ARTC

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Euroa Goods Shed
Building Inspection Report

25 August 2023

Sterling.

ARTC

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EXECUTIVE SUMMARY

Australian Rail Track Corporation (ARTC) have advised that as part of the Inland Rail Program, significant track realignment work will be required, which will necessitate the removal of the Euroa Goods shed (The Shed). ARTC have engaged Sterling Infrastructure Ltd Pty (Sterling) to undertake a visual inspection of The Shed to assess its current structural condition and to provide recommendations.

Access was gained to the structure on 11th July 2023, and all accessible and visible areas were inspected. The Shed is accessible to the public from Eliot Street, through the open yard. Access to the top surface of the roof was deemed unsafe and as such assessment of the condition of the top surface of the roof was made from ground level.

The inspection identified numerous severe structural deficiencies, including but not limited to:

- Segments of the internal timber deck have failed in entirety and are unsafe for use;
- The external stair and landing at the Up End have deteriorated to such an extent that there are no stair treads and is unsafe for use;
- Corrugated steel wall cladding is perforated, deformed, and disconnected from the timber framework (typical), and at risk of spontaneous collapse ;
- The timber fascia is severely rotten and disconnected at the Up End, Up Side, corner, and is at risk of spontaneous collapse;
- Up End 'large door' timber columns are severely rotten near ground level;
- Up End central timber column is detached from timber wall beams and steel roof truss, on a significant inward lean, and is at risk of spontaneous collapse;
- Up End timber wall girts (those within arm's reach) are rotten to the point of failure;
- 25% of the exposed timber deck planks on the Up Side were rotten to the point of failure;
- External timber loading beam on Up Side is severely split;
- Up Side external timber girts which support the wall cladding have rotted to the point of failure;
- Timber wall beam failure at Down End, Down Side, at risk of collapse;
- Timber roof bracing collapse at Down End;
- Steel gutter failure along Up Side in entirety, at risk of collapse;
- Localised areas of corrugated steel roof sheeting are loose and warped;
- Large door has collapsed at Down End;
- Numerous concrete stump footings have rotated and / or disengaged from the timber bearers above (which they are supposed to support).

The severity and extent of the defects identified on-site pose an unacceptably high risk of injury to anyone accessing the building, and as such a fenced off **exclusion zone must be set up as soon as possible** around the full perimeter of The Shed to prevent any unauthorized person from accessing either the external stair or the interior.

During the inspection controlled and cautious attempts were made to traverse the internal floor, however, failed floor beams were observed at multiple locations which adjusted the hazard assessment resulting in abandonment of any further attempt to traverse the potentially unstable deck.

There are segments of loose roof sheeting, cladding and failing timber components, which are considered to be at risk of disconnecting and falling without warning. This hazard of falling objects, poses a risk of injury to pedestrians accessing The Shed.

In addition to the considerable safety risk posed to pedestrian access, there is also a risk of The Shed collapsing onto the adjacent train line, as the lateral stability of this shed is considered unlikely to comply with the current wind code AS1170.2. Due to the severity of the consequence should this risk eventuate we advise that action must be taken with appropriate urgency **(structural 'make safe' works must commence within 5 months from the date of the inspection).** These may consist of demolition, dismantlement, or major strengthening works. The remaining asset life for The Shed in it's current form is therefore considered to be 5 months.

It is possible to salvage limited portions of the timber framework, the steel roof trusses, segments of the cladding, bluestone, and the large entrance doors. Theoretically, these materials could be re-purposed, however, if they were intended to be used structurally their material properties would need to be confirmed via lab testing, and they would need to be cleaned and appropriately treated.

