

EARTHQUAKE-PRONE BUILDING

Notice under section 133AL of the Building Act 2004

EQPB-0054

Earthquake rating 25%

This notice is for –

The building situated at 6 Chaucer Street, Rolleston, LOT 14 BLK I DP 307 – ROLLESTON TSHIP, known as Rolleston Fire Station.

The building has been determined by Selwyn District Council as earthquake prone.

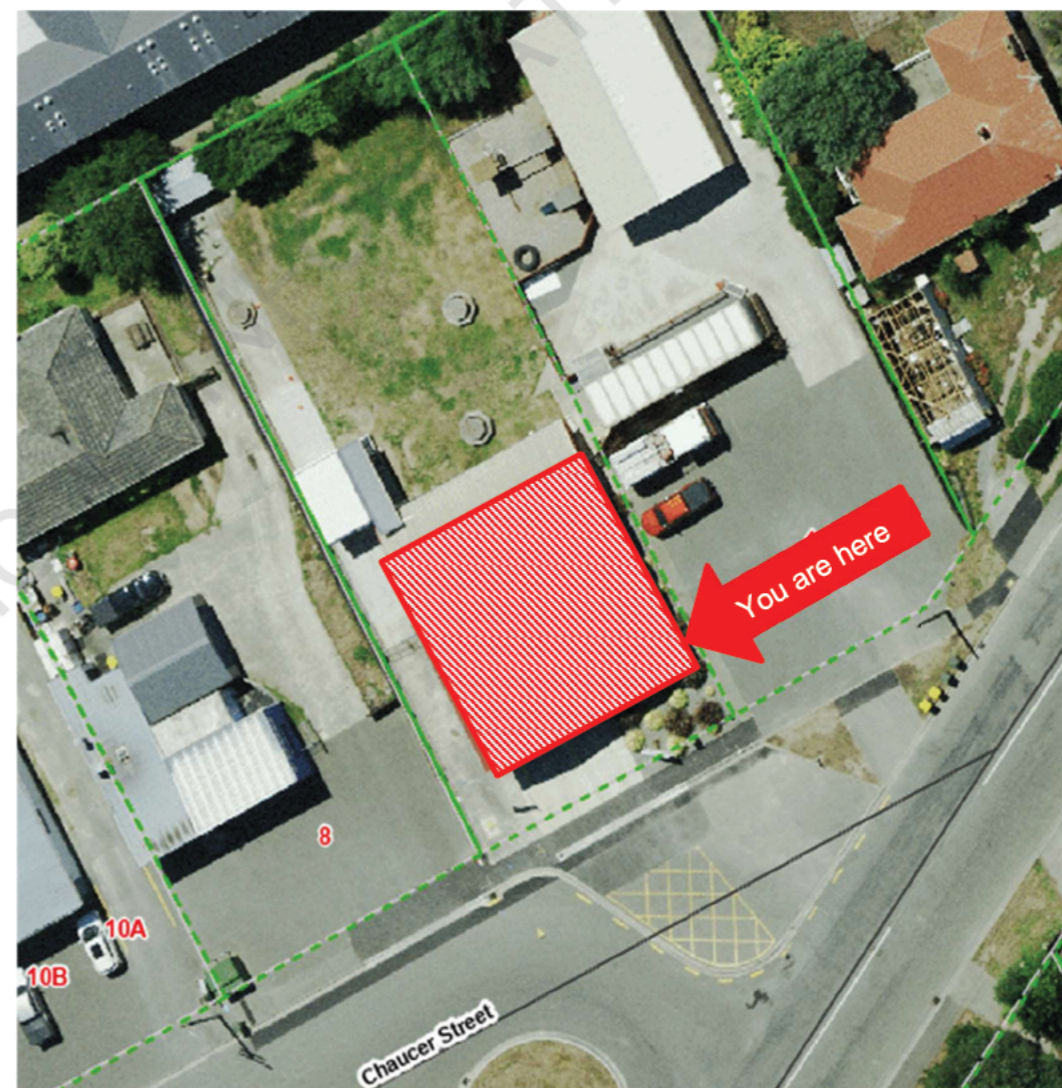
The building is a priority building (as defined in section 133AE of the Building Act 2004).

The owner of the building is required to carry out building work to ensure that the building is no longer earthquake prone (seismic work). The owner is required to complete seismic work by 7th February 2031.

The owner of the building/part of the building may apply to Selwyn District Council, under section 133AN of the Building Act 2004, for an exemption from the requirement to carry out seismic work. The building/part of the building must have certain characteristics to be granted an exemption (see the Building (Specified Systems, Change the Use, and Earthquake-prone Buildings) Regulations 2005).

The owner is not required to complete seismic work if Selwyn District Council determines or is satisfied, in accordance with section 133AQ of the Act, that the building/part of the building is not earthquake prone.

In the event that Selwyn District Council determines or is satisfied, in accordance with section 133AQ of the Building Act 2004, that the building/ part of the building is not earthquake prone, the owner is not required to complete the seismic work.



Signature:	9(2)(a)
Position:	Building Manager
On behalf of:	Selwyn District Council
Date:	7 th August 2023



Medium Business Case

Construction of New Rolleston Fire Station

The Strategic Case – the case for change

Background

Out of scope

Out of scope

It is also proposed that the Canterbury High Country Fire Team co-locate with the Rolleston fire brigade and the existing station and site is not large enough to accommodate both. The building is not fit for purpose with ...[Property]. The roof profile has ...[Property] The roof is ...[Property] The mould has been tested ...[Property].

Out of scope

High Risk buildings (buildings of interest)

Major Hazard Facility

Pest Control Research LP, 8 Centrum Lane

Out of scope

What do we want to achieve through this investment?

To meet statutory, regulatory and organisational requirements a new fire station for the Rolleston Volunteer Fire Brigade is required to be built as the current station does not meet our goals in our Property Strategy Plan 2018-2021 of being ...[Property].

Investment in this project will provide a fit for purpose building for the Rolleston Volunteer Fire Brigade which will result in the brigade being more sustainable, professional and able to expand as the population in this area continues to grow. There is a compelling case for the construction of a new fire station at Rolleston that meets the needs for now and in the future. The existing arrangements for housing the Rolleston Volunteer Fire Brigade are inadequate for a professional emergency response unit. Add to this the identified vegetation risk profile, the increasing population and built asset values, as well as emerging risk, it is clear that the Rolleston Volunteer Fire Brigade and surrounding community would benefit from this investment.

It is proposed to build ...[Property]

Out of scope

What are the existing arrangements and business needs?

