M+G Consulting

New Highschool in Bungendore

Majara Street, Bungendore NSW 2621

Structural Design Report

Issued for RTS

Revision: J

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REPORT AMENDMENT REGISTER

REV.	DATE	ISSUE/ AMENDMENT		INITIALS/ REVIEWED BY	
1	22 March 2021		Schematic	LM	DR/AB
A	8 April 2021		Schematic	LM	DR/AB
B	9 April 2021		Schematic	LM	DR/AB
C	23 April 2021		Schematic	LM	DR/AB
D	7 May 2021		Schematic	LM	DR/AB
E	13 August 2021		Schematic	LM	DR/AB
F	6 July 2021		SSD	LM	DR/AB
G	29 August 2021		SSD	EM	DR/AB
H	6 August 2021		SSD	EM	AB
I	8 September 2021		SSD	SM (M+G)	NN (M+G)
J	15 July 2022		RTS	SM (M+G)	NN (M+G)

Prepared by: M+G Consulting

Date: JULY 14, 2022

Project No: 5555

Issued for: RTS

Discipline: Structural

Contents

1. INTRODUCTION

M+G Consulting prepared a Structural Design Report that forms part of the Environmental Impact Statement for SSD No 14394209 for a new high school at Bungendore. The Environmental Impact Statement was exhibited by the NSW Department of Planning from Monday 20 September 2021 to Monday 18 October 2021. During the exhibition submissions were received and following exhibition the Department of Planning and Environment issued two requests for information dated 16 November 2021 and 24 December 2021.

This report accompanies an Amendment Report for the project and forms an update to the previously issued Structural Schematic Design Report.

2. AMENDED PROPOSAL

Proposal Amendments:

- The amended design no longer includes facilities for Queanbeyan-Palerang Regional Council (Council) such as the previously proposed community health centre, community library and council shop front. The facilities are still to be provided by Council, however, through a separate planning process and on a separate site.
- Administration and staff facilities have been relocated from Block A into Block C (existing council building) and the visual arts and TAS functions have been relocated into Block A.
- The school library has been relocated from Block D to a standalone block, Block E, which is located to east of the Majara Street alignment and centred on the school common.
- Block D has been replanned to address the removal of Council facilities, the relocation of the school library and to sit to the east of the Majara Street alignment. The floor level of Block D has also been lowered to suit the revised building footprint.
- Block B has been relocated to the west, off the Majara Street alignment.
- The games courts and cricket batting nets have been relocated within the school boundary.
- The bulk and scale of buildings facing public roads (Blocks A and B) have been reduced.
- The façade materials of the proposed buildings have been revised to be more sympathetic to the existing village character.
- The primary outdoor learning areas, including the 'covered' outdoor learning areas have been relocated and redesigned to be integrated within the landscape design.

- Minor planning changes to Block B which include relocation of the outdoor learning spaces, student amenities and building services to provide a new covered walk through from the school plaza to Mick Sherd Oval.
- The covered walkway connection between Block B and Block D has been redesigned to arc around the eastern side of the school common and provide a covered connection to the relocated school library, Block E.
- The school security fence between Blocks B and D has been redesigned to arc around the western perimeter of the school common. The school security fence to the northern and southern boundaries has been rationalised and face brickwork piers have been introduced to define the school entries.
- The waste vehicle turning circle has been removed from the proposal. The waste collection area has been relocated to the southern end of the existing carpark and a waste vehicle turning head has been added. A new turning bay is provided for assisted transport vehicles to the northern end of the car park.
- The onsite detention tank has shifted to the west.
- The electronic school sign has been replaced with a changeable, static 'notice board' sign. The sign has been relocated further back from Majara Street, behind the school security fence.
- The Scout storage shed has been relocated from the agricultural plot to within the Scout site. The Scout storage shed will be subject to a separate planning pathway and does not form part of this application. The school agricultural support building, Block F, has been repositioned and the landscape paths and driveways have been updated to suit the change.
- An addition 58 car parking spaces are proposed along Turallo Terrace providing a total of 98 spaces (compared to the original 35). An additional 3 drop off/ pickup spaces are proposed on Turallo Terrace providing a total of 6 spaces (compared with the original 3).
- The proposed delineation works to Mick Sherd Oval and the War Memorial have been removed from the proposal.
- The redesign of pedestrian crossings on Gibraltar Street and Turallo Terrace from 'School Crossings' to 'Wombat Crossings'.
- A footpath is proposed to the northern side of Turallo Terrace connecting the proposed parking with the existing path adjacent to Turallo Creek

