ATTACHMENT DOCUMENT
FOR
COUNCIL MEETING

PART D

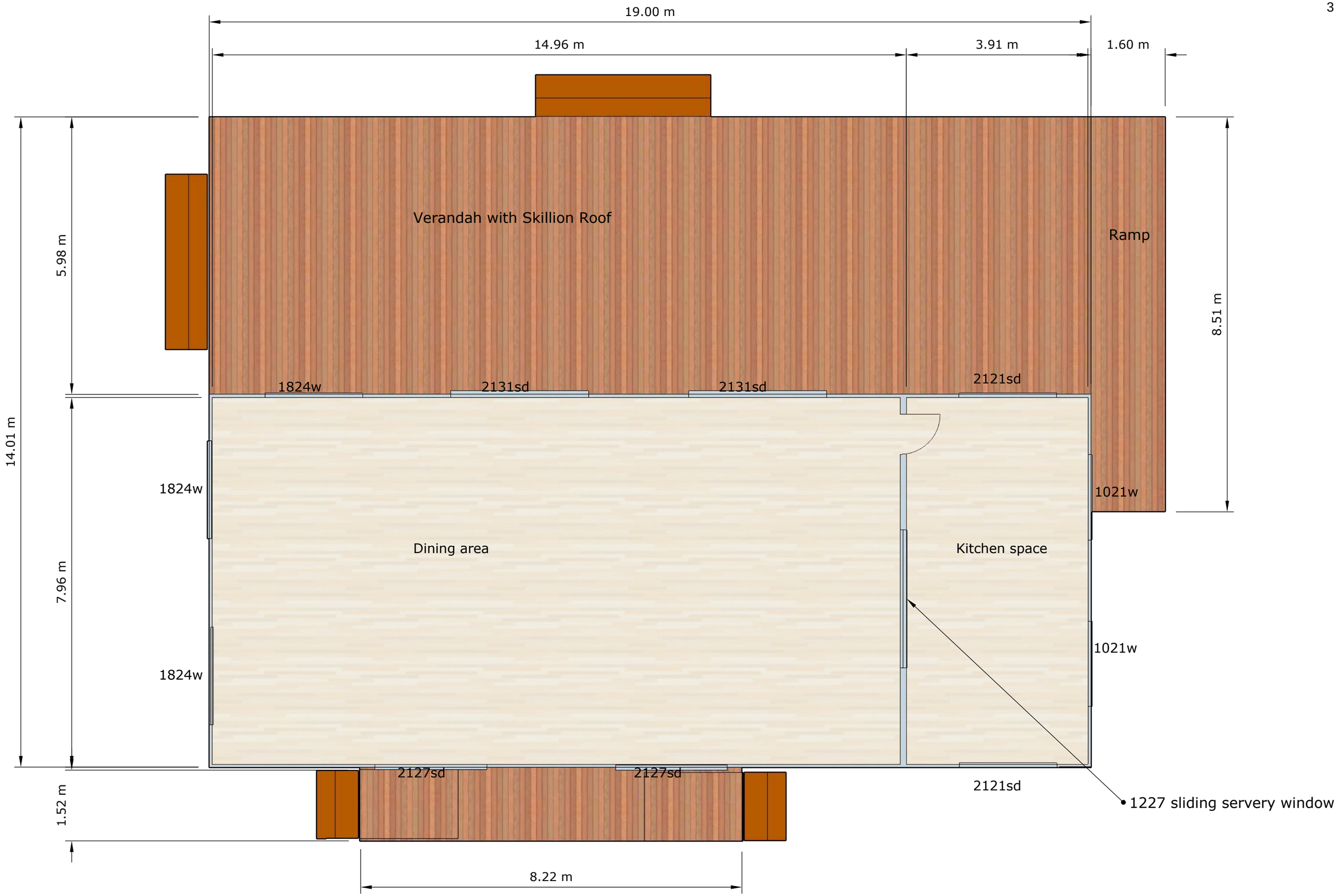
SUPPLEMENTARY

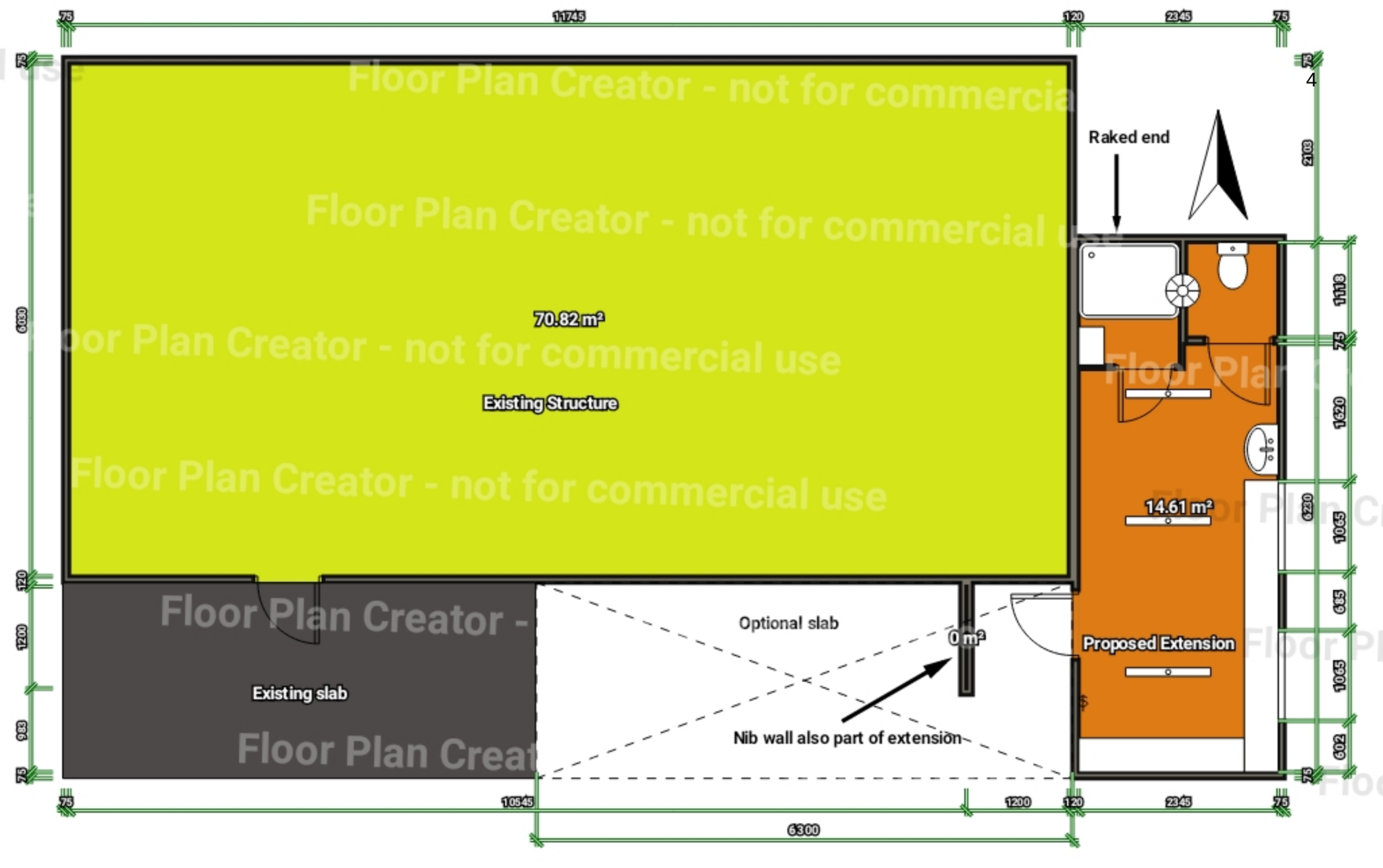
Tuesday 22 September 2020

Michael Urquhart
GENERAL MANAGER

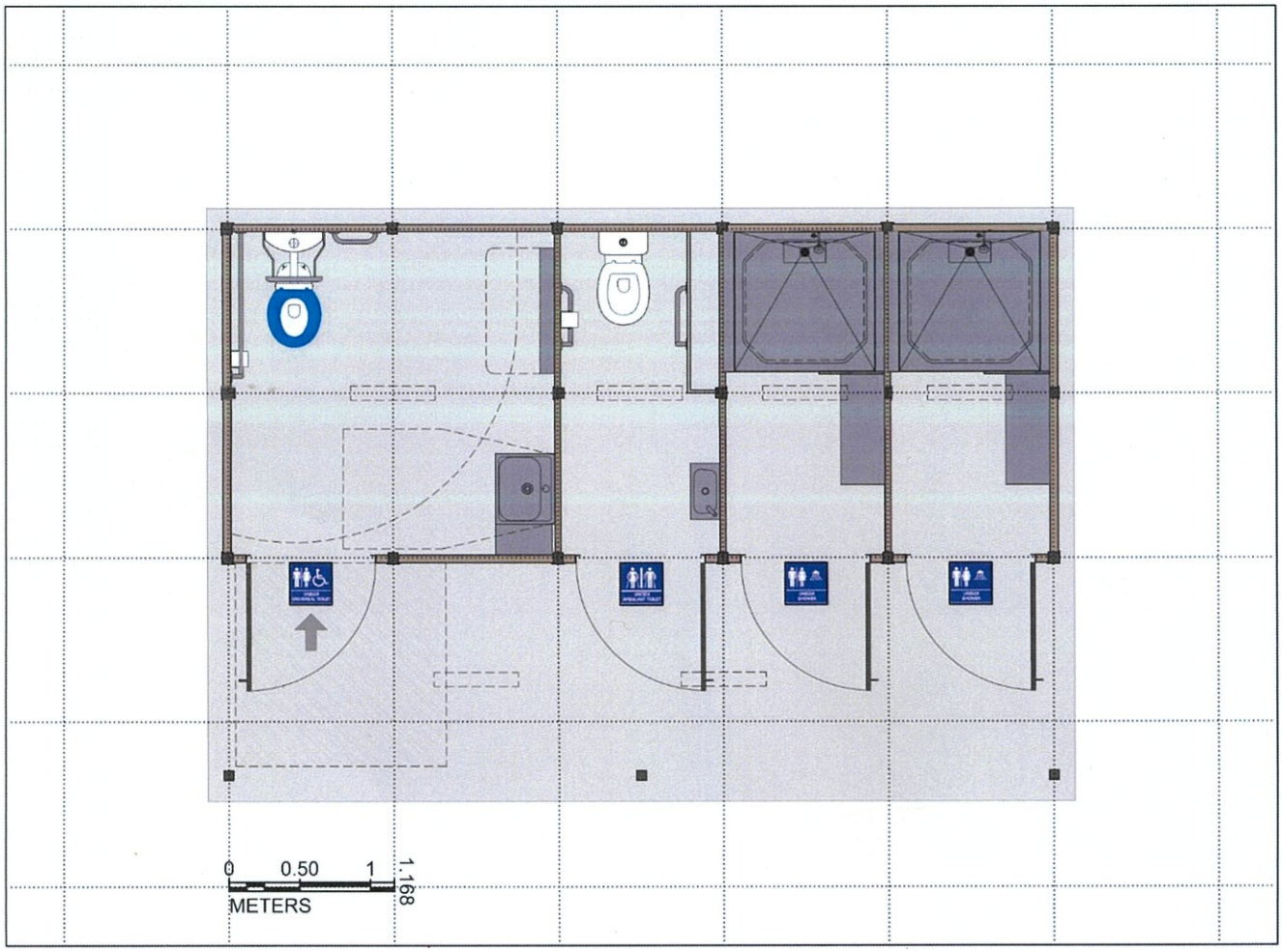
AGENDA

1. *Concept plans for kitchen dining room*
2. *Concept plans for Jockeys room*
3. *Concept plans for toilet and shower*
4. *Structural Engineer's Report – Collarenebri Grandstand*


19.00 m
14.96 m
3.91 m
1.60 m
Verandah with Skillion Roof
Ramp
5.98 m
14.01 m
8.51 m
1824w
2131sd
2131sd
2121sd
1824w
1021w
Dining area
Kitchen space
7.96 m
1824w
1021w
2127sd
2127sd
2121sd
1.52 m
1227 sliding servery window