The condition of some components of The Shed will allow repurposing in a non-structural / aesthetic capacity, these would likely include:

1) Large entrance doors
2) Perimeter stone stub walls
3) Steel roof trusses; and,
4) Internal timbers

Euroa Goods Shed - Component Summary

Structural Element	% Salvageable	Suitable for structural re-purposing	Recommendation
Façade sheeting	<50%	No	Dispose
Steel roof truss	100%	Potentially subject to testing	Potential re-purpose
Roof sheeting	<50%	No	Dispose
Fascia and gutter	<50%	No	Dispose
Purlins	>50%	Potentially subject to testing	Potential re-purpose
Columns	>60%	Potentially subject to testing	Potential re-purpose
Beams and bracing	>60%	Potentially subject to testing	Potential re-purpose
Perimeter stone wall	>80%	Potentially subject to testing	Potential re-purpose
Timber decking	<50%	No	Dispose
Concrete stumps	>80%	Potentially subject to testing	Potential re-purpose
Doors (feature)	100%	Potentially subject to testing	Potential re-purpose

Table 1 – Component condition and re-use recommendation summary

Given the percentage of materials which are non-salvageable, we advise that only partial repurposing of some structural elements is possible.

1 INTRODUCTION

1.1 GENERAL OVERVIEW

Sterling was engaged by ARTC to conduct a visual structural assessment of The Shed. The inspection was carried out on 11/07/2023.

The assessment consisted of determination of the construction type, and identification of all visible/accessible defects or signs of potential distress, damage, or deterioration on all accessible components of the building. This information has been used to identify areas and elements of the building which pose a safety risk and/or require defect remediation, and to provide recommendations to ARTC regarding the potential re-purposing of portions of The Shed.

1.2 PROJECT SCOPE

The scope included:

- Visual structural inspection of The Shed
- Structural Report which includes:
  - Non-intrusive inspection observations and defect descriptions
  - High-level defects list identified during the inspections
  - Photographic evidence of each defect; and,
  - Recommendations.
  - Assessment and recommendations regarding potential re-purposing of salvageable components of The Shed.
- Drawing Set including:
  - Site Plans including relevant adjacent features within 10m
  - Floor plan and elevations with approximate dimensions
  - Annotations describing the external building material
  - Any internal or external features (eg: plumbing fixtures & fittings, electrical fittings, built in fixtures or fittings, etc).

1.3 LIMITATIONS/EXCLUSIONS

Inspections were conducted from ground level only and in accessible and visible areas only with the use of a step ladder and Go-Pro camera on an extendable pole. The scope of the inspection was visual only; opening and access into concealed and confined areas were excluded from the scope of the inspection methodology.

The scope of the inspection excluded the following items.

- Access to the top surface of the roof was not possible, and therefore has not been inspected in any detail other than visual examination from ground level.
- The underside of the timber deck was considered both a confined space, and a structural hazard due to numerous failed deck planks, and therefore it was inspected using a go-pro on an inspection pole
- Geotechnical investigations were excluded from the scope
- Drilling and material testing were excluded from the scope
- Termite diagnostic testing

- Assessment of operational performance of building utilities and services, beyond the identification of obvious visual damage during the general building inspection was excluded.
- Any destructive/non-destructive testing of structural materials such as timber drilling.
- Asbestos reporting and inspection

2 METHODOLOGY

Under protection and instruction from a Track Force Protection Coordinator (TFPC), the inspection team which consisted of (2) Structural Engineers with extensive experience in the inspection of buildings, accessed the site and commenced a thorough visual inspection of all areas of The Shed which were deemed safe to access.

The inspection was undertaken from ground level and via a step ladder where access to the upper portion of the building was deemed necessary and safe to do so. All pertinent defects were photographed and where considered relevant measured to confirm magnitude and / or severity.

Site measurements were undertaken using a combination of tape measure and disto-meter. The dimensions were recorded on preliminary sketches prepared by Sterling based on available site images prior to mobilising.

A step ladder and extension poles were used to assist in observing defects beyond reach from ground level.

3 INSPECTION FINDINGS

3.1 GENERAL OBSERVATIONS

3.1.1 STRUCTURAL DESCRIPTION

The Shed consists of a single story open plan 375m^2 floor area, which was previously used as a Goods Shed, and is now dis-used and accessible at the time of the inspection.

