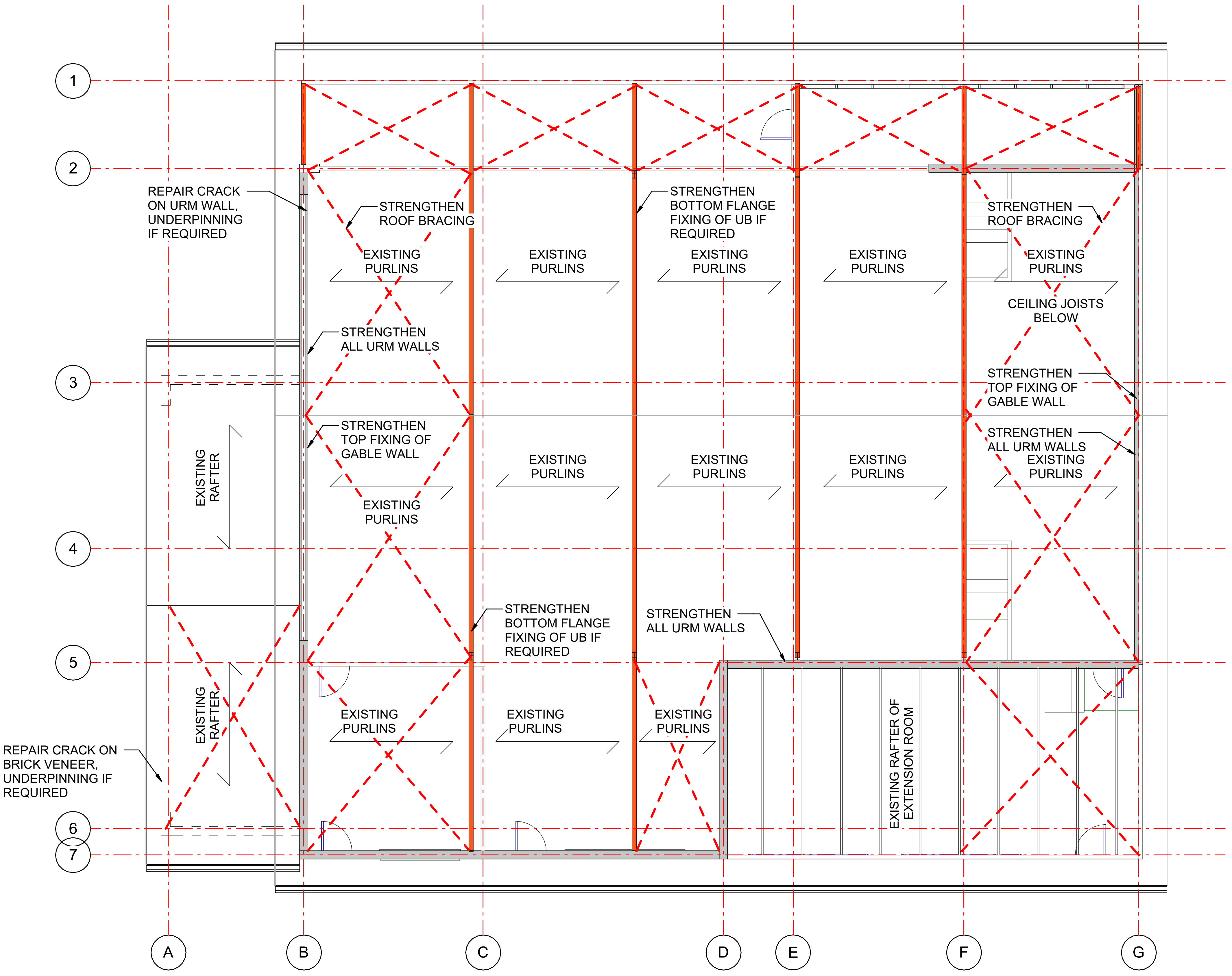
Key name	OIS1 (Holocene) river deposits
Simple name	Holocene river deposits
Main rock name	mud
Stratigraphic age	Q1
Description	Sand, silt mud and clay with local gravel and peat beds.

more...

Key name	OIS1 (Holocene) river deposits
Simple name	Holocene river deposits
Main rock name	mud
Stratigraphic age	Q1
Description	Sand, silt mud and clay with local gravel and peat beds.
Subsidiary rocks	sand silt clay peat
Key group	Holocene sediments
Stratigraphic lexicon name	Tauranga Group
Terrane equivalent	
Absolute age (min)	0.0 million years
Absolute age (max)	0.014 million years
Rock group	mudstone
Rock class	clastic sediment
Code	Q1.alvgvl
QMAP sheet name	Auckland

APPENDIX E – Design Options to Upgrade to 34% and 67%NBS

Refer to Table 5 of this report for the recommendations of strengthening of the structure to achieve 67% NBS. Some drawings and details are attached below as reference. These typical details are only based on general engineering judgment and practice. None of specifical calculation was completed. A DSA and detailing design are required for the remedial drawings.



LEGENDS:

⟋	ROOF FRAME AS NOTE
═	TIMBER FRAME WALL
▬	CONCRETE BLOCK MASONRY WALL (URM)
🟥	STEEL FRAME
✕	ROOF CROSS BRACING

ALL DIMENSIONS ARE TO BE VERIFIED ON SITE PRIOR TO MAKING ANY SHOP DRAWINGS OR COMMENCING ANY WORK.

CAD Filename: D:\works\Tapora Community Hall - 5 Okahukura Rd 12707-116\Tapora Community Hall 12707-116.rvt

ORIGINAL SIZE:

PRINT IN COLOUR

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CLIENT:
AUCKLAND COUNCIL

JOB TITLE:
TAPORA COMMUNITY HALL
5 Okahukura Road, Tapora

REV	AMENDMENT	DATE	BY
A	FINAL ISA	20-4-2023	

DRAWING STATUS:
FINAL

DESIGN: L.J
DRAWN: L.J
CHECKED: M.W
DATE: 21/04/2023 12:08:45 pm
SCALE: 1 : 100 @ A3
DO NOT SCALE FROM DRAWINGS

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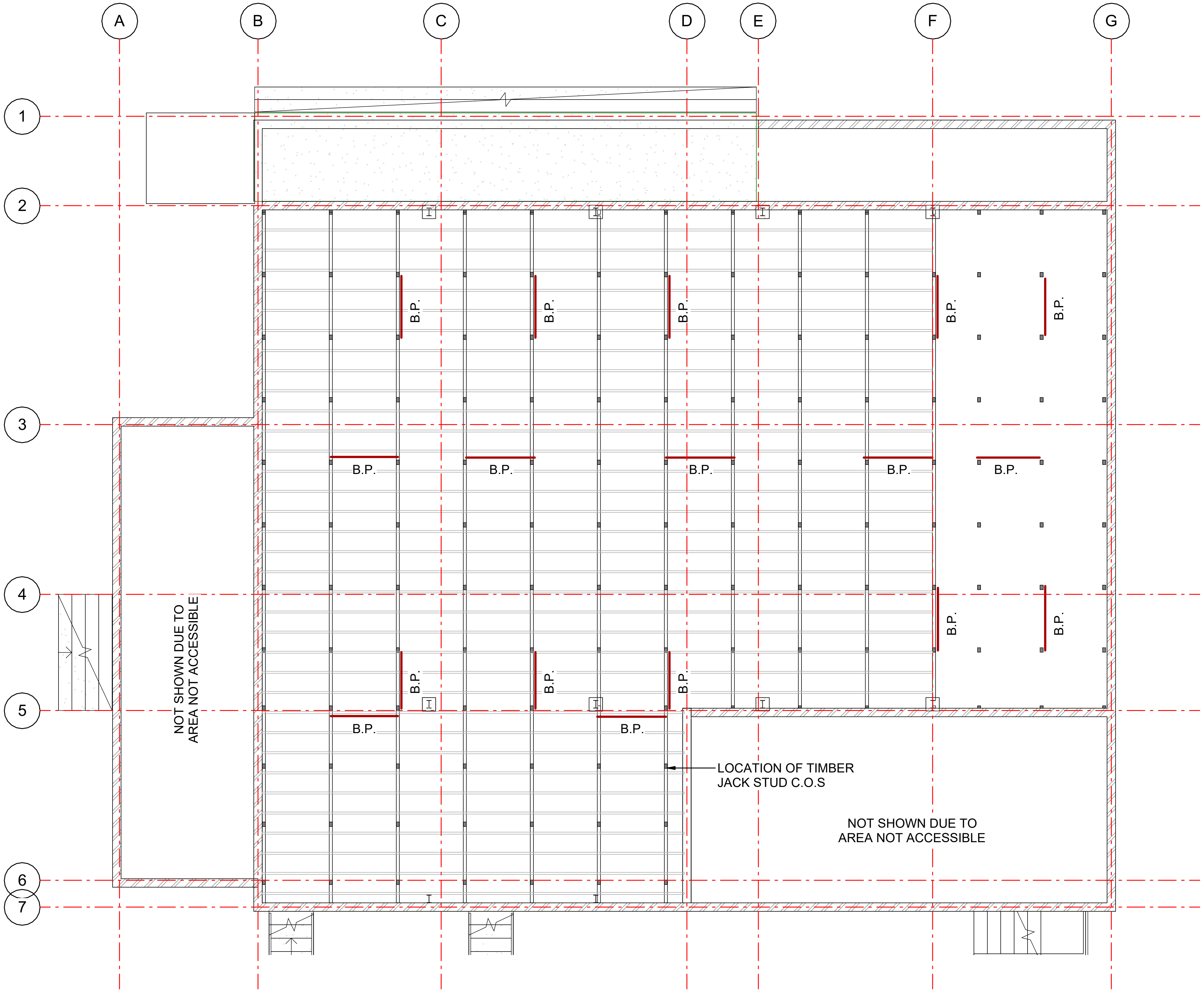
DRAWING TITLE:
33-67% NBS REMEDIAL PLAN

JOB No: 12707-116
SHEET No: S110
REV: A



LEGENDS:

▨	CONCRETE BLOCK MASONRY WALL
═	TIMBER JOISTS & BEARER
▪	TIMBER JACK STUD IN SUBFLOOR
B.P. 🟥	NEW BRACED PILES WITH NEW FOOTINGS

ALL DIMENSIONS ARE TO BE VERIFIED ON SITE PRIOR TO MAKING ANY SHOP DRAWINGS OR COMMENCING ANY WORK.

CAD Filename: D:\works\Tapora Community Hall - 5 Okahukura Rd 12707-116\Tapora Community Hall 12707-116.rvt

ORIGINAL SIZE:

PRINT IN COLOUR

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REV	AMENDMENT	DATE	BY
A	FINAL ISA	20-4-2023	

DRAWING STATUS:
FINAL

DESIGN: L.J
DRAWN: L.J
CHECKED: M.W
DATE: 21/04/2023 12:08:46 pm
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DO NOT SCALE FROM DRAWINGS

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DRAWING TITLE: 33-67% NBS REMEDIAL SUBFLOOR PLAN

JOB No: 12707-116
SHEET No: S111
REV: A

APPENDIX F – NZBC Section C: Clause A3 and Table 1.2

CLAUSE A3—BUILDING IMPORTANCE LEVELS

For the purposes of clause C, a *building* has one of the importance levels set out below:

Importance level	**Description of building type**	**Specific structure**
Importance level 1	*Buildings* posing low risk to human life or the environment, or a low economic cost, should the *building* fail. These are typically small non-habitable *buildings*, such as sheds, barns, and the like, that are not normally occupied, though they may have occupants from time to time.	• Ancillary *buildings* not for human habitation • Minor storage facilities • Backcountry huts
Importance level 2	*Buildings* posing normal risk to human life or the environment, or a normal economic cost, should the *building* fail. These are typical residential, commercial, and industrial *buildings*.	• All *buildings* and facilities except those listed in importance levels 1, 3, 4, and 5
Importance level 3	*Buildings* of a higher level of societal benefit or importance, or with higher levels of risk-significant factors to *building* occupants. These *buildings* have increased performance requirements because they may house large numbers of people, vulnerable populations, or occupants with other risk factors, or fulfil a role of increased importance to the local community or to society in general.	• *Buildings* where more than 300 people congregate in 1 area • *Buildings* with primary school, secondary school, or daycare facilities with a capacity greater than 250 • *Buildings* with tertiary or adult education facilities with a capacity greater than 500 • Health care facilities with a capacity of 50 or more residents but not having surgery or emergency treatment facilities • Jails and detention facilities • Any other *building* with a capacity of 5 000 or more people • *Buildings* for power generating facilities, water treatment for potable water, wastewater treatment facilities, and other public utilities facilities not included in importance level 4

CLAUSE A3—BUILDING IMPORTANCE LEVELS (continued)

Importance level	Description of building type	Specific structure
Importance level 3 (continued)		• *Buildings* not included in importance level 4 or 5 containing sufficient quantities of highly toxic gas or explosive materials capable of causing acutely hazardous conditions that do not extend beyond property boundaries
Importance level 4	*Buildings* that are essential to post-disaster recovery or associated with hazardous facilities.	• Hospitals and other health care facilities having surgery or emergency treatment facilities • *Fire*, rescue, and police stations and emergency vehicle garages • *Buildings* intended to be used as emergency shelters • *Buildings* intended by the owner to contribute to emergency preparedness, or to be used for communication, and operation centres in an emergency, and other facilities required for emergency response • Power generating stations and other utilities required as emergency backup facilities for importance level 3 structures • *Buildings* housing highly toxic gas or explosive materials capable of causing acutely hazardous conditions that extend beyond property boundaries • Aviation control towers, air traffic control centres, and emergency aircraft hangars • *Buildings* having critical national defence functions • Water treatment facilities required to maintain water pressure for fire suppression

CLAUSE A3—BUILDING IMPORTANCE LEVELS (continued)

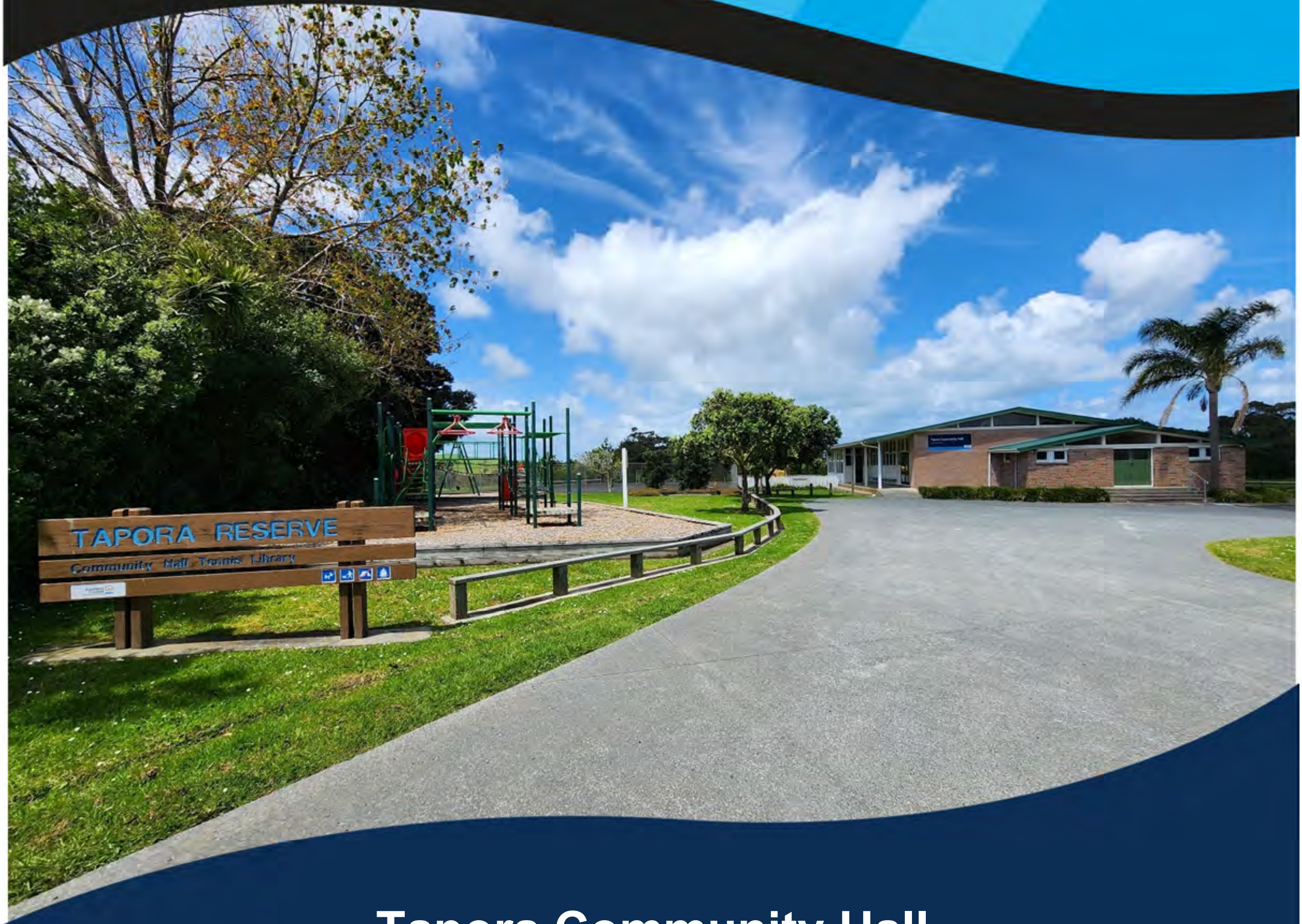
Importance level	**Description of building type**	**Specific structure**
Importance level 4 (continued)		- Ancillary *buildings* (including, but not limited to, communication towers, fuel storage tanks or other structures housing or supporting water or other *fire* suppression material or equipment) required for operation of importance level 4 structures during an emergency
Importance level 5	*Buildings* whose failure poses catastrophic risk to a large area (eg, 100 km^2) or a large number of people (eg, 100 000).	- Major dams - Extremely hazardous facilities

