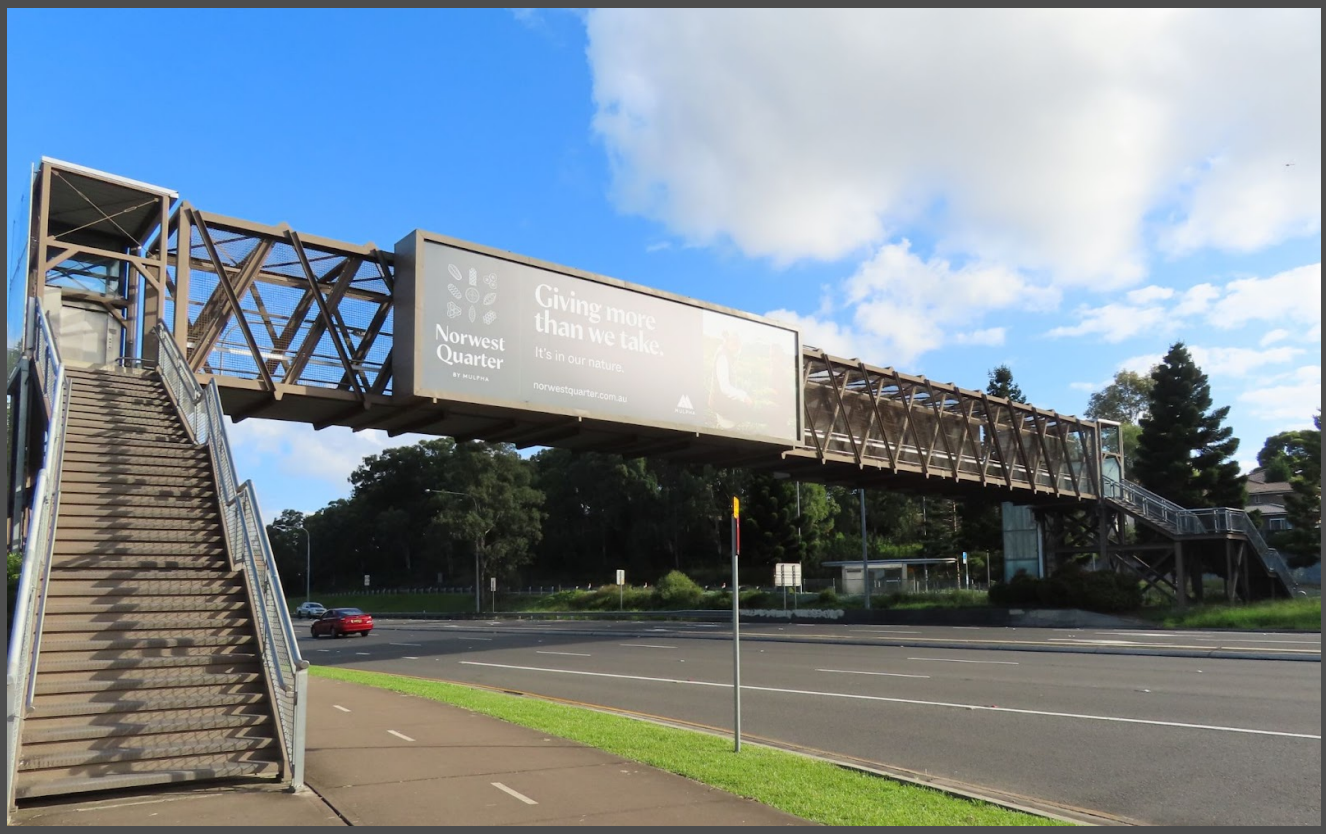

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STRUCTURAL INVESTIGATION REPORT

SIGNAGE BOARDS

Pedestrian bridge over Windsor Road, near Norbick Avenue, Bella Vista, NSW

Prepared By:
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NER, CPEng, APEC Engineer

Prepared for:
Calibre Professional Services

Project No.:
C2202B

Rev: 1.0
2 Dec 2022

Contents

1. Executive Summary

The pedestrian bridge over Old Windsor Road at the intersection of Old Windsor Road and Norbrik Drive, Bella Vista, is a 40m simply supported steel truss bridge constructed in 2009. The bridge is supported by two steel framed lift shafts, supported on concrete pad footings.

Concerns have been raised over the structural adequacy/ soundness of existing signboards attached to the side of the bridge. CALIBRE (On behalf of their client MULPHA Norwest Pty Ltd), have requested a special structural investigation of the two signage boards currently attached to either side of the bridge. The inspection was carried out on Friday, 4 November 2022 by an appropriately qualified structural engineer.

The signboards are approximately 12m long and the same height as the bridge cross-section. Signboard subframes are approximately 600mm in width. Based on our observations, the sign boards are bolted to the top cross members of the bridge truss at 6No. locations, and clamped onto the bridge bottom truss chords with 4No. cantilevered beams.

Based on our observations and assessment, it is believed that the signboards are adequately fixed to the bridge structure. The connections are believed to provide adequate restraint to stop the signboard subframe from detaching from the bridge in the worst case wind event.