Image 3-1 – Aerial image of The Shed

Image 3-2 – Down Side elevation

Image 3-2A – Shed is publicly accessible (there is no barrier to entry, such as a door, fence or gate)

3.1.2 SHED ACCESS

The Shed yard is accessible to pedestrians and vehicles, via Elliot Street. There are no barriers to entry. The Shed itself can be entered via the Down End door opening, as the door and frame have disconnected from The Shed leaving the doorway permanently open.

3.1.3 STRUCTURAL FORM

The site investigation confirmed The Shed to be a single storey timber-framed structure supported on a bluestone (or similar) perimeter wall, with corrugated steel wall and roof sheeting.

The roof structure consists of duo-pitched steel trusses supporting timber purlins and overlying corrugated steel sheeting.

The roof pitch falls East-West from a central ridge and cantilevers beyond the western façade.

There is an upper ridge vent consisting of a duo-pitched roof above the main ridge line for approximately 75% of the length.

Internally the building consists of a single open-plan room, with a timber deck platform supported on concrete stumps.

External eave gutters on the Down Side collect roof drainage and direct it to a series of downpipes which discharge directly onto the bluestone upstands. The gutters on the Up Side drain to a single downpipe, which is broken resulting in discharge onto the ground immediately adjacent the perimeter bluestone wall foundations.

No existing documentation was made available for this building.

Image 3-3 – Internal General (from Down End Door)

3.2 ASSESSMENT

3.2.1 WALL CLADDING

The wall cladding consists of corrugated steel sheets of varying degrees of deterioration. Given the contrast in appearance between adjacent sheets, it is evident that replacement of corrugated steel sheeting has been undertaken at some locations of The Shed.

The corrugated steel sheeting forming the wall cladding, is dislodged in many locations throughout with large openings and voids present. There are areas of the wall cladding which are loose due to apparent failure of fixings and these present a safety hazard due to the potential to become fully dislodged and fall.


Images 3-4 & 3-5 – Failed wall sheeting on the Up End, and warped disconnected wall sheeting


Images 3-6 & 3-7 – Precarious façade sheeting on Up End(Left image), and Down End (Right image)

The Up Side and Down Side façade sheeting was generally in better condition however these areas did contain numerous perforations and missing rivets.

Images 3-8A & 3-8B – Typical wall cladding condition on Down Side and Up Side elevations

Theoretically, minor sections of the corrugated steel wall cladding could be salvaged, and re-purposed. However, a Building Permit would likely be required for the construction (subject to specifics of proposed construction) which would trigger the need to provide adequate water resistance sufficient to satisfy clauses FP1.2, FP1.3, and FP1.4 (and possibly others) of the National Construction Code (NCC). It is our opinion that attempts to make the wall cladding waterproof are unlikely to succeed beyond the short term, and further leaks are likely to develop.

Furthermore, the wall cladding would need to have new fixings installed throughout to satisfy the wind load requirements of the current Australian Standard AS1170.2.

The installation of new fixings would present a problem as many of the internal timber 'girts' which support the corrugated steel cladding are themselves rotten beyond repair and in need of replacement (as shown below)

Image 3-9A&3-9B – Deteriorated timber 'girts' Up End

In addition to the wall cladding deterioration and inability to achieve weatherproofing and wind loading requirements in accordance with the NCC and Australian Standards, depending on the intended re-purposing, it may require Fire Rating.

Theoretically, any salvageable portions of the wall cladding could potentially be re-purposed as a non-functional 'feature' elements.

The wall cladding in it's current condition poses a significant safety hazard due to risk of full disconnection occurring. For this reason, an exclusion zone is required to be set up to prevent pedestrian access. Due to the risk of the wall cladding sheeting falling laterally or getting blown in the wind the exclusion zone should be erected several meters away from the building line.

3.2.2 ROOF

3.2.2.1 TRUSSES

The roof structure consists of (7) steel trusses, which support (6) timber purlins, to which corrugated steel roof sheeting is fixed.

