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STRUCT-ENG
design solutions ltd.

Structural Report: Investigating Floor Level Variations at 90 Waratah, Avondale, Christchurch 8061



Project: Non-intrusive structural report

Address: 90 Waratah, Avondale, Christchurch 8061

Project #: SX261004

Date: 30 October 2026

Document Control

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Disclaimers and Limitations

This Structural Condition Report has been prepared by Struct-Eng Design Solutions Ltd (Struct-Eng) at the request of Allanah Cosgrove (the Client). It addresses the structural conditions relating to the deviations in floor levels at 90 Waratah Street, Avondale, Christchurch 8061, a residential dwelling.

The findings and recommendations in this Report are based on the documents provided and the assumptions specified in the Report. Additionally, in preparing the Report, Struct-Eng has relied upon the data provided by or on behalf of the Client. Except as stated in the Report, Struct-Eng has not verified the accuracy or completeness of the Client Data supplied. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in this Report are based in whole or in part on the Client Data. Those conclusions are contingent upon the accuracy and completeness of the Client Data. Struct-Eng will not be liable for conclusions or findings in the Report should any Client Data be incorrect or hidden and not fully shared with Struct-Eng.

Struct-Eng did not perform a comprehensive assessment of all possible conditions or circumstances that may exist at the site. Some conditions may be undetectable due to the limited investigation of the site. Variations in conditions may occur between investigatory locations, and on-site conditions may not be revealed by the investigation and have not been considered in the report.

Struct-Eng has provided an opinion based on observations current at the time of reporting. The observations, findings, and conclusions outlined in this report are derived from the Structural Engineer's professional experience. They embody the interpretation of the data and information available at the time of the inspection or analysis. Despite every effort to ensure the accuracy and reliability of the information contained in this report, the nature of engineering judgment inherently involves uncertainties. Consequently, no warranty, either expressed or implied, is provided for the decisions and actions taken based on this report.

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Executive Summary

Struct-Eng Design Solutions Ltd (Struct-Eng) was engaged by Allanah Cosgrove to undertake a non-intrusive structural inspection and floor level survey of the residential dwelling located at 90 Waratah Street, Avondale, Christchurch. The assessment was undertaken to investigate the floor level variations identified in the pre-purchase building report prepared by Red LBP dated 6 October 2026 and to assess the general structural condition of the dwelling.

The dwelling is a two-storey, predominantly timber-framed structure with brick veneer external cladding, constructed in the 1980s. The property is classified as Technical Category 3 (TC3), and the review of available liquefaction mapping indicates that the site experienced moderate liquefaction-related effects during the February, June, and December 2011 Canterbury earthquake events.

The assessment comprised a visual inspection of accessible internal and external areas, a review of the available EQC Scope of Works and pre-purchase building report, a floor level survey, and spot measurements of wall verticality and window and door frame alignment. No intrusive investigations were undertaken, and the findings are limited to the conditions visible at the time of inspection.

The floor level survey recorded a total floor level variation of 40 mm on the upper floor and 47 mm on the ground floor. Both results are within the 50 mm limit referenced in the MBIE guidelines. Floor slopes were generally less than 0.5%, although localised exceedances were recorded in the garage, with a maximum slope of 1.0%, and in the hallway, with a slope of 0.65%. Most measured wall tilts and window and door frame slopes were within acceptable construction tolerances, with minor exceedances identified at isolated locations.

The visual inspection found the dwelling to be in generally good condition, having regard to its age and construction era. Minor cosmetic cracking was observed in the internal linings and external cladding, while only minor hairline cracking was identified in the accessible portions of the foundation ring beam. The garage slab was generally in good condition, with evidence of previous repairs and no significant cracking observed in the accessible areas. Fire damage was identified to the chord and web members of one roof truss located near the roof space access hatch. No other visible signs of fire damage were identified in the remaining roof truss framing.

The observed floor level variations may be attributable to a combination of factors, including original construction tolerances, long-term floor deflection, seismic movement, and potential differential foundation settlement associated with the historical liquefaction effects at the site. However, the visual inspection and floor level survey alone are insufficient to establish the precise cause or extent of any underlying ground or foundation movement.

Based on the findings of the assessment, the dwelling is considered to be in generally satisfactory structural condition, with no significant deterioration observed in the accessible structural elements that would indicate an immediate concern regarding structural performance at the time of inspection. Although localised floor slopes exceeded the 0.5% criterion referenced in the MBIE guidance, no associated structural distress was identified, and the doors and windows were generally operating satisfactorily. Accordingly, Struct-Eng considers that floor re-levelling is not warranted at this stage.

The following remedial works are recommended: completion of the outstanding recommendations in the Red LBP pre-purchase report, particularly those relating to the brick veneer; repair of the minor foundation ring beam cracks using a suitable repair method; repair of cosmetic cracks in the internal wall linings; and reinstatement of the structural capacity of the fire-damaged roof truss using the sister-member reinforcement methodology detailed in Appendix D. The extent of fire damage and the suitability of the proposed truss reinforcement should be confirmed before the repair is undertaken.

This assessment represents Struct-Eng's professional opinion based on a non-intrusive visual inspection and the information available at the time of reporting. Concealed defects or damage may exist in areas that were not accessible or visible during the inspection.

1 Introduction

1.1 Objective

Allanah Cosgrove (the Client) engaged **Struct-Eng Design Solutions Ltd. (Struct-Eng)** to undertake a non-intrusive structural inspection of the residential dwelling located at **90 Waratah Street, Avondale, Christchurch 8061**. The purpose of the inspection was to investigate the structural factors contributing to the observed variation in floor levels within the dwelling.

1.2 Scope

The scope of this assessment has been undertaken in accordance with the agreed terms of engagement with the Client. In general, the scope of work comprised the following:

- Conducting a site inspection and non-intrusive structural investigation to assess the overall structural condition of the dwelling.
- Undertaking independent floor-level and spot-level surveys of selected wall and window frames to identify any variations in level and plumbness.
- Preparing this assessment report based on observations made during the visual inspection, limited to accessible and observable areas only.

Exclusions

The following items are specifically excluded from the scope of this assessment:

- No structural calculations have been undertaken to verify the load-carrying capacity, adequacy, or structural integrity of the building and its individual elements.

2 Sources of Information

The structural assessment report has been prepared based on the following information available:

- *EQC Scope of Works,* CLM/2010/094445, CLM/2011/193541.
- Pre-purchase building report by Red LBP dated 6th October 2026.
- A non-intrusive site inspection was carried out by *Struct-Eng* on 9th October 2026.

3 The Structure

Overview: In the absence of original structural drawings at the time of the assessment, the following description has been developed based on the Structural Engineer's professional judgement and observations made during the site inspection. The subject property is a two-storey residential dwelling constructed in the 1980s, comprising predominantly timber-framed construction with brick veneer external cladding.