Current state and existing arrangements	Future State and Business Needs
Non-compliant facility existing Rolleston fire station	Modern compliant fit for purpose IL4 building
Inadequate and unfit for purpose facilities	Fit for purpose facilities
Unsafe entry and egress from site	Site with safe entry and egress

What are the benefits this investment will deliver?

Project benefits	Benefit Owner	How will the benefit be measured	Target measure
Compliant fit for purpose modern facility	Fire and Emergency NZ Rolleston Volunteer Fire Brigade Local Community	IL4 building with appropriate facilities such as compliant ablution and decontamination areas, provision of training facilities, exhaust fume management	Content workforce. Functional healthy brigade. 100% IL4 requirements Vehicle extraction system

Out of scope

STRUCTURAL ASSESSMENT OF



ROLLESTON FIRE STATION

4 Chaucer Street, Rolleston, Canterbury, 7614

Structural Assessment incorporating Detailed Seismic Assessment (DSA), Wind Assessment (WA), Snow Assessment (SA) & Visual Ground Assessment (VGA) prepared by Aurecon New Zealand Ltd for Fire and Emergency New Zealand (FENZ)

Job Number: [506697 – 53]
[August 2023]

[Revision C]

aurecon

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1. Introduction

As requested by Fire and Emergency New Zealand (FENZ), Aurecon New Zealand Ltd has been engaged to assess the current structural capacity of the Rolleston Fire Station at 4 Chaucer Street, Rolleston.

This structural assessment is part of a nationwide condition assessment programme of the FENZ Rural Fire Station buildings. FENZ have requested that the following items are investigated as part of the structural assessment:

- Seismic rating of the structure as determined by a Detailed Seismic Assessment (DSA) providing Percentage of New Building Standard (%NBS) scores for Importance Levels IL2, IL3 & IL4.
- Lateral and vertical load carrying capacity of the structure as determined by a Wind Assessment (WA) providing Percentage of New Building Standard (%NBS) scores for Importance Levels IL2, IL3 & IL4.
- Vertical load carrying capacity of the structure as determined by a Snow Assessment (SA) providing Percentage of New Building Standard (%NBS) scores for Importance Levels IL2, IL3 & IL4.
- Identification and explanation of Critical Structural Weakness (CSW) and other Structural Weaknesses (SW's) for each of the three assessments noted above.
- A Visual Ground Assessment (VGA) of each property aimed at identifying any evidence of excessive ground moisture levels or subsidence leading to potential settlement of the structure.

We are not aware of any previous seismic assessments or desktop studies performed on this building.

This report summarises the findings of our structural assessment in relation to the five bullet points above.

We did not do any destructive investigation or testing, nor did we undertake any geotechnical testing.

2. %NBS, Return Periods & Relative Risk

The Loadings Standard AS/NZS 1170.0 requires that newly built *Post-Disaster Structures* falling under category IL4 with a design working life of 50 years have “Ultimate Limit State” (ULS) strengths to meet the demands of a 1 in 2500 year earthquake event. For *Major Structures (affecting crowds)* falling under category IL3 the demand drops to a 1 in 1000 year earthquake event and for *Normal Structures* under category IL2, a 1 in 500 year earthquake event. These are the 100% of New Building Standard (NBS) levels which any new structure built in accordance with current New Zealand Standards must achieve. For example, a building with a rating of 60% NBS IL4 has the strength to meet 60% of the demands of a 1 in 2500 year (IL4) earthquake event.

At the Ultimate Limit State, substantial damage is allowed, such as irrecoverable displacement or cracking, so long as there is a margin against collapse and appropriately low life-safety risk.

Buildings are generally required by legislation to have a design working life of 50 years. The chance of a 1 in 2500-year (IL4) event being exceeded in any 50-year period is approximately 2%.

The following table from the Ministry of Business, Innovation and Employment (MBIE) publication – *The Seismic Assessment of Existing Buildings – July 2017* (henceforth referred to as the *Seismic Assessment Guidelines*), provides the basis of a proposed grading system for existing buildings, as one way of interpreting the %NBS building score. It can be seen that Earthquake Prone buildings (%NBS less than 33%) have more than 10 times the risk of collapse than a similar new building. For buildings that are a potential Earthquake Risk (67% > %NBS > 33%), the risk of collapse is 5 to 10 times greater than that of an equivalent new building. Broad descriptions of the life-safety risk can be assigned to these Building Grades accordingly.

Table 1 Relative Earthquake Risk [Source: MBIE]

Building Grade	Percentage of New Building Strength (%NBS)	Approx. Risk Relative to a New Building	Risk Description
A+	>100	≤1	low risk
A	80 to 100	1 or 2 times	low risk
B	67 to 79	2 or 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

While the Percentage of New Building Standard (%NBS) scoring system has been developed for the seismic assessment of existing structures, the same scoring system has been adopted throughout this report for assessing existing structures against wind and snow loadings.

3. Building Description

The building description is based on site survey carried out by Aurecon Engineers in May 2023. The structure is single storey, light timber-frame building with steel portal frames and lean-to roof trusses. There were no existing structural drawings available for this building. It appears that the building has been extended over time. The appliance bay appears to be the original part of the station, with a social room extension, and a rear extension for toilets and storage being added later.

Table 2 Building Description

Date of Design/Construction	Unknown
Gross Floor Area	Total Plan Area = 214.5m ² Appliance Bay = 83.16m ² Lean-to Area = 60.06m ²
Foundation System	Shallow foundation assumed
Wall/Cladding System	Light timber-framed walls with horizontal spanning timber weatherboard cladding
Roof System	Lean-to roof area and social area has lightweight corrugated steel cladding on purlins spanning between timber trusses supported by load bearing walls. Appliance bay area has lightweight corrugated steel cladding on purlins spanning between steel portal frames.
Lateral Load Resisting System – Longitudinal direction [NE-SW]	Timber-framed walls lined with plasterboard sheeting. The roof diaphragm consists of corrugated steel sheeting, and plasterboard ceilings.
Lateral Load Resisting System – Transverse direction [NW-SE]	As above. Steel portal frames are present in the appliance bay. However, since the columns are slender, the system is not capable of acting as a moment resisting frame.
Site Subsoils and Liquefaction	An Aurecon desktop study showed topsoil underlain by gravel from shallow depths. Gravels are likely to extend to a significant depth in excess of 200m. Therefore, the sites soil subclass can be classified as Class D. There is low liquefaction risk.

Refer to Appendix A for a plan of the building.

4. Detailed Seismic Assessment (DSA)

4.1 DSA Methodology

We have calculated the current capacity of the building under seismic loading based on the Ministry of Business, Innovation and Employment (MBIE) publication – *The Seismic Assessment of Existing Buildings* - July 2017. (the *Seismic Assessment Guidelines*).