The steel trusses are supported on timber columns which are supported on a timber wall plate sat on top of the bluestone perimeter wall.

The Down Side roof extends beyond the wall line by 1.9m and is supported by circular hollow sections which also act as downpipes.

Images 3-10 – Steel roof trusses, generally in good condition

Images 3-11 – Steel roof truss connection (image taken via Go-Pro on pole)

Images 3-12 – Steel roof truss connection to timber beam (image taken via Go-Pro on pole)

Images 3-13 – Steel roof truss connection to timber beam

Generally, the steel roof trusses appeared to be in reasonable condition. The protective coating was generally intact, and no significant evidence of corrosion was observed.

These roof trusses could feasibly be disconnected from their supports at the timber wall beams, and re-purposed, albeit the rivet connections would have to be fully inspected for adequacy.

It should be noted that if these trusses were intended to be structurally functional in the future – i.e provide support to purlins and roof sheeting, they would need to undergo the following procedures(and possibly others):

- Strength testing
- Inspection of the rivet connections for adequacy
- Ultrasonic thickness gauge testing to confirm thicknesses and any potential section loss, especially for top chord CHS section

- Check paint type and assess hazard (i.e, paint with lead content)
- Wire brushing and recoating for durability

Alternatively, these trusses could be re-purposed and used as non-functional 'feature trusses' which would not carry any load.

3.2.2.2 SHEETING

The corrugated steel roof sheeting was generally in poor condition throughout, exhibiting warping, deformation, disconnection, and surface deterioration. Numerous areas of the roof sheeting have been replaced, however there remains a section of roof which is missing sheeting.

Images 3-14 – General condition of roof sheeting, view from Down Side

Images 3-15 – Missing roof sheeting at Up End, Up Side corner

Images 3-16 – Disconnected, warped roof sheeting

Given that the general condition of the roof sheeting is poor, we would not recommend attempting to re-purpose the sheeting in a similar funcitonal capacity.

It is our opinion that attempts to make the roof sheeting waterproof are unlikely to succeed beyond the short term, and further leaks are likely to develop.

Theoretically, the salvageable portions of the roof sheeting could potentially be re-purposed as a non-functional 'feature' sheeting or as cladding. However, as with the roof trusses, the sheeting should be assessed for any lead content in any coating.

The roof sheeting poses a safety hazard due to risk of disconnection. For this reason an exclusion zone is required to be set up to prevent pedestrian access. Due to the risk of the roof sheeting falling laterally or getting blown in the wind the exclusion zone should be erected several meters away from the building line.

3.2.2.3 FASCIA & GUTTER

Generally, the fascia is weathered and the protective paint coating has disintegrated. There are large areas of the facia which are rotten beyond repair, particularly on the Up End and Down End.

Images 3-17 – Failed fascia at Up End, Up Side corner

Images 3-18 – Typical condition of fascia

The gutter is generally in poor condition, exhibiting surface coating deterioration, loose fixings, and disconnection.

Images 3-19 – Failed gutter on Up Side

Images 3-20 – Typical condition of gutter

The gutter is supported by the fascia, which is supported by a series of 'strut and tie' circular hollow sections, which also provide drainage points to the gutter.

The ‘strut and ties’ exhibited moderate corrosion and visible compression induced out-of-plane movement (precursor to buckling).

Images 3-21 – Typical condition of fascia supports (strut and ties)

Images 3-22 – Typical condition of fascia supports at connection to gutter

Given the severity and extent of damage to the gutters, fascia and their ‘strut and tie’ supports, we do not envisage a practical re-purposing of any of these components.

The gutter and fascia pose a safety hazard due to their instability and risk of disconnection. For this reason, an exclusion zone is required to be set up to prevent pedestrian access. Due to the risk of the gutter or fascia falling laterally, the exclusion zone should be erected several meters away from the building line.

3.2.2.4 PURLINS

Generally, the purlins appeared aged and water-stained, however, no visible signs of splitting or rot could be confirmed, though water staining did indicate a likelihood that prolonged exposure to moisture could have induced some hidden rot to the top surface abutting the roof sheets.