Table 1.2 **Occupant densities**

Activity	**Occupancy density (m²/ person)**
Aircraft hangars	50
Airports – baggage areas	2
– waiting areas, check in	1.4
– terminal space	10
Area without seating or aisles	1
Art galleries, museums	4
Bar sitting areas	1
Bar standing areas	0.5
Bleachers, pews or bench-type seating	0.45 linear m per person
Boiler rooms, plant rooms	30
Bulk storage including racks and shelves	100
Bulk retail (trading stores, supermarkets etc)	5
Call centres	7
Care and detention	Bed spaces, see Paragraph 1.4.6
Classrooms	2
Commercial kitchens	10
Commercial laboratories, laundries	10
Computer server rooms	25
Consulting rooms (doctors, dentists, beauty therapy)	5
Dance floors	0.6
Day care centres	4
Dining, restaurant and cafeteria spaces	1.25
Early childhood centres	Based on Education (Early Childhood Services) Regulations 2008 plus the number of staff
Exhibition areas, trade fairs	1.4
Fitness centres/weights rooms	5
Gaming, casino areas	1
Heavy industry	30
Indoor games areas, bowling alleys	10
Interview rooms	5
Libraries: stack areas	10
Libraries: other areas	7
Lobbies and foyers	1
Mall areas used for assembly uses	1
Manufacturing and process areas	10
Meeting rooms	2.5
Office spaces	10

Table 1.2 **Occupant densities**

Activity	Occupancy density (m²/ person)
Parking buildings, garages	50
Personal service facilities	5
Reading or writing rooms and lounges	2
Retail spaces and pedestrian circulation areas including malls and arcades	3.5
Retail spaces for furniture, floor coverings, large appliances, building supplies and Manchester	10
Reception areas	10
Showrooms	5
Sleeping non institutional	Bed spaces
Space with fixed seating	As number of seats
Space with loose seating	0.8
Space with loose seating and tables	1.1
Sports halls	3
Stadiums and grandstands	0.6
Staffrooms and lunchrooms	5
Stages for theatrical performances	0.8
Standing space	0.4
Swimming pools (water surface area)	5
Swimming pools: surrounds and seating	3
Teaching laboratories	5
Technology classrooms (e.g. woodwork, metalwork, food science and sewing)	10
Workrooms, workshops	5



Tapora Community Hall

5 Okahukura Road,
Tapora

Structural Condition Assessment

Prepared for Auckland Council

June 2023 Ref L24815a

Auckland Council

Recommendations and Structural Observations Report

for

Tapora Community Hall

Prepared by	K. Dougall **ENGINEER**	Hutchinson Consulting Engineers Ltd P O Box 150, Orewa 0946 154 Centreway Road, Orewa 0931	
Reviewed by	P. Jarvie **STRUCTURAL MANAGER**	+64 9 426 5702 info@hc.co.nz www.hc.co.nz	
Approved by	I. Hutchinson **DIRECTOR**	**Date** **Status**	12 June 2023 Rev A

CONTENTS

1.0 INTRODUCTION

Hutchinson Consulting Engineers has been engaged by Auckland Council to provide a structural condition assessment and remedial maintenance recommendation report for the Tapora Community Hall.

1.1 Site and Building Description

The Tapora Community Hall building is located within the northern portion of the Tapora Recreation Reserve. The property is located just south of the intersection between Run Road, Journeys End and Okahukura Road, Tapora and is depicted within *Figure 2* below.

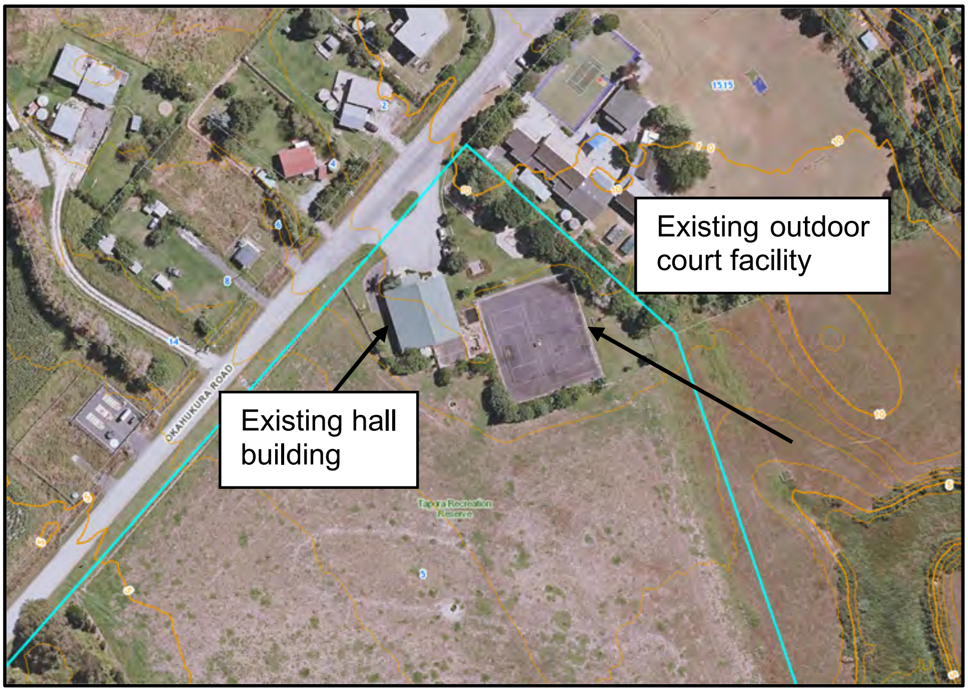


Figure 1 Existing hall building and outdoor court area

Tapora Community Hall in its current state appears to have been built in two main stages. It is estimated that most of the construction of the first stage would have been completed in the 1950's. These works included the approximately 18.8 metre by 11 metre hall with foyer and a kitchen area.

A small addition was later completed comprising an extension of approximately 9.0 metres by 4.2 metres on the western side of the hall. The works included the room that is currently used for a childrens play group. It is estimated this addition was completed sometime between 1982 and 1992 based on historical images from the online Retrolens service.

Current construction appears to typically comprise light weight corrugated steel roofing, combination of full height perimeter concrete masonry walls, brick veneer and fibre cement external wall cladding which are supported on concrete masonry foundation walls. The full height concrete masonry walls and concrete masonry foundation walls are supported on reinforced concrete foundations that are founded approximately 300mm below finished ground level.

Photo 1: North western building elevation

Photo 2: Southern building elevation

The main hall area roof is supported and braced via steel portal frames spaced at 3.65 m centres spanning approximately 10.5 m. The frames appear to be Universal Beam sections welded to form the cranked portal frames evident on site. The portal frame legs extend through the timber floor and are fixed to concrete foundation plinths, 300 mm by 300 mm in dimension. We were unable to observe any roof space bracing for these portals.

Six steel frames attach to the eastern side of the main hall portal frames and concrete masonry walls to form an open verandah and enclosed library. These frames are external and exposed to weather and appear to be Universal Beam sections welded to form the steel frames evident on site. We were also unable to observe any roof space bracing for these portals.

Photo 3: Eastern building elevation

Photo 4: Building Elevation looking north

The interior of the hall comprises light weight timber flooring supported on a timber subfloor which is supported on shallow concrete piles. Four large span steel portal frames are spaced at equal distances inside the hall, and these are supported on concrete plinth piles.
The suspended timber floor, which is separate from the concrete foundation walls, comprises timber flooring boards supported on 140 x 45 mm wide timber joists spaced at 460 mm centres. The joists span 1.5 m between 100 x 75 mm wide timber bearers. The bearers span approximately 1.3 m and are directly supported on 100 x 75 mm wide timber posts seated on concrete plinths and connected with steel tie wire, a typical foundation detail for timber subfloors for buildings of this era. The sub-floor does not appear to be braced.

Photo 5: Hall Interior

Photo 6: Timber subfloor supporting hall floor

1.2 Previous Reporting

In 2017 Auckland Council engaged Asset Management Intelligence Support to complete a "*Asset Assessment Report*" and an "*Asbestos Management Survey*" and copies of same can be found within Appendix A of this report.

The purpose of the asset assessment report was to review the building envelope to identify any visible defects and report on the overall condition of the building.

The Asbestos Management Survey report forms a part of the Asbestos Management Plan that every Auckland Council Building is required to display. The purpose of the survey was to locate the presence of any asbestos containing materials and assess their condition.

Asset Management Intelligence Support recommended clearing and cleaning of the roof spouting and downpipes, repairs to the Library and Kitchen windows, clearing hazards and making safe the rear of the building for children as well as repainting the entire building.

Asbestos was identified at the down pipe on the western rear corner of the building and soffit on the western eaves. The building was finally classed as Low Risk – Category 3 indicating no significant health risk if the ACM's are left undisturbed during maintenance or work activities. It was recommended to monitor the site annually.

2.0 INVESTIGATIONS

2.1 Structural Condition Assessment

A structural engineer from this office visited the site on Thursday the 20th October 2022 and Friday the 10th of February 2023.

The purpose of the site assessments was to carry out inspection of the existing hall building structural condition and to quantify the nature and extents of recommended repair works required to remediate the observable defects.

A measure-up of the primary structural elements was also completed where possible in order to carry out a load capacity assessment for comparison with current New Zealand building standards. Unfortunately, given the majority of the super-structure is concealed by linings, only the timber subfloor could be reliably assessed.

The full details of the structural condition assessment are described below and form the basis of the remedial works recommendations.

2.2 Structural Condition Assessment Limitations

The Hall has been assessed assuming that it was originally designed to the appropriate New Zealand Building Standards and Design Codes at the time the Hall was constructed.

This report does not cover any structural and/or construction deficiencies that were identified at the time of construction during the Building Consent Process.

The structural assessment has been completed from a visual inspection only as it has not been possible to verify any structural elements behind wall linings and/or ceilings etc. In order to report on these items, considerable destructive testing would be required.

3.0 CONDITION ASSESSMENT

The conditions assessment carried out by this office comprised the inspection of the existing hall building to quantify the nature and extents of recommended repair works required to remediate only the observable defects.

3.1 Internal Steel Portal Frames

The internal steel portal frames are generally in good condition above the timber subfloor. Below subfloor the portal frame legs are not painted and corrosion (rust) of the legs, base plates and especially the hold-down anchors was noted. No grout or dry pack mortar has been used under the baseplates where gaps between steel and concrete were observed. Not all base plates are fully seated on the supporting concrete plinths below.

Photo 7: Portal Frame Knee

Photo 8: Portal Frame Base

Photo 9: Portal frame base plate

3.2 External Steel Frames

The external steel frames are generally in poor condition. Considerable corrosion of the legs was visible more notably at verandah slab level. Base plates of the frames on the northern and southern ends of the building were partially visible which showed base plates and hold-down fixings have completely rusted through and failed. The timber eaves beams connected to the portals are in poor condition and fixings are unsatisfactory.

Photo 10: Frame Knee

Photo 11: Frame Base

Photo 12: South frame base plate

3.3 Perimeter Concrete Masonry Walls

The perimeter concrete masonry walls appeared to be in average condition. It was also confirmed through a hole on the exterior of the northern gable wall that the wall is likely unfilled and unreinforced. Numerous cracks were evident throughout the perimeter full height concrete masonry walls however this was more evident on the northern gable end (entrance) wall. The wall shows signs of distress with horizontal, vertical, and stepped cracking, more visible from the interior of the building. Our inspection of the building took place after an extended period of wet weather, but it is believed these cracks open considerably during prolonged periods of dry weather when the ground dries out and the foundations settle.

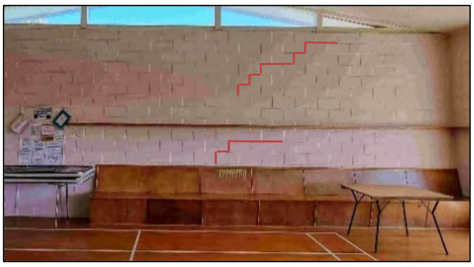


Photo 13: Northern gable end wall cracks

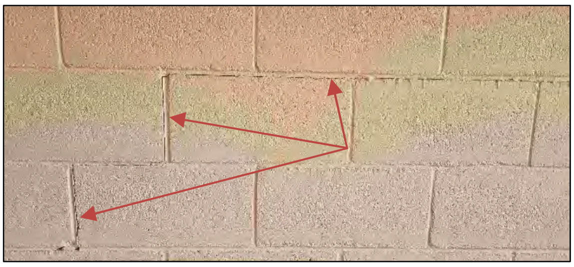


Photo 14: Northern gable end wall cracks

Photo 15: Playgroup return wall cracks

Photo 16: Northern gable end wall cracks

The cracking observed was generally attributed to the seasonal movement of the perimeter concrete foundation. Historcal photos of the hall show that a large amount of vegetation was once planted along the northern gable end as well as three conifer trees along the western side of the building. Although much of this vegetation has since been removed it would have excaserbated these movements.

Clay-subsoils are typically sensitive to the seasonal changes in moisture content, and hence volume change. Slight subgrade shrink/swell could cause the foundations to experience minor differential movement which has the potential to cause concrete cracking. Seasonal differential movement of the foundations is likely to be the main contributor to the observed concrete masonry wall and brick veneer.

A geotechnical investigation report was completed by this office in order to determine the appropriate embedment depth for all foundation work prior to remedial and / or replacement works being undertaken. Full details of the geotechnical investigation are included within Appendix B of this report.

3.4 Brick Veneer

The brick veneer cladding system on the foyer / bathrooms on the northern gable end displays significant stepped cracking occurring mainly on the north western side of the extension. A gap has also opened at the joint between the brick veneer on the western return wall and perimeter gable end wall.

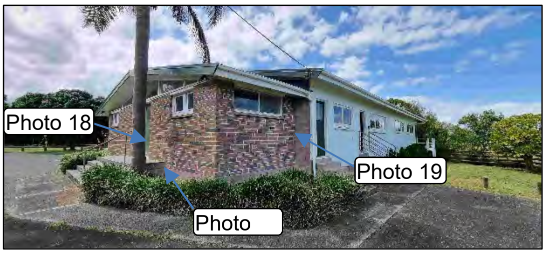


Photo 17: Brick veneer NW elevation

Photo 18: Brick veneer stepped cracks

The cracking observed was generally attributed to the movement of the perimeter concrete masonry foundation wall, which supports the brick veneer, from seasonal soil shrink / swell effects, and amplified by the presence of the existing palm tree located near the building. The trunk base of the palm tree, and previous vegetation planted in between, has shifted the concrete masonry and possibly the concrete foundation off their original positions as it has grown.

Photo 19: Gap at western return wall

Photo 20: Foundation wall moved by Palm tree

A localised excavation adjacent to the footings was dug by this office to ascertain the depth of embedment for the perimeter concrete foundation. The foundation was embedded approximately 300mm below finished ground level and around 100mm below cleared clay subgrade, well below embedment depths typically required for North Auckland expansive clay soils.

3.5 Joists, Bearers & Foundations

The subfloor joists, bearers and piles are generally in good material condition, however display structural inadequacy. The piles are seated on concrete plinths and connected with steel tie wire that is consistent with the period of construction. The timber is in good condition and doesn’t show any signs of significant splitting/cracking or rot considering its age, however joist to bearer and bearer to pile fixings were not visible and could be skew nailed or do not exist. The sub-floor lacks any sub-floor bracing via either cantilever pile action or diagonal bracing.

Photo 21: Typical view on subfloor

Photo 22: Typical subfloor pile connection

3.6 Ancillary Items

3.6.1 Concrete Verandah Slab

The concrete verandah slab is supported on perimeter masonry walls and timber boards on timber bearers and piles. The concrete slab is in good condition and cracks were not visible. Rotting of the timber boards, bearers and posts was visible at the location of the down pipe where the timber is likely getting exposed to rainwater. It is possible the slab does not rely on this tiimber for support and may have been used as sacrificial formwork only.

The veranda is accessed via a concrete ramp at its northern end and stair on the eastern end. The ramp has a slope of roughly 1 in 5 and does not comply with the recommended ramp slope for an accessible ramp slope of 1 in 12 in accordance with Table 3 D1/AS1 of the New Zealand Building Code.