Gravity Load-Resisting System: The gravity load-resisting system transfers roof loads through the timber roof framing into the load-bearing walls at the upper level. These walls, together with the suspended floor structure, are supported by the load-bearing walls at the ground floor, which transfer gravity loads to the foundation system. The ground-floor walls are supported by external perimeter concrete foundation beams, while the internal load-bearing walls are understood to be founded on localised slab thickenings that provide adequate bearing capacity and facilitate load transfer into the underlying ground.

Lateral Load-Resisting System: The lateral load-resisting system is understood to comprise timber bracing walls arranged in both the longitudinal and transverse directions at the ground and upper levels. Lateral actions acting at roof level are transferred through the upper-storey bracing walls, which provide the primary in-plane lateral resistance at that level. Seismic and wind-induced forces associated with the upper storey are transferred through the floor diaphragm to the ground-floor bracing walls. These walls then transfer lateral loads into the foundation

system, consisting of perimeter concrete foundation beams supporting the external walls and slab thickenings supporting the internal load-bearing walls.

Foundation System: The primary foundation system comprises a concrete slab-on-grade supporting a timber-framed dwelling with heavy external cladding. Based on the observed construction, the building is generally consistent with a Type C2 structure as defined in Table 2.1 of *MBIE Part A: Technical Guidance*.

Illustration: A typical floor plan of the structure is illustrated in the figure below. It should be noted that this floor plan was provided by the Client and is used only for recording floor levels.

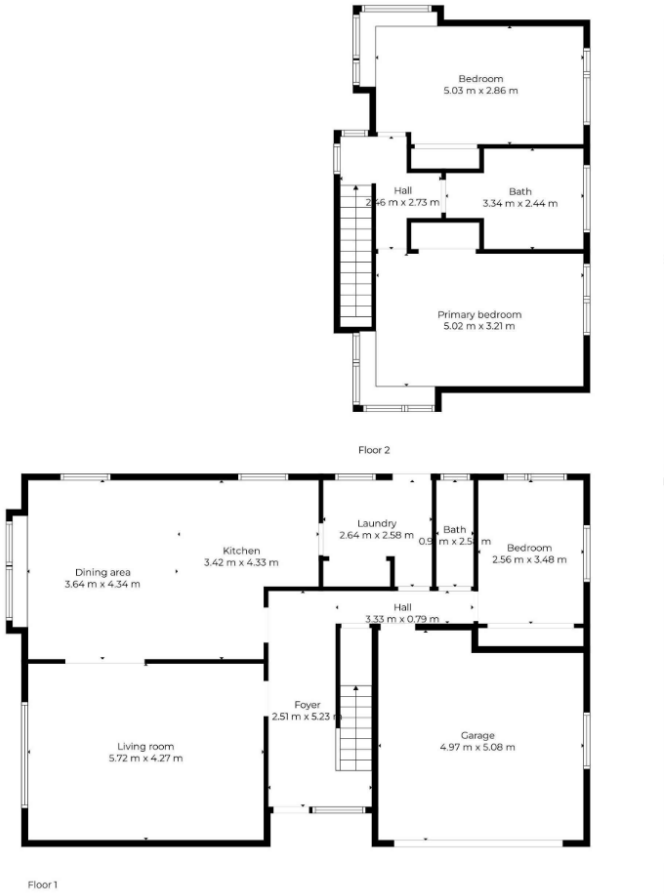


Figure 1: Indicative floor plan only.

Typical photos of the structure taken during the visual structural inspection are illustrated in the table below:

Table 1: Table summarising typical views of the structure

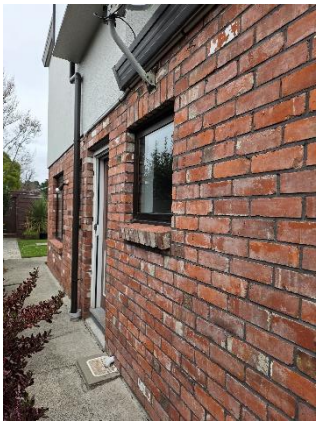
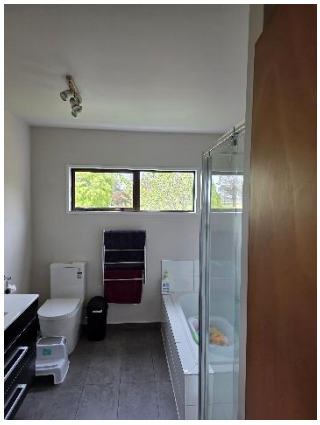
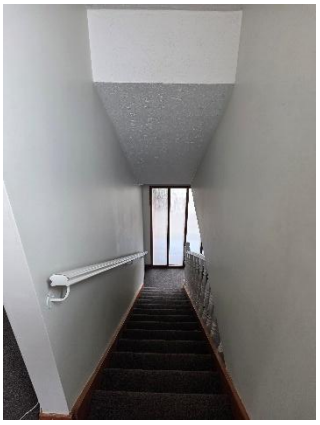
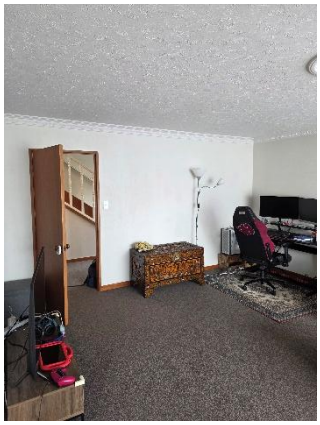
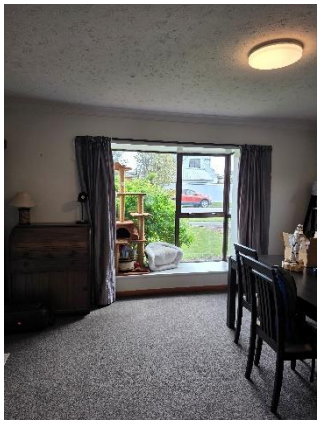
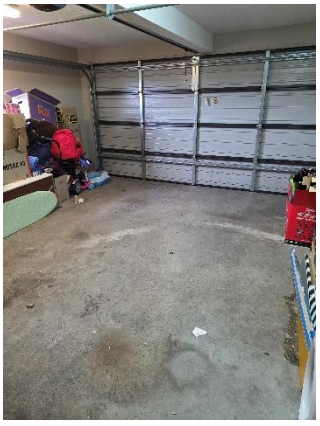
	
Photo 1: Front elevation of the house.	Photo 2: Rear elevation of the house.
	
Photo 3: Typical side elevation of the house.	Photo 4: Typical view of the bedroom upstairs.
	