Image 3-23 – Typical condition of purlins

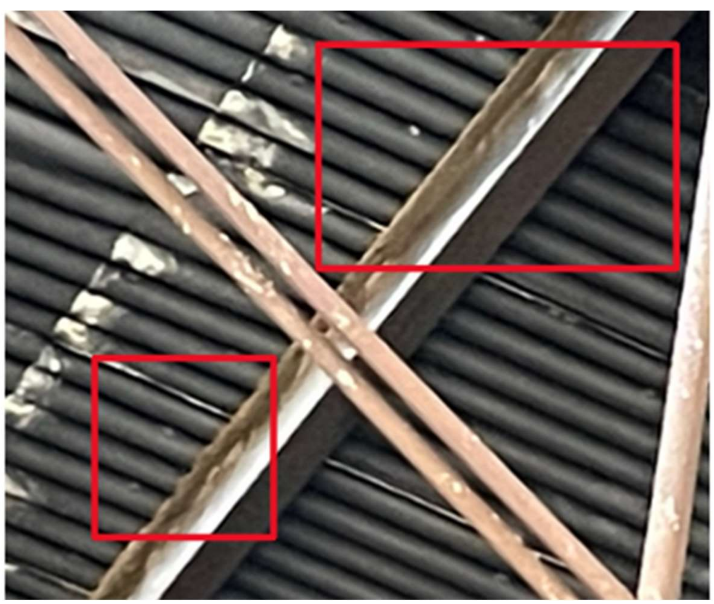


Image 3-24 – Water staining on the upper portion of purlin

An arm's reach inspection of the purlins was not possible due to their height above ground. They were instead inspected via our vantage point on the step ladder, and using Go-Pro on an extension pole.

Based on our visual assessment of the severity of the water staining, it is inferred that the purlins have likely endured a degree of rot and will therefore likely have a reduced structural capacity, however, this cannot be quantified accurately without a more detailed intrusive inspection which would involve the removal of roof sheeting.

Given that the purlins are suspected of having endured water-induced deterioration which is likely to include section and capacity loss, we would not recommend attempting to re-use the purlins in a similar functional capacity.

It is theoretically possible to remove the purlins from The Shed, and extract the solid portions of timber discarding the weakened or rotten areas, and then apply a durability treatment to enable re-purposing.

3.2.3 TIMBER FRAMEWORK

3.2.3.1 COLUMNS

Generally, the columns were in an aged but fair condition, with deterioration of protective coatings, and minor to moderate splitting.

Image 3-25 – Typical condition of timber columns

There were however (4) columns which have severe defects which compromise their structural integrity, as shown below.

Image 3-26 – Rotten column at footing connection, Up End , Up side corner

Image 3-27 – Suspected termite affected column, Up end, central

Image 3-28 – Column has disconnected from roof truss and purlin, and is leaning inwards pulling the wall beam

Image 3-29 – Severe split in column propagating from connection to steel roof truss Up Side

The severity of the column defects poses a significant risk to the global stability of The Shed. The inward leaning column at the Up-End has the potential to destabilize and collapse bringing with it a portion of the roof framework and wall framework and cladding.

The suspected termite induced decay and rot, and severe splitting have reduced the column section capacity significantly and it is considered unlikely that these columns would retain sufficient capacity to comply with the design loads of the current Australian Standards.

Rectification would involve widespread drilling to confirm the extent of the decayed/deteriorated area, followed by temporary propping and bracing installed to ensure The Shed remains stable during extraction and replacement of adversely affected full or partial columns.

The works would also likely involve a footing assessment and potentially pouring new footings, or underpinning the existing footings.

The cost and complexity of this work is high and would involve both structural and geotechnical design as well as temporary works specialists. The proximity of the structure to the rail track adds a significant constraint to ensure the works can be undertaken safely.

It is however theoretically possible to remove the columns from The Shed and extract the solid portions of timber discarding the weakened or rotten segments, and re-purpose them.