2. Description

2.1. Bridge details

Structure Name: Old Windsor Road Pedestrian Bridge **Structure ID:** 10391

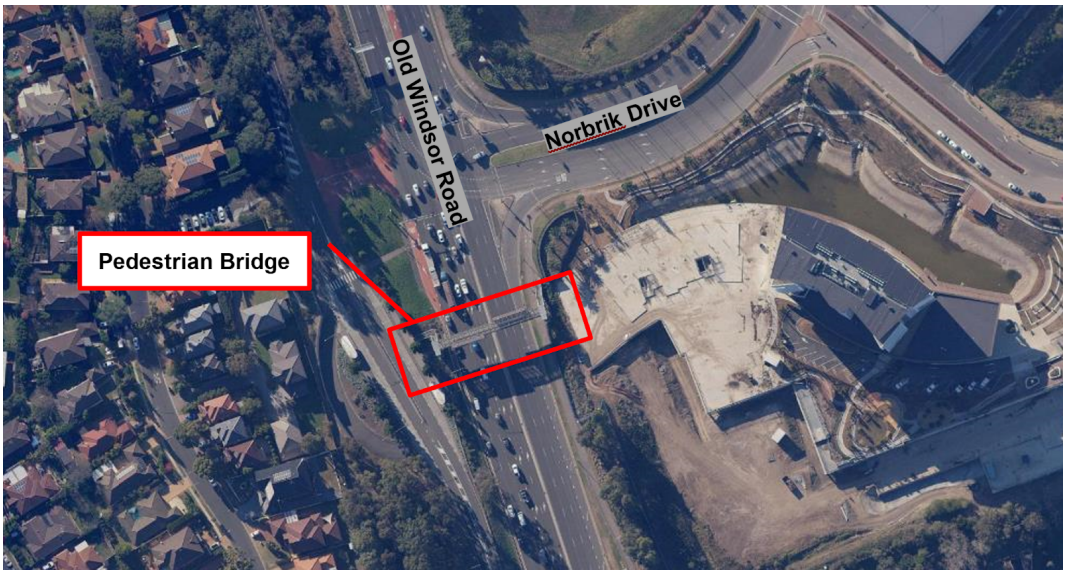
Structure Type/Description: A simply supported steel truss bridge, built with a Bondek slab deck. The structure is supported at each end by steel piers founded on a concrete footing. The base fixity of each steel element is a bolted connection. Furthermore, at each support is a steel framed staircase with steel posted handrails and a glass encased steel framed lift shaft.

Zone: West Zone (Z3) **LGA:** The Hills (031)

Longitude: 150.95014 **Latitude:** -33.74788

Overall Length: 44.19m **Overall Width MAX:** 3.30m

2.2. Locality plan



3. Inspection details

3.1. Inspection details

Inspection type: Special Structural Investigation

Weather: Cloudy **Temp (C):** 26

Inspector/s: Navid Nikjoo **Contact:** **E** navid@vannboma.com.au
M 0481 568 674

Inspection Date: 4 Nov 2022

3.2. Scope of inspection

The scope of our inspection included the following:

- Visual assessment of the signboards, with particular attention to connections to the bridge structure, any deficiencies, and structural integrity/ soundness.

3.3. Inspection Methodology

The inspection undertaken was of a special structural nature and thus solely focused on the aforementioned signboards.

It should be noted that other structural elements, services, defects, etc… have not been investigated in this report. Furthermore, this report is not to be construed as being a dilapidation report, thus specific defects have **not** been noted or recorded in detail, rather, the report aims to outline any general structural concerns with respect to the structural elements inspected and associated encountered defects.

4. Observations

The following observations were made with respect to the structural elements being inspected and assessed, (See the attached photographs for reference):

- The signboards are positioned on either side of the bridge, and centred over the carriageway direction of travel
- The signboard subframes were covered with cladding, and thus were not visible at the time of inspection.
- Connections between the signboards and the bridge framing were observed to consist of the following:
    - 6 x Bolted steel plate connections to the top of the bridge truss.
    - These connections were not entirely visible due to access limitations, however we observed steel members from the signboard subframe connected to the top cross members of the bridge truss.
    - 4 x steel beam outriggers clamped to the bridge truss bottom chords, and bolted to the bottom of the signboards.
    - The outriggers included a bolted spigot connection underneath the bridge, with welded plate clasps, clamped to the truss bottom chords.

5. Discussions

Based on the site observations and later assessment, the signboard subframe connections to the bridge structure are believed to be adequate to cater for the expected loads and conditions. However, following considerations and assumptions will apply:

5.1. Signboard Subframes

- Given that the signboard subframes were covered with cladding, only a visual assessment of the signboards was possible.
- No apparent signs of overstressing were observed, including excessive deflections, distortions, or movement of the signboards relative to the bridge.
- Given the age of the structure (Approx. 13 years), and lack of any significant structural defect, we believe that the signboard subframes are structurally sound in terms of compliance with proven design.

5.2. Signboard connection to the bridge structure

- As observed on site, the signboard frames are attached to the bridge structure at Ten (10) connection points.
- A conservative worst case wind pressure of 2.5kPa can be assumed to act horizontally on the back of the signboards, without any shielding from the bridge structure.
- Imposing an approximate shear force of 11kN at the base connections and 7.5kN at the top connections.

- The minimum shear force capacity of the signboard connections to the bridge are estimated to be greater than 39kN per each.
- Therefore the connections are believed to be adequate to withstand expected wind conditions.

It must be noted that the bridge structure is assumed to have been designed to cater for the additional loading imposed by the signboards. No considerations or assessments have been undertaken of the bridge structure.