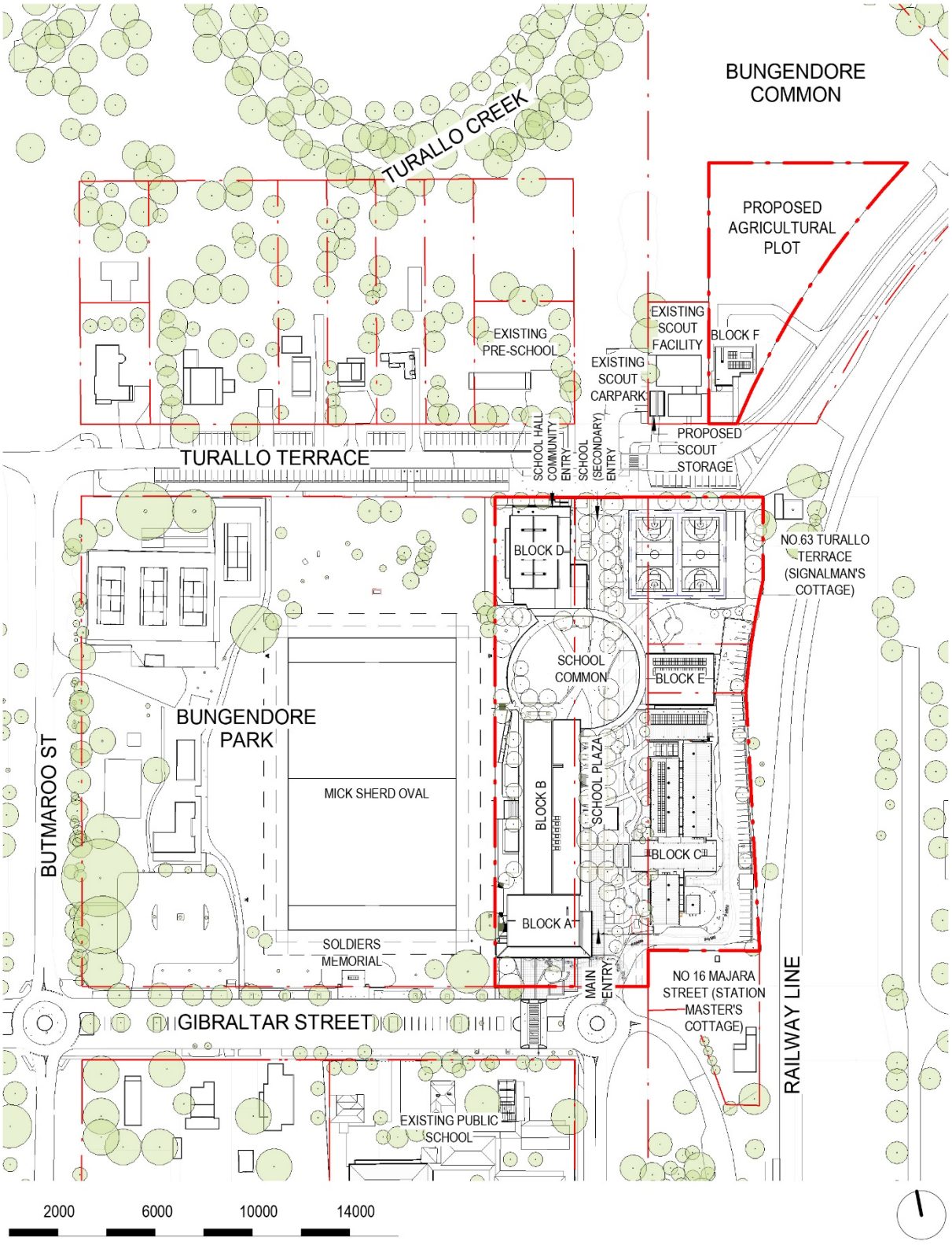


Figure 1: Proposed site plan
Source: TKD Architects

3. SITE DESCRIPTION

The proposed development is located within the Bungendore Town Centre within the local government area of Queanbeyan-Palerang Regional Council. The proposal involves the use of land bounded by Bungendore Park, Gibraltar Street, Majara Street, Turallo Terrace and Butmaroo Street, the existing former Palerang Council site at 10 Majara Street, the Majara Street road reserve bounded by Turallo Terrace and Gibraltar Streets and Nos. 2, 4 and 6 Majara Street (Refer to Table 1 below).

The site is legally described as per the existing Lots and DPs in Table 1 below. The school site comprises land which has recently been transferred to the ownership of the Department of Education, being Lots 12-14 of DP1139067, Lot 3 of DP830878, part of Lot 701 of DP1027107, the part of lot 701 of DP96240, and part of the Majara Street Road Reserve. The proposed Lots and DPs are detailed within Table 1 below and are not yet registered at the time of writing of this Amendment Report.

The site is approximately 25,350m2 in area and consists of a relatively flat topography. It contains existing Council buildings. The land is mostly cleared of vegetation with some mature trees intersperse throughout subject lots.

The surrounding area generally includes low density residential developments to the north and west, an existing rail line to the east and Bungendore Public School and the Bungendore train station to the south and south west respectively.

Table 1 – New high school in Bungendore legal descriptions

Property Address	Existing Lot and DP	Proposed Lot and DP
6-14 Butmaroo Street	Part Lot 701 DP1027107	Lot 1 DP1276282
2 Majara Street	Lot 12 DP1139067	Lot 12 DP1139067
4-6 Majara Street	Lot 13 DP1139067 Lot 14 DP1139067	Lot 13 DP1139067 Lot 14 DP1139067
10 Majara Street	Lot 3 DP830878	Lot 3 DP830878
Butmaroo Street	Part Lot 701 DP96240	Lot 1 DP 1276285
Portion of Majara Street (between Turallo Terrace and Gibraltar Street)	N/A	Lot 1 DP 1276279

Figure 2: Site aerial depicting the land subject to the proposed High School.
Source: TKD Architects

3.1. Existing Structures

A portion of site of the new high school is currently used as a public sports oval used for a variety of sports; a public play space and as an exercise/training facility. The site east side is occupied by existing council chambers buildings.

The council buildings are currently used as an office space. Existing structure comprises of slab on ground with steel frame and lightweight steel roof. The plan to change the occupancy types of the building to include various utilities for educational usage must therefore be considered in the design process. There are records "As Built" drawings available of the existing Council building. For a copy of the existing structural drawings, refer to "Appendix A – Record Structural Drawing of Council Building - BHS".

3.2. Site proximity to Rail Corridor

The Bungendore Stationmaster's Cottage along with the Bungendore Railway station and yard are heritage listed and within close proximity to the development site. Proposed development is to have no impact on rail corridor and associated infrastructures.