8.22 m


Raked end
70.82 m²
Existing Structure
14.61 m²
Proposed Extension
Optional slab
0 m²
Existing slab
Nib wall also part of extension
Floor Plan Creator - not for commercial use
11745
2345
6300
10545
1200

FLOOR PLAN



Structural Engineer's Report

Client: Walgett Shire Council

Attn: Michael Urquhart

Site Address: Collarenebri Grandstand, NSW

(Our Reference: 29763-SR01_A)

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date
7.08.2018

reference
29763-SR01_A

receiver
Walgett Shire Council
Attn: Michael Urquhart
PO Box 31
Walgett NSW 2832

Dear Michael,

Structural Investigation and Recommendation for the long term repairs and temporary strengthening to allow use during the upcoming Collarenebri Races.

We are pleased to provide you with the following Structural Engineering Report and recommendations for the Collarenebri Grandstand. The recommendations have been provided to temporary strengthen the structure to allow use during the upcoming Collarenebri races, long term repair recommendations have also been provided.

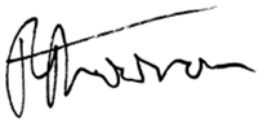
Written
Jeziah Poole
BE Co-op MIEAust
Structural Engineer

Disclaimer

This report has been prepared solely for Walgett Shire Council in accordance with the scope provided by the client and for the purpose(s) as outlined throughout this report.