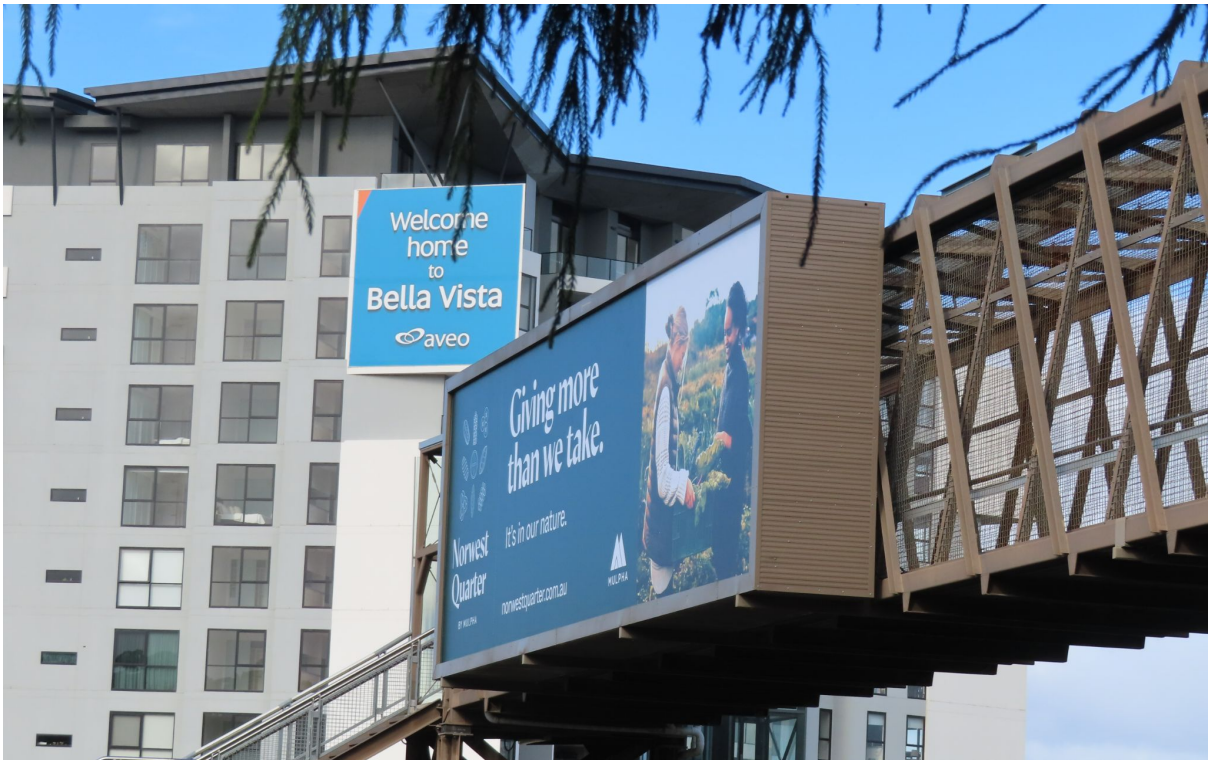
6. Conclusion

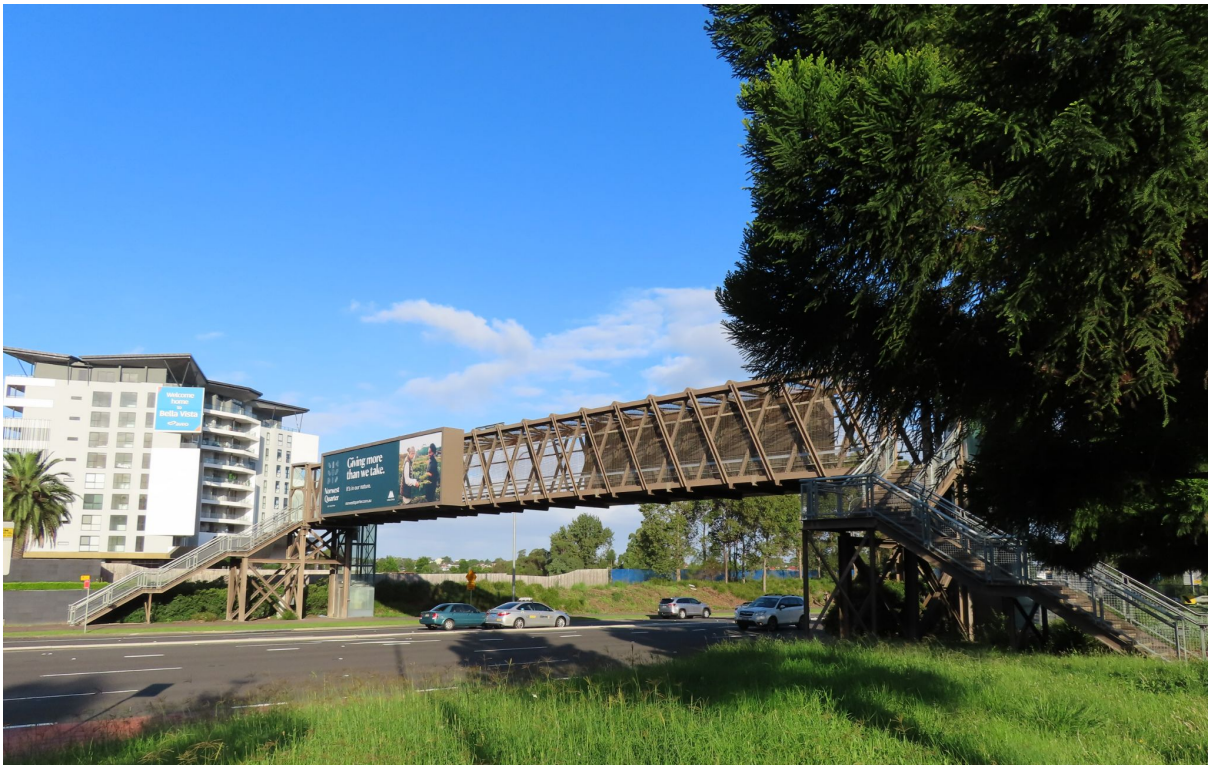
It is thus concluded that based on the structural investigation and assessment, the signboards are adequately fixed to the bridge structure. The connections are believed to provide adequate restraint and fixity, to transfer all expected loads to the bridge structure.