An assessment has been undertaken to figure out the impact of proposed development on existing rail corridor. Proposed development is not impacting the rail corridor, there is no excavation proposed to the depth of 2m (below the ground level) within 25m of the existing rail corridor

4. STRUCTURAL SYSTEM

Structural system for the New High School in Bungendore comprises of a conventional steel framed superstructure with composite steel beams and profile metal decking with composite concrete slab

The steel framing is fabricated off-site. The primary steel beams are pre-cambered to control deflections.

The roof structure is a proprietary (Austruss) lightweight steel modular framing system.

The structure is founded on a reinforced concrete raft slab founded on earthworks bench.

4.1. Raft Foundation Slab

The geotechnical report prepared by Douglas Partners have been utilised for design of footings the raft slab.

Douglas Partners have conducted geotechnical study of the Bungendore High School site. The results of the site investigations have been summarized in the geotechnical report with Project No. 202107.01 & document No. R.001.Rev1, dated 12th of May 2021.

No ground water has been identified during the above investigations.

The bulk earthworks (cut and fill) create a building platform that the raft slab is founded. The raft slab is designed to ensure that the settlements, including differential settlements are within acceptable limits.

These earthworks will be undertaken into accordance with a Level 2 Inspection and Testing to AS 3798-2007 Guidelines on Earthworks for Commercial and Residential Developments.

4.2. Steel Superstructure

The steel super structure framing system is composed of the following:

- Steel columns spaced at about a nominal grid 9m x 7.5m to suit the architectural room layout.
- Primary steel composite steel beams spanning between the columns in the primary direction. These beams are precambered.
- Light weight profiled metal decking spanning between the primary beams with a concrete topping that acts composite with the metal decking. This flooring system achieves the required Fire Resistance Level (FRL) 90/90/90
- Lateral stability of the superstructure is achieved by a combination of some steel bracing within some walls and some structural reinforced concrete walls and/or reinforced concrete block walls.
- All steel structure and floor members are fire protected were required by the NCC/ BCA to achieve a FRL 90/90/90.

4.3. Roof and Walls (Internal & External)

The roof structure and the walls (internal and external) are a proprietary lightweight steel modular framing system by Austruss.

This framing consists of off-site constructed lightweight steel frames and trusses generally made from light gauge cold formed steel sections.

5. STRUCTURAL DESIGN

5.1. Australian Standards and NCC

The following Australian Standards in combination with NCC 2019 and EFSG are used in the structural design of this project.

- AS/NZS 1170.0/2002 – Part 0: Structural design actions
- AS/NZS 1170.1/2002 – Part 1: Permanent, imposed and other actions
- AS/NZS 1170.2/2011 – Part 2: Wind actions
- ASNZS 1170.3-2003 – Part 3: Structural design actions - Snow and ice actions
- AS 1170.4/2007– Part 4: Earthquake loads
- AS/NZS 2312.1-2014 Guide Protection of Steel - Paint Coatings
- AS/NZS 2312.2-2014 Guide Protection of Steel - Hot dip galvanizing
- AS/NZS 2327-2017 Composite structures - Composite steel-concrete construction in buildings
- AS3600 – 2018: Concrete structures
- AS4100 – 1998: Steel structures
- AS1720- 2010: Timber Structures
- AS3700 – 2018: Masonry Structures
- AS2159 – 1995: Piling
- AS/NZS4600 – 2001: Cold-formed steel structures
- AS/NZS3828 – Guidelines for the erection of building steelwork

5.2. Design Loading Information

Loads and their appropriate load combinations are in accordance with AS/NZS 1170.0, AS/NZS 1170.1, AS/NZ 1170.2 and AS 1170.4.

5.2.1. Self-Weight Loads (SW)

Self-Weight loads are calculated as provided for in the current version of AS/NZ 1170 Part 1: Permanent, imposed and other actions.

Material densities are taken from AS/NZ 1170.1.

5.2.2. Super Imposed Live and Dead Loads

Live loads are taken from AS/NZ 1170.1

Part 1: Permanent, imposed and other actions. The following table describes the more significant loading on the project, and clarification of floor loads are obtained by referring to the loading diagrams in the structural set of drawings.

Pattern Live loads have been considered, if applicable in accordance with Clause 2.4.4 of AS 3600. Live load reduction shall be applied to AS/NZ 1170.1 where appropriate for vertical elements.

5.2.3. Building Wind Loads

The design wind loads are in accordance with AS/NZ 1170.2 taking into account a detailed study of the local terrain for a Region A2 wind.

5.2.4. Construction Live Loads

5KPa allowance should be made for construction loading on concrete floors/pavements.

5.2.5. Snow Loads

Design snow loading is in accordance with AS/NZS 1170.3-2003 Snow & Ice Actions the design snow loading is 0.87 kPa.

5.2.6. Earthquake Loads

Project has been designed in accordance with AS1170.4-2007.

Hazard Factor: Z = 0.08

Life Span: 50 years

Site Subsoil To be confirmed.

Probability of exceedance kp = 1.3

Importance Level 3

5.2.7. Robustness Loads

In accordance with the requirements of AS/NZS 1170.0-2002 Amendment 3 the robustness load is taken as 1.5% of the gravity load (G + ψcQ).

5.3. Limit State Design Criteria for Structural Elements

5.3.1. General Design Approach

The limit state design for strength, serviceability and stability of the relevant structural elements within the building are in accordance with relevant criteria in the relevant material design codes AS 4100 and AS 3600 unless noted otherwise below.

5.3.2. Structural Movements

Building Sways (Deflection) subject to service wind loads shall satisfy;

Total lateral deflection to not exceed height/500.

Inter-storey deflection to not exceed inter-storey/500 or 12mm, whichever is lesser.