Photo 5: Typical view of the upstairs bath area.	Photo 6: Typical view of the stairs.

	
Photo 7: Typical view of a downstairs bedroom.	Photo 8: Typical view of the downstairs hallway.
	
Photo 9: Typical view of the downstairs living area.	Photo 10: Typical view of the kitchen area.
	
Photo 11: Typical view of dining area.	Photo 12: Typical view of the garage area.

4 Foundation Technical Category

According to the Christchurch City Council's property search tool, the property is classified under Technical Category 3 (TC3). This classification indicates that TC3 land experienced liquefaction-related land damage and settlement during the 2010/11 Canterbury earthquakes. Land damage from liquefaction is possible on TC3 land during significant future earthquakes.



Figure 2 - A snippet from the Christchurch City Council property search tool indicating the land category

5 Observed Liquefaction and Lateral Spreading

Following the 2010–2011 Canterbury Earthquakes, the Earthquake Commission (EQC) conducted extensive mapping of liquefaction and lateral spreading across affected areas.

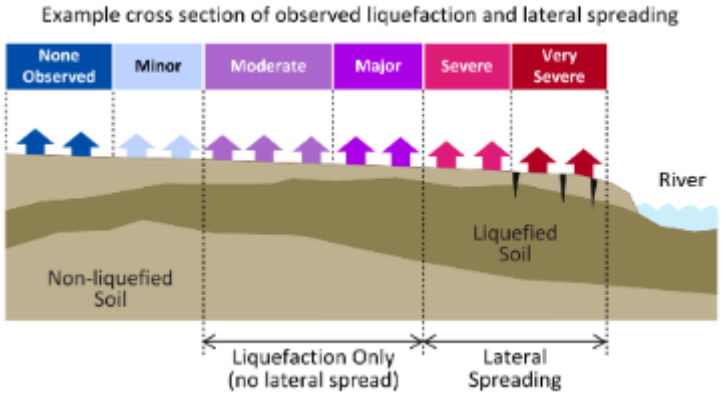


Figure 3: Map legend for liquefaction mapping (Ref: CCC Liquefaction information website).



Figure 4: Observed liquefaction mapping in the September 2010 seismic event (Ref: CCC Liquefaction information website).



Figure 5: Observed liquefaction mapping in the February 2011 seismic event (Ref: CCC Liquefaction information website).



Figure 6: Observed liquefaction mapping in the June 2011 seismic event (Ref: CCC Liquefaction information website).



Figure 7: Observed liquefaction mapping in the December 2011 seismic event (Ref: CCC Liquefaction information website).

Review of the liquefaction mapping presented in the figures above indicates that the subject site experienced **moderate liquefaction-related effects during the February, June, and December 2011 Canterbury earthquake events.**

6 Review of EQC Scope of Works

A review of the EQC Scope of Works was undertaken. The review identified several types of damage to the dwelling, including wall cracking, cracking above windows, damage to a door, cracking in the concrete slab, and cracking to window trims.

These types of damage are generally consistent with movement and shaking of the superstructure during seismic events. Refer to the EQC Scope of Works prepared for the dwelling for a detailed record of the identified damage.

Furthermore, it was noted that during the February and June seismic events, approximately 100 mm of sand was ejected, and localised lifting of the driveway was also observed.

7 Investigations

The following observations are based on a non-intrusive structural inspection undertaken by the Structural Engineer on 9 October 2026. The assessment was limited to visually accessible areas of the dwelling. No internal linings were removed during the inspection. Access to the roof space was limited to inspecting the burnt truss member.

The following measurements and checks were undertaken as part of the inspection:

- Floor levels: Floor levels were measured using a Bosch GLL3-80 laser and a surveying staff. The measurements provide an indication of floor slopes and an overview of floor level variations across the building footprint.
- Wall and window frame alignment: The verticality and horizontality of walls and window frames were checked using an Empire 1,200 mm digital level.
- Wall and window frame dimensions: Wall lengths, window frame dimensions, and stud heights were measured using a DeWALT 16 m laser measuring device.

7.1 Interior Inspection

A walk-through inspection was undertaken to assess the condition of the internal linings. Overall, the linings were found to be in good condition, having regard to the age of the dwelling. No significant structural cracking was observed at the time of inspection; however, minor cosmetic cracking was noted in the wall and ceiling linings. The internal doors were also generally observed to open and close freely, without catching on the carpet.

Evidence of previous repairs to cracks in the wall and ceiling linings was observed. These repairs are considered consistent with the repair works documented in the EQC Scope of Works.

On-site measurements were undertaken to assess the horizontal alignment of window frames and verify the verticality of walls and door frames. The results of these measurements are provided in the appendices for reference.

Representative photographs taken during the internal inspection are presented in the table below.

Table 2: Typical photos were taken during the interior inspection.

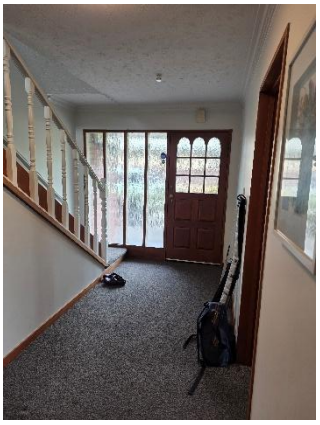
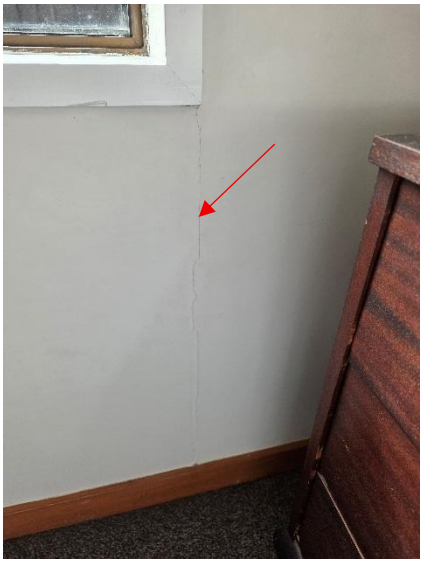
	
Photo 1: Typical lining condition of the upstairs bedroom.	Photo 2: Measuring the horizontal slope of the window frame.
	
Photo 3: Spot wall verticality check carried out.	Photo 4: Minor cosmetic cracking around the corner of the frame.
	
Photo 5: General lining condition in downstairs bedroom.	Photo 6: General lining condition around the entrance area.

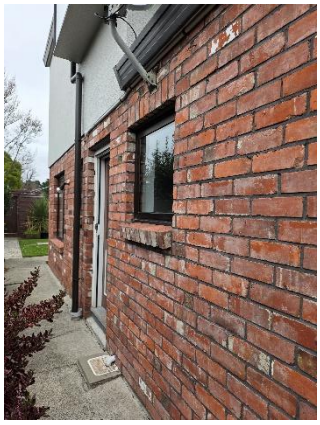
	
Photo 7: Minor cosmetic cracking around the frame.	Photo 8: Measuring horizontal slope of the window frame.
	