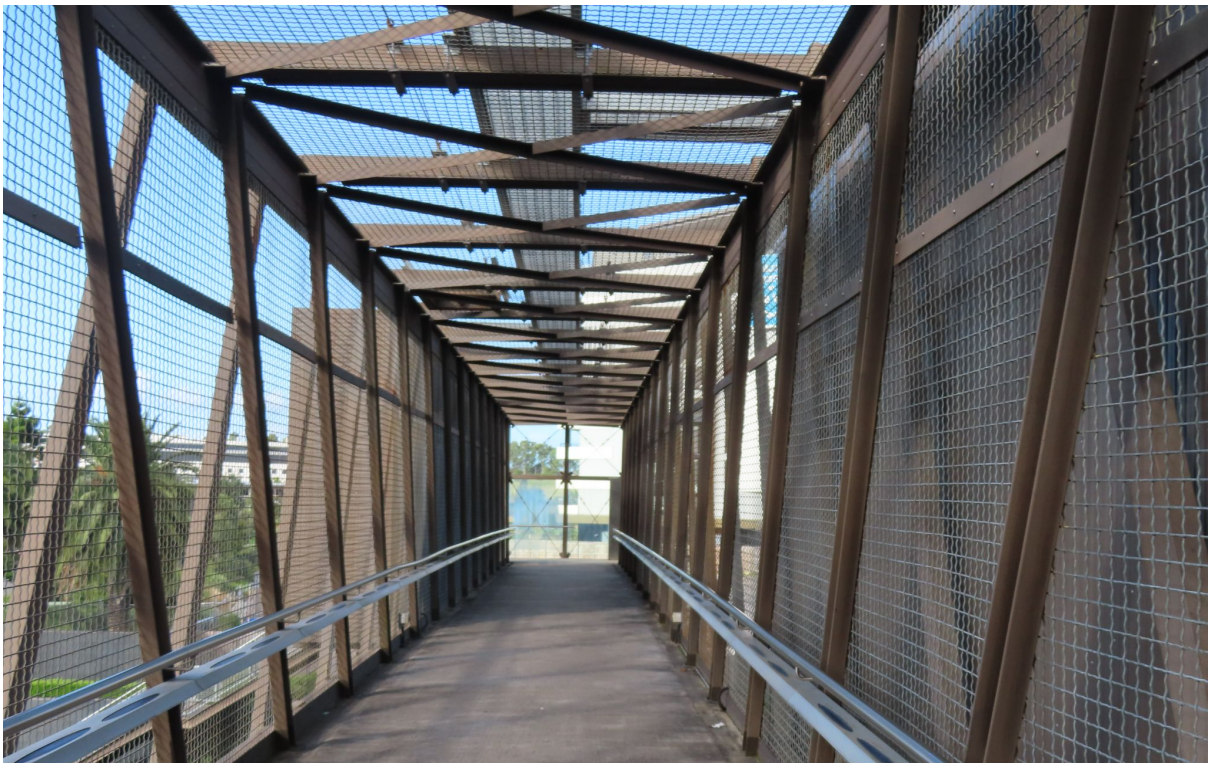
7. Limitations of this report

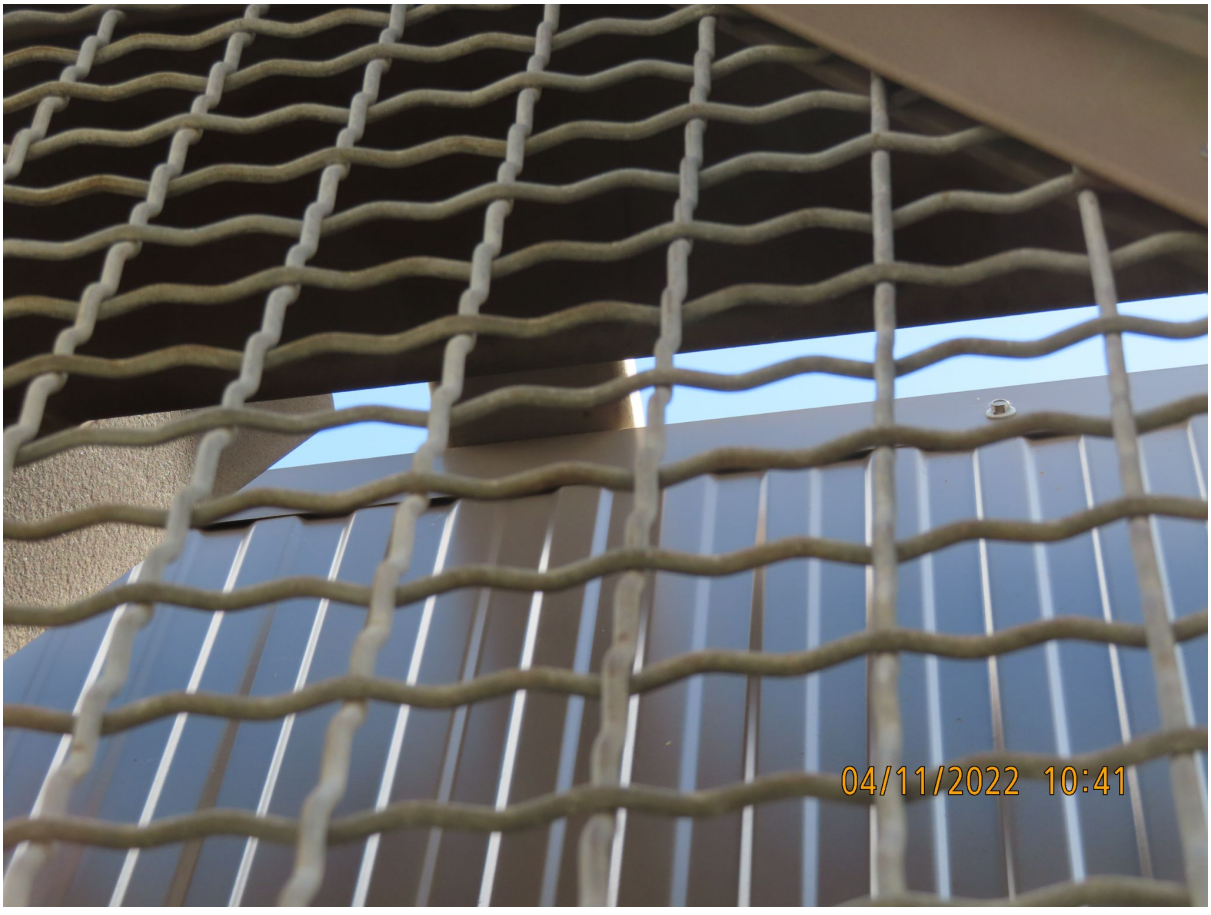
The extent of this investigation was limited to the extent and scope explained above. It is thus possible that other problems exist which were not apparent at the time of inspection. No guarantee can be given regarding such matters.