Floor Deflections to AS3600 and AS4100, limited to span/250 total and span/500 incremental for flexible partitions, and span/500 total and span/1000 incremental for (non flexible) rigid partition walls without regularly spaced movement joints.

Deflections for transfer elements shall be limited to the lesser of Span/360 or 10mm max total deflection.

5.3.3. Fire Resistance

Generally, the elements are generally designed for a FRL of; 90/90/90 in accordance with NCC/BCA requirements.

5.3.4. Crack Control

Generally, all internal suspended slabs are designed for a moderate degree of crack control in accordance with AS 3600.

Temporary Movement Joints (TMJs) are introduced where appropriate to minimise the long-term creep and shrinkage effect of the concrete and these will be coordinated with the builder construction program.

5.3.5. Minimum Connection Requirements and Ties

All connections, including but not limited to beam/slabs to columns/wall, precast, etc. are designed to clause 6.2.3 AS/NZS 1170.1 for the transfer of the lateral loads and robustness.

5.3.6. Durability

Durability to AS 3600, AS 4100, AS/NZS 2312.1 & AS/NZS 2312.2

Atmospheric Corrosivity Category (AS/NZS 2312) – Category C2 (Low)

Coating Life to First Maintenance (AS/NZS 2312) – Very Long (15-25 years)

5.3.7. Floor Vibrations

Floors are designed to ensure that there are only slight perceptible vibrations under footfall effects, or from other internal or external sources.

Floors are not designed for vibration emanating from plant equipment, ducting, fans etc. All vibrations from *plant are to be isolated at the source with dampers and vibration isolation devices.*

5.4. Structural Steel Design Criteria

Vertical Deflection Criteria

The design criteria for vertical deflections of structural steel rafters and beams are as follows;

Total Deflection (after precambers)

Self-Weight and Dead Load:	Span/300 or 20mm
Self-Weight, Dead Load and short-term Live Load:	Span/250 Incremental
Deflection Short Term Live Load or Wind Load:	Span/200 or 30mm
Ceiling Dead Load only:	Span/500

Incremental and Total Deflection criteria are based on AS/NZS 1170.0:2002 Table C1 for Rippling, sagging and cracking limit requirements for hung ceilings

Incremental deflections to rafters and primary beams can be additional and consideration of suitable deflection heads to walls is required.

It is assumed that appropriate movement and expansion joints are installed into brittle ceiling finishes and fixtures to assist in controlling cracking from the roof deflections described above.

For cantilever beams and rafters, the deflection limit at the ends of the cantilevers is based on the above limits but with the span being equivalent to twice the distance from the support to the end of the cantilever.

5.5. Construction Material: Codes, Properties and Construction Practices

6.5.1. Concrete

The design, material properties and construction of all reinforced concrete elements will comply with the relevant provisions of AS 3600 and AS/NZS 2327

For detailed information on the specification of concrete elements refer to the Concrete Specification.

In particular take note of the curing requirements within the specification to prevent shrinkage and drying shrinkage cracking.

6.5.2. Structural Steel

The design, material properties and construction of all structural steel elements will comply with the provisions of AS 4100 & AS/NZS 2327 and any other relevant reference noted in this brief.