Photo 9: General lining condition in living area.	Photo 10: Cosmetic cracking in wall lining.

7.2 Exterior

An external walk-through inspection was undertaken to assess the condition of the building cladding. Overall, the cladding was observed to be in good condition, with no significant cracking identified that would indicate a potential compromise to the structural integrity of the building at the time of inspection. Cosmetic cracking was observed in isolated areas, as also noted in the pre-purchase report by LBP Red.

Representative photographs illustrating the observations made during the external inspection are provided in the table below.

Table 3: Typical photos were taken during the exterior inspection.

	
Photo 1: Typical condition of the exterior cladding.	Photo 2: Typical condition of the exterior cladding.
	
Photo 3: Minor cosmetic cracking in the veneer cladding observed.	Photo 4: General condition of the exterior cladding.
	
Photo 5: General condition of the exterior cladding.	Photo 6: General condition of the exterior cladding.

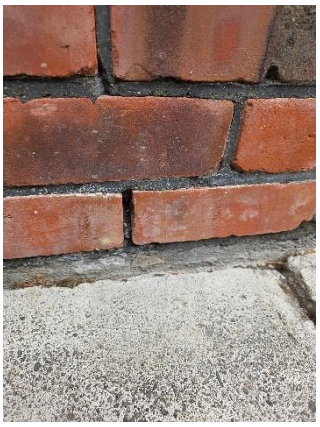
7.3 Foundation Ring Beam

An inspection of the visible portions of the foundation ring beam was undertaken. Visibility was limited, and the observations are therefore based solely on the accessible areas, which are assumed to be broadly representative of the condition of the foundation ring beam across the building footprint.

No significant cracking was observed in the inspected areas that would indicate a compromise to the structural integrity of the building. Overall, the foundation ring beam was assessed to be in good condition, with only minor hairline cracking observed. These cracks may have been exacerbated by seismic shaking or foundation settlement.

Representative photographs of the foundation ring beam, taken by the Structural Engineer during the inspection, are presented in the table below.

Table 4: Typical photos taken of the foundation ring beam

	
Photo 1: Limited visibility of foundation beam with cracking.	Photo 2: General condition of the foundation ring beam.
	
Photo 3: General condition of the foundation ring beam.	Photo 4: General condition of the foundation ring beam.

7.4 Roof Truss Framing

An inspection of the roof truss framing was undertaken to assess the extent of fire damage. The cause of the fire is unknown. However, the inspection identified fire damage to the chord and web members of a single roof truss located nearest to the roof space access hatch, as illustrated in the photographs presented in the table below.

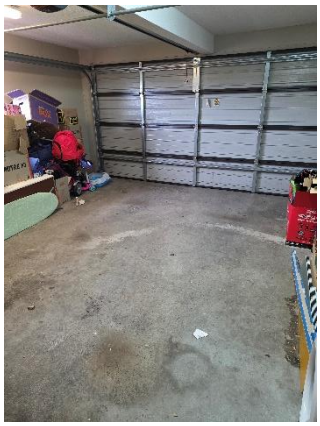
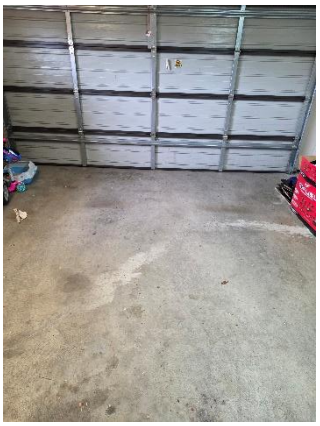
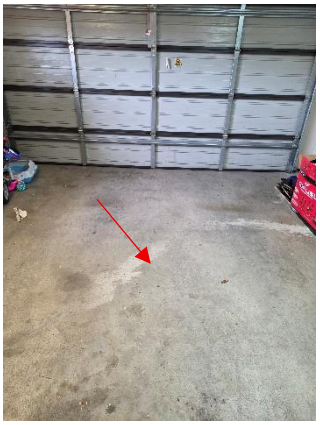
Apart from the identified fire-damaged truss members, the remaining roof truss framing was observed to be in good condition, with no other visible signs of fire damage noted at the time of inspection.

	
Photo 1: Extent of fire damage to the truss.	Photo 2: Extent of fire damage to the truss.
	
Photo 3: General condition of the rest of the roof truss members.	Photo 4: General condition of the rest of the roof truss members.

7.5 Garage Slab

At the time of inspection, the garage concrete slab was observed to be in generally good condition. Evidence of previous concrete slab repairs was noted. In the areas accessible for inspection, no significant cracking was observed. However, the inspection was limited in some areas where the slab was concealed by boxes, shelving, and the client's stored belongings.

Representative photographs of the garage slab taken during the inspection are presented in the table below.

	
Photo 1: General condition of the garage slab	Photo 2: General condition of the garage slab
	
Photo 3: Repair in the slab observed	Photo 4: Repair in the slab observed

8 Structural Checks on Site

Struct-Eng conducted a series of structural assessments on-site to evaluate the floor deviations highlighted in the building report. These assessments included a floor-level survey, spot checks of wall & door verticality, and spot evaluations of the horizontal slopes of windows. The results of these assessments are detailed in the following subsections.

8.1 Floor Level Survey

A comprehensive floor level survey was undertaken throughout the dwelling to assess relative floor elevations and identify any significant variations in floor levels. Carpet thickness was accounted for in determining the final floor levels. Large furniture items were not moved during the survey; however, a sufficient number of measurement points were recorded to provide a representative indication of the general floor slopes and overall levelness of the dwelling.

8.1.1 Upper Floor

The maximum positive floor level deviation recorded was +17 mm, while the maximum negative deviation was −23 mm, resulting in a total floor level variation of 40 mm. This is within the 50 mm limit referenced in the MBIE guidelines.

Individual floor slopes were calculated within rooms and between measurement points spaced approximately 2 m apart. The calculated slopes were generally less than 0.5%, which is within the referenced MBIE guidelines.

8.1.2 Ground Floor

The maximum positive floor level deviation recorded was +10 mm, while the maximum negative deviation was −37 mm, measured in the garage. This resulted in a total ground floor level variation of 47 mm, which is within the 50 mm limit referenced in the MBIE guidelines.

Individual floor slopes were also calculated across the ground floor. The slopes were generally less than 0.5%, with the exception of a few isolated locations where higher values were recorded. The maximum slope of 1.0% was recorded in the garage, while a slope of 0.65% was recorded in the hallway. These localised slopes exceed the 0.5% criterion referenced in the assessment.