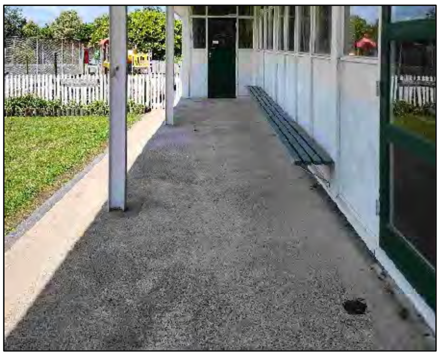


Photo 23: Verandah Slab

Photo 24: Rotting timber support / formwork

3.6.2 Timber Stair

The timber staircase providing access to the playcentre areas and backstage on the south western corner is in poor condition. The timber stringers, treads and handrail, previously painted, are showing signs of splitting/cracking likely due to the age of the stairs. The posts are rotting at ground level where their concrete encasements start resulting in reduced section capacity and would need replacement. The anchors fixing the timber stringer to the block wall are also significantly corroded.

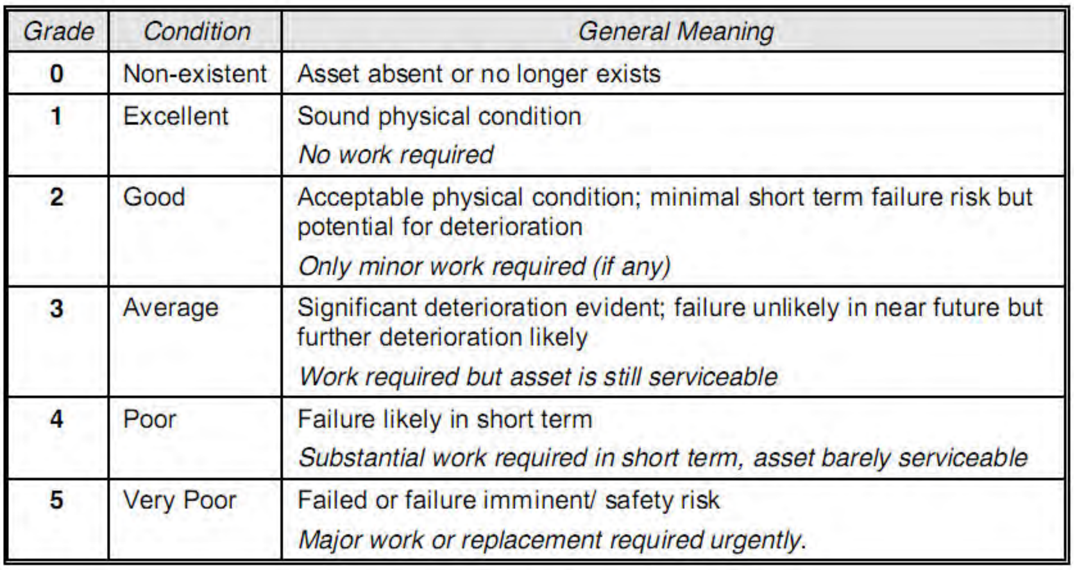
Photo 25: Timber Staircase

Photos 26 and 27: Corroded stringer fixings and rotting timber post

3.7 Condition Grading

A condition assessment for the structural and non-structural components of the hall has been carried out and summarised to provide an overview of the conditional performance in accordance with the recommendations of a PRAMS generic schedule.

Table 1 below prescribes individual assessment schedules for all types of assets. The assessment is based on physical condition, and the schedule describes the type of visible defects expected for each asset type incorporated into a 1–5 grading scale.



Grade	*Condition*	*General Meaning*
0	Non-existent	Asset absent or no longer exists
1	Excellent	Sound physical condition *No work required*
2	Good	Acceptable physical condition; minimal short term failure risk but potential for deterioration *Only minor work required (if any)*
3	Average	Significant deterioration evident; failure unlikely in near future but further deterioration likely *Work required but asset is still serviceable*
4	Poor	Failure likely in short term *Substantial work required in short term, asset barely serviceable*
5	Very Poor	Failed or failure imminent/ safety risk *Major work or replacement required urgently.*

Table 1: PRAMS Working Group Generic Schedule

The general condition of the hall structure is average to poor. The main structural elements within the hall, primarily the steel portal frames, joists and bearers, have not been designed to current loading standards but generally appear sound, albeit structurally inadequate. This is discussed further under section 4.2.

In accordance with the generic schedule format, the greater hall structure should be assigned a condition grade of 4 – "*Substantial work required in short term, asset barely serviceable*".

The individual components comprising the greater hall structure have been assessed and should be assigned individual condition grades as follows:

Component	**Grade**	**Notes**
Steel Portals (Hall)	3	The steel portal frames are generally in average condition with issues associated with corrosion to the steel and base plate fixings below the subfloor as well as some base plates not seated fully on concrete plinth supports.
Steel Frames (Verandah)	5	The steel frames are severely rusted at and below concrete slab level. Northern and southern frames' base plates were partially visible which showed base plates and hold-down fixings have completely rusted through and failed.
Western Room	2	The timber rafters are painted and appear to be in good condition.

Timber Rafters		
Concrete Masonry Walls including foundation walls	4	The concrete masonry walls have significant cracking occurring throughout including stepped cracking, vertical and horizontal cracking. The cracking is especially severe on the northern (entrance) masonry wall. The concrete masonry appears to be hollow core which is not standard practice nowadays.
Brick Veneer	4	The brick veneer cladding system has significant cracking occurring throughout including vertical, horizontal andstepped cracking. There is also a lack of control joints.
Joists	2	The timber joists are in good condition.
Bearers	2	The timber bearers are in good condition, albeit appear under capacity – refer below.
Timber Posts and Foundations	4	The timber support posts, and concrete plinths are in good condition however connection to the bearers is poor. The entire sub-floor lacks transverse or longitudinal bracing. Some wire ties are corroding (rust).
External Timber Staircase	4	The timber joists, bearers, stringers, posts handrail are in poor condition due with cracking and splitting evident because of their general age and location. The posts are rotting at ground level.
Fibre Cement Wall Cladding	5	Fibre cement boards on the western side of the building are in poor condition. A penetration is visible on the western elevation and has partly broken off at ground floor level on each corner of the southern gable exposing timber wall framing and steel frame to the weather.
Soffit, Fascia's, and Joinery	4	Paint is old and peeling on timber fascia's and joinery. Timber is generally in poor condition with cracking, splitting, and warping evident because of their general age. Soffit is in average to poor condition.
Perforated Ceiling Tiles	4	The ceiling tiles within the hall are in poor condition with sagging / warping evident indicating possible failure of support and have partially pulled off their support at some locations.

Table 2: Condition grades for individual components

4.0 STRUCTURAL CAPACITY

4.1 Internal Steel Portal Frames Capacity

The topography of the land the hall site is located on is generally flat with open terrain and well scattered obstructions. Sites with similar attributes typically fall within a High Wind Zone in accordance with NZS 1170.2:2021 and NZS 3604:2011.

By observation these frames would not be adequate to resist the load requirements for a high wind zone, however a detailed structural analysis has not been completed. If the hall were to be structurally upgraded to accommodate the current design high wind zone load, the frames would need to be re-designed, replaced and/or supplemented throughout.

4.2 Joists and Bearers Structural Capacity

Element	Size	Spacing (mm)	Span (mm)	Load Capacity
Joists	140 x 45	460	1500	4.0 kPa (400kg/m²)
Bearers	100 x 75	1500	1300	1.2 kPa (120kg/m²)

Table 3: Structural Capacity of various joists and bearers at the Tapora Community Hall

The current design live load required for the Tapora Community Hall is 4kPa (400kg/m²). This in accordance with the New Zealand loadings code NZS 1170.1:2002 Table 3.1, Activity Type C2, Areas with fixed seats, subcategory *'Public assembly areas such as public halls, theatres, courts of law, auditoria, conference centres and similar'*.

For comparison, a residential dwelling is designed for an internal floor live load of 1.5 kPa (150kg/m²), and a domestic external deck live load of 2.0 kPa (200kg/m²).

If the hall were to be structurally upgraded to accommodate the current design live load of 4 kPa (400kg/m²), the bearers will need to be re-designed, replaced and/or supplemented throughout the hall given their significantly low load capacity. The sub-floor requires to be braced to accommodate expected sub-floor bracing loading from both wind and earthquake.

This potential upgrade would require further investigation and specific design to determine the most cost effective and pragmatic solution, including design to suit the specific geotechnical requirements of the site. This has not been carried out under the scope of this report.

5.0 DISCUSSION

The existing Community Hall building presents several structural condition and capacity deficiencies. We also understand that the building does not meet satisfactory seismic performance following an IEP assessment carried out by others.

The areas requiring attention are widespread throughout the building and include:

- The steel frames and timber eaves beams on the eastern side of the building are not fit for service and need to be replaced.
- The timber sub-floor is both under capacity for live load and also lacks any bracing.
- The building foundations are inadequate and various areas of the building have sustained settlement.
- The masonry gable end wall is unreinforced and presents extensive cracking.
- The foundations supporting the brick veneer cladding around the entrance and toilet area have settled and caused extensive cracking to the brick veneer.
- Timber addition that accommodates the playschool area is under capacity and the access stairs are in poor deteriorated condition.
- The concrete access ramps are over-steep and do not comply with NZBC D1

A geotechnical investigation has also been carried out by this office in conjunction with this structural condition assessment. The geotechnical investigation identified a Holocene river deposits through all boreholes, overlying highly compressible organic stained peat material approximately 3.0m below existing ground level. Full details of the geotechnical reporting are provided in Appendix B.

On account of the underlying layer of peat material and prevalence of mature trees within close proximity to the building foundations, the geotechnical reporting by this office has recommended any replacement or remediated structures at the site should be adequately pile supported to transfer building loads into competent underlying ground.

Given the widespread deficiencies of the building it is expected that it would be infeasible to carry out re-piling to the existing structure without largely demolishing the building.

For comparison purposes, we have considered four options for the immediate future management of the hall, however we believe that the only **long-term** satisfactory outcome for the building will be complete re-development.

The considered options include the following:

Option 1:	Undertake aesthetic refurbishment works only and address any structural concerns that are possible within budget.
Option 2:	Undertake refurbishment works while ensuring all structural concerns are addressed and remediated. Note: A complete remediation specification has not been prepared and would require further detailed assessment during the design of proposed remedial works.
Option 3:	Demolish and re-build the hall like-for-like
Option 4:	Demolish, re-design and re-build a new hall

5.1 Assessment of Options

We have completed indicative cost estimates of the above four options in the following matrix table. The merits and dis-advantages of each of the options have also been included.

The cost estimates provided for each of the four options are based on current construction costs to design and construct including all consenting, demolition and asbestos removal and all professional fees. Scope and cost contingencies should be applied to each option relative to the given risk of the option.

It is understood that it is desired to open the toilets to the public outside of hall use and this cost has been included as part of Option 2. In order to achieve this the foyer entrance stairs will need to be modified to accommodate an accessible ramp and an accessible toilet will need to be provided in accordance with the NZBC.

It should be noted that making the toilets accessible to the public will lend itself to vandalism of the facility and extra on-going maintenance costs will be involved.

Table 4 Options Evaluation

	Option 1 Undertake Aesthetic Refurbishment and Partial Repairs	Option 2 Undertake Comprehensive Refurbishment and Repairs, Open Toilets to Public	Option 3 Demolish and re-build like for like	Option 4 Demolish and re-design a new hall of similar size
Cost Estimate	$100 - $300K	$1.5m - $2m ($150K Public Toilets)	$1.5m - $2m	$1.5m +
Risk	High	High	Low	Low
Expected service life	4 - 5 yrs	15 - 20 yrs	50 - 100 yrs	50 - 100 yrs
Pro's	Low cost	Retains existing hall character and history	Increased service life of existing asset with retained character Defined scope Adequate structural capacities No long term durability issues with appropriate maintenance schedule Allows a compliant structure to be constructed that meets code requirements	As per Option 3 Long term solution Durability detailing can minimise future maintenance costs Opportunity to redesign to better suit community requirements
Con's	Continuous maintenance and refurbishment required No major structural concerns addressed Poor structural capacity. Uncertifiable on completion. Non-compliant construction elements Long term durability issues	Likelihood of scope increasing as a result of timber rot, steel corrosion etc. Poor structural capacity Non-compliant construction elements Long term durability issues Feasibility of existing foundation remediation still to be determined.	Higher initial build cost	Potential higher initial build cost Scope undefined

Based on the overall condition of the existing hall structure, and the difficulty involved in remediating the existing foundations as well as the long term associated durability issues, this office recommends that options three or four are progressed.

6.0 SUMMARY

A structural engineer from this office visited Tapora Community Hall on Thursday the 20th October 2022 and re-visited on Friday the 10th of February 2023 to conduct a detailed visual inspection of the building.

The purpose of the inspection, along with desktop review of Auckland Councils previous inspection records, was to observe the current condition and assess the severity of the existing structural defects. A load capacity check of the floor structure was also completed to determine the floor capacity in terms of current building code standards. The outcome of the structural assessment sought to provide Auckland Council with sufficient information to consider and determine an appropriate long-term future management strategy for the structure.

The existing building displays widespread condition and capacity deficiencies and has been rated in a poor overall condition utilising a PRAMS assessment method.

As a result of widespread and significant deficiencies throughout the structure of the building it will be economically infeasible to carry out remediation works to the existing structure, that incorporates foundation improvements, without largely demolishing the building and constructing it from new. Following our assessment and a basic cost to benefit evaluation we consider that a full re-development of this building to be the only viable long-term solution.

It is recommended that Auckland Council investigates the historical significance of the existing hall prior to any demolition works being undertaken.

Should you wish to discuss any aspects of the above information, please contact the above office.

We trust this meets with your approval.

Yours faithfully,

HUTCHINSON CONSULTANTS LTD

Prepared by Kevin Dougall
ENGINEER

Reviewed by Paul Jarvie
STRUCTURAL MANAGER

Approved by Ian Hutchinson
DIRECTOR

APPENDIX A PREVIOUS REPORTING

Asbestos Management Survey

Tapora Hall and Library

5 OKAHUKURA ROAD TAPORA 0977

SAP ID: 11261-B001

Property Owner	Auckland Council
Local Board	Rodney
Asset Description	Tapora Recreation Reserve

Date of Report	14 July 2017
Assessor	**Tim Newton | Senior Asset Assessor Asset Management Intelligence Support | Community Facilities**

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1.0 Tapora Library geo-location

5 OKAHUKURA ROAD TAPORA 0977

5 OKAHUKURA ROAD TAPORA 0977

5 OKAHUKURA ROAD TAPORA 0977

1 : 1,000

NZTM : 1716846, 5976122

2.0 Building side view

3.0 Building side view

4.0 Summary

Auckland Council, Community Facility department requested a Management Asbestos Survey (MAS) to be conducted.
This report is a component of Asbestos Management Plan that every AC building has to display based on **“The Code of Practice of the Management and Removal of asbestos, WorkSafe NZ, November 2016”,** documentation.

5.0 Caveat and Purpose of Survey

The purpose of the survey is to locate, as far as reasonably practical, the presence of any asbestos containing materials (ACM) at (in) the premises and assesses their condition. To facilitate this, representative samples from each type of suspect ACM are collected and analysed to confirm or refute the surveyor’s judgement. If the sampled material is found to contain asbestos, other similar homogeneous materials used in the same way in the premises can be strongly presumed to contain asbestos. Less homogeneous materials require a greater number of samples, the number being sufficient for the surveyors to make an assessment of whether asbestos is present or not present.

Areas in the premises were visually inspected to determine the presence of ACM. The locations of these materials have been logged along with the material type and where necessary, a sample taken to confirm not only the presence of, but also the type of asbestos found.

This **Management Survey Report** provides material assessment and initial recommendations for all asbestos containing materials identified and/or presumed in both management and refurbishment or demolition surveys.

It must be noted that it is not possible that survey(s) can guarantee to locate all asbestos containing materials even with “complete” access demolition surveys, all ACM’s may not be identified and this only becomes apparent during demolition itself.

It is possible that there are residues of asbestos beneath any newly applied lagging, resulting from poor quality stripping methods carried out at some time in the past. It might not be practical to detect such residues without substantial disturbance to the new lagging.