Table 3 DSA Methodology

Parameter	Value
Design Working Life	50 years
Importance Level	IL2, IL3 and IL4
Return Period Factor - R	IL2 – 1.0, IL3 – 1.3 and IL4 – 1.8
Site Subsoil Classification	D
Period - T (seconds)	Assumed period of structure in both major directions e.g. $T \leq 0.4$ (longitudinal direction) $T \leq 0.4$ (transverse direction)]
Hazard Factor - Z	Z = 0.30 – Christchurch
Near Fault Factor - N	N = 1.0, for period ≤ 1.5 s
Structural Ductility Factor - μ	$\mu = 3$ (for timber-framed wall bracing elements) $\mu = 1.25$ (for roof diaphragm)
Structural Performance Factor - S_p	$S_p = 0.5$ (for timber walls) $S_p = 0.5$ (for timber roof diaphragm)

4.2 DSA Results

Our assessment concluded that the building has the following Percentage of New Building Standard (%NBS) scores under earthquake loading:

Table 4 DSA Results

Importance Level	%NBS
IL 2	E = 45% NBS IL2
IL 3	E = 30% NBS IL3
IL 4	E = 25% NBS IL4

The following table summarises the %NBS scores for the various lateral load resisting elements based on the seismic analysis conducted:

Table 5 Elements Assessed as part of DSA

Element	Direction	%NBS IL2	%NBS IL3	%NBS IL4	Commentary with regards to IL 4 scores
Plasterboard linings to timber-framed walls	Transverse	E= 45%	E= 30%	E= 25%	Transverse plasterboard wall linings provide insufficient bracing capacity against lateral seismic loads as an IL4 building
Plasterboard linings to timber-framed walls	Longitudinal	E= >100%	E= >100%	E= 80%	Longitudinal plasterboard wall linings provide insufficient bracing capacity against lateral seismic loads as an IL4 building
Roof Diaphragm (Appliance Bay)	Transverse	E=>100%	E=>100%	E=75%	Corrugated steel roofing and ceiling plasterboard provide insufficient bracing capacity against lateral seismic loads as an IL4 building
Roof Diaphragm (Appliance Bay)	Longitudinal	E=>100%	E=>100%	E=>100%	Corrugated steel roofing and ceiling plasterboard provide sufficient bracing capacity against lateral seismic loads as an IL4 building

Roof Diaphragm (Lean-To)	Transverse	E=>100%	E=>100%	E=>100%	Corrugated steel roofing and ceiling plasterboard provide sufficient bracing capacity against lateral seismic loads as an IL4 building
Roof Diaphragm (Lean-To)	Longitudinal	E=>100%	E=>100%	E=70%	Corrugated steel roofing and ceiling plasterboard provide insufficient bracing capacity against lateral seismic loads as an IL4 building

4.3 DSA Critical Structural Weakness (CSW) and Structural Weaknesses (SW's)

Based on our assessment and Table 4 on the previous page, the Critical Structural Weakness (CSW) of this building's lateral load resisting system under earthquake loading is:

1. Light timber-frame wall linings

Other Structural Weaknesses (SW's) which were identified are:

2. Roof Diaphragm

Reasons for the listed %NBS scores are discussed below:

The CSW from the seismic assessment was the plasterboard lined timber-frame walls when loaded in the transverse direction. Due to the open plan area of in the appliance bay, large portions of the seismic load were concentrated along bracing lines where limited wall length was available. There were also large voids present in several load bearing walls which limited the capacity available on each bracing line. Therefore, there was insufficient bracing capacity provided against seismic loads.

Another seismic assessment SW of this building was determined to be the roof diaphragm, both in the lean-to area under longitudinal loading and appliance bay area. Timber diaphragms are typically designed as flexible horizontal elements that allow lateral loads to be transferred from the roof level down through the lateral load resisting system and into the foundation. Diaphragms are usually supported on all four sides by load bearing walls and behave like a simply supported deep beam. Rolleston fire station's roof diaphragm consisted of corrugated iron sheeting and plasterboard ceiling. In the appliance bay area, two of the diaphragm's supporting walls had large voids in them, one from the garage doors and the other from the connection to the social room (see Appendix B). These walls have less strength and stiffness which results in a lack of support in this portion of the diaphragm. This causes the diaphragm to behave as a two-way cantilever to transfer the loads into the timber-frame walls.

5. Wind Assessment (WA)

5.1 WA Methodology

We have calculated the current capacity of the building under wind loading based on the Australian & New Zealand Standard AS/NZS1170.2:2021 – *Structural Design Actions, Part 2: Wind Actions*.

Table 6 Wind Assessment Methodology

Parameter	Value
Wind Region	NZ2
Importance Level	IL 2, IL 3 and IL 4
Event Return Period (Years)	IL 2 – 500 years, IL 3 – 1000 years and IL 4 – 2500 years
Regional Wind Speed - V_R (m/s)	$V_R = 45$ m/s for IL2 $V_R = 46$ m/s for IL3 $V_R = 47$ m/s for IL4
Wind Direction Multiplier - M_d	$M_d = 1.00$ for any direction
Terrain Category	Category 3 [For all directions]
Reference height on the structure above the average local ground level – z (m)	$z = 4.64$ m
Terrain/Height Multiplier – $M_{z,cat}$	$M_{z,cat} = 0.83$
Shielding Multiplier – M_s	$M_s = 1.0$ Ignored for the purpose of the calculations
Topographic Multiplier – M_t	$M_t = 1.0$ [For all directions]
Site Wind Speed – $V_{sit,\beta} = V_R * M_d * (M_{z,cat} * M_s * M_t)$ (m/s)	$V_{sit,\beta} = 37.4$ m/s [IL2] $V_{sit,\beta} = 38.2$ m/s [IL3] $V_{sit,\beta} = 39.0$ m/s [IL4]
Aerodynamic Shape Factor – C_{shp}	Aerodynamic Shape Factor determined for each major element of structure in accordance with Section 5 of AS/NZS1170.2:2021
Dynamic Response Factor – C_{dyn}	$C_{dyn} = 1.0$

Design Wind Pressures – p (kPa)	p = 0.84 kPa for IL2 p = 0.87 kPa for IL 3 p = 0.91 kPa for IL4
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5.2 WA Results

Our assessment concluded that the building has the following Percentage of New Building Standard (%NBS) scores under wind loading:

Table 7 WA Results

Importance Level	%NBS
IL 2	W = 25% NBS IL2
IL 3	W = 25% NBS IL3
IL 4	W = 20% NBS IL4

The following table summarises the %NBS capacities for the various lateral and vertical load resisting elements based on the wind analysis conducted:

Table 8 Elements Assessed as part of WA

Element	Direction	%NBS IL2	%NBS IL3	%NBS IL4	Commentary with regards to IL 4 scores
Plasterboard linings to timber-framed walls	Transverse	E= 25%	E= 25%	E=20%	Transverse plasterboard wall linings provide insufficient bracing capacity against lateral wind loads as an IL4 building
Plasterboard linings to timber-framed walls	Longitudinal	E= >100%	E= >100%	E= >100%	Longitudinal plasterboard wall linings provide sufficient bracing capacity against lateral wind loads as an IL4 building
Roof Diaphragm (Appliance Bay)	Transverse	E= >100%	E= >100%	E= >100%	Corrugated steel roofing and ceiling plasterboard provided sufficient bracing capacity against lateral wind loads as an IL4 building
Roof Diaphragm (Appliance Bay)	Longitudinal	E= >100%	E= >100%	E= >100%	Corrugated steel roofing and ceiling plasterboard provided sufficient bracing capacity against lateral wind loads as an IL4 building
Roof Diaphragm (Lean-To)	Transverse	E= >100%	E= >100%	E= >100%	Corrugated steel roofing and ceiling plasterboard provided sufficient bracing capacity against lateral wind loads as an IL4 building

Roof Diaphragm (Lean-To)	Longitudinal	E= >100%	E= >100%	E= >100%	Corrugated steel roofing and ceiling plasterboard provided sufficient bracing capacity against lateral wind loads as an IL4 building
Roof Diaphragm (appliance bay portal rafter)	Vertical	E= >100%	E= >100%	E= >100%	300PFC steel portal rafter provided sufficient flexural capacity against IL4 wind uplift

5.3 WA Critical Structural Weakness (CSW) and Structural Weaknesses (SW's)

Based on our assessment and Table 8 on the previous page, the Critical Structural Weakness (CSW) of this building's lateral and vertical load resisting system under wind loading is:

1. Light timber-frame wall linings

Other Structural Weaknesses (SW's) which were identified are:

1. n/a

Reasons for the listed %NBS scores are discussed below:

The wind assessment CSW of this building was determined to be the timber-frame walls in the transverse direction. The timber-frame walls are designed to transfer the lateral loads from roof level to the foundation below. As with many other fire stations, there are usually large openings at the front of the building to allow fire trucks to enter and be stored in the appliance bay. Since the steel portal frames in the appliance bay are also too slender to contribute any bracing capacity, it results in all the demand in the transverse direction being taken by a limited number of lateral elements. This significantly reduces the buildings lateral strength and stiffness against all importance levels.

6. Snow Assessment (SA)

6.1 SA Methodology

We have calculated the current capacity of the building under snow loading based on the Australian & New Zealand Standard AS/NZS1170.3:2003 – *Structural Design Actions, Part 3: Snow and Ice Actions*.

Table 9 SA Methodology

Parameter	Value
Snow Region	Region N4
Importance Level	IL 2, IL 3 and IL 4
Annual Probability of Exceedance of the Action - P	IL 2 – 1/150, IL 3 – 1/250 and IL 4 – 1/500
Probability Factor - k_p	IL 2 – 1.25, IL 3 – 1.35 and IL 4 – 1.50
Height above New Zealand Mean Sea Level – h_0 (m)	55 m
Alpine or Sub-Alpine	Sub-Alpine
Ground Snow Load – s_g (kPa)	0.9 kPa (Minimum Value for N4 Region Governs)
Exposure Reduction Coefficient – C_e	1.0 (Sub-Alpine)
Shape Coefficient - μ_i	0.70
Roof Snow Load – s (kPa)	0.63 kPa (For all importance levels)

6.2 SA Results

Our assessment concluded that the building has the following Percentage of New Building Standard (%NBS) scores under snow loading:

Table 10 SA Results

Importance Level	%NBS
IL 2	S = >100 NBS IL2
IL 3	S = >100 NBS IL3
IL 4	S = >100 NBS IL4

The following table summarises the %NBS capacities for the various gravity load resisting elements based on the snow analysis conducted.

Table 11 Elements Assessed as part of SA

Element	%NBS IL2	%NBS IL3	%NBS IL4	Commentary with regards to IL 4 capacities
Appliance Bay Steel Portal	S=>100%	S=>100%	S=>100%	The appliance bay steel portals have sufficient flexural capacity to withstand IL4 snow loads. From inspection, the lean-to section of the roof had appropriate truss spacing and connections. Therefore, only the portal frames needed to be assessed.

6.3 SA Critical Structural Weakness (CSW) and Structural Weaknesses (SW's)

Based on our assessment and Table 11 on the previous page, the Critical Structural Weakness (CSW) of this building's vertical load resisting system under snow loading is:

1. N/A

Other Structural Weaknesses (SW's) which were identified are:

2. N/A

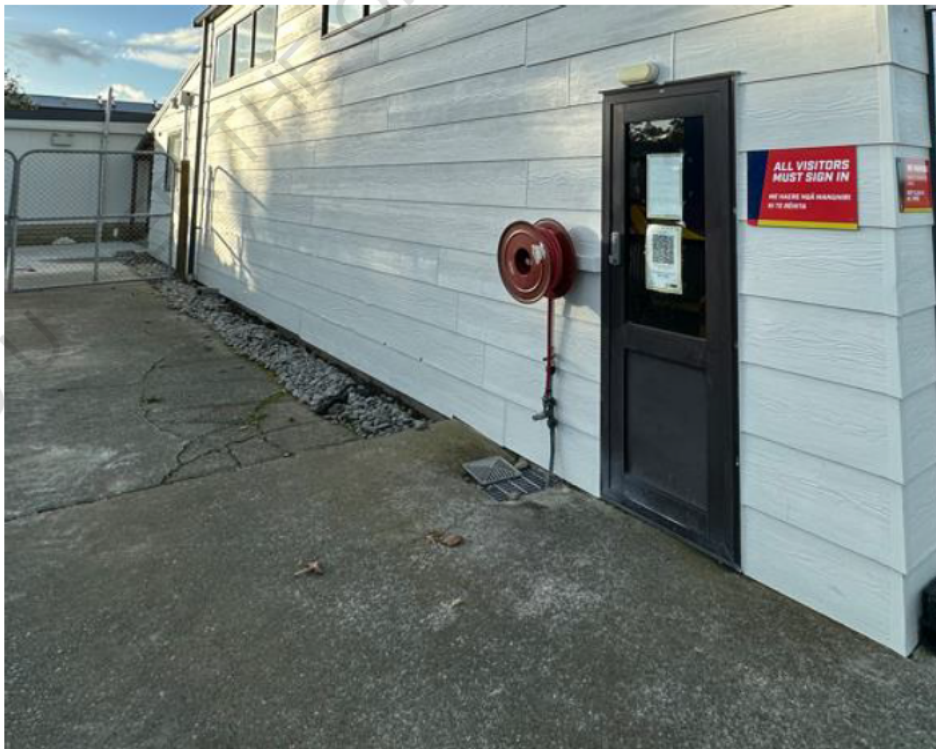
Reasons for the listed %NBS scores are discussed below:

Due to the >100% NBS score rating for snow loading, there are no structural weaknesses from this assessment.