8. Appendix A - Inspection Photos





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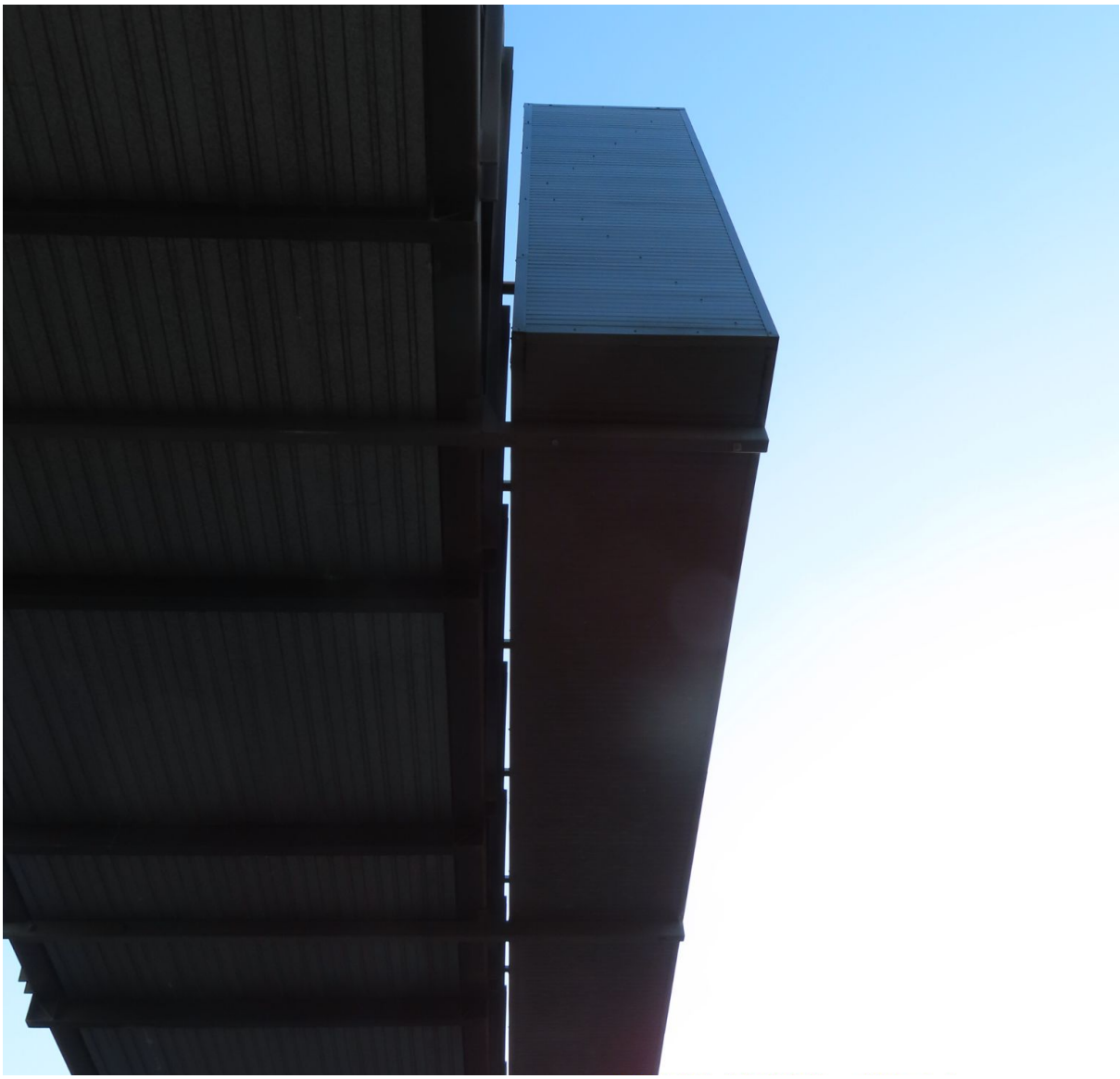