6.0 Sampling areas (Floorplan & Photos) and Analysis Technique used

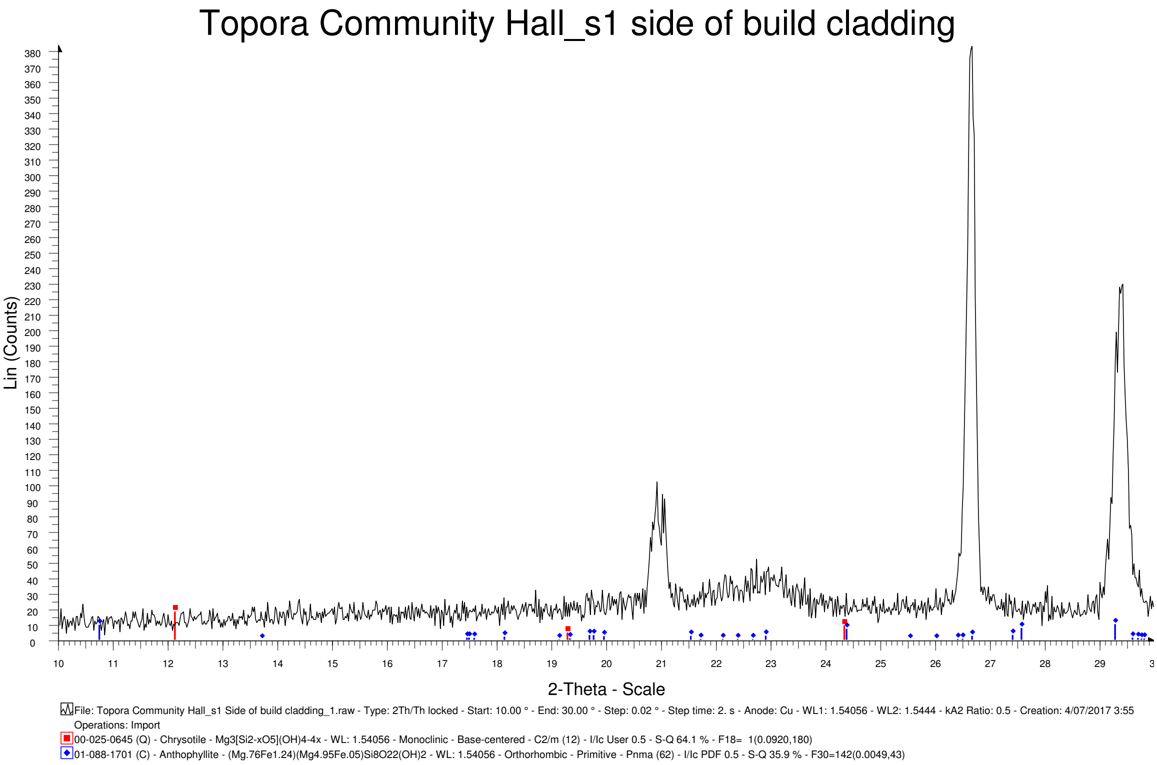
In areas where there were substantial quantities of visually uniform material, only a small number of samples were taken and should be considered as being representative of the whole area.
Reference to asbestos containing board or asbestos cement is based upon their asbestos content and visual appearance alone. The samples were analysed using XRD diffraction using Rigaku Analyser in 2 Theta Range of 10-30 degrees. Analysis was done by Light Metals Research Centre – University of Auckland - an accredited laboratory.

7.0 Asbestos register (Risk Assessment)

The following areas (numbered on the floorplan) were sampled:

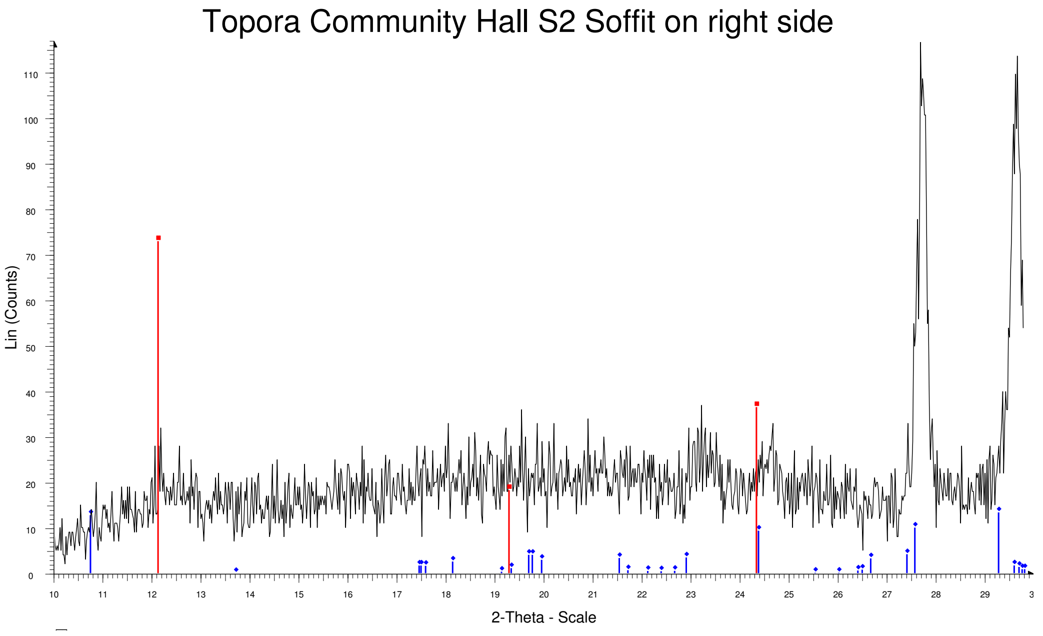
Sample # 1: Cladding on right building side

No Asbestos phases detected



Sample # 2: Soffit on right building side

Asbestos phase (Chrysotile) was detected



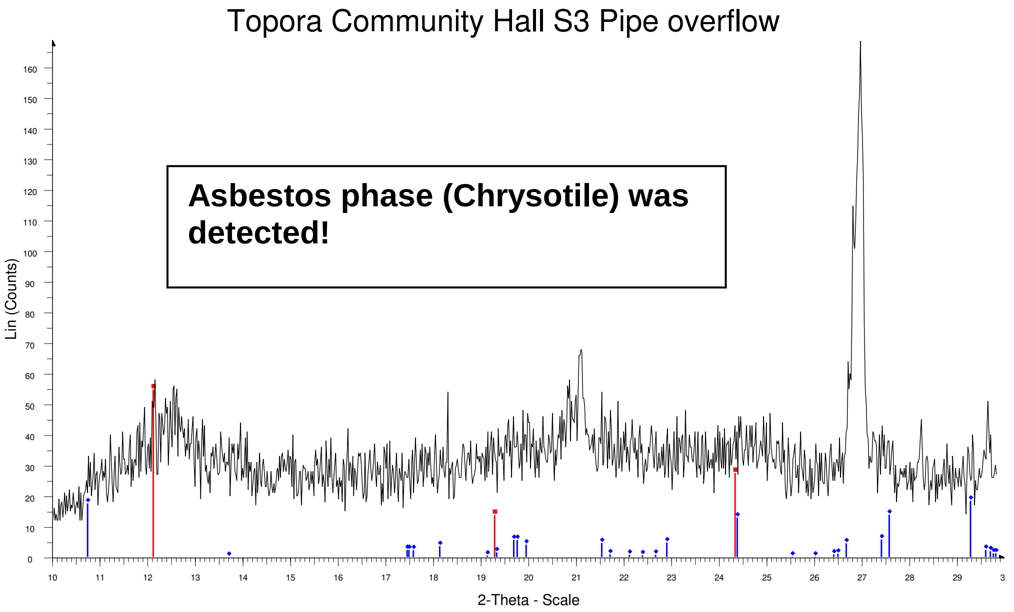
File: Topora Community Hall_s2 Soffit on right side_1.raw - Type: 2Th/Th locked - Start: 10.00 ° - End: 30.00

Operations: X Offset -0.200 | X Offset 0.080 | X Offset -0.200 | X Offset 0.000 | X Offset -0.200 | Import

★ 🟥 00-025-0645 (Q) - Chrysotile - Mg3[Si2-xO5](OH)4-4x - WL: 1.54056 - Monoclinic - Base-centered - C2/m (12

◆ 01-088-1701 (C) - Anthophyllite - (Mg.76Fe1.24)(Mg4.95Fe.05)Si8O22(OH)2 - WL: 1.54056 - Orthorhombic -

Sample # 3: Gutter downpipe back of the building



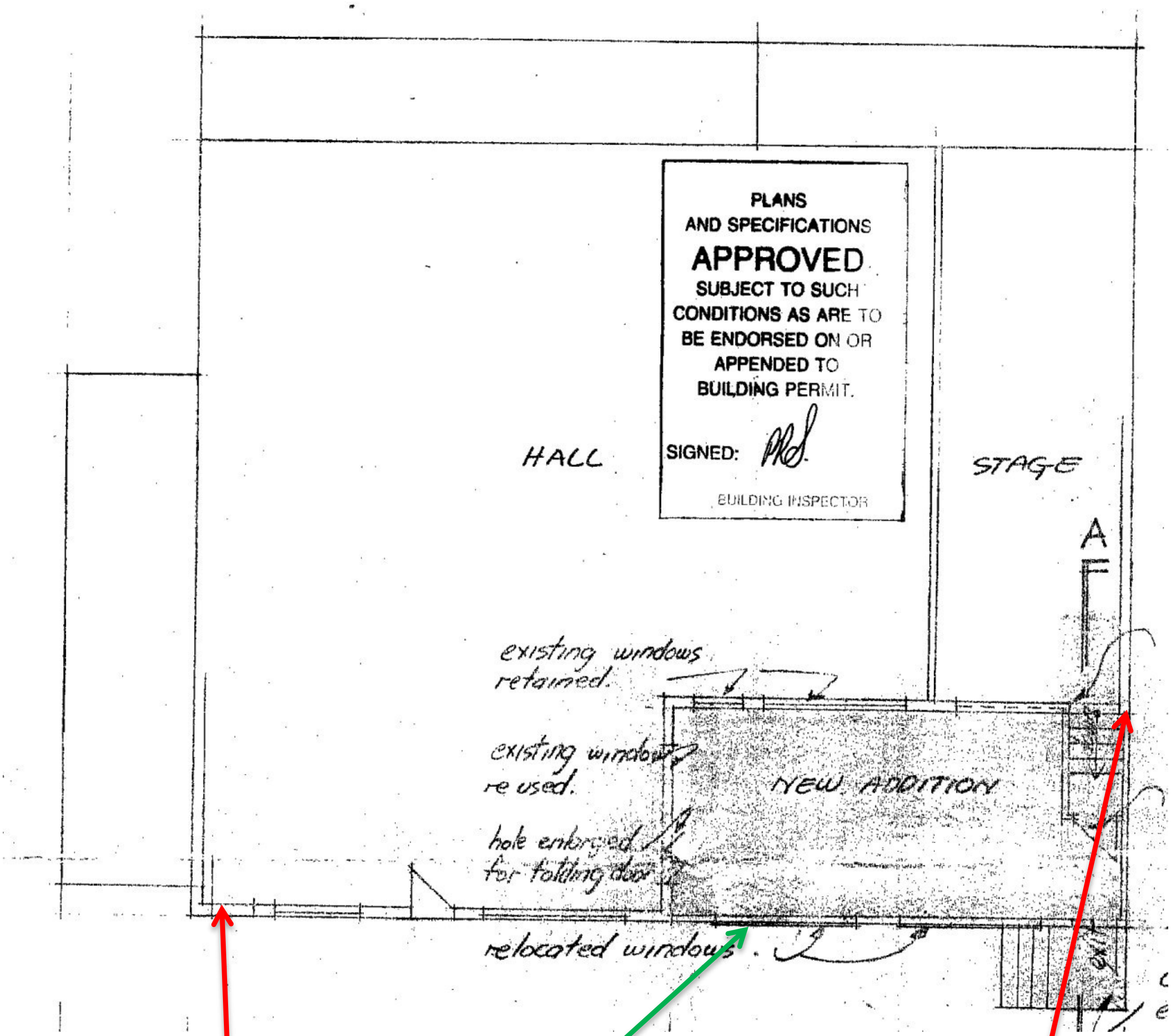
Asbestos phase (Chrysotile) was detected!

File: Topora Community Hall_s3 Pipe overflow_1.raw - Type: 2Th/Th locked - Start: 10.00 ° - End: 30.00 ° - Step: 0.02 ° - Step time:

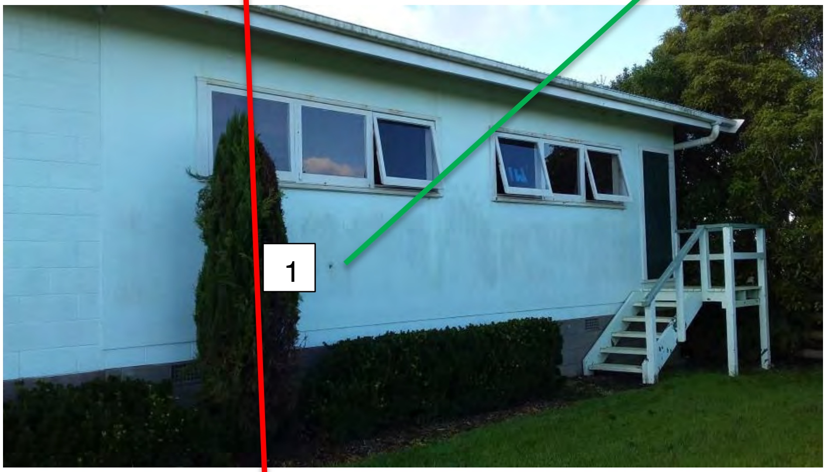
Operations: X Offset -0.160 | Import

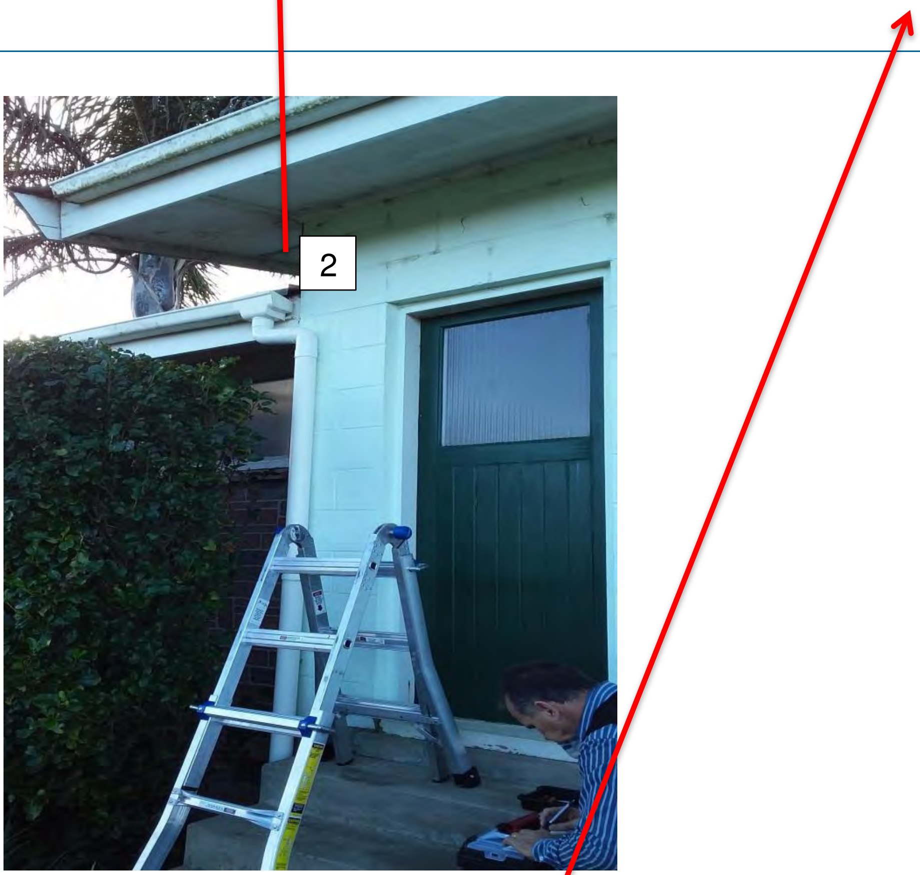
★ 🟥 00-025-0645 (Q) - Chrysotile - Mg3[Si2-xO5](OH)4-4x - WL: 1.54056 - Monoclinic - Base-centered - C2/m (12) - I/Ic User 0.5 - S-Q 7

◆ 01-088-1701 (C) - Anthophyllite - (Mg.76Fe1.24)(Mg4.95Fe.05)Si8O22(OH)2 - WL: 1.54056 - Orthorhombic - Primitive - Pnma (62) -



PLANS
AND SPECIFICATIONS
APPROVED
SUBJECT TO SUCH
CONDITIONS AS ARE TO
BE ENDORSED ON OR
APPENDED TO
BUILDING PERMIT.
SIGNED:
BUILDING INSPECTOR





8.0 RISK ASSESSMENT

MATERIAL ASSESSMENT ALGORITHM

Sample Variable	Score	Examples of Scores	
Product type (or debris from product)	1	Asbestos reinforced composites (plastic, resins, mastics, roofing felts, vinyl floor tiles, semi-rigid paints or decorative finishes, asbestos cement)	**1**
	2	Asbestos insulating board, mill boards, other low density insulation boards, asbestos textiles, gaskets, ropes and woven textiles, asbestos paper and felt.	
	3	Thermal Installation(i.e. pipe and boiler lagging),sprayed asbestos, loose asbestos, asbestos mattresses and packing	
Extent of damage/deterioration	0	Good Condition: no visible damage	**1**
	1	Low damages: a few scratches or surface marks, broken edges of tiles etc.	