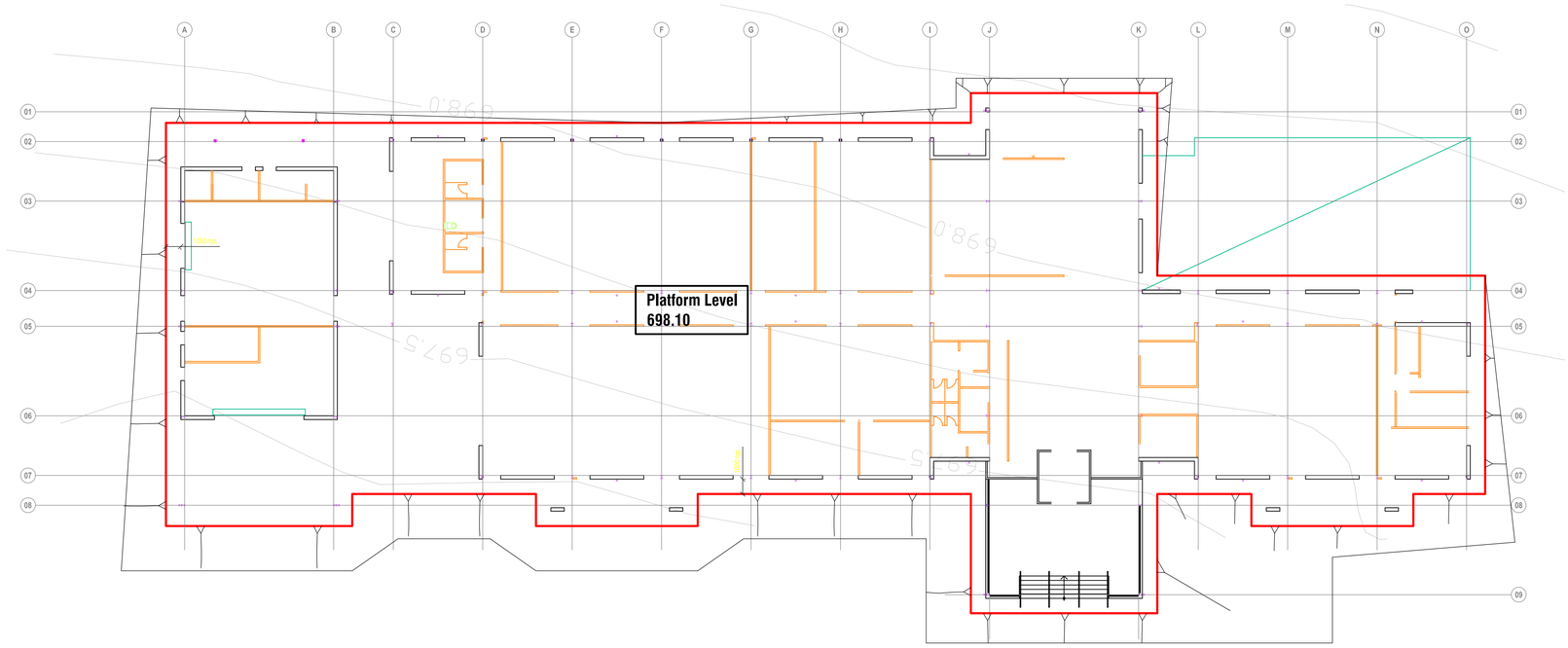
6.5.3. Design Certification by Others

The overall structural certification of the building structure by M+G will rely on the structural certification, by Austruss, of the wall and roof elements that are designed and detailed by Austruss.

6.5.4. Design and Certification of Waterproofing

All roofs, retaining walls, hydrostatic basement slabs, and balconies that require waterproofing are not designed to be watertight in their own right, the water tightness of concrete elements is achieved through the application of appropriate waterproofing membranes that are applied, designed, specified, and certified by the architect.

Appendix A – Structural Drawing of Council Building - BHS



Bulk Earthworks Plan

BULK EARTHWORKS

1 Refer to the Geotechnical Investigation Report on the site prepared by ACT Geotechnical Engineers Pty Ltd dated December 2005.

2 Remove existing topsoil, organic material and fill beneath the building platform.

3 Batter temporary banks at an angle that will be stable throughout construction. Obtain advice from the geotechnical engineer if necessary.

4 Refer to clause 5.3 in the Geotechnical Investigation Report for re-use and treatment of excavated materials. Import fill when excavated material is unsuitable or insufficient.

5 Imported fill properties
- Passing 50mm sieve 100%
- Passing 75micron sieve < 25%
- Plasticity index < 15%

6 Place fill in layers and compact in accord with clause 5.4 in the Geotechnical Investigation Report.

7 Provide certification by a registered geotechnical engineer that the quality of materials and levels of compaction in the completed building platform comply with the recommendations in the Geotechnical Investigation Report.

DESIGNED by: MJJ DRAWN by: MR VERRIFIED by: x

PRELIMINARY

ISSUE	AMENDMENT	DATE
A	TENDER ISSUE	23.03.06
1	PRELIMINARY.	09.02.06

1:200 @ A1 0 2 4 6 8 10

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PROJECT NUMBER: 922

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DRAWING NUMBER
C01 A

NUMBER IN SET : ?

GENERAL NOTES

1 Read drawings and notes in conjunction with specifications and other consultants' drawings.

2 Specification: NATSPEC Site & Structure UNO.

3 Refer discrepancies to the Architect before proceeding with work.

4 Do not scale drawings.

5 Ensure work quality, testing, materials and verifications are in accordance with the specifications and current applicable SAA codes.

6 Install proprietary items specified in accordance with the manufacture's written specification.

7 Install and maintain temporary bracing and support to ensure structure is stable at all times during construction.

8 All architectural fitments such as glazing, partitions, ceiling, etc. should allow for the short and long term movement of structural elements. Allow for movement of 20mm unless specified or agreed otherwise.

EARTHWORKS

1 Remove existing topsoil, organic material and fill beneath building platforms.

2 Batter temporary banks at an angle that will be stable throughout the construction period. Obtain advice from the geotechnical engineer if necessary.

3 If earthworks extend beyond the site boundary, obtain appropriate approvals and reinstate on completion.

4 Import fill when excavated material is unsuitable or insufficient.

5 Imported fill properties
- Passing 50mm sieve 100%
- Passing 75micron sieve < 25%
- Plasticity index < 15%

6 Place fill and sub-base in layers not exceeding 200mm and compact to at least 95% MMDD.

7 Backfill against retaining walls with granular materials and compact with hand operated equipment.

8 Provide certification that the quality of materials and levels of compaction comply with the drawings and specification.

CONCRETE

1 Carry out all work in accordance with AS3600 and NATSPEC Concrete.

2 Concrete properties UNO
- Grade N25
- Max. Aggregate Size 20mm
- Slump 80mm

3 Obtain approval for the following:
- Curing procedures (PVA membranes not permitted)
- Stripping and back propping procedure (Refer AS3600 Section 19.6)
- Detail and location cast in services and fitments
- Conduits and penetrations
- Construction joints not shown on the drawings
- Set downs and falls not shown on the drawings

4 Lap reinf. in accordance with AS3600 Section13.

5 Clear concrete cover to reinf. UNO
- Columns 30mm to ties
- Interior (protected from weather) 20mm
- Exterior 30mm
- In contact with ground (unformed) 50mm

6 Formwork Class (AS3610)
- UNO 3
- Exposed concrete walls 2
- In ground footings 5

7 Consolidate concrete by vibration.

8 Sample and test concrete in accordance with AS3600 Section 20.7.
Project assessment of strength grade unless instructed otherwise.

9 Surface Finishes
- Columns, beams, walls & stairs off form
- Floor slabs UNO machine float & fine steel trowel
- Areas to have other applied finshes screeded

10 Surface tolerances
- UNO class B
- Exposed concrete walls class A

11 Cure finished concrete surfaces for at least 5 days.

12 Masonry anchors
- UNO Ramset truebolts (longest version). Use stainless steel where exposed to the weather or joining non-ferrous or pre-painted members.