3.2.3.2 BEAMS AND BRACING

Generally, the beams and bracing were in an aged but fair condition, with deterioration of protective coatings, and minor to moderate splitting.

Image 3-30 – Typical condition of timber beams

Image 3-31 – Typical condition of timber bracing

There were however (4) beams and (2) bracing elements which have severe defects which compromise their structural integrity, as shown below.

Image 3-32 – Failed timber beam at Down Side, Down End

Image 3-33 – Collapsed roof bracing. Down Side, Down End

Image 3-34 – Severely split beam end, Down Side, central

The failed timber beams and bracing elements, pose a risk to the current and ongoing stability of The Shed.

The suspected termite induced decay and rot, and severe splitting have reduced the beam's section capacity significantly and it is considered unlikely that these beams would retain sufficient capacity to comply with the design loads of the current Australian Standards.

The failed bracing, leaves the structure vulnerable to lateral instability, which could potentially result in the structure falling laterally during high winds.

Rectification would involve temporary propping works to ensure The Shed remains stable during extraction, and replacement of adversely affected beam segments.

The works would also likely involve a lateral stability assessment, which based on preliminary site observations would result in the need for significantly more bracing to be included in The Shed.

The cost and complexity of this work is high, and would involve structural design as well as temporary works specialists. The proximity of the structure to the rail track adds a significant obstacle to ensure the works can be undertaken safely.

It is theoretically possible to remove the beams and bracing from The Shed, and extract the solid portions of timber discarding the weakened or rotten segments, and re-purpose them.

3.2.4 BLUESTONE PERIMETER WALL

The perimeter bluestone wall consists of split faced feature walling with mortar and dry laid walling construction.

The perimeter stone wall was generally found to be in fair condition, with the only significant defects being mortar deterioration and water staining.

Bluestone has been widely used in Victoria from the 1850s, with quarries in Melbourne and in Malmsbury. Given the estimated date of construction of The Shed being in the 1870s, it is possible that the bluestone walls are original, and date back to the original construction.

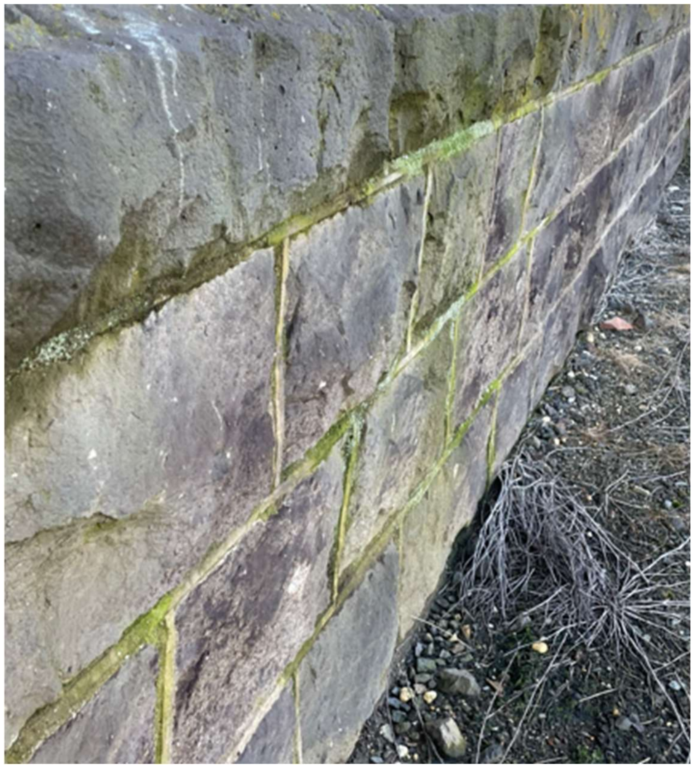


Image 3-35 – Bluestone upstand generally in good condition

Image 3-36 – Deteriorated stone upstand, Down Side

The condition of the stone elements, combined with their ongoing durability make them a recommended feature to be incorporated into any re-purposing.