	2	Medium damage: significant breakage of materials or several small areas where material has been damaged revealing loose asbestos fibres	
	3	High damage or delamination of materials, sprays and thermal insulation. Visible asbestos debris	
Surface treatment	0	Composite materials containing asbestos: reinforced plastics, resins, vinyl tiles	**1**
	1	Enclosed sprays and lagging, asbestos insulating board(with exposed face painted or encapsulated) asbestos cement sheet etc.	
	2	Unsealed asbestos insulating board, or encapsulated lagging and sprays	
	3	Unsealed laggings and sprays	
Asbestos type	1	Chrysotile	**1**
	2	Amphibole asbestos excluding crocidolite	
	3	Crocidolite	
No asbestos	0	No asbestos in sample	**0**

Total score	**4**

PRIORITY ASSESSMENT ALGORITHM

Assessment factor	Score	Examples of score variables	
<u>**Normal occupant activity**</u>			
Main Type of activity in area	0	Rare disturbance activity (i.e. little used store room)	**1**
	1	Low disturbance (i.e. office activity)	
	2	Periodic disturbance(i.e. industrial or vehicular activity which may contact ACM's	
	3	High levels of disturbance(i.e. fire doors with the asbestos insulating board sheet in constant use)	
Secondary activities of area	As above	As above	

Likelihood of disturbance			
Location(L)	0	Outdoors	**1**
	1	Large room or well ventilated areas	
	2	Room up to 100m^2	
	3	Confined spaces	
Accessibility(A)	0	Usually inaccessible or unlikely to be disturbed	**1**
	1	Occasionally likely to be disturbed	
	2	Easily disturbed	
	3	Routinely disturbed	
Extent/Amount(E)	0	Small amounts of items(i.e. strings, gaskets)	**3**
	1	≤10 m^2 or ≤ 10 m pipe run	
	2	≥ 10 m^2 to ≤ 50 m^2 > 10 m to ≤ 50 m pipe run	
	3	≥ 50 m^2 or > 50m pipe run	
Human exposure potential			
Number of occupants(N)	0	None	**3**
	1	1 to 3	
	2	4 to 10	
	3	> 10	
Frequency of use of area(F)	0	Infrequent	**3**
	1	Monthly F	
	2	Weekly	
	3	Daily	
Average time area in use(A)	0	< 1 hour	**2**
	1	> 1 to < 3	
	2	> 3 to < 6	
	3	> 6 hours	
Maintenance activity			
Types of maintenance activity	0	Minor disturbance(i.e. possibility of contact when gaining access)	**1**
	1	Low disturbance (i.e. changing light bulbs in asbestos insulating board ceiling tiles to access a valve)	
	2	Medium disturbance(i.e. lifting one or two asbestos insulating board ceiling tiles to access a valve	
	3	High levels of disturbance(i.e. removing a number of asbestos insulating board ceiling tiles to replace a valve or for re-cabling)	
Frequency of maintenance activity	0	ACM unlikely to be disturbed for maintenance	**1**
	1	≤ 1 per year	

	2	> per year	
	3	> per month	
-			

Total score	**7**

Material Risk Assessment: Total material assessment of asbestos containing material (ACM) has a risk score of 4. This indicates a very low potential of fibre release if distributed.

Priority Risk Assessment: Total priority risk assessment of ACM is 7. This equates to a low risk.

Risk Assessment Score = Material Assessment + Priority Risk Assessment

= 4 + 7 = 11

Risk Categories

Low Risk - Category 3 (less than 13 points) indicates ACMs in good / fair condition, no significant health risk if left undisturbed during maintenance or work activities

Asbestos Management Plan must be prepared and an asbestos risk register put in place along to monitor the extent of damage/deterioration.

The asbestos management plan should be reviewed at suitable intervals. The plan must be reviewed annually, however, the plan should also be reviewed if there are significant changes or there is a reason to believe the plan is no longer valid. These reviews should critically examine its effectiveness in:

- Preventing exposure to airborne asbestos fibres.
- Controlling maintenance workers and contractors.
- Identifying the need for action to maintain or remove ACMs.
- Raising awareness among all workers.
- Maintaining the accuracy of the register of ACMs.

It would be a good practice to monitor this site once in a year and in terms of surface treatment and if need be required encapsulation by painting (preferably alkali resistant paint).

Extreme care must be taken while carrying out any work on this wall cladding as fibre cement is likely to increase levels of airborne asbestos fibres if abraded, hand sawn or worked with power tools. Therefore it is recommended that qualified, experienced, competent asbestos workers be involved – and that regulations around PPE and PPR, as well as asbestos removal procedures described in the 2016 Management and Removal of Asbestos, Approved Code of Practice, procedures be used.

9.0 Conclusions and Management Plan

Recommended action (Jun 2017): **Asbestos is present on this site. Please proceed with caution.**

Asset Assessment Report

Tapora Library and C. Hall

5 OKAHUKURA ROAD TAPORA 0977

SAP ID: 11261-B001

Property Owner	Auckland Council
Local Board	Rodney
Land Area	3915m2
Building Area (Gross External)	402m2
2014 Land Value	$107,000.00
2014 Improvement Value	$113,000.00
Latest Capital Value (to be used for 2018/19 rates)	$220,000.00

Date of Report	20 July 2017
Assessor	**Tim Newton | Senior Asset Assessor** **Asset Management Intelligence Support | Community Facilities**

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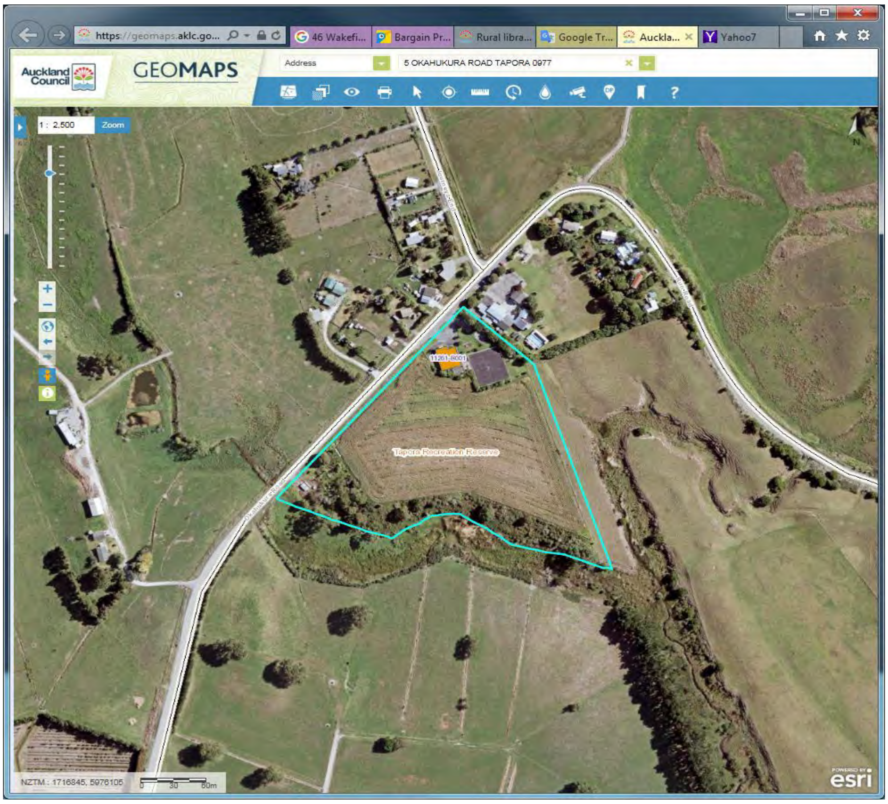
Auckland Council
Te Kaunihera o Tāmaki Makaurau

1.0 Tapora Library and C. Hall geo-location



2.0 Building rear view

3.0 Building side view

4.0 INTRODUCTION

Our inspection and this report are based on a visual inspection only. The purpose of the site visit is to review any visible defects of the building, carrying out non-destructive tests around concerned areas and discuss the history of problems with the relevant occupiers. This report is intended to give a general picture/overall condition of the condition of the structure/building.

5.0 BRIEF

Asset Management Intelligence Support has been requested to carry out an initial investigation on behalf of the business owner to assess current issues relating to the condition of the building.

6.0 PROPERTY DETAILS

Site: The property is located in Tapora, 5 Okahukura Rd and is part of Tapora Recreation Reserve.**Building:** The building is constructed of light weight timber frame with brick, concrete blocks and cement based sheets as exterior walls. The roof is corrugated iron type in condition consistent with building age. Windows are of wood frame type with single glazed units and the external doors are the same. Spouting is of PVC with PVC downpipes. Internally ceilings/walls are made of plasterboard and other materials. The floors are timber type with some areas covered by linoleum.

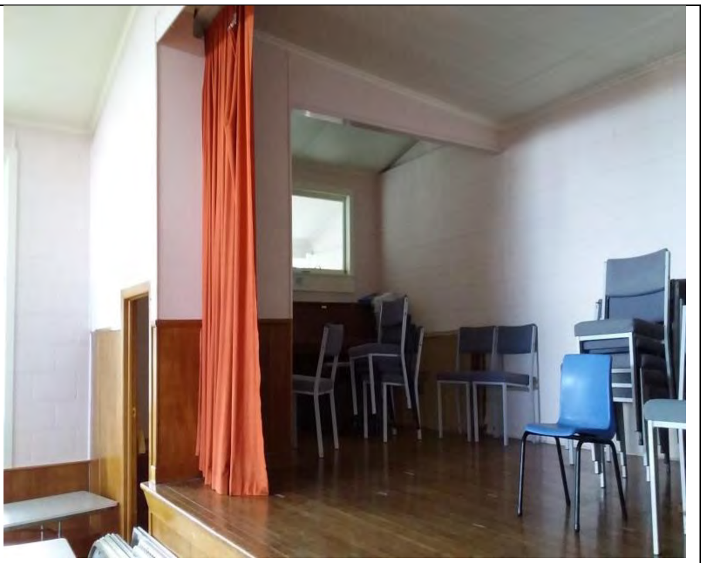
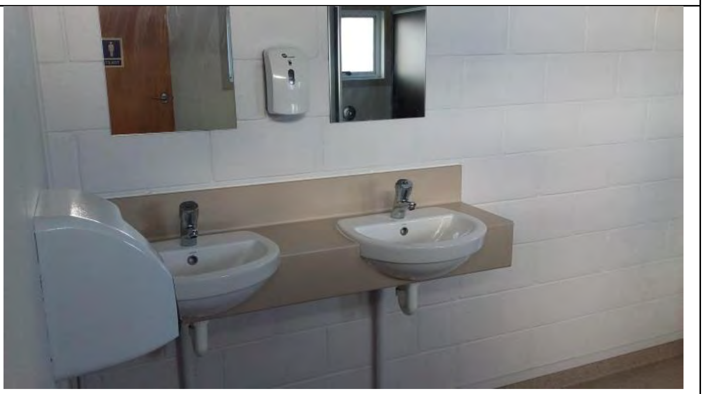
This building accommodates 1 storey. It comprises of; the main hall and it’s stage area, the kids room, the M and F toilet, the kitchen, the Fire Exit foyer, the utility room and the Library room . The building is used as Community Hall and Library.

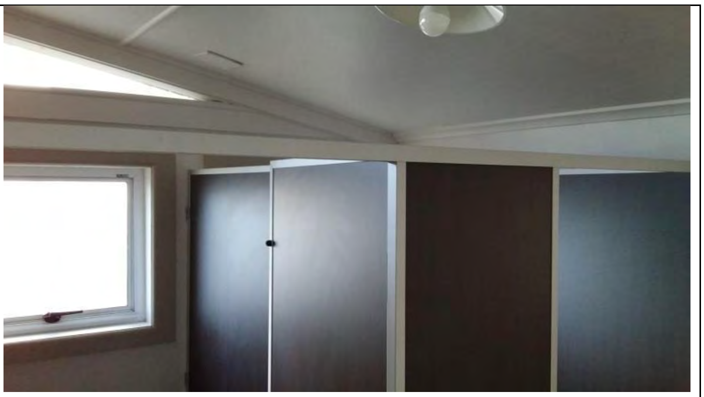
Other building related info: Building Consent: BWOF:

7.0 RECORD OF FINDINGS

Description	Grade	Condition	Description	Photograph
Roof exterior	3	Average	The roof is made from painted corrugated iron. The roof ridge is generally even and without significant undulation. It is considered to be in condition consistent with building age.	
Roof spouting and downpipes	3	Average	The roof spouting and downpipes are in fair condition but require clearing/cleaning and local repairs. The down pipe located at the rear of the building contains asbestos.	
External Walls	3	Average	The exterior walls are made of brick, concrete blocks and cement based sheets. Generally in fair condition although the Library wood based window wall located on the side of the building need repairs ASAP.	

External Walls Paint Finish	3	Average	The building exterior has a painted finish and is in need to be repainted. Also the rear side of the building need extra attention. Also the Soffit on right building side contains asbestos.	
Exterior joinery Windows, doors and	4	Average	Exterior joinery (windows and frames) is in average condition. The Library wood based windows located on the side of the building need repairs ASAP.	
Ceiling Finishes	3	Average	The ceilings are made of plasterboard with paint finish and suspended false ceiling tiles. The ceilings are in fair condition.	

				
Internal walls	3	Average	Internal walls are mainly of timber frame with plasterboard painted finish and also concrete blocks with paint finish. They are in fair condition.	
Internal joinery Windows, doors and skirting	3	Average	Internal joinery is in average condition. Kitchen windows need to be repaired as hardly can be locked down.	
Toilet fixture and fittings	3	Average	Toilet room fittings are well presented and they are in a condition consistent with building age.	

				
Kitchen fixture and fittings	3	Average	The kitchen is in average condition consistent with building age.	
Floor	3	Average	The wooden floor is in average condition consistent with building age.	
Electrical system	0		Not checked	
Water supply & drainage	0		Not checked	
Heating & hot water	0		Not checked	
Fire alarm	0		Not checked	
Security System	0		Not checked	
Roof structure	0		Not checked	

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 The roof spouting and downpipes require clearing and cleaning as well as (maybe) adjacent repairs
8.2 Library wood based window wall located on the side of the building need repairs ASAP
8.3 Kitchen windows need to be repaired ASAP as hardly can be locked down
8.4 The rear side of the building need extra attention as become hazardous area for young kids
8.5 Overall the building needs a full repaint job.

APPENDIX 1: Condition Grading

Condition	Condition Grade	% of Base Life remaining	Description of Condition
Non-existent	0	N/A	N/A
Very Good	1	100-54	Sound physical Condition – No work required.
Good	2	55-41	Minimal short term failure risk, but potential deterioration – minor work required.
Average	3	40-26	Significant deterioration evident but failure unlikely in the near future – Work required but asset still serviceable.
Poor	4	25-11	Failure likely in the short term – Substantial work required.
Very Poor	5	10-0	Failed or failure imminent/safety risk – Urgent replacement/attention required.

Hutchinson
CONSULTING ENGINEERS

APPENDIX B GEOTECHNICAL INVESTIGATION REPORT

Tapora Community Hall
5 Okahukura Road,
Tapora

Geotechnical Investigation Report

Prepared for Auckland Council

March 2023 Ref L24815

Geotechnical Investigation Report

for the

Tapora Community Hall Remediation

at

5 Okahukura Road,
Tapora

Prepared by	Jayden Quensell **ENGINEER**	Hutchinson Consulting Engineers Ltd P O Box 150, Orewa 0946 154 Centreway Road, Orewa 0931
Reviewed by	Josh Charlwood **ENGINEER**	+64 9 426 5702 info@hc.co.nz www.hc.co.nz
Approved by	Ian Hutchinson **MANAGING DIRECTOR**	**Date** 2 May 2023 **Status**

INTRODUCTION

This office has visited and observed the above site on Friday the 10th of February 2023 to investigate sub-soil conditions for the proposed remedial works to be carried out on the existing hall building and outdoor court facility. The hall building is displaying signs of subsidence and differential foundation movements. The outdoor court facility comprises asphalt surfacing that displays extensive cracking.

SITE LOCATION

NZ Topo50
Sheet AZ30

Dargaville

Grid Reference:
168E 763N

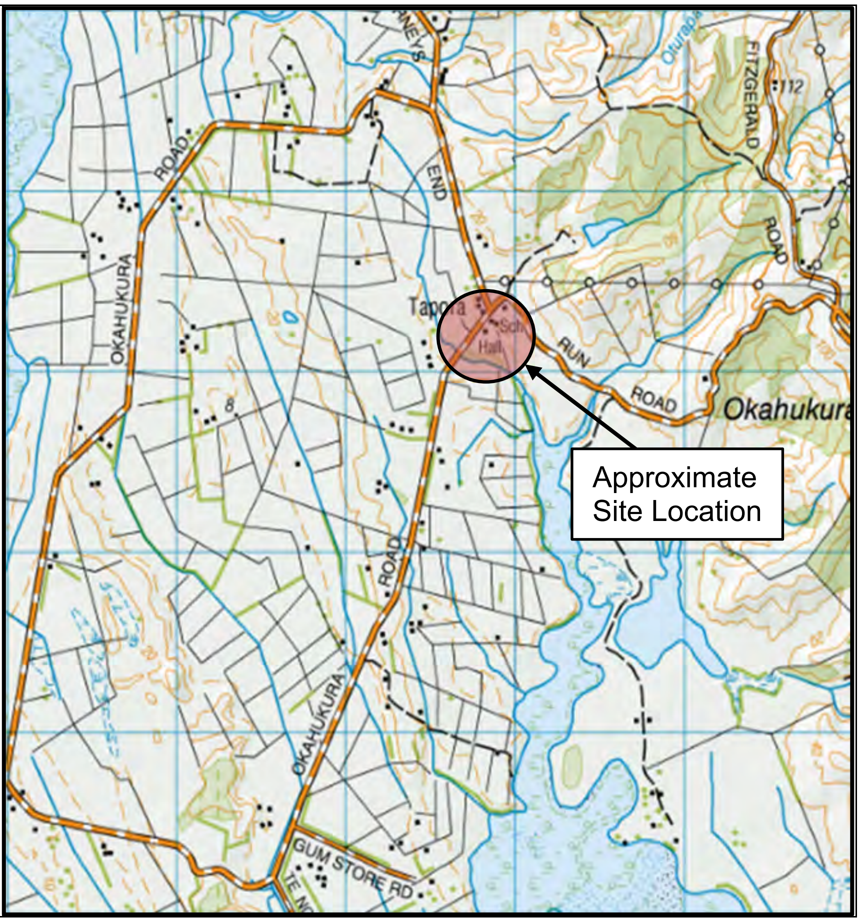


Figure 1 NZ Topo50 Map

SITE DESCRIPTION

The Tapora Community Hall building is located within the northern portion of the Tapora Recreation Reserve. The Tapora Recreation Reserve is a single property parcel legally described as (SEC 20 TOWN OF TAPORA SO 40339) with a combined total property area of around 3.9 Ha. The property is located just south of the intersection between Run Road, Journeys End and Okahukura Road, Tapora and is depicted within *Figure 2* below.