7. Visual Ground Assessment (VGA)

As noted earlier in this report, Aurecon visited the site on 4th of May 2023. Based on this site visit, the following notes were made with regard to general ground conditions at the site:

- 1) During the site investigation we noted no subsidence or settlement affected the building.



Photos showing typical ground conditions on site and foundation slab.

8. Summary of Assessment Results

The following table summarises the results from the four main assessments we have conducted on the FENZ building of Rolleston Fire Station, located at 4 Chaucer Street, Rolleston.

Table 12 Summary of Assessment Results

Assessment	%NBS IL2	%NBS IL3	%NBS IL4	Critical Structural Weakness (CSW)
Detailed Seismic Assessment (DSA)	E=45%	E=30%	E=25%	Timber-frame wall linings under transverse loading
Wind Assessment (WA)	W=25%	W=25%	W=20%	Timber frame wall linings under transverse loading
Snow Assessment (SA)	S=>100%	S=>100%	S=>100%	N/A
Visual Ground Assessment (VGA)	N/A	N/A	N/A	N/A

Refer to Appendix C for a mark-up drawing of the existing building showing assessment scores of all major structural elements which have been assessed.

9. Estimated Difficulty of Strengthening

FENZ has a key long-term objective to 'bring facilities in high-risk areas up to a seismic resilience standard of a minimum of 67% NBS IL4'. While it is outside the scope of this report to provide full strengthening options for each CSW or SW found at this site, the following section should assist FENZ in prioritising further investigation into strengthening work by providing them with an estimation of the difficulty of strengthening the building being investigated. When assessing their entire rural portfolio, the *estimated difficulty of strengthening* will provide FENZ with another parameter by which to compare their rural properties and prioritise future works. The estimation provided gives a rough overall view of how difficult strengthening this building to 67%NBS IL4 is perceived to be. The particular *difficulty of strengthening* category which this structure falls under is not necessarily directly related to the %NBS values listed in Section 7. For example, a building which is currently at 38%NBS IL4 could be very easily brought up to 67%NBS IL4 by simply removing a non structural element such as a parapet. In another case, a building which currently sits at 60%NBS IL4 may be very difficult to bring up to 67%NBS IL4 due to the fact that the CSW is the out-of-plane capacity of a concrete block wall. In order to bring this structure above 67%NBS IL4, new footings, steel posts and steel transoms may need to be installed at regular centres, over a large area of external block walls. The particular categories selected for each of the three assessments conducted; earthquake, wind and snow, have been selected using sound engineering judgement and through drawing on prior experience in strengthening design. The table shown overleaf provides brief descriptions of each of the five categories:

Table 13 Description of Strengthening Categories

Category	Description of Category
A	No strengthening required, currently >67%NBS IL4
B	Minor strengthening work required e.g. Seismic/Wind – replace a small number (<3) of existing linings to internal timber-framed walls or remove a non-structural element such as an unreinforced masonry parapet e.g. Snow – replace a small number (<3) of understrength elements such as a timber lintel
C	Intermediate strengthening work required e.g. Seismic/Wind – new portal frame and concrete footings to provide additional lateral bracing e.g. Snow – replace existing understrength roof purlins over office area
D	Major strengthening work required (extensive strengthening work to a large portion of the structure requiring major disruption to operation) e.g. Seismic – remove large portion of exterior unreinforced masonry veneer and re-clad, install numerous portal frames and replace numerous internal wall linings e.g. Wind – replace and re-line a large number of timber-framed walls throughout the structure and install new portal frames with concrete footings e.g. Snow – remove nail-plate truss roof structure over appliance bay area and replace with new timber-framed trusses
E	Demolition Recommended In attempting to attain 67% NBS IL4 the amount and nature of strengthening work at this site is so extensive, costly and time-consuming that we would recommend demolishing the existing building and re-building a new structure

The following table shows the categories selected for each of the assessments conducted:

Table 14 Estimated Difficulty of Strengthening

Assessment Type	Category Selected
Seismic	[C]
Wind	[C]
Snow	[A]

Appendix B – Relevant Site Photographs



Lean-to roof truss system



Appliance bay steel portal frame.



Bottom flange of appliance bay rafter connected to steel post.



Exterior view of western elevation with high level windows in appliance bay.



Penetrations in appliance bay side bracing walls. Steel roof rafter can be seen, boxed out in white plasterboard. The post can also be seen on the left high-level door.



Exterior weatherboard and corrugated steel cladding.



Plasterboard lined timber-frame walls.