8.2 Horizontal & Vertical Checks

Horizontal slope measurements were undertaken on selected window and door frames, with measurements limited to locations where the measuring device could be accurately positioned due to physical constraints. The results indicated that the majority of measured horizontal slopes were within acceptable construction tolerance limits. The exception was the large window frame in the upstairs primary bedroom, which recorded a slope of 13 mm/m. The floor slope beneath this window frame was calculated to be 0.45%, as documented in the floor level survey results. The measured window frame slope marginally exceeded the tolerance limits referenced in NZS 3604. It is noted that the dwelling was constructed prior to the implementation of NZS 3604:2011; therefore, the applicable construction practices and standards at the time of construction should be considered when interpreting these results.

Verticality assessments of the internal walls indicated that most measured wall tilts were within acceptable construction tolerances and the MBIE guidance provided in Table 7.1. Minor exceedances of the MBIE criteria were identified at isolated locations. These localised out-of-plumb deviations may be attributable to the response of the superstructure during the Canterbury Earthquake Sequence and, potentially, to bowing of the timber-framed walls associated with the age of the dwelling.

At ground floor level, the wall verticality measurements showed no consistent direction of tilt, and no clear correlation was identified between the measured wall tilts and the recorded floor slopes. However, a limited correlation was observed between the horizontal slopes of some window frames and the corresponding floor slopes beneath them. Although the measured slope values were not identical, the direction of slope showed some consistency.

At the upper floor level, some correlation was also observed between the direction of wall tilts, floor slopes, and window frame slopes. These relationships may indicate that the observed geometric deviations are partly associated with differential movement of the superstructure during the Canterbury Earthquake Sequence. Given the seismic and potential liquefaction-related ground conditions experienced at the site, some of the recorded floor level variations may also be attributable to differential ground movement or settlement. However, the observed correlations alone are insufficient to establish the specific cause or extent of any underlying ground or structural movement.

9 On-Site Observations Discussion / Summary

This section presents the discussions and observations recorded by the Structural Engineer and reflects the professional opinion of Struct-Eng Design Solutions Ltd.

9.1 Struct-Eng Observations & Discussions

- **Background to Assessment:** The structural inspection and floor level survey were undertaken following an earlier pre-purchase assessment by Red LBP. The pre-purchase report identified floor level deviations exceeding the tolerances referenced in the MBIE guidelines and recommended further investigation.
- **Independent Assessment by Struct-Eng:** Struct-Eng Design Solutions Ltd subsequently undertook an independent floor level survey and visual structural inspection of the dwelling to assess the current condition of the structure and investigate the observed floor level variations.
- **Floor Level Survey Findings:** The survey results indicated that the overall floor level variations on both levels were within the 50 mm limit referenced in the MBIE guidelines. However, isolated areas of the ground floor exhibited slopes exceeding 0.5%, as referenced in the MBIE guidance for floor slopes measured between points more than 2 m apart.
- **Wall Verticality Assessment:** Measurements of wall verticality indicated that most wall tilts were within acceptable construction tolerances and the relevant MBIE guidance, with only minor exceedances recorded at isolated locations. These deviations may be attributable to age-related bowing of the timber-framed walls and the effects of seismic shaking during the Canterbury Earthquake Sequence. Some correlation was observed between wall tilts and floor slope deviations, which may indicate that both have been influenced by differential movement during seismic events. Given the evidence of liquefaction at the site, localised foundation settlement may also have contributed to the observed deviations.
- **Correlation Between Floor Slopes and Structural Behaviour:** Minor correlations between floor slopes and wall tilts were identified in isolated areas, potentially indicating localised structural movement during seismic events. Door operation was also considered as part of the assessment of potential structural distortion. At the time of inspection, the doors generally opened and closed freely without catching on the floor coverings. The EQC Scope of Works recorded requirements for doors to be eased, which may indicate that adjustments were required following earlier movement. The current condition of the doors is consistent with the required adjustments having been completed.
- **General Structural Condition:** Based on the visual inspection, the superstructure was assessed to be in generally good condition, having regard to the age of the dwelling. Although visibility of the foundation ring beams was limited, no significant deterioration or cracking was observed in the accessible areas that would indicate an immediate concern regarding structural integrity.
- **Likely Causes of Floor Level Deviations:** In the professional opinion of Struct-Eng Design Solutions Ltd, the observed floor level variations may be attributable to a combination of factors, including seismic movement, original construction tolerances, long-term deflection, gradual foundation settlement, and intentional floor gradients.
    - **Seismic movement and potential liquefaction-related settlement:** The site has experienced seismic shaking, and evidence of sand ejection was noted in the site history. Liquefaction-related ground movement may have resulted in localised differential settlement of the foundations, contributing to the observed floor level variations. The extent of any such settlement has not been established by the visual inspection and floor level survey alone.
    - **Original construction tolerances:** The dwelling was constructed in the early 1980s. The observed deviations may partly reflect the construction practices and tolerances applicable at the time, which may differ from those referenced in modern assessment guidelines.
    - **Long-term floor deflection:** Long-term deflection of the timber floor framing under sustained loading may have contributed to the upper floor level variations. Potential contributing factors include sustained loads from furniture, internal partitions, and other building elements. However, as the upper primary bedroom floor is sloping in the direction of the garage floor, there is also potential that some of this sloping is attributed to foundation settlement.

    - **Long-term foundation settlement:** Gradual or differential settlement of the foundations may have contributed to the recorded floor level variations. The effects of sustained building loads, including the upper storey, exterior cladding, and concrete foundation beams, may be relevant when considering the long-term behaviour of the foundations, particularly given the site's TC3 land classification. However, the extent of any settlement cannot be determined from the available observations alone.
    - **Intentional floor gradients:** The garage floor exhibited the largest measured slope. As garage slabs are commonly graded to facilitate drainage, some of the recorded slope may be intentional rather than the result of structural movement. The original design levels were not available to confirm the intended gradient.
- **Overall Structural Performance:** Based on the non-intrusive visual inspection and floor level survey, the dwelling was assessed to be in generally good condition for its age. No significant deterioration was identified in the accessible structural elements that would indicate an immediate concern regarding structural performance at the time of inspection. The recorded floor level variations and isolated exceedances in floor slopes and wall verticality should be considered in the context of the dwelling's age, historical seismic exposure, potential ground movement, and original construction tolerances.

9.2 Foundation Re-levelling

The concrete slab floor exhibits an overall floor level variation of less than 50 mm. Although localised areas with floor slopes exceeding 0.5% were identified, no associated structural distress was observed at the time of inspection.