Barnson Pty Ltd accepts no liability or responsibility for or in respect of any use or reliance upon this report and its supporting material by anyone other than the client.

Project Name:	Structural Engineering Investigation for Walgett Shire Council Collarenebri Grandstand, NSW
Client:	Walgett Shire Council
Project No.	29763
Report Reference	29763-SR01_A
Date:	7.08.2018
Revision:	A

Prepared by:	**Reviewed by:**
	
Jeziah Poole *BE (Co-op) MIEAust* Structural Engineer	Richard Noonan *BE (Hons) ME FIEAust CPEng NER* Director

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1.0 INTRODUCTION

The following Structural Engineer's report for the Grandstand at Collarenebri aims to detail the condition of the grandstand and connected structures, provide temporary repair works to allow use during the Collarenebri races and long term recommendations to extend the life of the structure. The writer of the report, Mr. Jeziah Poole, a Structural Engineer with Barnson Pty Ltd, inspected the grandstand on the 26th of July 2018.

1.1 Background

The following information was provided at the time of the inspection.

- The grandstand was originally moved to its current position in the 1890's. Prior to this, the grandstand was located at the Collarenebri Oval.
- The grandstand was renovated in 1983.
- The grandstand is periodically painted by the Jockey Club.

1.2 Structure

The grandstand has a northern exposure to the racetrack and is made from timber using historic construction techniques with corrugated roof sheeting. The tiers are constructed with tongue and groove timber planks on secondary support timber framing. The 1983 renovation involved the installation of steel columns to support the main beam supporting the mid-span of the tier seating timber joist.

A mound has been constructed to the northern end of the grandstand to increase the viewing height.

There is a concrete suspended slab to the northern elevation that forms a landing and walkway along the northern elevation of the grandstand.

A roof structure has been constructed to the southern elevation of the grandstand, over the bar area. The bar extends below the grandstand.

2.0 INSPECTION

From the site inspection, the grandstand and the roof over the southern bar area are considered to be structurally inadequate. It is recommended that the grandstand and bar area are fenced off prior to and during the strengthening and repair works.

Photos taken during the inspection have been provided below to help in describing the damage and providing insight into the cause of the damage.

2.1 Grandstand Overview

The following photos are provided to give an overview of the grandstand and the attached bar area.

Figure 1 – Northern elevation of the grandstand.

Figure 2 – Eastern elevation of the grandstand and bar area.

Figure 3 – Southern elevation of the bar.

Figure 4 – Western elevation of the bar area.

Figure 5 – Western elevation of the grandstand.

2.2 Defects to the top of the Grandstand

The defects to the grandstand have been based on a visual inspection, no invasive testing was undertaken nor was sheeting removed from the grandstand to allow inspection of the timbers beyond. It is expected that as repairs are being undertaken further damages will be revealed.

There is a considerable hump to the tier seating which has been caused by the differential settlement of the timber structure in comparison to the steel supports, as discussed below. The grandstand tiers vibrate under foot traffic as the joists to the eastern end are no longer supported at midspan.

The barrier rail around the top of the tier seating is no longer adequately fixed to the columns, particularly along the south and east elevation. Due to the compromised connections, the barrier will no longer be able to resist barrier loadings to Australian Standards.

The down pipes to the grandstand discharge to the ground immediately adjacent to the structure, to the northern ends of both the eastern and western elevations. The slope of the mound to the northern elevation of the grandstand is directing the stormwater, from the downpipes, and stormwater landing along the east and west elevations, under the grandstand.

The southern wall of the grandstand appears to have settled and rotated to the south. It is expected that the additional loading of the bar area roofing and saturation of the soil around the columns has been the cause of the settlement.

The corrugated steel external cladding has a number of defects which would allow rain to pass to the timber framing beyond. This is expected to have caused deterioration of the timbers and connections.

Figure 6 – Curve to the tier seating at the eastern end.

Note: Curvature to the western end is similar. The blue lines drawn over the photo shows the variation of the seating from being level.

Figure 7 – Moisture staining to various timber battens.

Figure 8 – Timber batten split.

Figure 9 – External cladding is damaged throughout.

Figure 10 – Various timber connections are compromised.

Note: The existing barriers will fail under design barrier loading.

Figure 11 – Downpipes discharge to ground on the east and west elevations.

Note: The slope of the ground will direct stormwater under the door and below the timber flooring under the grandstand.

Figure 12 – The southern wall of the grandstand has settled and rotated to the south.