MASONRY

1 Carry out masonry construction in accordance with AS3700.

2 Minimum characteristic unconfined compressive strength of the masonry units
- Clay bricks 20MPa
- Concrete blocks 15MPa

3 Bed units in freshly prepared uniformly mixed mortar M3

4 Reinforced block work
- Ensure starters are correctly located in footings
- Use E shaped blocks in the bottom course to clean cores and tie reinforcement
- Clean out cores after each day's laying

5 Grout
- Compressive strength 20MPa
- Maximum aggregate size 10mm
- Slump 250mm

6 UNO on drawings use galvanised steel lintels
- 10 thick flat bar for maximum spam 900
- 100 x 10 EA for maximum span 2100
- 150 x 100 x 10 UA for maximum span 3000
To support stud walls over masonry
-100 x 10EA for maximum span 2400
-150 x 100 x 10UA for maximum span 3600

7 Use medium duty masonry ties UNO.

8 Where masonry joins structural steel or passes a return wall on the inner skin, provide medium duty galvanised ties at 300 max centres. Shot fix or spot weld ties to steelwork. If shot fixed, ensure nails concealed.

9 Provide control joints at max 8m spacing generally and 4m from return walls or other restraints.

10 Do not cut, chase or rake joints more 5mm deep unless approved for every location.

11 Top load bearing walls with:
- For clay bricks and grout filled blocks, 2 layers of "Alcor" or similar over level render
- For hollow blocks 6mm compressed fibre cement sheet and one layer of "Alcor"

12 Finish non-load bearing walls 20mm below slab soffit and fasten to the soffit using MFA-4 sliding ties at max 500mm centres.

13 Masonry anchors in cored masonry
- Ramset "Hollow block studs with sleeve" or approved equivalent. Anchors exposed to weather galvanised.

PRECAST CONCRETE

1 Where applicable, carry out work in accordance with "Recommended Practice Design and Detailing Precast Concrete" published by Concrete Institute of Australia.

2 Reinforcement shown on structural drawings is the minimum required for in service conditions. If necessary, provide additional reinforcement for handling and transport loads.

3 Details on drawings show one possible method of supporting the precast elements. Alternative methods can be used if they conform with the required concrete outlines and are structurally sound.

4 Prepare detailed drawings of precast elements and their connections. Include chamfers, drip grooves, rebates for windows and flashing, etc and structural details. Submit for approval.

5 If necessary, submit shop drawings to the Building Authority and obtain the necessary approvals.

6 Submit colour and finish samples for approval before casting.

7 Formwork UNO Class 2

8 Finish UNO off form

9 Provide adequate notice of fixing details which may affect the construction of other parts of the structure, eg inserts in beams, holes in structural steel members, etc.

STRUCTURAL STEELWORK

1 Fabricate and erect structural steelwork in accordance with AS4100 and AS4600.

2 Provide holes, cleats and fixing for timber framing, finishes etc. shown on architectural drawings.

3 Prepare shop drawings and submit for review before fabrication starts.

4 UNO, use
- 10mm plates
- M20 8.8/S bolts
- 6mm continuous fillet welds
- E48XX mild steel electrodes
- Category SP welds

5 Install bolts with one hardened washer under the turned part.

6 Cold formed sections
- Minimum yield stresses purlins and girts 450MPa, other sections 250MPa
- Surface treatment hot dipped zinc coating, at least 200g/sqm
- Laps, bridging, brackets and purlin bolts in accordance with manufacturer's specifications

7 Surface treatment UNO
- Protected from weather, class 1 clean (Mechanical wire brush acceptable) with 70 microns of zinc phosphate primer (SP1-C in AS2312)
- Exposed to weather, class 2.5 blast clean with 70 microns of inorganic zinc silicate paint (MP01-A in AS2312)

8 Unless otherwise detailed, provide 100x100x1.2 angle or C10012 trimmers, screw fixed to purlins or steel framing, to support edges of sheeting at hips, valleys, penetrations, etc.

9 Typical steelwork connections UNO
- Column base plates, 20 base plate, 4M16 holding down bolts to footing or slab
- Beam to top of column, cap plate, 2 or 4 bolts
- Beam to side of column, fin plate, 2 bolts
- Beam to side of beam, end plate or fin plate, 2 bolts
- Column to top of beam, base plate, 2 or 4 bolts or site weld
-Beam to precast concrete, end plate, 4M12 chemset anchors

TIMBER

1 Carry out work in accordance with AS1720 and AS1684.

2 Supply timber with certified stress grade clearly identified.

3 All exposed timber durability class 2 or better

4 UNO use
- M16 4.6/S bolts with 55dia x 3.0 washers under head and nut
- M16 4.6/S coach screws with 55dia x 3.0 washers
- 10g Type 17 screws with at least 30mm penetration
- 3.15dia nails
- Connector plates complying with AS1649
- All bolts, nuts, washers, screws, nails, etc to be galvanised

5 Protect timber from the elements during fabrication and erection.

6 Re-tighten accessible bolts as close to completion as possible.

7 Install bracing and hold down in accordance with the details in AS1684.

DESIGN LOADS

1 Wind loads
- Basic wind speed Vu(max.) 45m/s
- Structure importance multiplier 1
- Terrain category 3
- Internal pressure coefficient 0.3

2 Earthquake loads
- Acceleration coefficient 0.08
- Site factor 1.0
- Structural importance factor 1.0

3 Floor live loads
- Allowance for partitions etc 1.0kPa
- General live load 4.0kPa
- Plant rooms 5.0kPa

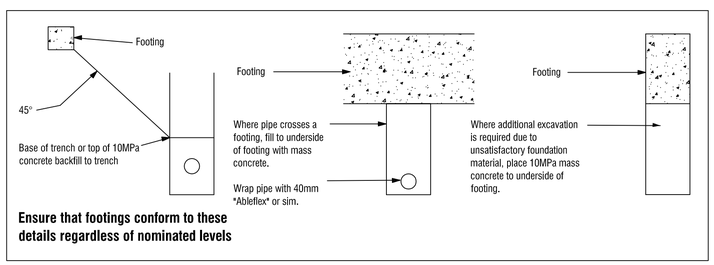
4 Roof live load 0.25kPa

FOOTINGS

1 Refer to the report on the geotechnical investigation of the site prepared by ACT Geotechnical Engineers Pty Ltd dated December 2005.