From an engineering perspective, and in the professional opinion of Struct-Eng Design Solutions Ltd, the localised exceedances of the 0.5% slope criterion do not appear to adversely affect the serviceability or usability of the dwelling. Doors and windows were generally found to operate satisfactorily, no obvious areas of potential water ponding were identified during the inspection, and the observed floor slopes were not considered to present a significant trip hazard.

Having regard to the generally satisfactory serviceability of the structure, the localised nature of the floor level deviations, and the absence of associated distress observed during the inspection, Struct-Eng Design Solutions Ltd considers that floor relevelling is not warranted at this stage.

10 Conclusions & Recommendations

Based on the visual inspection and spot-level measurements, Struct-Eng Design Solutions Ltd considers the dwelling to be in generally good condition, having regard to its age and construction era. The minor floor level deviations observed at isolated locations may be attributable, in part, to differential settlement associated with the Canterbury Earthquake Sequence, given the evidence of liquefaction at the site. However, the available observations are insufficient to confirm the extent to which seismic activity or liquefaction-related ground movement has contributed to the recorded deviations.

In the professional opinion of Struct-Eng Design Solutions Ltd, floor re-levelling is not considered necessary at this stage, as the overall floor level variation is within the limits referenced in the MBIE guidelines, and no cracking of the floor tiles, particularly in the kitchen and bathroom area, was observed at the time of inspection.

Overall, the dwelling appears to continue to perform satisfactorily, with the observed deterioration and geometric deviations generally consistent with those that may be expected for a dwelling of this age and construction era.

Based on the visual inspection, the following recommendations are provided:

1. Recommendations from the LBP pre-purchase report: Complete the outstanding recommendations identified in the LBP pre-purchase report, particularly those relating to the repair of the brick veneer.

2. Foundation ring beam cracking: Repair the minor cracks identified in the foundation ring beam using an appropriate epoxy injection repair system, subject to confirmation that the selected repair method is suitable for the crack characteristics and the condition of the concrete.

3. Internal wall lining cracks: Repair minor cosmetic cracks in accordance with the relevant MBIE repair guidance by filling the cracks with a suitable flexible filler or jointing compound, sanding smooth once dry, and repainting to match the existing finish.

4. Fire-damaged roof truss: Reinstate the structural capacity of the fire-damaged roof truss by installing sister members alongside the affected existing truss members. The new timber reinforcement members should extend beyond the damaged areas into sound timber, with the connections formed using appropriately specified bugle batten screws. The repair should be carried out in accordance with the repair methodology sketch provided in the appendices. The extent of fire damage and the suitability of the proposed reinforcement should be confirmed before the repair is undertaken.

11 Limitations

The observations, assessments, and conclusions presented in this report are based on a visual, non-intrusive structural inspection undertaken on the date specified in this report and reflect the condition of the dwelling as observed at that time. No intrusive investigations were undertaken, and no building linings, claddings, or other elements were removed to expose concealed structural components. Accordingly, the assessment is limited to visually accessible areas, and concealed defects or damage may exist that were not identifiable during the inspection. The conclusions are based on the observed condition of the structure and its apparent historical performance; future structural performance cannot be guaranteed, particularly in the event of further seismic activity, ground movement, or other unforeseen circumstances.

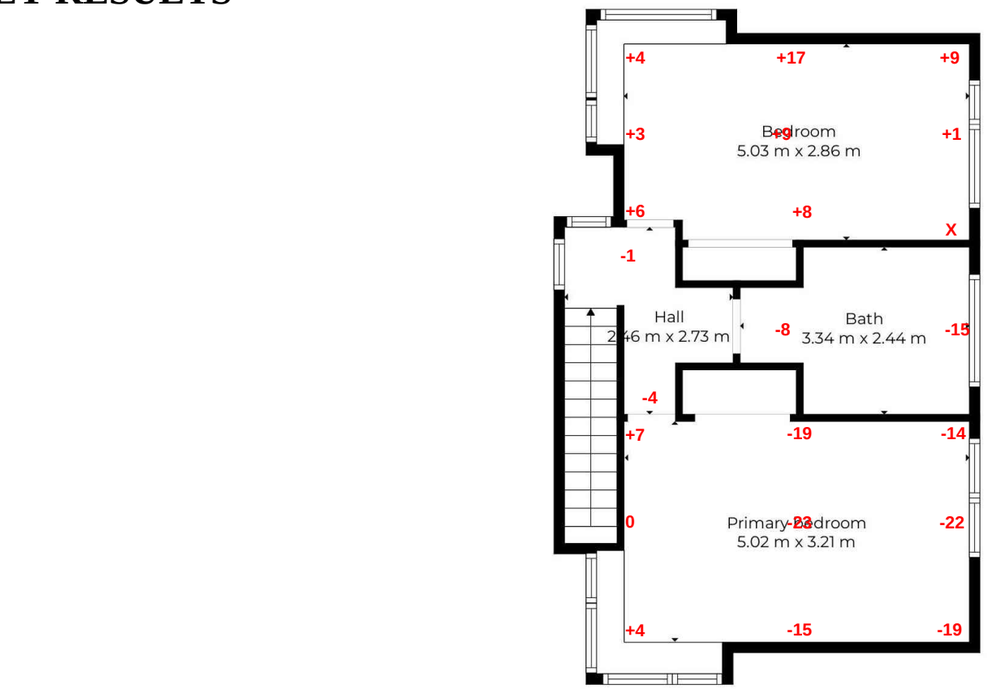
This report addresses only the structural aspects of the dwelling within the scope of the inspection. Non-structural elements, including architectural finishes and mechanical, electrical, and plumbing services, have not been assessed, except where relevant to the structural observations. Any conclusions or recommendations relating to these excluded elements fall outside the scope of this report.