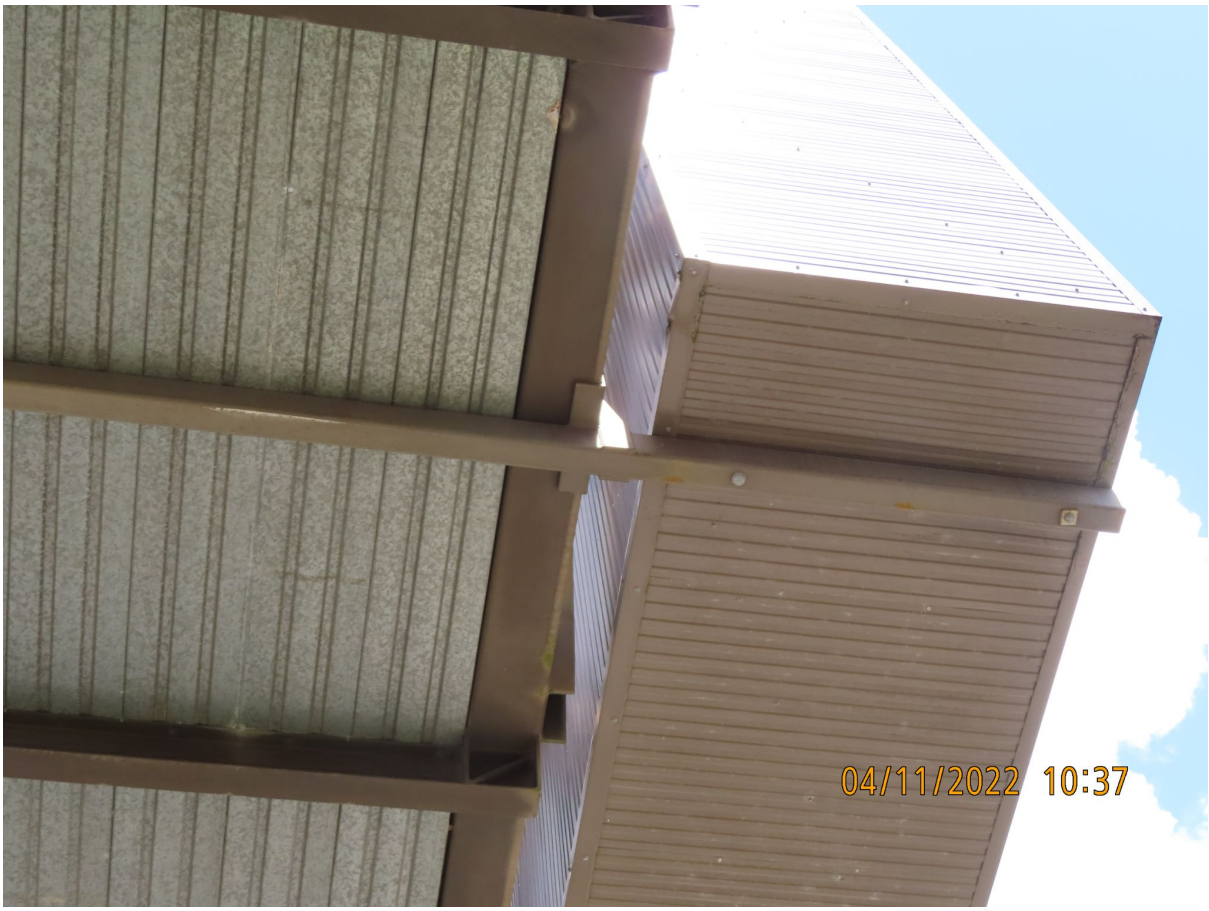
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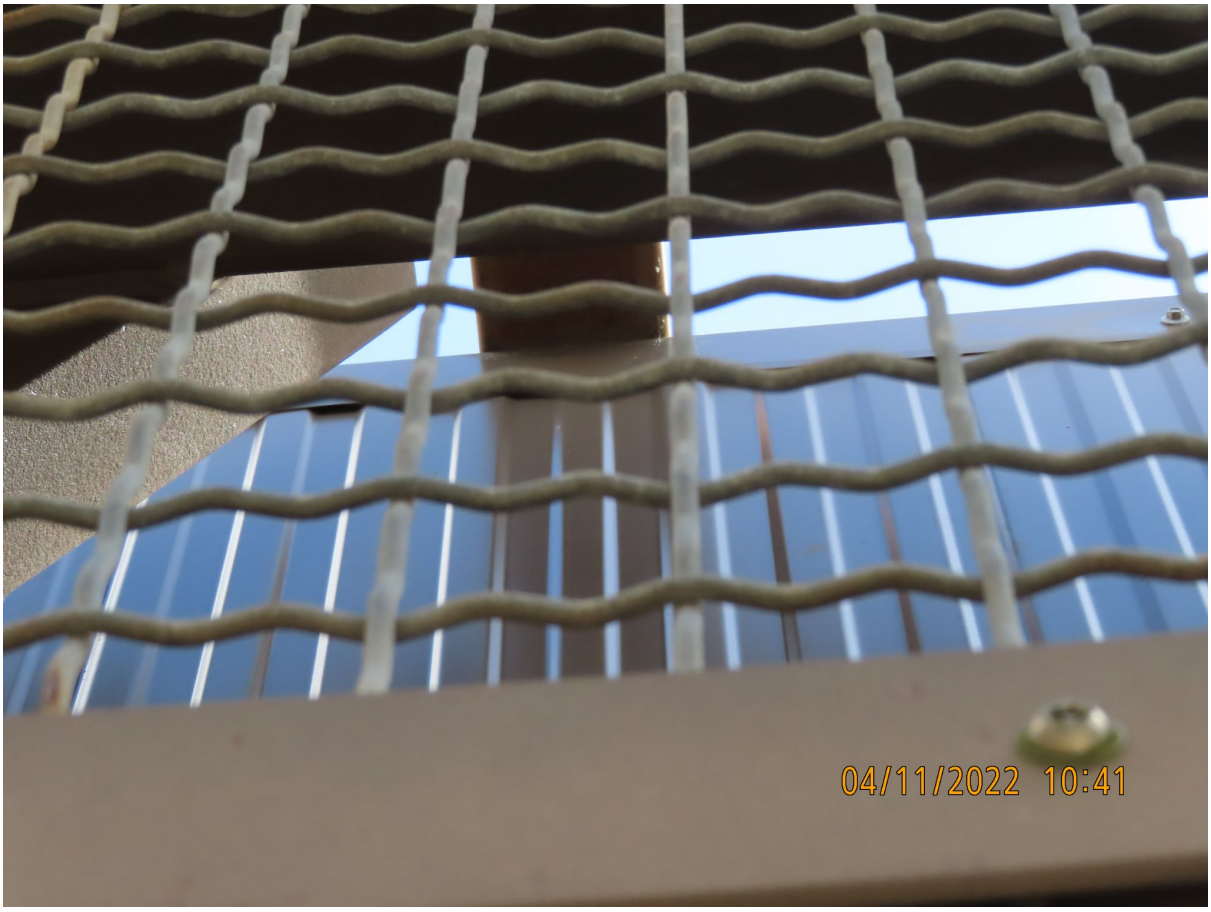