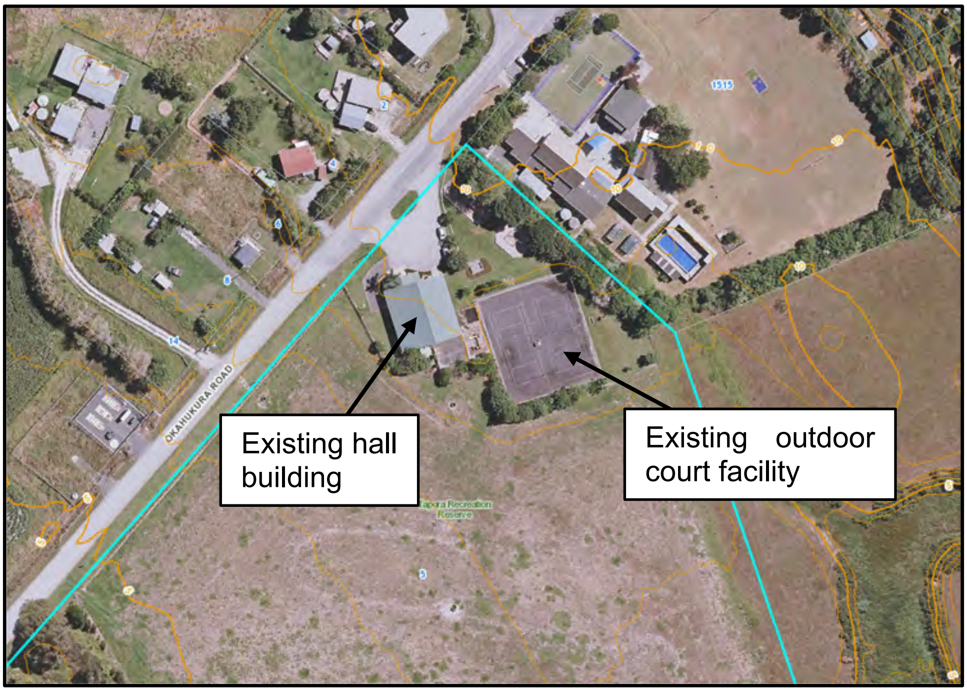


Figure 2 Existing hall building and outdoor court area

The community hall and court site is located within the northern portion of the property and comprises two playgrounds, a hall building and a fenced outdoor court facility. The majority of the remaining property comprises relatively level pasture with an existing shed situated within the south western portion of the site.

The hall and court site contains clusters of mature trees and is vegetated in grass. There is an existing concrete hardstand area that extends from the Okahukura Road vehicle crossing to the hall building

Photos 1 & 2 Existing hall building and outdoor court facility

SITE INVESTIGATION

The fieldwork carried out on the site involved the drilling of three 50mm diameter hand auger boreholes to a maximum depth of 3.2 metres below existing ground level. Insitu and remoulded shear strengths were recorded utilising a Geotechnics shear vane apparatus. Scala Penetrometer testing was carried out at the base of boreholes 1 and 2 until virtual refusal.

This office carried out a test-pit investigation within the court area to determine the existing pavement composition and subgrade consistency.

The location of the boreholes and test pits are shown on the attached site plans and depicted within *Figure 3* below.

Figure 3 Geotechnical Investigation site plan

Geology

The 1:250000 Institute of Geological & Nuclear Sciences Limited Geological Map of New Zealand Map 3 (Auckland Area) and the GNS Science – New Zealand Geology Web Map *(Figure 4)* indicates the proposed building site is within proximity to a geological boundary between Holocene River Deposits and Early Pleistocene - Middle Pleistocene dune deposits.

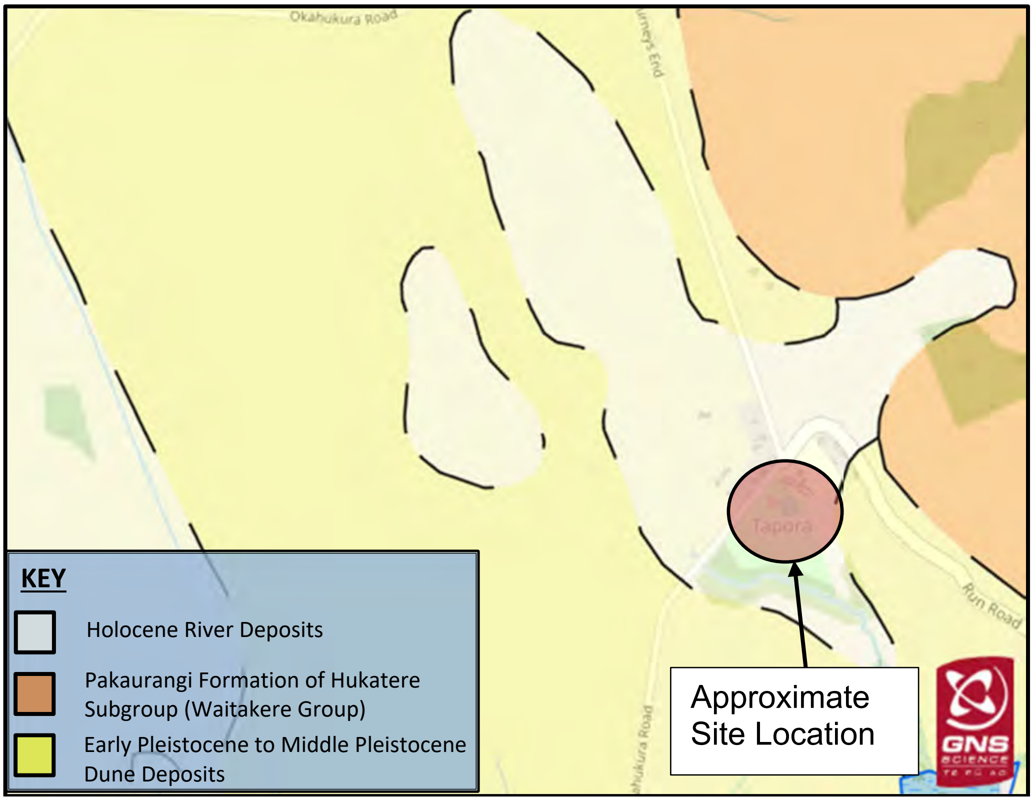


Figure 4 GNS Science – New Zealand Geology Web Map

Holocene River Deposits are typically described as *"Sand, silt mud and clay with local gravel and peat beds."*

Pakaurangi Formation of Hukatere Subgroup (Waitakere Group) are typically described as **"***Thick-bedded, muddy, volcaniclastic sandstone and fossiliferous mudstone."*

Early Pleistocene - Middle Pleistocene dune deposits are typically described as "*Dune belts of arcuate, subparallel, weakly cemented and uncemented sand ridges, often capped by cemented, clay-rich sandy paleos."*

The geotechnical investigation encountered material generally consistent with Holocene River Deposits soil type description.

Hydrology

The Auckland Council Geomaps Catchments and Hydrology overlay and Emergency Management Layer indicate that the proposed building sites are outside any overland flow paths, potential flood plains, flood prone areas and coastal inundation as as depicted within *Figure 5* on the following page.

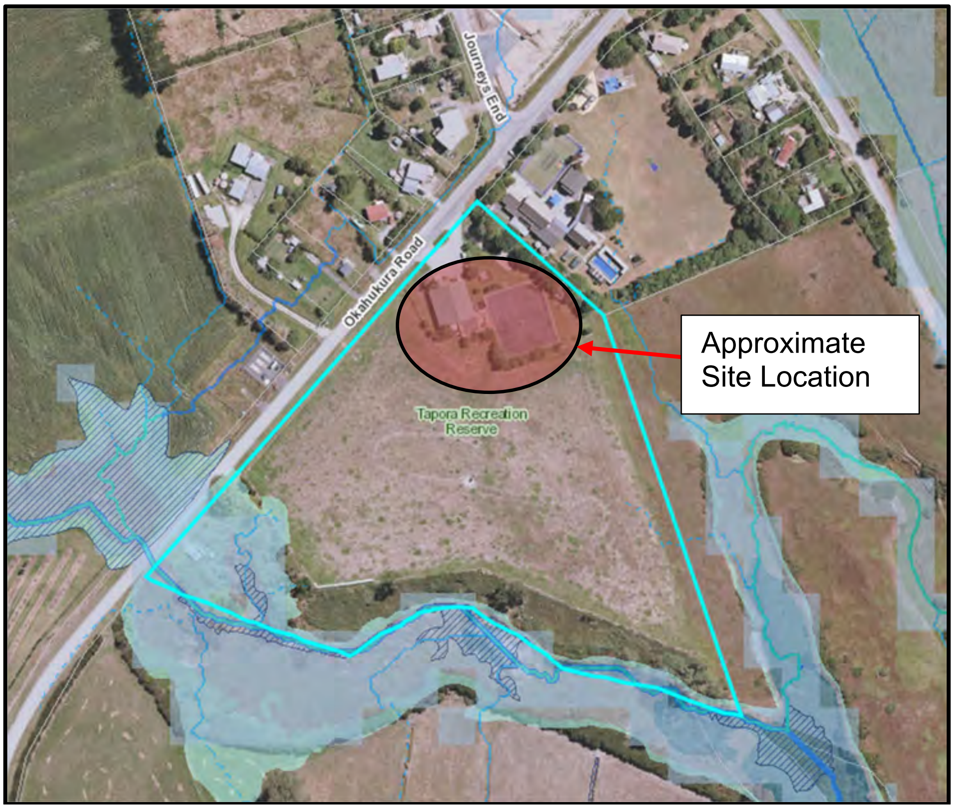


Figure 5 Auckland Council Geomaps– Catchments and Hydrology and Emergency Management overlays

SUB-SURFACE CONDITIONS

Sub-surface conditions are shown on the attached borehole logs, Scala Penetrometer test result sheet and test pit data. A summary is given below:

<u>Borehole Investigation</u>

- Topsoil was encountered in all boreholes overlying Holocene River Deposits with depths of around 0.2 metres below existing ground level.

- Holocene River Deposits, of stiff to hard consistency (86 kPa to 209+ kPa) were encountered in all boreholes.

- Highly compressible organic stained peat material was encountered in boreholes 1 and 2 underlying the Holocene River Deposit soils approximately 3.0 metres to 3.2 metres below existing ground level.

- Competent weathered sandstone/siltstone was not encountered during our site observations to a maximum depth of around 5.5 metres below existing ground level. However, competent material with Scala Penetrometer results in excess of 20 blows/100mm was encountered in borehole 2 at a depth of 5.5 metres below existing ground level.

- Groundwater was encountered within boreholes 1 and 2 at the interface of clay and peat material, approximately 2.3 metres to 3.0 metres, respectively, below existing ground level.

Test Pit Investigation

Test Pit 1 – Western portion of outdoor court facility

Test pit 1 comprised the following pavement structure,

- 20 mm depth of fatigued asphalt surface.
- 20mm depth of dense drainage chip.
- 160mm depth of well graded, dense, mixed aggregate, brown rock, non plastic fines, GAP 65 inclusions.
- Light whitish grey, orangey brown staining, highly plastic, Silty CLAY, average CBR strength 3%.

Photo 3 – *Test pit 1*

Photo 4 – *Test pit 1 pavement profile*

Test Pit 2 – Eastern portion of outdoor court facility

Test pit 2 comprised the following pavement structure,

- 25 mm depth of fatigued asphalt surface.
- 75mm depth of well graded, dense, greywacke with non plastic fines.
- 120mm depth of well graded, dense, mixed aggregate, brown rock, non plastic fines and GAP 65 inclusions.
- Whitish grey, orangey brown staining, highly plastic, Silty CLAY, average CBR strength 3%.

Photo 5 – *Test pit 2*

Photo 6 – *Test pit 2 sample recovery*

Expansive Soils

Based on a tactile assessment of the naturally occurring sub soils encountered in the borehole investigation the soils encountered beneath the building site are considered Site Classification H1 (highly expansive) in terms of AS 2870:2011 Residential slabs and footings-Construction.

Seismic Soil Category

In accordance with NZS 1170.05 the Site Soil Class is Class D – *Deep or soft soil sites*

DISCUSSION

This office has been engaged by Auckland Council to carry out a Geotechnical Investigation of the subsoils underlying the existing hall building and outdoor court facility to assist in the planning and design of proposed remedial works and / or redevelopment at the site.

This accompanies a separate structural condition assessment report for the existing community hall building that displays various structural deficiencies including differential foundation movements and settlement. This geotechnical reporting should be read in conjunction with the structural condition assessment report.

Community Hall Building

We understand that the existing hall building is subject to assessment of defects to determine whether it is feasible to carry out refurbishment and upgrades to meet current building standards or whether full replacement is required.

During our borehole investigation, organic stained sandy silt (peat) was encountered approximately 3.0 metres below the building site underlying existing alluvial Silty CLAY material. The allowable bearing capacity of the highly compressible organic material is insufficient to support the foundation loads applied by buildings designed in accordance with NZS 3604:2011. The existing building has sustained differential settlements and this movement is expected to continue unless the building foundations are replaced with new pile foundations, specifically designed to transfer building loads into competent underlying ground.

There are also various existing mature trees located within close proximity and south west of the existing hall building. As a result of the expansive nature of the underlying clay soils, the moisture withdrawal effects from the adjacent trees will be causing the soil to shrink during periods of dry weather.

To mitigate moisture withdrawal effects within the underlying soil, the trees should either be removed entirely or root barrier protection systems would be required to protect the south western edges of the hall building.

Photo 7 Existing trees within close proximity to hall building

As the existing hall building is in poor condition, relocating the building unlikely to be practical. The construction of remedial ‘under-pinning’ pile foundations beneath the existing building is expected to carry significant construction feasibility issues with substantial associated costs.

The remediation of the existing foundations to suit the ground conditions at the site is not considered practical and options for complete re-development of the hall should be considered.

Any new structure should be fully pile supported on driven pile foundations designed to support the anticipated building loads. Where any slab-on-grade concrete floor slabs are utilised, a minimum 150mm thick layer of hardfill should be placed to create a stable building platform.

Outdoor Court Facility

It is proposed to rehabilitate the existing fenced outdoor court facility situated to the east of the existing hall building at the northern portion of the site.

The existing court comprises an asphalt surface that is worn and displays extensive cracking.

Photo 8 Existing tennis court

During our test pit investigation, approximately 200 mm of basecourse was identified beneath the asphalt surfacing. Highly expansive, Silty CLAY, alluvial soils with an average CBR of 3% was identified beneath the asphalt surfacing overlying highly compressible peat material.

The asphalt pavement has failed and requires remediation to address the surface cracking. Resurfacing of the courts over the existing pavement would result in reflective cracking within the replacement surface and is not a viable long-term solution.

A reconstructed metal pavement with replacement asphalt type surfacing could be implemented, however this would require undercutting of the existing pavement to a depth of at least 500mm below subgrade level before reinstatement with compacted granular hardfill over synthetic geogrid reinforcement layers.

The cost associated with reconstructing the pavement is likely to exceed that of replacing it with a reinforced concrete pavement, which would provide a more durable long-term solution for the facility.

We recommend utilising a 150mm thick steel reinforced concrete slab. A concrete slab will have a comparable or favourable cost to an asphalt surface including the associated base course preparation, with the benefit of little future maintenance required.

There are several native trees located within proximity to the existing outdoor court facility. As a result of this, consideration should be given to the potential adverse effects of moisture withdrawal and subsequent differential soil shrink/swell movement. The trees should either be entirely removed, or any portion of the tennis court located within the ultimate dripline of the existing trees should utilise specifically designed protection piles and/or a root barrier system to mitigate the adverse effect of moisture withdrawal and root intrusion.

A thickened concrete edge beam around the perimeter of the outdoor court facility to prevent edge cracking and to provide adequate support for the perimeter fencing is recommended.

RECOMMENDATIONS

The proposed remedial works on the existing hall building and outdoor court facility should be carried out in accordance with the following recommendations.

1. This office should be given the opportunity to review the design plans for any future building work and court facility upgrade on the subject site including the foundation design plans. This is to ensure the proposed development generally complies with the following of our recommendations.

2. This office or another Chartered Professional Engineer should be retained to observe all earthworks operations and foundation excavations and certify same on completion.

3. **Foundation Recommendations**

   Hall Building

   Any proposed remediated or replacement structure associated with the hall building should be supported on H5 driven timber piles, specifically designed to transfer building loads through underlying organic material and into competent ground.