APPENDIX A: FLOOR LEVEL SURVEY RESULTS

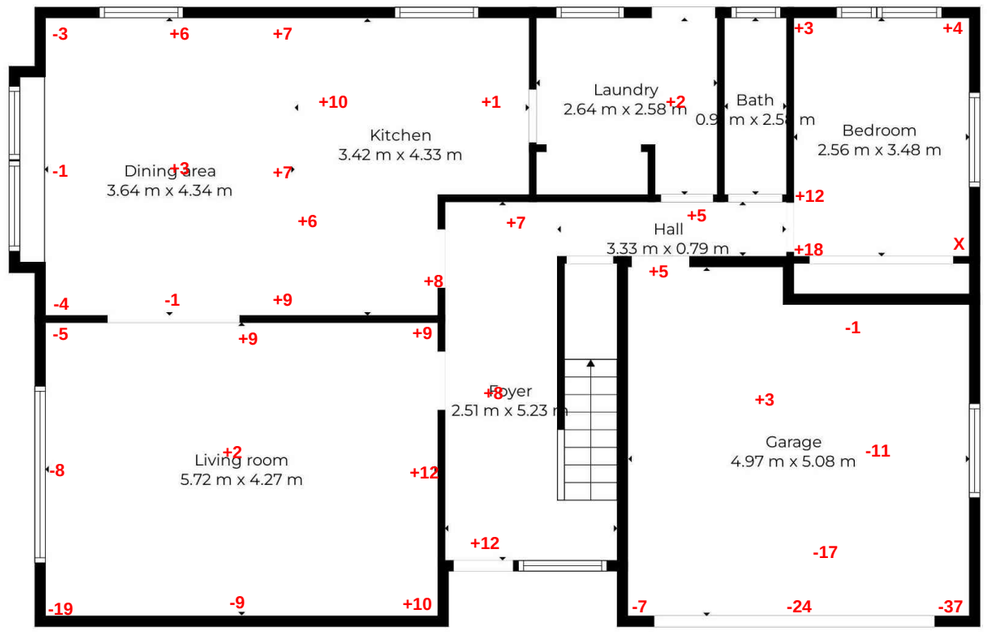
LEGEND

X	DATUM
+4	+VE INDICATES A RISE IN THE FLOOR
-6	-VE INDICATES A DIP IN THE FLOOR

NOTE: ALL MEASUREMENTS IN mm.



Floor 2



Floor 1

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NOTES:

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REV	DATE	DESCRIPTION
1	30.10.2026	FOR REPORT

	DATE	INITIAL
DESIGNED	30.10.2026	NND
DRAWN	30.10.2026	SSK

ADDRESS:
90 WARATAH STREET
AVONDALE
CHRISTCHURCH

DRAWING TITLE:
SURVEY RESULTS

SCALE: N.T.S

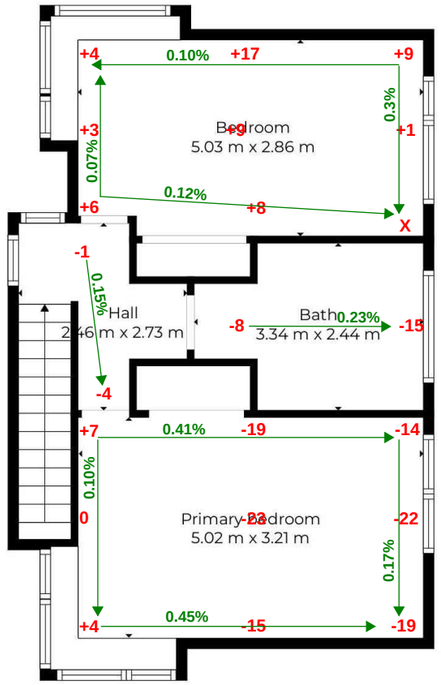
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APPENDIX B: FLOOR SLOPES & DIRECTIONS