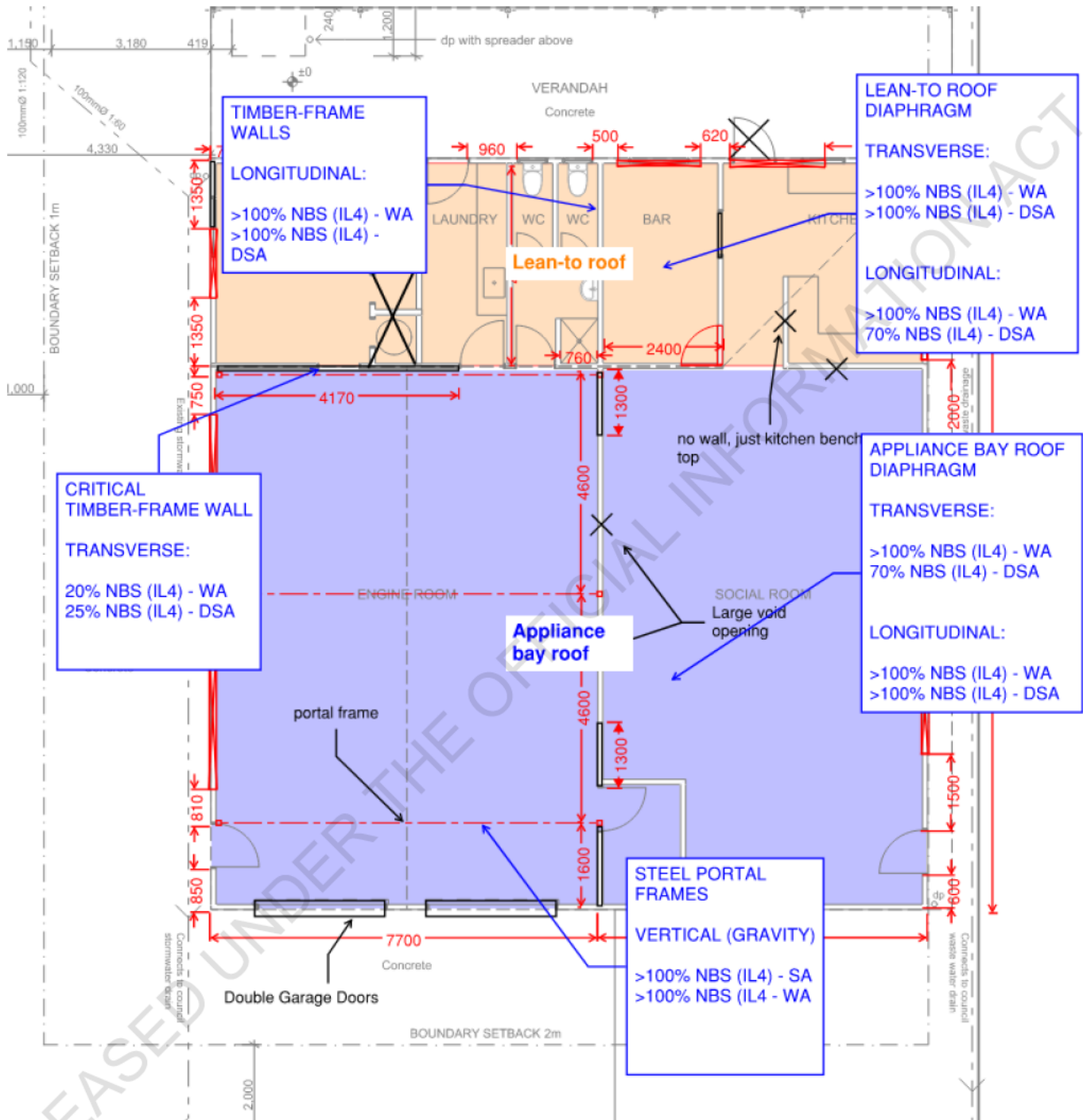


Large void behind curtain in social room to appliance bay wall.



Large voids in kitchen area wall.

Appendix C – Mark-Up Drawing showing Assessment Scores



Appendix D – Assessment Summary

1. Building Information	
Building Name/ Description:	Rolleston Fire Station Building
Street Address	4 Chaucer Street, Rolleston, 7614, Canterbury, New Zealand
Territorial Authority	Fire and Emergency New Zealand
No. of Storeys	1 storey (appliance bay, office, equipment store, and training room)
Area of Typical Floor (approx.)	Total = 214.5m ² Appliance Bay = 83.16m ² Lean-to area = 60.06m ²
Year of Design (approx.)	Unknown
NZ Standards designed to	Unknown
Structural System including Foundations	Lateral system consists of timber framed walls lined with plasterboard sheeting, and roof diaphragm with corrugated steel panel and ceiling plasterboard. Steel portals are present in the appliance bay. However since the columns are slender, the system is not capable of acting as a moment resisting frame. A shallow foundation was assumed.
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	The site subsoil classification, in terms of NZS1170.5:2004 Clause 3.1.3, is Class D.
Previous strengthening and/ or significant alteration	N/A
Heritage Issues/ Status	N/A
Other Relevant Information	N/A

Assessment Information	
Consulting Practice	Aurecon NZ Ltd
CPEng Responsible, including: <ul style="list-style-type: none"> Name CPEng number A statement of suitable skills and experience in the seismic assessment of existing buildings 	<ul style="list-style-type: none"> Wayne Phillips 239990 20 years' experience as a structural engineer with significant experience in the seismic assessment of existing buildings
Documentation reviewed, including: <ul style="list-style-type: none"> date/ version of drawings/ calculations previous seismic assessments 	<ul style="list-style-type: none"> Architectural drawings from Portacom expansion, with original structure included, titled "Rolleston Fire Station" dated 2020

Geotechnical Report(s)	Desktop review of site geology by Aurecon geotechnical engineers, May 2023. No site-specific investigative work was carried out.
Date(s) Building Inspected and extent of inspection	May 2023
Description of any structural testing undertaken and results summary	N/A
Previous Assessment Reports	N/A
Other Relevant Information	N/A

2. Summary of Engineering Assessment Methodology and Key Parameters Used

Occupancy Type(s) and Importance Level	4
Site Subsoil Class	D
For a DSA: Summary of how Part C was applied, including: <ul style="list-style-type: none"> the analysis methodology(s) used from C2 other sections of Part C applied 	Force-Based Analysis (Equivalent Static Method)
Other Relevant Information	N/A

3. Assessment Outcomes

Assessment Status	Draft	
Assessed %NBS Rating	<34%	
For a DSA:		
Comment on the nature of Secondary Structural and Non-structural elements/ parts identified and assessed	Non-structural elements have not been assessed at this stage.	
Describe the Governing Critical Structural Weakness	Timber-framed wall linings in the transverse direction	
If the results of this DSA are being used for earthquake prone decision purposes, and elements rating <34%NBS have been identified (including Parts):	<u>Engineering Statement of Structural Weaknesses and Location:</u> <ul style="list-style-type: none"> Timber framed wall lining in the transverse direction, labelled as critical, as shown in Appendix C 	<u>Mode of Failure and Physical Consequence Statement(s):</u> <ul style="list-style-type: none"> Sheathing and/or nail fastener connection failure will occur with consequence of roof diaphragm from above collapsing as it loses its critical load bearing wall.
Recommendations (Optional for EPB purposes)	Adding new moment resisting portal frames and/or re-lining timber frame walls. Add load bearing walls to reduce area of diaphragm action required.	

Appendix E – Strength Assessment Explanation

Explanatory Statement

This report has been prepared by Aurecon at the request of Fire & Emergency NZ (the “Client”) and is exclusively for the Client’s use and reliance for the purpose for which it is intended in accordance with the agreed scope of work and terms of engagement. The report will not address issues which would need to be considered for another party if that party’s particular circumstances, requirements and experience were known and, further, may make assumptions about matters of which a third party is not aware. Aurecon accepts no responsibility or liability to any third party for any loss or damage whatsoever arising out of the use of or reliance on this report by any third party.