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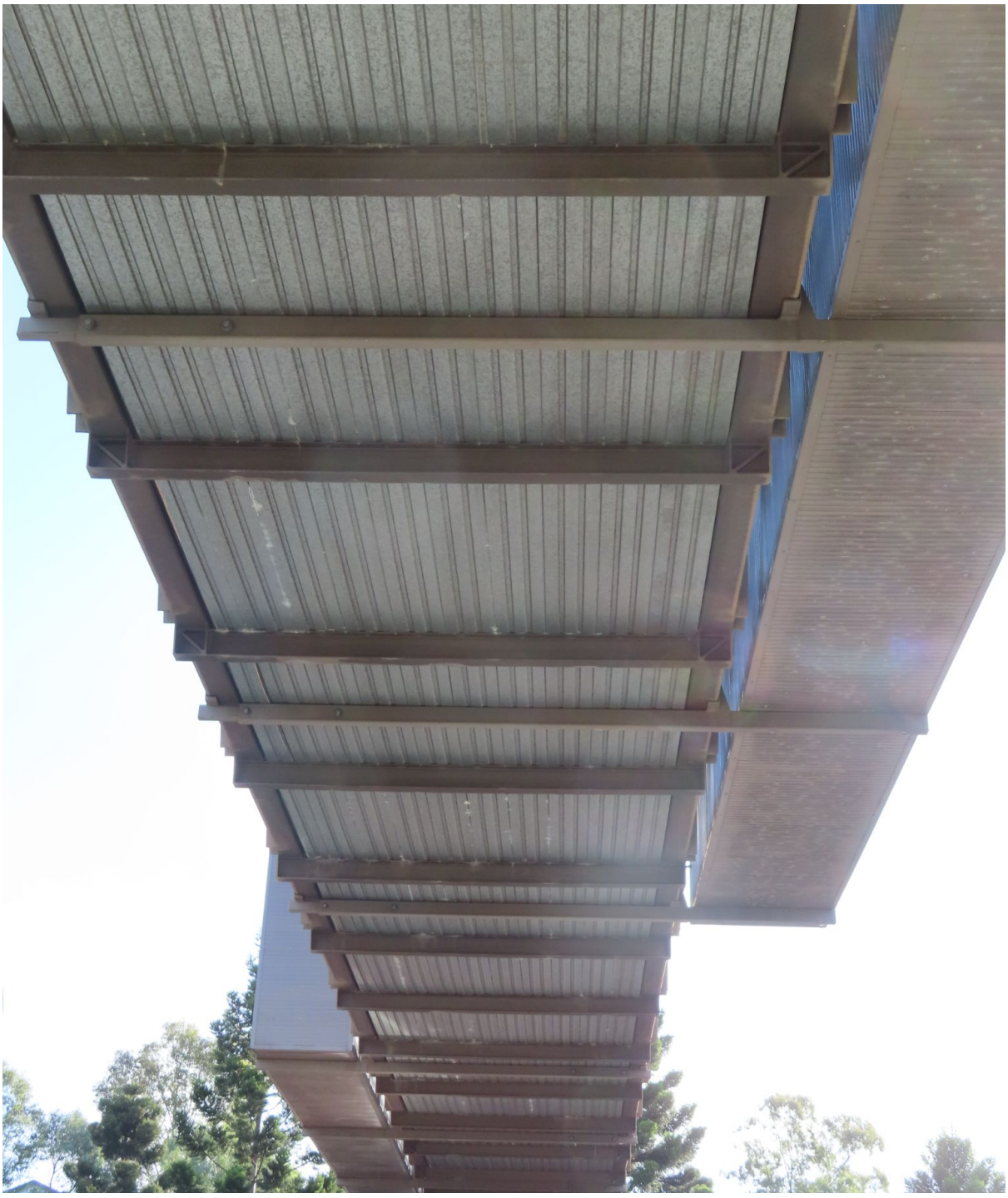