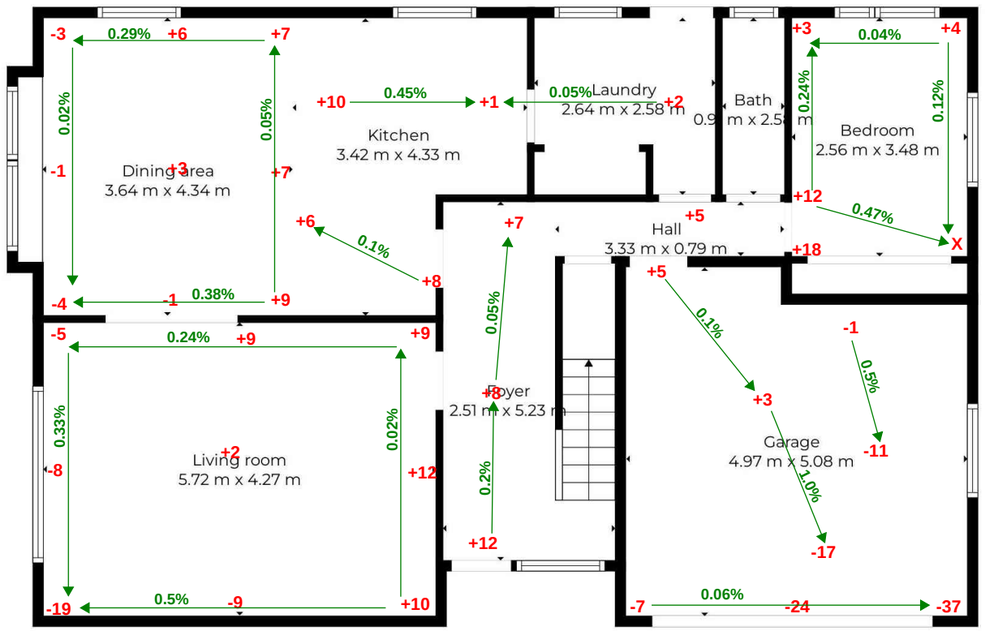
LEGEND

0.2% % FLOOR SLOPE & DIRECTIONS

NOTE: ALL MEASUREMENTS IN mm AND FLOOR SLOPES IN %



Floor 2



Floor 1

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CHRISTCHURCH

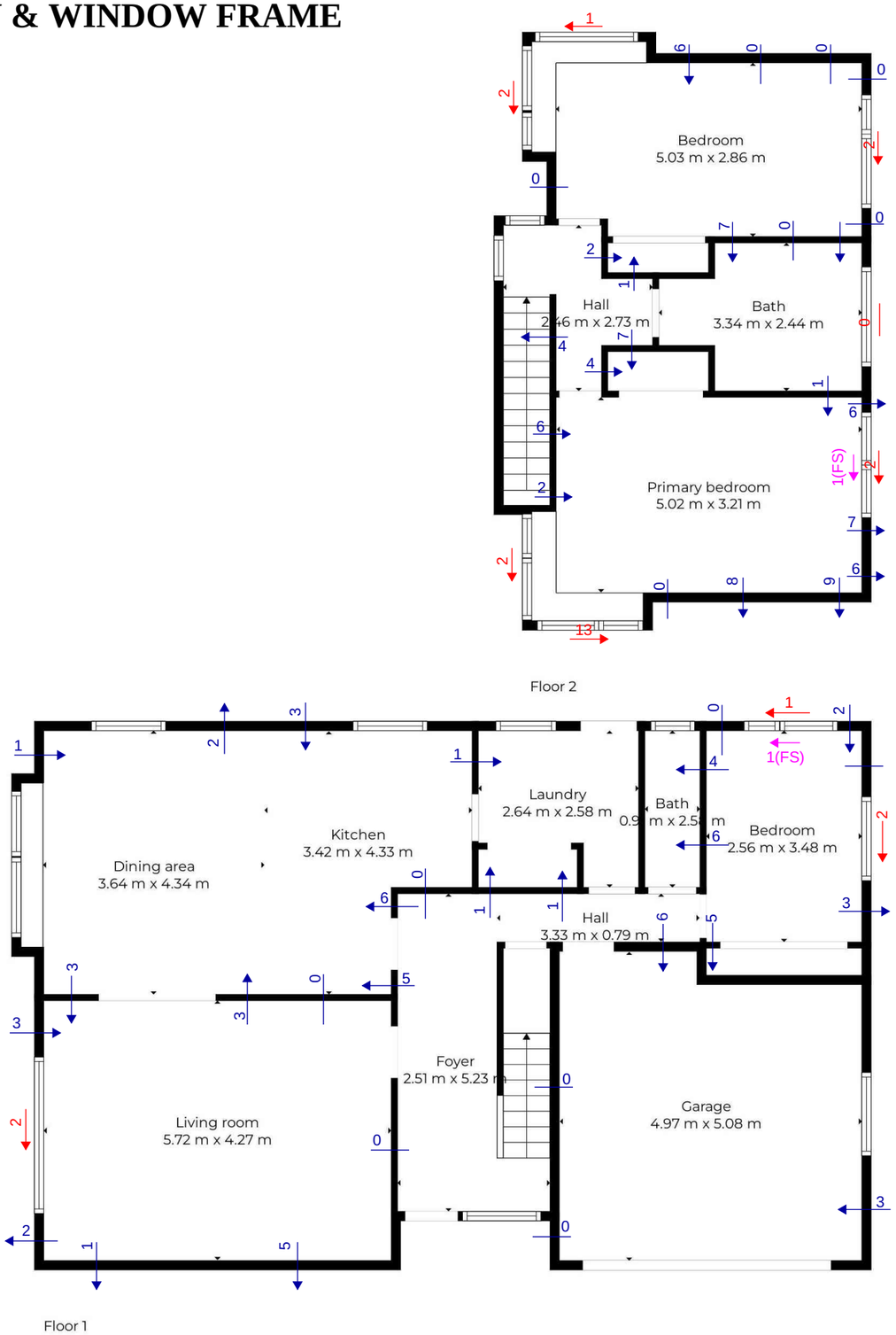
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SURVEY RESULTS

SCALE: N.T.S

JOB NO.	DRAWING NO.	REVISION
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APPENDIX C: WALL VERTICALITY & WINDOW FRAME HORIZONTAL SLOPES



LEGEND

- 1 — WALL VERTICALITY & TILT DIRECTIONS
- 2 — HORIZONTAL SLOPE OF WINDOW FRAME & ARROW INDICATING SLOPE DIRECTION
- 1(FS) — % FLOOR SLOPE & DIRECTIONS

NOTE: ALL MEASUREMENTS IN mm/m.

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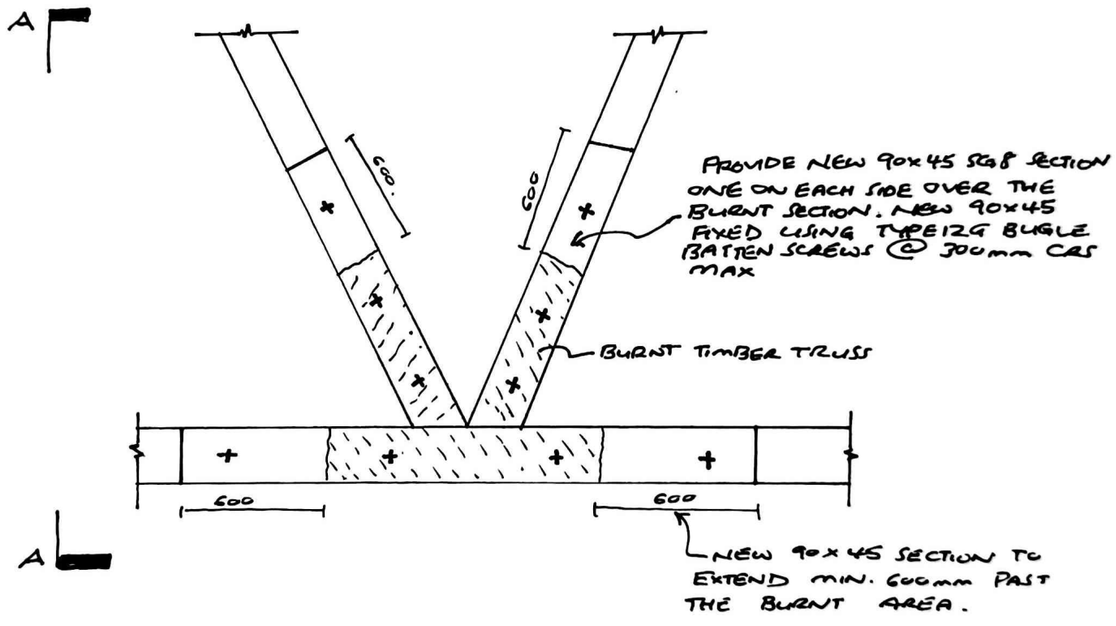
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SURVEY RESULTS

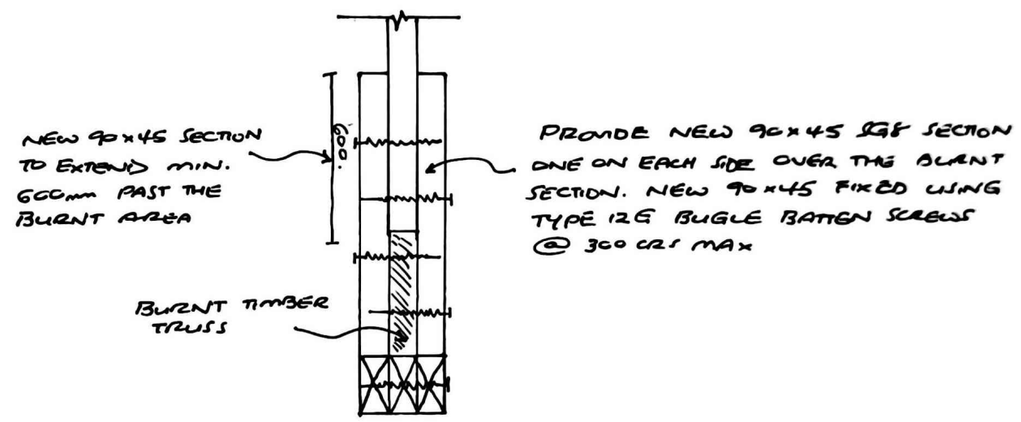
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APPENDIX D: ROOF TRUSS REPAIR METHODOLOGY



TRUSS REPAIR ELEVATION
N.T.S



DETAIL A-A
N.T.S

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DRAWING TITLE:
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