Figure 13 – The roof sheeting has reached the end of its design life.

Note: Corrosion to the cladding indicates that the protective coating has failed.

2.3 Defects below the Grandstand

The severe damage to the grandstand has been caused due to the differential settlement of the timber structure and the 1983 steel support columns. Deterioration of timber has also compromised structural connections.

The midspan support beam to the tier seating joists has cracked above the eastern steel support column and the connection of the beam to the original timber column has also failed. The timber flooring to and around the bar under the grandstand is very uneven and has severe vibration under foot traffic. The steel rod bracing appears to be inadequate and does not appear to be fit for purpose.

Figure 14 – Eastern end of the joist support beam.

Note: The beam has split over the steel column and the connection to the timber column has failed. The tier seating joists to the eastern end are no longer bearing on the support beam.

Figure 15 – Splitting to the bearer beam over the steel column.

Figure 16 – Failure of the timber support beam at the timber column.

Figure 17 – The grandstand external wall has settled relative to the steel columns.

Note: The tier seating joists have bowed over the steel supports.

Figure 18 – Timber flooring is very uneven.

Note: Stormwater from the down pipes is entering below the floor.

Figure 19 – Deterioration of timber floor boards.

Figure 20 - Deflection of timber flooring.

Figure 21 – Settlement of the southern wall has caused the timber framing to buckle.

2.4 Defects to the attached roof over the Bar Area.

The light weight steel trusses are not uniformly supported and have bent and buckled. A number of columns are no longer vertical. The roof structure to the bar area has failed and is considered structurally inadequate. The roof is also of insufficient pitch for stormwater drainage.

Figure 22 – The roof is not straight and is back falling to the building.

Note: The southern wall of the grandstand has settled which has caused the damage.

Figure 23 – Western lightweight steel truss has buckled.

Figure 24 – Eastern lightweight steel truss has started to buckle.

Figure 25 – Columns are no longer vertical.

Figure 26 – The timber beam where the bar area connects has split at the eastern end.

3.0 CAUSE OF DAMAGE

The damage to the grandstand has been caused by age deterioration, lack of maintenance and differential settlement of the original timber structure and the 1983 steel support columns.

The lack of maintenance and age of the structure has allowed the timber and steel cladding to deteriorate.

It is expected that the original columns to the grandstand are embedded into ground in accordance with building practices at the time when the grandstand was re-located. It is expected that the steel columns, which were installed as part of the 1983 renovations, were installed with concrete footings. The differential footing movement has caused the failure of the bearer beam.

4.0 TEMPORARY RECOMMENDATIONS TO ALLOW USE DURING THE RACE DAY.

The grandstand should immediately be closed to the public until the below temporary works are carried out. Due to the below being temporary, the grandstand should be re-closed until the final repairs are undertaken.

4.1 Clear out under the Grandstand.

The timber flooring, bar, timber framed partition wall and the concrete slab under the grandstand should be removed and disposed of to allow repairs to be undertaken.

4.2 Prop the underside of the Grandstand

Engineering sketches have been attached to Appendix A which describe the temporary repair works.

Two new 90x3.5 SHS steel columns need to be installed on 900 x 900 x 600mm deep concrete pad footings to each end of the existing bearer beam. Two new runs of columns and support beams need to be installed at quarter points along the tier seating joists. The columns are to align with the columns under the existing beam. Cross bracing to be installed as per Engineering Sketches.

The temporary columns and footings will need to be removed for the permanent repairs.

4.3 Strengthen Barrier Connections.

The timber connections for the barriers need to be strengthened so that they no longer deflect or open under barrier loading. Framing anchors or steel plates may be required to strengthen the connections.

4.4 Restricting Access

After the above works are complete, the grandstand can be re-opened for the race day, however the top two tiers should remain fenced off to restrict loading on the southern elevation. Furthermore, below the grandstand should be fenced off and access restricted, a new opening in the bar may need to be created to allow this.

4.5 Structural Engineer's Review

A Structural Engineer should assess the grandstand after the above works have been completed, prior to the race day to determine if any further safety issues require rectification. It is recommended that as the works are being undertaken, any issues are documented and sent to a Structural Engineer for review.

5.0 LONG TERM RECOMMENDATIONS

The long term repairs are subject to detailed design. The below provides an indication of the works required.

5.1 Strip off all Cladding

It is recommended that all external wall and roof cladding and all wall framing is removed to repair defected timber and provided access for repairs. New cladding and framing should be installed to match after the below works are complete. All deteriorating timber members should be renewed to match existing. Roof cladding should be removed and renewed after all below works are complete.