This report contains the professional opinion of Aurecon as to the matters set out herein, in the light of the information available to it during preparation, using its professional judgment and acting in accordance with the standard of care and skill normally exercised by professional engineers providing similar services in similar circumstances. No other express or implied warranty is made as to the professional advice contained in this report.

The building assessment is necessarily reliant on the accuracy, currency and completeness of the information that has been provided to Aurecon from other sources or by other parties, including the structural drawings. We have not sought to independently verify any of the information provided. The report has been prepared strictly on the basis that the information that has been provided is accurate, complete and adequate. To the extent that any information is inaccurate, incomplete or inadequate, including where intrusive investigations on site have not been able to confirm the as built arrangement, Aurecon takes no responsibility and disclaims all liability whatsoever for any loss or damage resulting from any conclusions based on such inaccurate, incomplete or inadequate information. The drawings available for the preparation of this report are listed in the appendices.

The report does not address defects that are not reasonably discoverable on visual inspection, including defects in inaccessible places and latent defects. Where site inspections were undertaken, they were restricted to external inspections however, where practicable, internal visual inspections were undertaken.

Document control record

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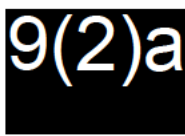
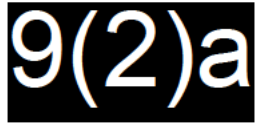
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Document control					aurecon	
Report title		Rolleston Fire Station				
Document code		Project number		506697-37		
File path		https://aurecongroup.sharepoint.com/sites/506697/5 Deliver Design/501 Engineering/Rolleston/Issue to Client/FENZ Structural Assessment Report - Rolleston [revC].docx				
Client		Fire & Emergency NZ				
Client contact		Tim Tootell	Client reference			
Rev	Date	Revision details/status	Author	Reviewer	Verifier (if required)	Approver
A	2023-05-17	Internal Review	A Robinson			W Phillips
B	2023-06-14	Issue to Client	A Robinson			W Phillips
C	2023-07-26	Re-issue to Client	A Robinson			W Phillips
Current revision		C				

Approval			
Author signature		Approver signature	
Name	Alfie Robinson	Name	Wayne Phillips
Title	Structural Engineer	Title	Lead Structural Engineer

From: [Snelling, Phil](#)
To: [Hill, Stephen](#)
Cc: [Harris, Grant](#); [Juranovich, Olivia](#); [Kennedy, Steve](#)
Subject: RE: Shane Cole items to sort
Date: Wednesday, 30 July 2025 2:32:47 pm
Attachments: [image001.png](#)

Hi Steve

My comments in red below

Kind Regards

Phil Snelling

Property Coordinator - Te Ihu

Canterbury, Mid-South Canterbury

91 Chester Street East

PO Box 13-747

Christchurch 8141

Mobile: 9(2)a

@.

www.fireandemergency.nz

Te Rōpū Whakaruruhau – The team that shelters

[Log a Zendesk Property Job](#)

From: Hill, Stephen

Sent: Wednesday, 30 July 2025 2:19 pm

To: Snelling, Phil

Cc: Harris, Grant ; Juranovich, Olivia ; Kennedy, Steve ; Dawson, Pamela

Subject: RE: Shane Cole items to sort

Hi Phil

Firstly, none of this has just occurred

Rolleston sliding door between appliance bay and training room not adequate for exhaust extraction fumes can move around in appliance bay and rest of station roof fans only

Think this has come up before (? Tim), look at options

- Seals around door **Ill have a look tomorrow with catch up on site with Shane**
- Remove slider and pop a opening door with door closer in its place **Team want to be able to open wall up for functions was Shanes comment**
- Individual extraction at source, would need to go on CAPEX list and be prioritised for 2026-2027 **Ive asked Olivia to request pricing from AtSource**
-

Lincoln not enough toilets showers , one downstairs one upstairs would like a ablutions portacom installed.

- Why a problem now when all has worked previously ??
- This would need to go on CAPEX list and be prioritised for 2026-2027 **Noted**
- Check number of toilets ?? **Ill do Friday on way back from Diamond Harbour**

Kindest

From: Snelling, Phil <@.>

Sent: Wednesday, 30 July 2025 2:08 pm

To: Hill, Stephen <@.>

Cc: Harris, Grant <@.>; Juranovich, Olivia

<@.>

Subject: Shane Cole items to sort

Hi Steve

Just been rung by Shane Cole and items to be sorted at Rolleston fire station and Lincoln fire station

Lincoln not enough toilets showers , one downstairs one upstairs would like a ablutions portacom installed.

Kind Regards

Phil Snelling

Property Coordinator - Te Ihu

Canterbury, Mid-South Canterbury

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PO Box 13-747

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Mobile: 9(2)a

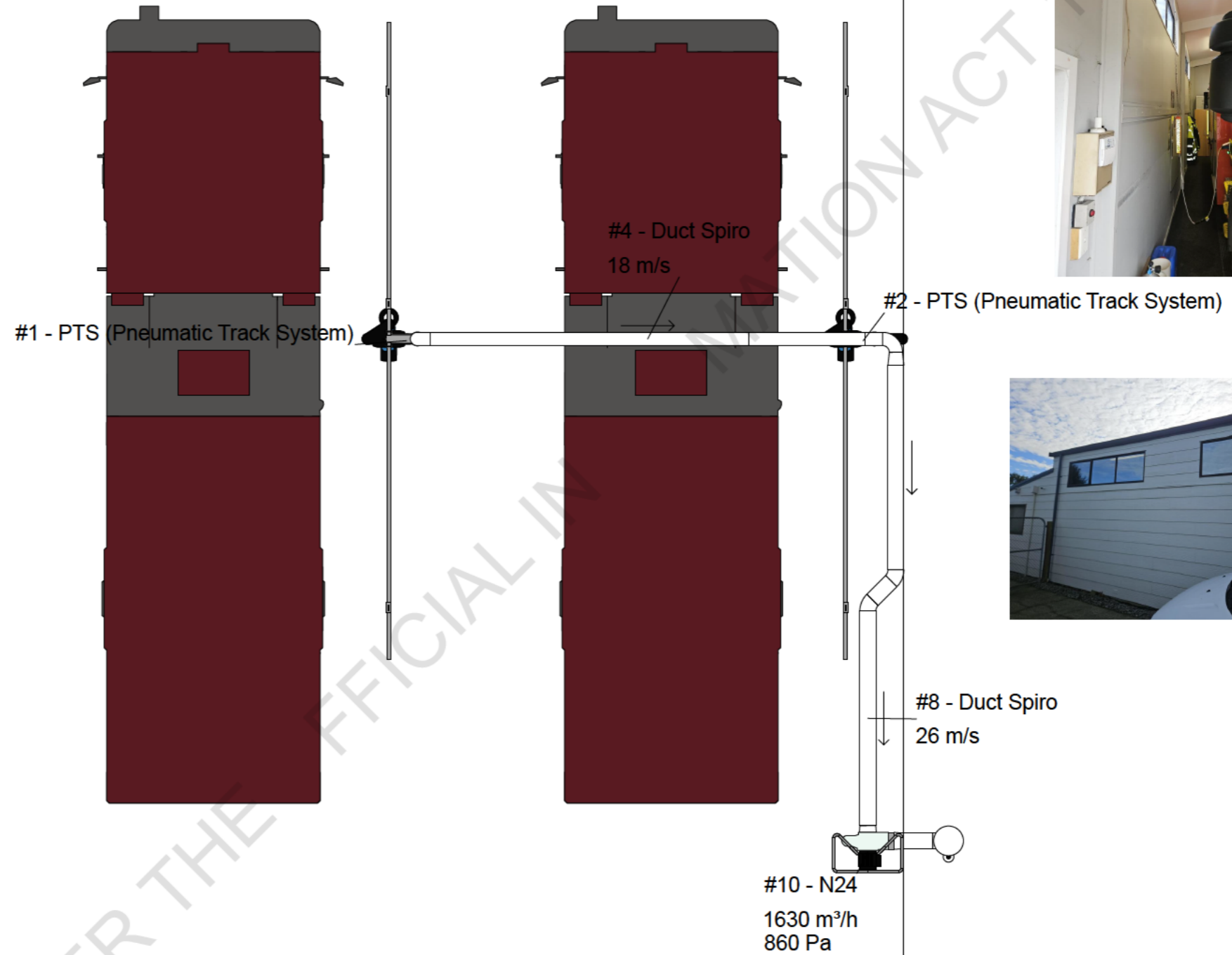
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Te Rōpū Whakaruruhau – The team that shelters