   Based on our Scala Penetrometer tests, we anticipate the required driving sets should be achieved from around 4.5 metres below existing ground level however the driving of test piles is advised. The final depth of driven piles should be confirmed via specific structural design.

   All driven pile foundations located within the 45° zone of influence of any underground reticulation services should be pre-drilled to the invert level of the service line and meet required works-over design standards.

   Tennis court

   The existing failed court pavement should be reconstructed with a 150mm thick steel reinforced concrete slab.

   Alternatively, to accommodate an asphalt surface, base course hardfill rework is required. The existing pavement should be undercut to a minimum depth of 500mm and reinstated with compacted granular GAP65/40 hardfill over synthetic geogrid reinforcing.

The cost of preparing an asphalt court design on the existing subgrade is likely to be significant.

4. Consideration should be given to the potential for differential foundation movement caused by the existing trees. We recommend either or a combination of the following options:

    - the removal of any mature tree which ultimate dripline encroaches the hall building or court facility.
    - installation of a root barrier system.
    - specifically designed protection piles to mitigate the adverse effects of moisture withdrawal.

5. All buried and overhead services should be accurately located on site prior to the commencement of any construction work and protected during the construction work.

6. Any site excavations should not be left to “dry out” for any extended period causing shrinkage cracks to appear in the upper exposed surface. Should the building foundation excavation be left to “dry out” further geotechnical advice is recommended prior to commencing the foundation construction works.

8. All services excavations and/or trenching should be backfilled in a timely manner with controlled engineered compacted earthfill and/or compacted hardfill.

LIMITATION

This report has been prepared solely for the benefit of Auckland Council as our client with respect to the brief for a structural and geotechnical assessment on the subject site. This report should be read in conjunction with the structural assessment completed by our office. The reliance by other parties on the information or opinions contained in the report shall, without prior review and agreement in writing be at such parties sole risk.

The recommendations and opinions in this report are based on data from three boreholes and two test pits. The nature and continuity of subsoil conditions away from the borehole positions is inferred and it must be appreciated that actual conditions could vary from the assumed model. Should variations in subsoil conditions from those described in this report be encountered it is essential that Hutchinson Consulting Engineers Ltd be contacted as it may affect the recommendations and design parameters given in this report.

Health and Safety by Design principles acknowledging the users who will interact with the artefact being designed throughout its lifecycle, from the concept through to decommissioning and disposal, have been considered in the design process and should also be embedded throughout the procurement and construction processes.

pShould you wish to discuss any aspects of the above information, please contact the above office.

We trust this meets with your approval.

Yours faithfully
HUTCHINSON CONSULTING ENGINEERS LTD

Prepared by	Jayden Quensell **ENGINEER**	Reviewed by	Josh Charlwood **ENGINEER**
Approved by	Ian Hutchinson **MANAGING DIRECTOR**		

GEOTECHNICAL AND GEOLOGICAL INFORMATION

SOIL STRENGTH CLASSIFICATION
(Fine grained cohesive soils)

TERM	FIELD IDENTIFICATION	SHEAR STRENGTH (kPa)
Very Soft (Vs)	Exudes between fingers when squeezed	<12
Soft (S)	Easily indented by fingers	12–25
Firm (F)	Indented only by strong finger pressure	25–50
Stiff (St)	Cannot be indented by thumb pressure	50–100
Very Stiff (VSt)	Indented by thumbnail	100–200
Hard (H)	Difficult to indent by thumbnail	200–500

SCALA PENETROMETER RESULTS

TERM	SCALA PENETROMETER (No. of blows/100mm)
Very dense	>17
Dense	7–17
Medium dense	3–7
Loose	1–3
Very loose	0–2

PROPORTIONAL TERMS DEFINITION

	TERM	% OF SOIL MASS	EXAMPLE
SUBORDINATE FRACTION	(....)y	20–50	Sandy
MAJOR FRACTION	... –	≥50 major constituent	SAND–GRAVEL GRAVEL
MINOR FRACTION	trace ... minor ... some ...	<5 5–12 12–20	trace sand minor sand some sand

IN–SITU STRENGTH TESTING

V128	Insitu Shear Strength (kPa) corrected to BS:1377
R52	Remoulded Shear Strength (kPa)
UTP	Unable to penetrate
CH	Clegg Hammer

MOISTURE CONDITION

Dry (D)–Soil looks and feels dry; cohesive soils usually hard, powdery or friable, granular soils run freely through hands

Moist (M)–Soil feels cool, darkened in colour; granular soils tend to cohere, cohesive soils usually weakened by moisture presence, but one gets no free water on hands when remoulding

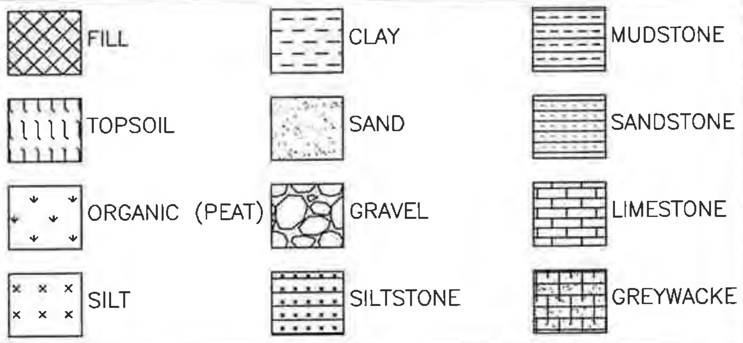
Wet (W)–Soil feels cool, darkened in colour; granular soils tend to cohere, cohesive soils usually weakened and free water forms on hands when handling

Saturated (S)–Soil feels cool, darkened in colour and free water is present on the sample. Fully saturated refers to the case where the soil is below the water table

PARTICLE SIZE TERMINOLOGY

SOIL FRACTION	PARTICLE SIZE RANGE
CLAY	<2um
SILT	2–60um
SAND fine medium coarse	0.06–0.2mm 0.2–0.6mm 0.6–2.0mm
GRAVEL fine medium coarse	2.0–6.0mm 6.0–20.0mm 20.0–60.0mm
COBBLES	60.0–200.0mm
BOULDER	>200.0mm

GRAPHIC SYMBOLS



PLASTICITY TERMS DEFINITION

Non plastic	Sample can't be rolled
Slightly plastic	Sample can be rolled into 3.5mm thread
Moderately plastic	Thread can be bent
Highly plastic	Thread bends alot

COLOURS

1	2	3
light dark	pinkish reddish yellowish brownish greenish bluish greyish	pink red orange yellow brown green blue white grey black

PARTICLE SHAPE
(roundness terms)

Rounded

Sub–rounded

Angular

Sub–angular

*Reproduced from NZ Geotechnical Society Guidelines December 2005

Hutchinson
CONSULTING ENGINEERS

LOG OF BOREHOLE NO: 1

50mm DIAMETER HAND AUGER

JOB No: 24815
DATE: 10/02/2023
TESTED BY: JQ
SHEAR VANE No: 1270
(SHEAR VANE TESTING BASED ON BS1377)

CLIENT: AUCKLAND COUNCIL
LOCATION: TAPORA HALL / COMMUNITY SPORTS CENTRE

GEOLOGICAL UNIT	SOIL DESCRIPTION	GRAPHIC LOG	DEPTH (m)	CONSISTENCY	SHEAR STRENGTH (kPa)	MOISTURE CONDITION	GROUNDWATER	COMMENTS
	dark brown, Topsoil, rootlets			St		M		
HOLOCENE RIVER DEPOSITS	moderately plastic, whitish grey, organic stained, black carbonaceous inclusions, light orangey brown staining, Silty CLAY		0.5		V92/R57			
	highly plastic, whitish grey, light orangey brown staining, Silty CLAY		1.0	VSt	V119/R75			
			1.5	St	V89/R60	M/W		
	non to slightly plastic, friable, light orangey brown, Clayey SAND							
	highly plastic, whitish grey, Silty CLAY		2.0	H	V209+			
	non to plastic, blackish brown, carbonaceous inclusions, organic material, PEAT					W	▼	10/02/23
			2.5		V209+			
			3.0	St	V60/R15	S		
	E.O.B. @ 3.0 m – terminated, borehole collapsing							
			3.5					
			4.0					
			4.5					
			5.0					

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CONSULTING ENGINEERS

LOG OF BOREHOLE NO: 2

50mm DIAMETER HAND AUGER

JOB No: 24815
DATE: 10/02/2023
TESTED BY: JQ
SHEAR VANE No: 1270
(SHEAR VANE TESTING BASED ON BS1377)

CLIENT: AUCKLAND COUNCIL
LOCATION: TAPORA HALL / COMMUNITY SPORTS CENTRE

GEOLOGICAL UNIT	SOIL DESCRIPTION	GRAPHIC LOG	DEPTH (m)	CONSISTENCY	SHEAR STRENGTH (kPa)	MOISTURE CONDITION	GROUNDWATER	COMMENTS
	dark brown, Topsoil, rootlets			H		M		
HOLOCENE RIVER DEPOSITS	moderately plastic, whitish grey, organic stained, black carbonaceous inclusions, light orangey brown staining, Silty CLAY							
			0.5		V209+			
	highly plastic, whitish grey, light orangey brown staining, Silty CLAY		1.0	VSt	V152/R89			
			1.5		V146/R86	M/W		
			2.0	St	V89/R60			
			2.5		V86/R39			
	becoming dark grey, black carbonaceous inclusions appearing							
	non to plastic, blackish brown, carbonaceous inclusions, organic material, PEAT		3.0	F	V32/R8	W	▼	10/02/23
						S		
	E.O.B. @ 3.2 m – terminated, borehole collapsing							
			3.5					
			4.0					
			4.5					
			5.0					

LOG OF BOREHOLE NO: 3

50mm DIAMETER HAND AUGER

JOB No: 24815
DATE: 10/02/2023
TESTED BY: JQ
SHEAR VANE No: 1270
(SHEAR VANE TESTING BASED ON BS1377)

CLIENT: AUCKLAND COUNCIL
LOCATION: TAPORA HALL / COMMUNITY SPORTS CENTRE

GEOLOGICAL UNIT	SOIL DESCRIPTION	GRAPHIC LOG	DEPTH (m)	CONSISTENCY	SHEAR STRENGTH (kPa)	MOISTURE CONDITION	GROUNDWATER	COMMENTS
	dark brown, Topsoil, rootlets			VSt		M		
HOLOCENE RIVER DEPOSITS	moderately plastic, whitish grey, organic stained, black carbonaceous inclusions, light orangey brown staining, Silty CLAY		0.5		V119/R75			
	highly plastic, whitish grey, light orangey brown staining, Silty CLAY		1.0		V194/R85			
			1.5		V104/R52			
	becoming dark grey, rootlets appearing					M/W		
			2.0	St	V89/R43			
	E.O.B. @ 2.0 m – terminated, borehole collapsing							
			2.5					
			3.0					
			3.5					
			4.0					
			4.5					
			5.0					

Hutchinson
CONSULTING ENGINEERS

LOG OF TEST-PIT NO: 1

JOB No: 24815
DATE: 10/02/2023
TESTED BY: JQ/KD
SHEAR VANE No:1270

CLIENT: AUCKLAND COUNCIL
LOCATION: TAPORA HALL / COMMUNITY SPORTS CENTRE

PAVEMENT DESCRIPTION

DEPTH (m)

(20 mm) fatigued chipseal surfacing, poor condition

(20 mm – 40 mm) bluish grey, drainage chip, dense

0.1

(40 mm – 200 mm) mixed aggregate, brown rock, dense, non plastic fines, GAP 65 inclusions

0.2

(200 mm+) Subgrade, highly plastic, light whitish grey, orangey brown staining, Silty CLAY
Shear Strength (Peak/Remoulded) – 80 kPa/ 46 kPa

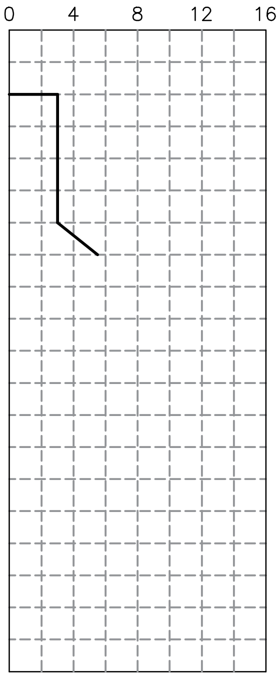
0.3

0.4

0.5

SCALA PENETROMETER

Depth (mm)	Blows	CBR %
100	OWN	
200	WEIGHT	
300	2	3
400	2	3
500	2	3
600	2	3
700	3	5.5
800		
900		
1000		
1100		
1200		
1300		
1400		
1500		
1600		
1700		
1800		
1900		
2000		



TEST METHODS:

- NZS4402:1988 Test 6.5.2 Dynamic Cone Penetrometer
- Inferred CBR values taken from Austroads Pavement Design Manual 2004
- Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001

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LOG OF TEST-PIT NO: 2

CLIENT: AUCKLAND COUNCIL
LOCATION: TAPORA HALL / COMMUNITY SPORTS CENTRE

JOB No: 24815
DATE: 10/02/2023
TESTED BY: JQ/KD
SHEAR VANE No: 1270

PAVEMENT DESCRIPTION

(25 mm) fatigued chipseal surfacing, poor condition

(25 mm – 100 mm) AP40, dense, well graded, non plastic fines

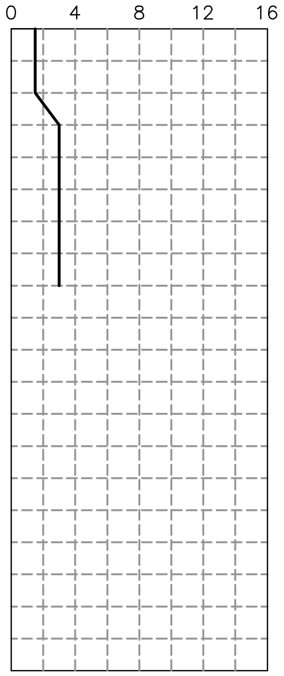
(100 mm – 220 mm) mixed aggregate, brown rock, dense, non plastic fines, GAP 65 inclusions

(220 mm+) Subgrade, highly plastic, whitish grey, orangey brown staining
Shear Strength (Peak/Remoulded) – 96 kPa/ 45 kPa

DEPTH (m)
0.1
0.2
0.3
0.4
0.5

SCALA PENETROMETER

Depth (mm)	Blows	CBR %
100	1	1.75
200	1	1.75
300	2	3
400	2	3
500	2	3
600	2	3
700	2	3
800	2	3
900		
1000		
1100		
1200		
1300		
1400		
1500		
1600		
1700		
1800		
1900		
2000		



TEST METHODS:

- NZS4402:1988 Test 6.5.2 Dynamic Cone Penetrometer
- Inferred CBR values taken from Austroads Pavement Design Manual 2004
- Shear Strength using a Hand Held Shear Vane, NZ Geotechnical Soc Inc 8/2001

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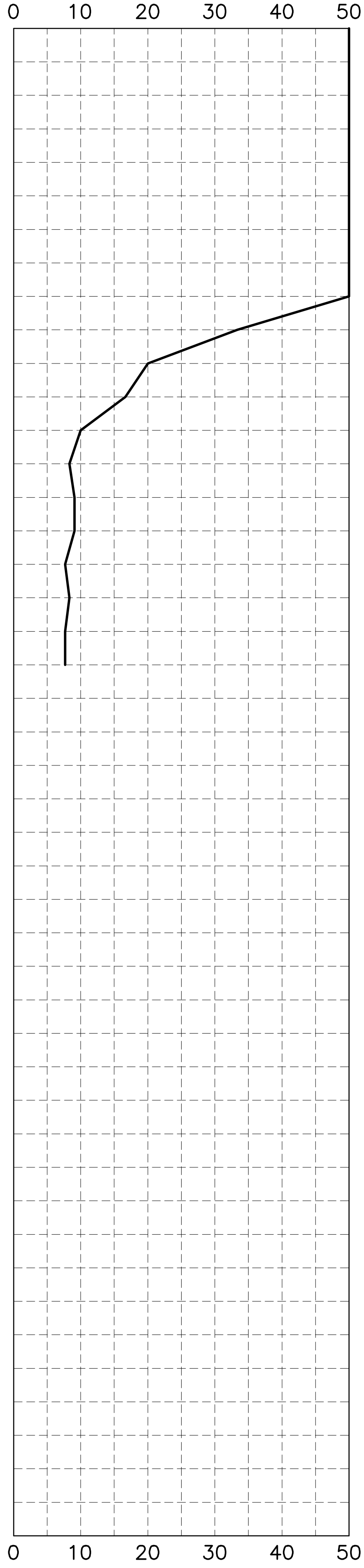
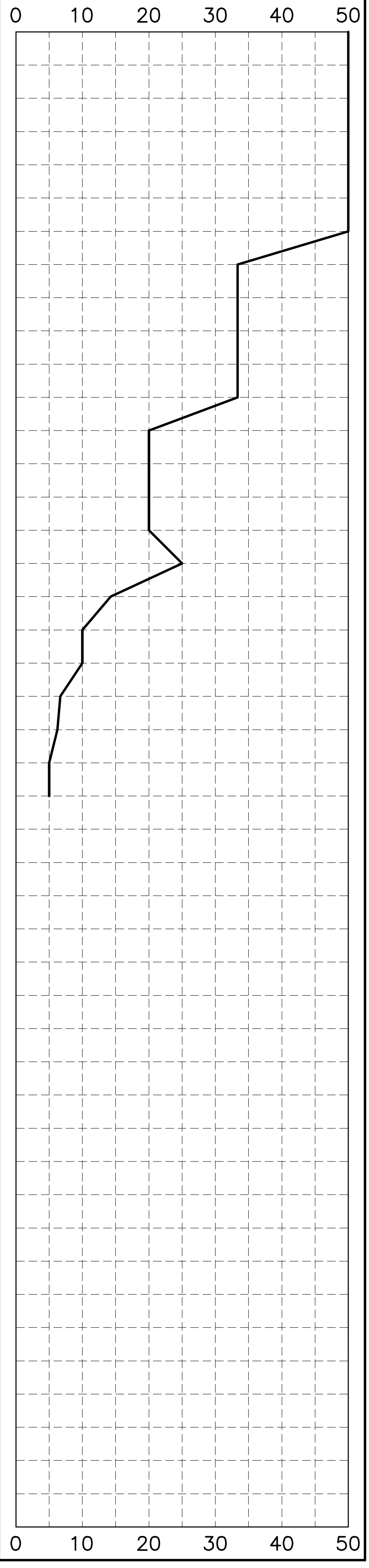
SCALA PENETROMETER TEST RESULTS