2 Allowable bearing capacity UNO
- Pad footings 150kPa
- Strip footings 100kPa

3 Ensure foundation material at base of footings is approved before proceeding with construction.



Ensure that footings conform to these details regardless of nominated levels

DRAWN MR JDL MJJ VERIFIED MJJ JM MJJ

ISSUE	AMENDMENT	DATE
A	TENDER	17.03.06
B	AMENDED AS CLOUDED	31.03.06

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STRUCTURAL NOTES

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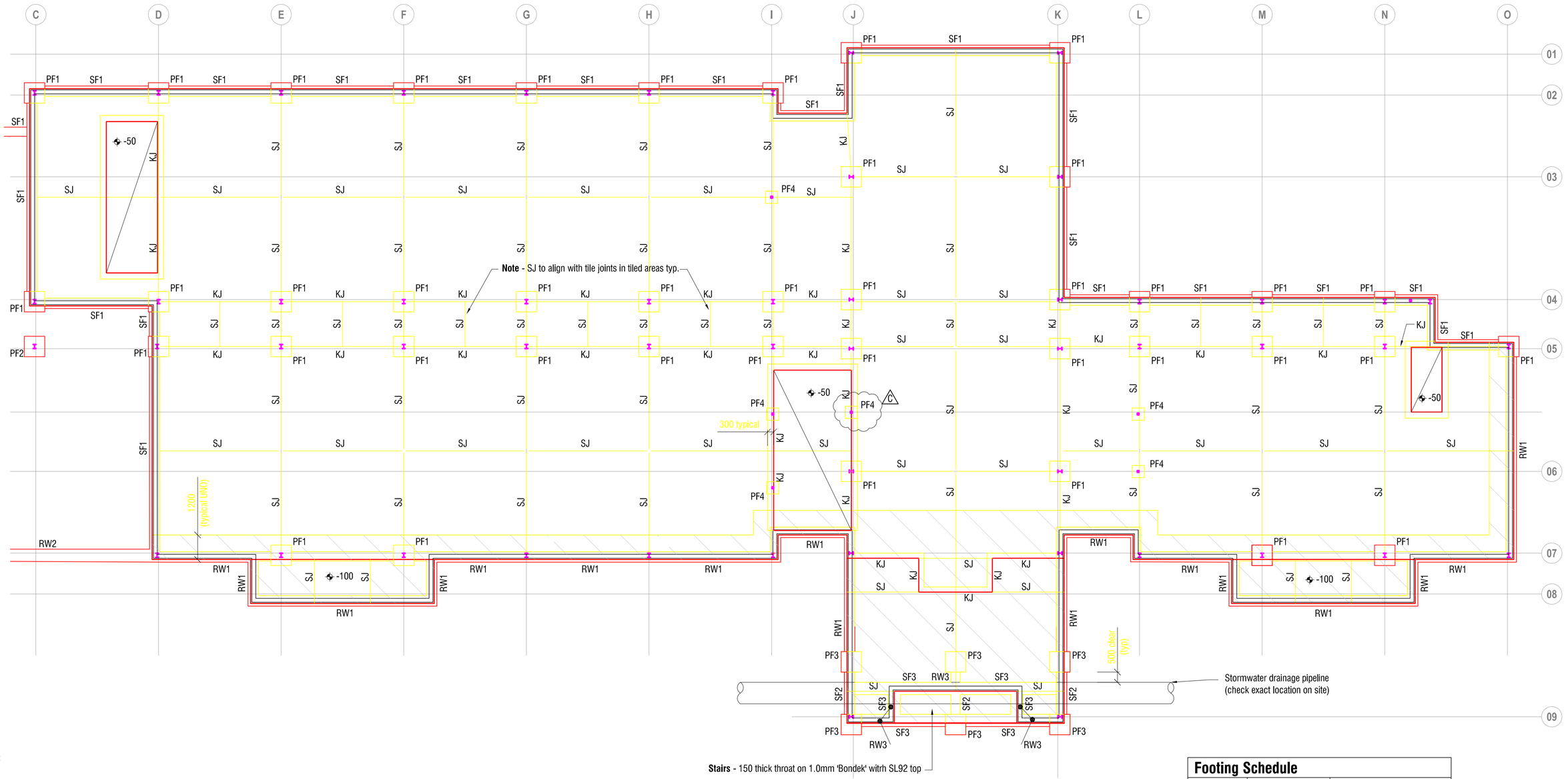
JOB NUMBER CB050308

DRAWING NUMBER S00 B

SIZE: A1



Footing & Slab Plan

Slabs UNO
100 thick
SL82 mesh top
0.2 poly membrane
Sand levelling
Compacted subgrade

Hatched Areas
120 thick
SL82 mesh top & bottom

SJ - sawn joint in slab
KJ - keyed joint

Footing Schedule

Pad Footings	Size	Reinforcement
PF1	1000 x 1000 x 400D	6N12 b0th ways bottom
PF2	1000 x 1000 x 800D	Mass concrete
PF3	1000 x 1000 x min 1000D	Mass concrete. Found below invert level of stormwater pipe
PF4	600 x 600 X 400D	Mass concrete
Strip Footings		
SF1	400D x 450W	4-L11TM top & bottom
SF2	600D x 450W	4N16 top & bottom N12 closed ties at 400mm crs
SF3	600D x 600W	5N16 top & bottom N12 closed ties at 400mm crs
RW1	400D x 450W	4-L11TM top & bottom
RW2	300D x 800W	5N12 top & bottom N12 closed ties at 400mm crs