This should also include the demolition of the southern bar area roof, including the roof sheeting, lightweight steel trusses and columns. A new standalone roof should be designed and installed after the repairs to the grandstand are complete. The design of the roof is subject to detailed design.

5.2 Underpinning the Grandstand

The existing timber columns require underpinning, this will require the propping of the grandstand at each column, the column should then be removed, new pier footings installed, and the column renewed to match existing. The pier footing will be dependent on a geotechnical investigation however, expected pier size will be 450mm diameter, 2500mm deep pier with 6/ N12 vertical bars with R10 ligs at 300mm centres. The pier design is subject to detailed design.

Once one pier has been installed, concrete has met the required strength and column reinstalled, the propping should be moved to the next column and the process repeated until all columns are underpinned. The columns along the northern elevation may not require underpinning dependent on the arrangement of the existing steel columns. To be confirmed by a Structural Engineer prior to works commencing.

5.3 Renewing Temporary Footings.

The temporary columns and pad footings should be removed, the columns could be set aside for re-use. New pier footings, to match the underpinning footing, should be installed to support the support beams. The temporary column can be re-used on the new pier footing. The pier footings are subject to geotechnical investigation and detailed design. During this process it is recommended that the existing timber support beam is renewed with a steel beam to match to other beams.

5.4 Concrete Slab

It is recommended that a 100mm thick concrete infill slab is installed to the bottom of the grandstand and sloped to direct water to the south, out to the bar area and away from the grandstand.

5.5 Make Good Works

The bar should be made good to suit the new steel framing under the grandstand and the access to the bar renewed.

The down pipes from the grandstand should be extended underground and connected to the existing stormwater drainage or discharged away from the building sloped to encourage drainage off site.

6.0 CONCLUSION

The structural inspection revealed that the Collarenebri grandstand is currently in an unstable condition and should be closed to the public prior to and during the temporary repair works.

Temporary repair works have been provided to allow the use of the structure during the Collarenebri race day. These works will include the installation of two new support beams and run of columns under the tier joists and new columns under the ends of the existing support beam. The columns will be founded on 900 x 900 x 600mm deep concrete pad footings which will require removal as part of the permanent repairs. The temporary columns, footings, support beams and bracing have been detailed in the attached Engineering Sketches.

Permanent repair works are subject to detailed design but expected repairs will require the removal and renewal of steel wall and roof cladding, renewal of wall framing, renewal of deteriorating timber members, the underpinning of the main timber columns, upgrading the temporary footings to the support beam columns, modifying downpipes to discharge away from the grandstand, constructing an infill slab under the grandstand and making good the bar to suit the new steel supports.

It is also recommended that the roof to the southern bar area is demolished and renewed with a standalone roof, designed to meet Australian Standards.

Appendix A – Engineering Sketches of Temporary Repair Works

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Project COLLARENEBRI GRANDSTAND
Ref No. 29763 Page 1 of
Made by JEZIAH POOLE Chk
Date 2/8/18 Rev

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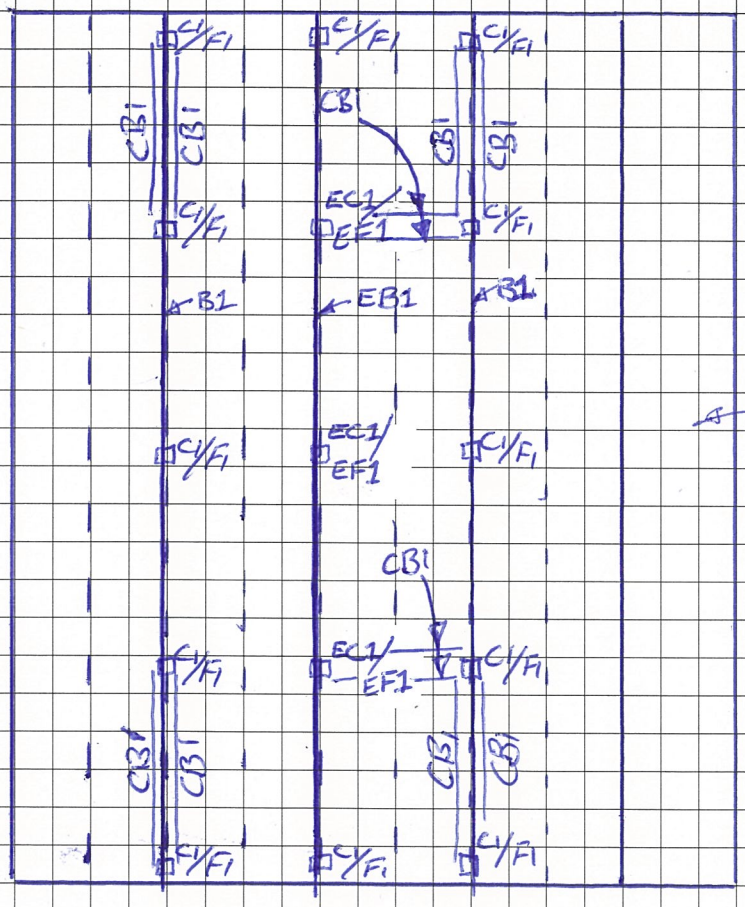