However, we would recommend undertaking testing on the stone elements if they were to be used as a future structural load bearing element.

3.2.5 TIMBER DECKING

Generally the timber decking was in poor condition, and numerous areas had failed in entirety. Due to the risk of serious injury should members of the public attempt to traverse the deck, an exclusion zone must be set up immediately.

Image 3-37 – The timber deck

Image 3-38 – Failed timber deck poses a serious risk of injury

Image 3-39 – Failed timber deck poses a serious risk of injury

The timber deck is covered in thick layers of bird excrement. This covering makes it difficult to visually assess the condition of each deck plank, which further increases the risk of members of the public unknowingly accessing failing segments of the deck and incurring potentially serious injury.

Furthermore, bird excrement is highly toxic, and if ingested can cause serious harm.

Image 3-40 – Failed timber deck poses a serious risk of injury

Given the severity and extent of damage to the timber deck planks, we do not envisage a practical re-purposing of any of these components.

The deck planks pose a safety hazard due to their instability and risk of further collapse if accessed. For this reason an exclusion zone is required to be set up to prevent pedestrian access.

3.2.6 CONCRETE STUMPS

Generally the concrete stumps were in fair condition, however three of these have settled, rotated and disconnected from the timber bears which they were designed to support.

Image 3-41 – Concrete stump rotated and disconnected from bearer

Image 3-42 – Concrete stump rotated and disconnected from bearer

The condition of the concrete stumps, combined with the relative ease of removal and re-use make them a recommended feature for re-use or re-purpose.

3.3 DEFECTS

The inspection identified a total of 30 No. defects throughout the internal and external areas of the building.

The following section describes all defects identified during the inspection.

REF	DEFECT DESCRIPTION	PHOTO
FACADE		
1	External timber stairway has decayed and the treads are missing in full.	
2	External timber landing stub column is severely rotten.	

REF	DEFECT DESCRIPTION	PHOTO
3	Corrugated steel wall cladding is missing, adjacent wall cladding is loose and at risk of falling without further warning. Up End.	
4	Corrugated steel wall cladding rivets are missing. Up End.	
5	Roof sheeting has disconnected from the eaves and fallen. Up End, Up Side.	

REF	DEFECT DESCRIPTION	PHOTO
6	Timber fascia is severely rotten and is disconnected from adjacent fascia. Up End, Up side.	
7	Timber column is rotten at base. Up end, Up side.	
8	Rotten timber wall plate beam end. Up End, Up Side.	

REF	DEFECT DESCRIPTION	PHOTO
9	Failed timber column. Up End, central.	
10	Failed timber deck planks, (5) of.	
11	Failed timber deck planks, (3) of.	

REF	DEFECT DESCRIPTION	PHOTO
12	Rotten timber girt. Up End.	
13	Rotten timber girt. Up End.	
14	Timber column disconnection and inward lean. Up End.	

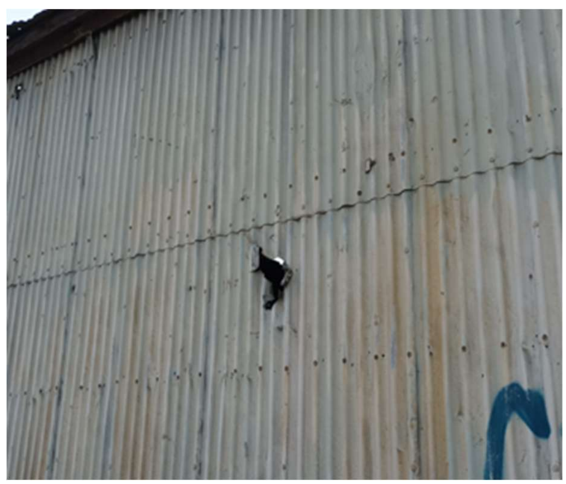
REF	DEFECT DESCRIPTION	PHOTO
15	Paint deterioration and corrosion on cantilevered roof (strut-tie) supports. (Typical).	
16	Paint deterioration on steel gutter and fascia. (Typical)	
17	Rotten external timber deck planks. 30% of total quantity of external deck planks are in this condition.	