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DB IS HERE!

Scale 1:50

Client:
Fire and Emergency New Zealand

Project:
Vehicle Exhaust Extraction System

x2 5.9m PTS Tracks
1x N24 0.75kw 3ph Fan
Associated Compressor

Wall Discharge
Powdercoated galv external duct to match NDB

Rev.	Date	Description
1	02/09/2025	Draft Layout Drawing

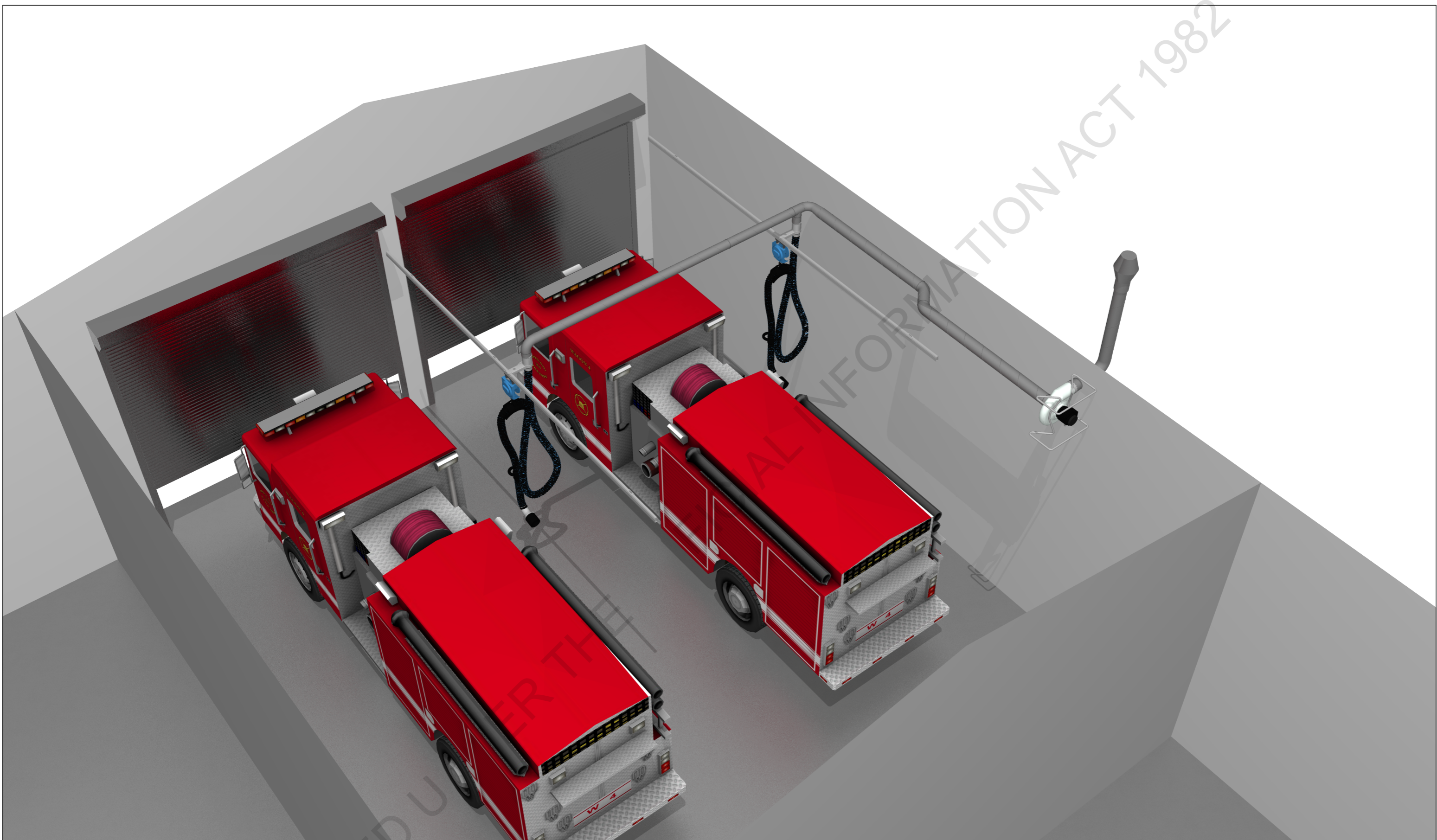
Rolleston Fire Station
Draft Drawing

Sheet No. 1
Author: RC

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Client:
Fire and Emergency New Zealand

Project:
Vehicle Exhaust Extraction System

x2 5.9m PTS Tracks
1x N24 0.75kw 3ph Fan
Associated Compressor

Wall Discharge
Powdercoated galv external duct to match NDB

Rev.	Date	Description
1	02/09/2025	Draft Layout Drawing

Rolleston Fire Station
Draft Drawing

Sheet No. 2

Author: RC

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