TEMPORARY REPAIRS PLAN.

B1 = 200UB18.2
C1 = 90x3.5 SHS
F1 = 900x900x600 deep pad. 25MPA conc

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Project COLLARENEBRI GRANDSTAND
Ref No. 29763 Page 2 of
Made by JEZIAH POOLE Chk
Date 2/8/18 Rev

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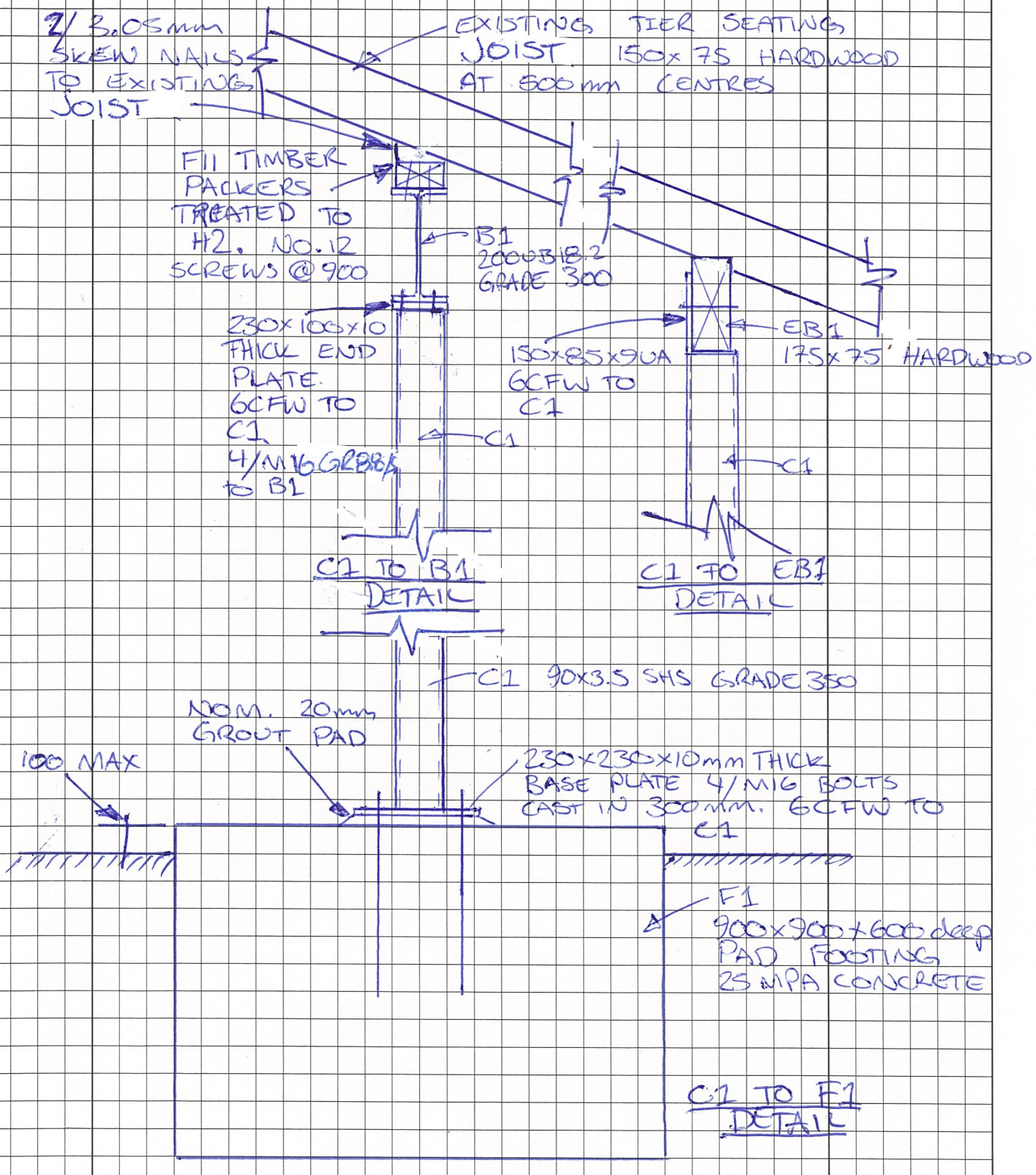