CLIENT: AUCKLAND COUNCIL
LOCATION: TAPORA HALL / COMMUNITY SPORTS CENTRE

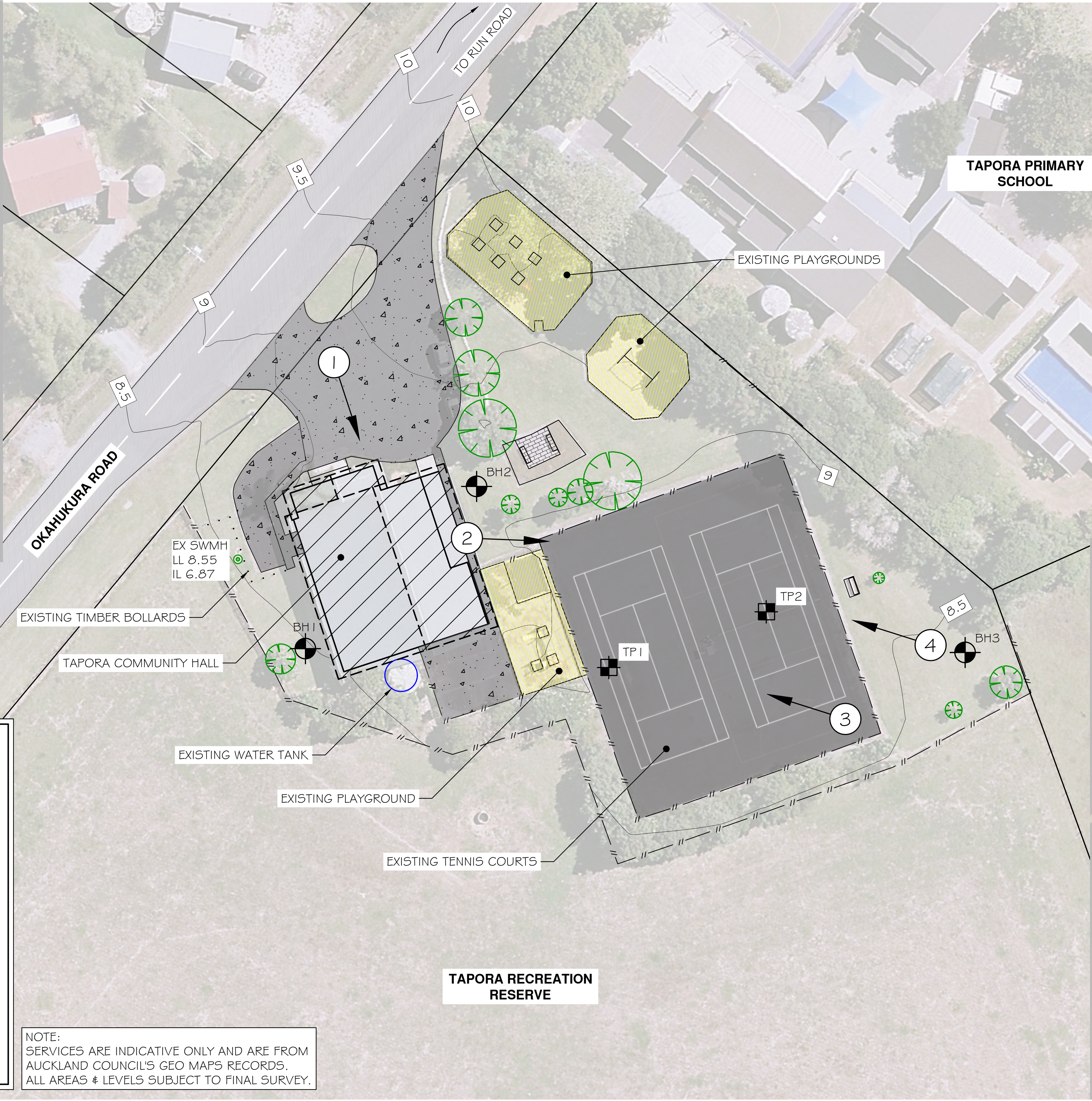
JOB No: 24815
DATE: 10/02/2023
TESTED BY: JQ

DEPTH OF PENETRATION (mm)	BH1 "e" mm/BLOW	BH2 "e" mm/BLOW
START DEPTH (m):	3.0	3.2
100	OWN	OWN WEIGHT
200	WEIGHT	1
300	↓	1
400		1
500		1
600	1	2
700	1	3
800	2	3
900	3	3
1000	5	3
1100	6	3
1200	10	5
1300	12	5
1400	11	5
1500	11	5
1600	13	4
1700	12	7
1800	13	10
1900	13	10
2000		15
2100		16
2200		20
2300		20+
2400		
2500		
2600		
2700		
2800		
2900		
3000		
3100		
3200		
3300		
3400		
3500		
3600		
3700		
3800		
3900		
4000		
4100		
4200		
4300		
4400		
4500		
END DEPTH (m):	4.9	5.5





*Based on test method: NZS4402:1988 Test 6.5.2 Dynamic Cone Penetrometer



LEGAL DESCRIPTION
DP: SEC 20 TOWN OF
TAPORA SO 40339
AREA: 3.9153 Ha

LEGEND

EXISTING CONTOUR	──
EXISTING FENCE	── // ──
EXISTING BUILDING	▨
EXISTING PLAYGROUND	🟨
EXISTING CONCRETE HARDSTAND	▦
EXISTING ROAD	▭
APPROXIMATE TEST PIT LOCATION	TP1
APPROXIMATE BOREHOLE LOCATION	BH1
SLOPE ANGLE	15°

NOTE:
SERVICES ARE INDICATIVE ONLY AND ARE FROM AUCKLAND COUNCIL'S GEO MAPS RECORDS.
ALL AREAS & LEVELS SUBJECT TO FINAL SURVEY.

No.	Revision	Drawn	Chk.	Appd.	Date
A	INFORMATION ONLY	K.D	P.J	I.H	MAR 2023

Hutchinson
CONSULTING ENGINEERS
PO Box 150, Orewa 0946
154 Centreway Road, Orewa 0931
Ph: 09 426 5702 www.hc.co.nz

Design	J. QUENSELL	MAR 2023
Drawn	J. QUENSELL	MAR 2023
Checked	J. CHARLWOOD	MAR 2023
Approved	I. HUTCHINSON	MAR 2023
Scale	SCALE: 1:500	
Scale vert. exag.		

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Project
TAPORA COMMUNITY HALL AND
HARDCOURT REBURSHMENT
TAPORA RECREATION RESERVE
TAPORA

Title
GEOTECHNICAL INVESTIGATION SITE PLAN

Job No.
24815

Sheet No.
G01

As discussed recently, we have carried out further site investigation of the existing Tapora Community Hall building.

The intention of the investigation was to further explore options for the maintenance of the hall to retain inherent character/historical value, whilst recognising a potentially reduced future service life of around say 20 years.

The scope of our investigation was to include:

Investigation

- To carry out desktop study of the site including property file records
- To re-visit the site and carry out further assessment survey of structural and non-structural elements around the Hall with a view to establishing potential remedial options
- To complete additional measure up where necessary

Engineering Reporting

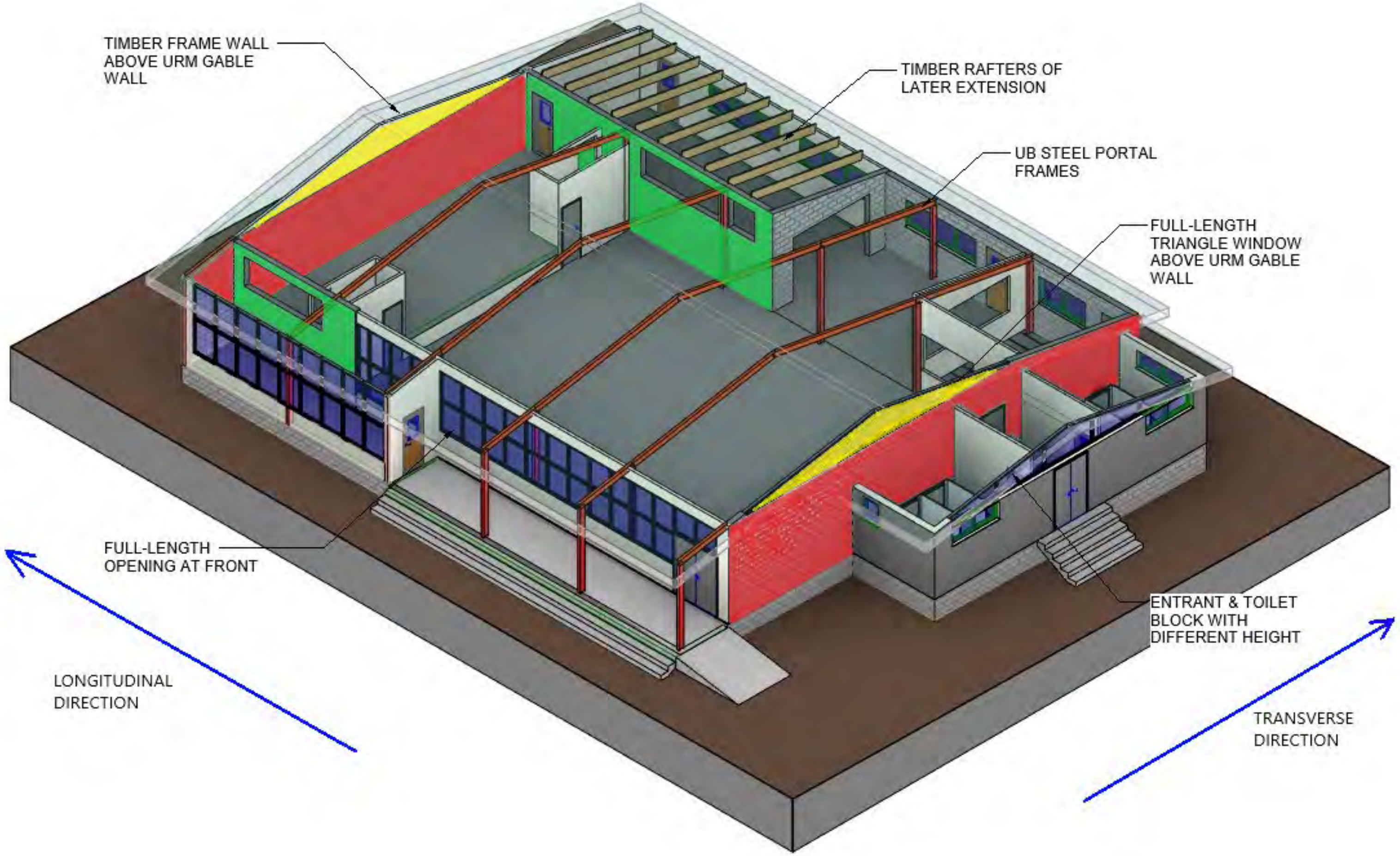
- To liaise with Auckland Council
- To investigate options for structural remediation that acknowledge a reduced future service level and design life expectancy
- To address load capacity assessment of existing timber floors and building super-structure
- To address sub-floor bracing capacity and advise on existing foundation requirements
- To review Initial Seismic Assessment (by others) and incorporate identified deficiencies into the remedial works options assessment
- To prepare options assessment with recommended maintenance and remedial activities

Following the re-visit and measure-up of the hall I want to bring to your attention a true picture of the extent of damage and structural inadequacy of the existing building.

Seismic Performance

As described in the ISA previously completed by Airey Consultants, the existing building currently achieves a **19% NBS (Very High Risk)** rating.

This is primarily on account of the poor seismic performance of the unreinforced masonry walls (URM) at the ends of the building (**red**), the uneven URM walls in the longitudinal building direction (**green**) with poor roof bracing connection, and a lack of connection between the end walls and the roof due to the large window separation (**yellow**).



The **Green** walls are supposed to brace the building in the longitudinal direction, however because they have an unsymmetrical/eccentric layout they need adequate roof bracing between the portal frames to distribute the seismic loading between them and this does not exist.

The **Red** walls are also disconnected from the building structure as a result of the **Yellow** windows. This leaves them to brace themselves in both the transverse and longitudinal directions which they are incapable of.

Further to the inadequate seismic performance of the super-structure, the existing timber floor is below capacity for static live load (general occupancy weight) and currently has no sub-floor bracing at all (seismic).

The combined result of these seismic inadequacies, along with various ancillary effects, leads to the 19% NBS rating that Aireys have determined.

Structural Condition

The building also exhibits poor structural condition in nearly every main element of the building.

There is significant cracking present throughout the URM end walls and transverse walls that requires attention. The cracking can be observed in nearly every section of masonry throughout the building.

The existing masonry in the sub-floor presents an example of the condition of the URM that is expected to extend throughout the building.

The structural steel portal frames cannot be observed in their entirety within the building, however the external portals visible at the lean to areas on the eastern side of the building display advanced corrosion at their connection. Whilst the corrosion is not guaranteed to extend to the internal portal frame structure, you would need to strip all claddings to observe the remainder of the structural steel in order to provide any future certainty of their condition, which is a significant undertaking.

The foundations of the hall sub-floor are not braced, as mentioned above, and are also of the 1960s era of 100 x 70 mm timber pile supported on a 200 x 200 mm concrete footing, only superficially embedded below the ground surface.

The geotechnical investigation that was completed as part of our prior reporting identified organic material beneath a ‘crust’ layer of clay soils at the building platform, and soils consistent with Class H (Highly) expansive ground. The expansiveness classification would necessitate a minimum 900mm deep footing to mitigate ground shrinkage, and the presence of the underlying organic material would necessitate even deeper piling.

The foundations of the URM walls comprise concrete perimeter strip footings that are also inadequately founded to mitigate the effects of soil shrinkage.

The more recently constructed toilet block add-on to the northern end of the building displays significant cracking in the veneer cladding system and the foundations. The building is clearly inadequately founded in relation to both ground conditions and the presence of surrounding vegetation, and has settled differentially. The toilet block would not be worth salvaging during any seismic retrofit of the northern end walls of the hall building and would require full replacement.

The timber Playcentre extension on the southwestern corner of the building is in poor condition, appears to have been subject to little maintenance over time and poses future durability issues. As you are aware there are also Asbestos Containing Materials around the Playcentre and various other areas of the building that require attention.

Summary

The existing building is in an all-round poor structural condition and presents “very-high risk” seismic inadequacies. The extent of the issues are widespread, which unfortunately limits options to isolate the remedial works to any area or individual elements of the building.

The likely minimum requirements to make the building safe, and remediate it for an ~ 20-year timeframe would include:

- Rebuild of the existing URM end walls on new foundations

- Rebuild of the existing toilet block on northern end of building
- Comprehensive upgrade (reinforcement and solid filling) or rebuild of the longitudinal masonry walls including foundation walls
- Assessment of masonry wall foundations and any potential underpinning requirements
- Assessment and remediation of all structural steel portal frame connections
- Upgrade of the roof bracing between structural steel portal frames and new connections to block walls
- Structural steel repairs to corroded external lean-to portal frames
- Sub-floor bracing to the existing timber floor structure (note floor would remain under capacity and loading limitations would require signage)
- Detailed asbestos assessment and treatment plan required for timber playcentre and library areas
- Serviceability upgrades to porch areas, accessible accesses, paths, stairways and the like
- Weathertightness and cosmetic repairs to timber construction, joinery and painted areas
- Associated landscaping

We do appreciate that the hall holds significant historical value to the long-standing families in the Tapora area, and understand the desire to establish a medium-term “maintenance” strategy to keep the hall in safe service for a further ~ 20 year term.

Given the above structural requirements, however, we do not believe that this can be achieved within a sensible budget and our recommendation remains that the building should be re-developed from scratch. As I have indicated in the past, anything is possible, but the costs associated with the works above would be in a similar order to complete redevelopment of the site but with limited long-term service life.

I would be more than happy to meet with you to discuss any aspects of the above assessment further.

Before proceeding with the next steps of our scope of work, we will await your instruction.