REF	DEFECT DESCRIPTION	PHOTO
18	External loading timber beam is rotten and has section loss. Down Side, entrance door.	
19	Collapsed timber beam. Down Side, Down End.	
20	Collapsed timber roof bracing. Down Side, Down End.	

REF	DEFECT DESCRIPTION	PHOTO
21	Water ingress through roof sheeting. (Typical)	
22	Steel electrical pole is leaning away from the building, approximately 3.5 degrees from vertical. Up End.	

REF	DEFECT DESCRIPTION	PHOTO
23	Concrete stumps have settled, rotated, and disconnected from the timber bearers above.	
24	Corrugated steel wall cladding has disconnected and fallen. Down End.	

REF	DEFECT DESCRIPTION	PHOTO
25	Large door frame has disconnected and fallen. Down End.	
26	Numerous holes through corrugated steel roof sheeting allowing water to ingress. (Typical)	

REF	DEFECT DESCRIPTION	PHOTO
27	Disconnected downpipe.	
28	Hole in cladding. Up Side.	

REF	DEFECT DESCRIPTION	PHOTO
29	Split in timber loadbearing column Up Side.	
30	Concrete stump has disconnected from bearer.	

3.4 ACCESS TO THE PUBLIC

The structure is in Euroa, in close proximity to residential housing and within easy reach of residents. Although the structure is not in service it remains readily accessible.

The residential location and ease of access to the building increase the likelihood of the risks posed by the observed defects on site.

Secure fencing must be installed as soon as possible with signage warning of the structural hazard.

3.5 LATERAL STABILITY RISK

Sterling's assessment of the structural system yielded concerns and doubt regarding The Shed's adequacy to withstand lateral loads such as wind.

The Shed has cross bracing in its longitudinal direction, however it has no bracing in its transverse direction which actually endures a larger lateral load in proportion to its tributary area (ignoring wind direction multipliers for simplicity).

The frames are pinned to the bluestone upstands with discrete vertical bolts in-line with the column plane, incapable of transferring any bending moment, and thus incapable of providing lateral stability.

The top of the timber columns are again pinned, this time to the steel trusses. A frame with pinned connections at the top and bottom, is structurally unstable.

The only potential lateral stability in the transvers direction, is from the central timber columns which are cast-in to concrete footings and could act ass vertical cantilevers, and potentially the corrugated steel roof sheeting which may act as a diaphragm transferring the load to the perpendicular walls which are braced.

Based on engineering judgement, the capacity of the columns acting as vertical cantilevers and the diaphragm action of the corrugated steel roof sheeting is considered unlikely to be sufficient to carry the design loads prescribed in AS1170.2 - Wind Loads. On this basis we advise that The Shed is potentially unstable and poses a risk of collapse which given the proximity to the track may have catastrophic consequences.

Due to the severity of the consequence should this risk eventuate we advise that action must be taken with appropriate urgency **(structural 'make safe' works must commence within 5 months).**

4 RECOMMENDATIONS

The primary recommendation for The Shed is to eliminate the potential health and safety risk to anyone who may gain access to the building and eliminate the train derailment risk due to debris falling on the adjacent railway tracks.

To achieve this in the short term an **exclusion zone must be set up as soon as possible** to prevent any unauthorized person from accessing either the external deck or the interior.

While the building is in its current condition and until safe demolition can be programmed to be carried out **(which must commence within 5 months),** it is imperative that a fenced off exclusion zone be implemented, with signage warning of the structural hazard.

Segments of The Shed could be retained for aesthetic purposes. As described herein, each element has been assessed for their respective structural condition and feasibility for re-purposing.

In summary, it is possible to salvage some structural elements of The Shed, and to treat, test and re-purpose these.

APPENDIX A

DRAWING