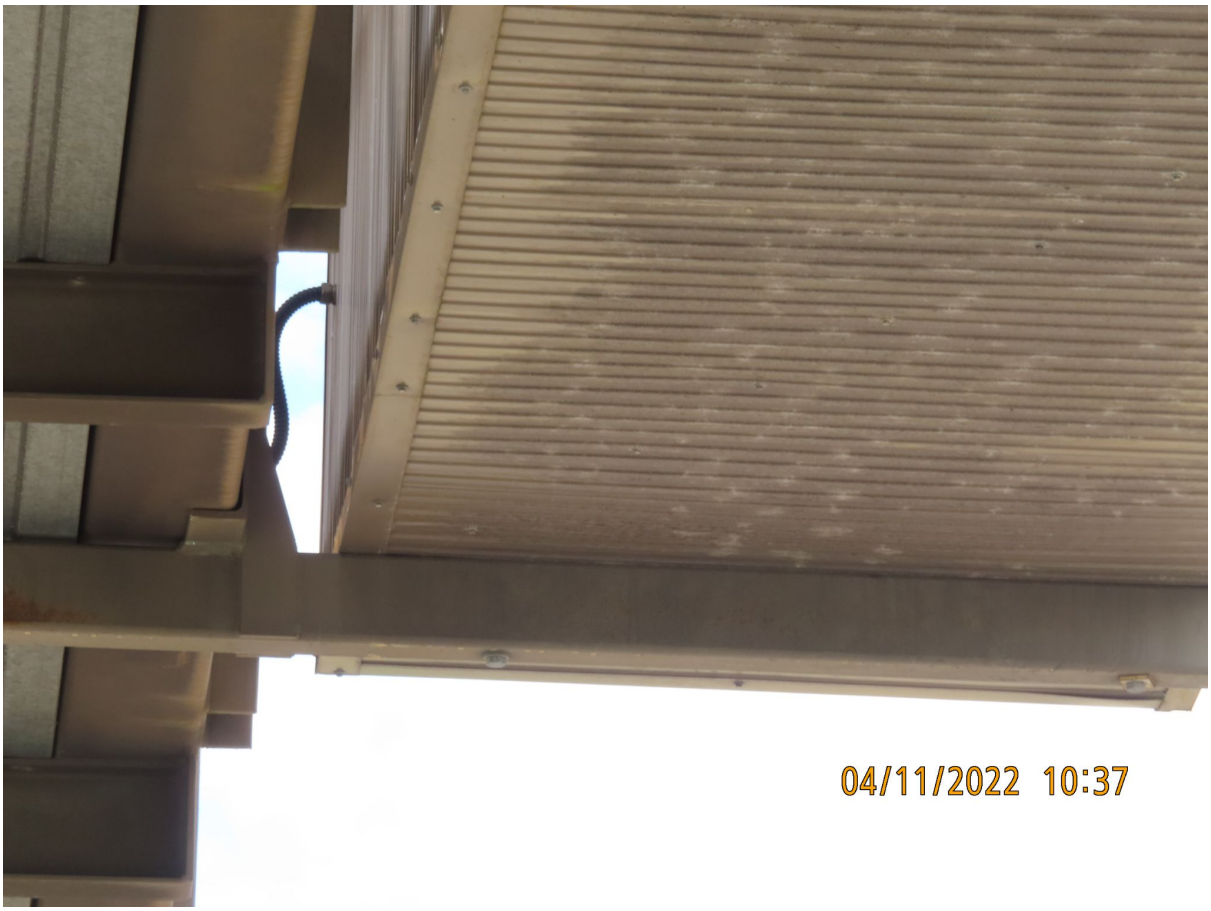
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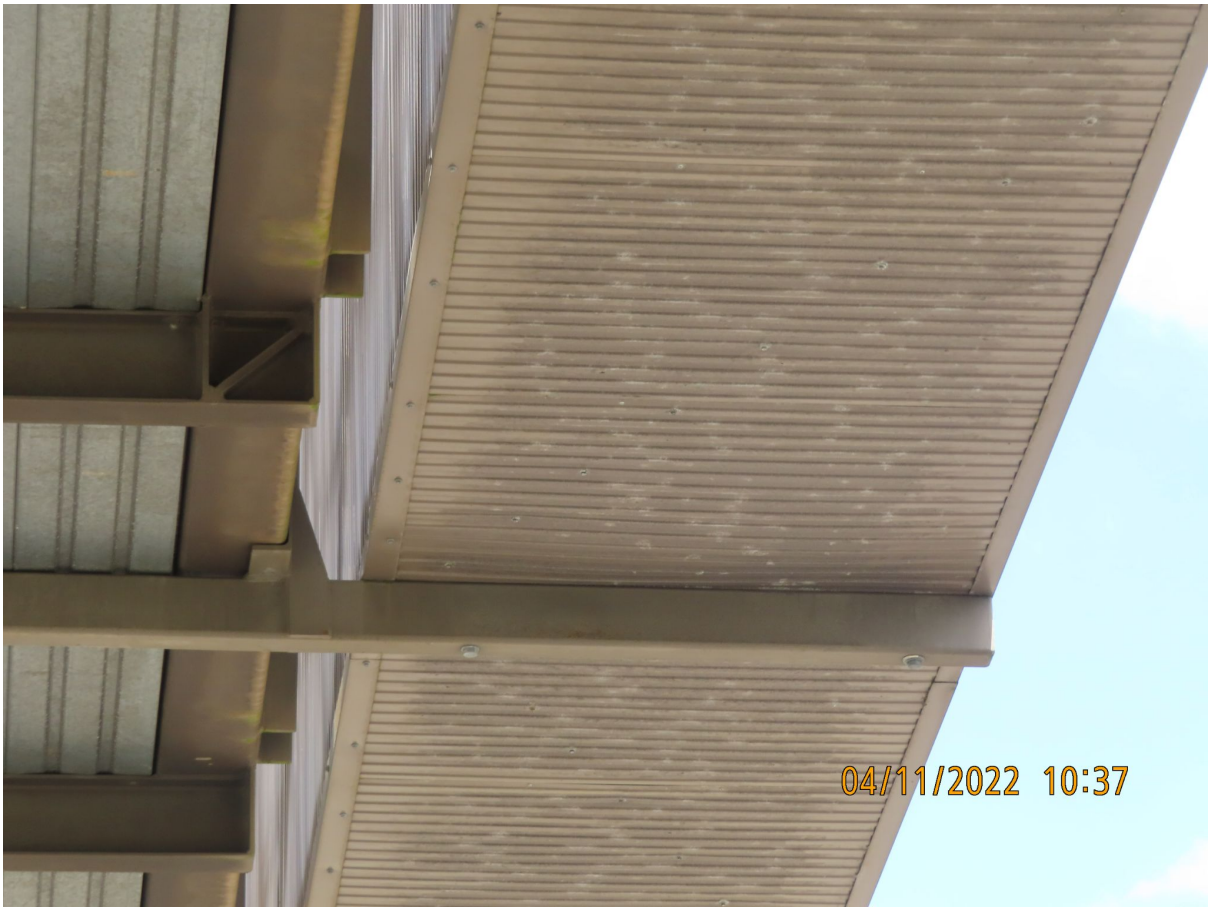
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