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Project COLLARENEBRI GRANDSTAND
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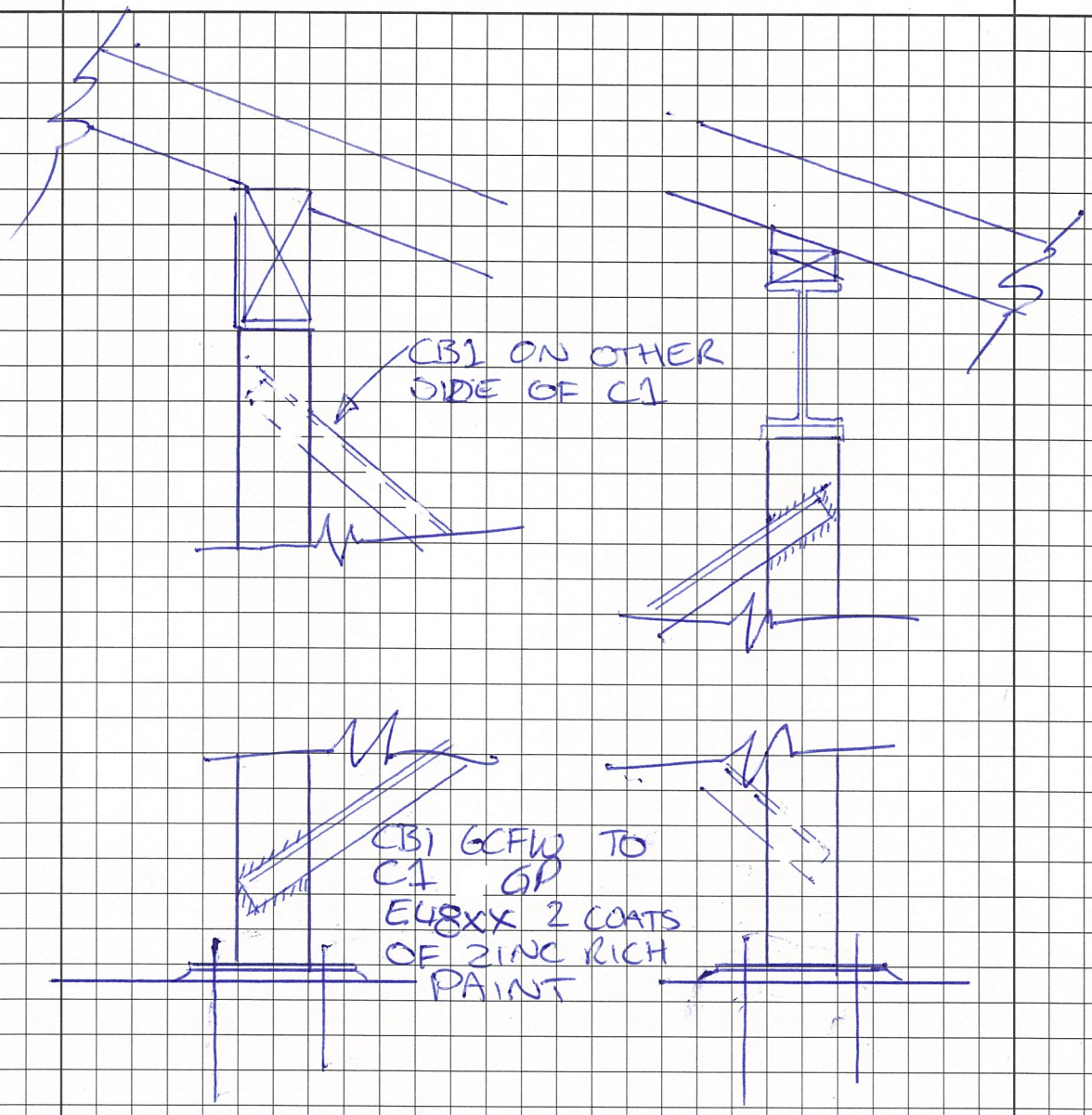

CB1 = 75x75x3 EA GRADE 300

ALTERNATIVE CONNETION

8mm THICK CLEAT PLATES WELDED TO C1 & 2/ M16 GR8.8/S BOLTS TO CB1