0 1 2 3 4 5m SCALE 1:100 @ A1
0 1 2 3 4 5m SCALE 1:200 @ A3

DRAWN MR JDL MJJ VERIFIED MJJ JM MJJ

ISSUE	AMENDMENT	DATE
A	TENDER	17.03.06
B	AMENDED AS CLOUDED	31.03.06
C	AS NOTED	18.05.06

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PROJECT
PALARANG COUNCIL OFFICES
MAJARA STREET BUNGENDORE

DRAWING TITLE
FOOTINGS & SLABS – SHEET 1

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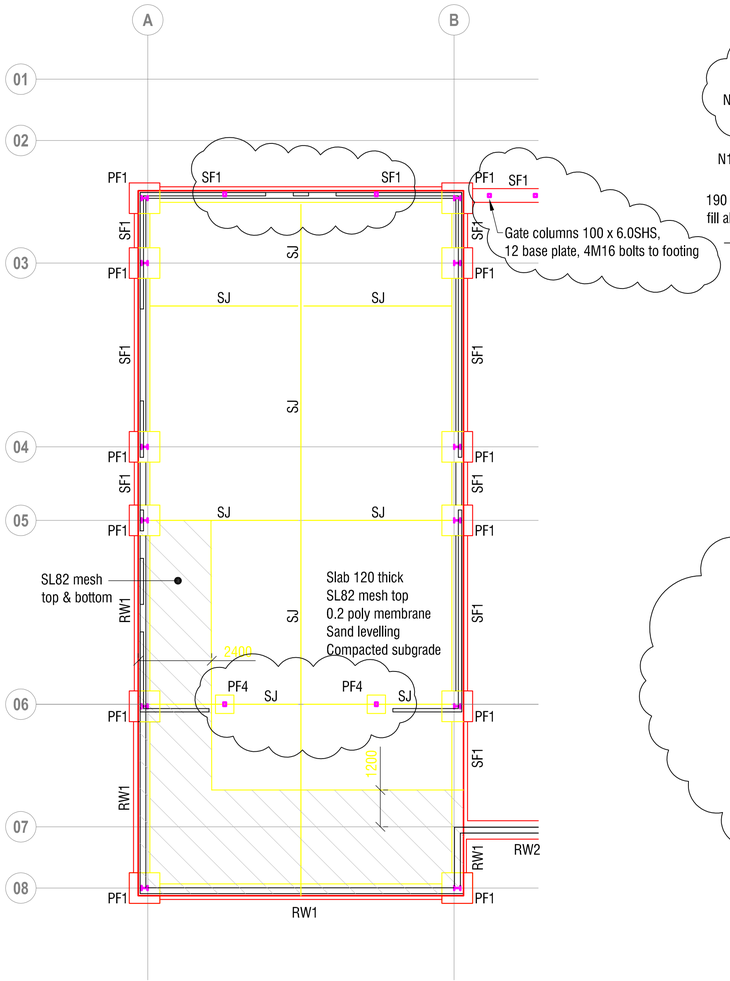
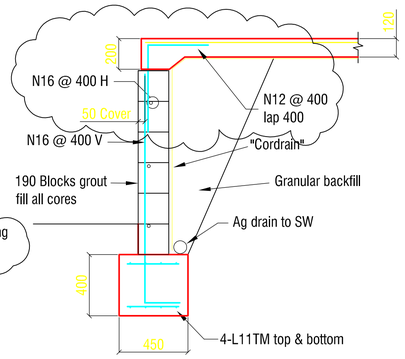


Footing & Slab Plan

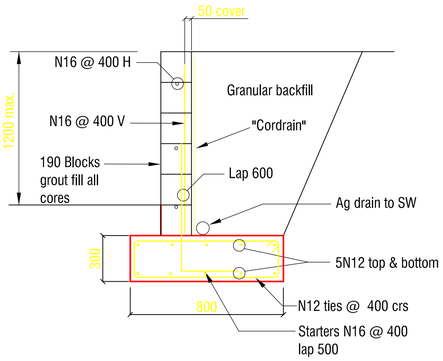
Slabs UNO
120 thick
SL82 mesh top
0.2 poly membrane
Sand levelling
Compacted subgrade

Hatched Areas
120 thick SL82 mesh top & bottom

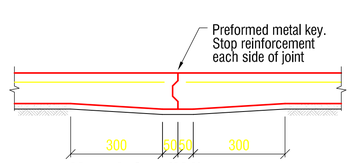
Footing Schedule		
Pad Footings	**Size**	**Reinforcement**
PF1	1000 x 1000 x 400D	6N12 bw. bottom
PF2	1000 x 1000 x 800D	Mass concrete
PF4	600 x 600 x 400D	Mass concrete
Strip Footings		
SF1	400D x 450W	4-L11TM top & bottom
RW1	400D x 450W	4-L11TM top & bottom
RW2	300D x 600W	4N12 top & bottom N12 closed ties at 400mm crs



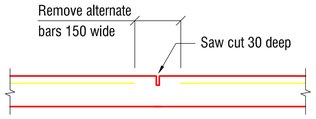
Typical RW1 Detail
RW3 Similar



Typical RW2 Detail

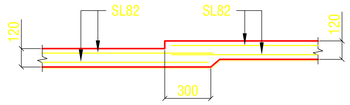


Key Joint (KJ)

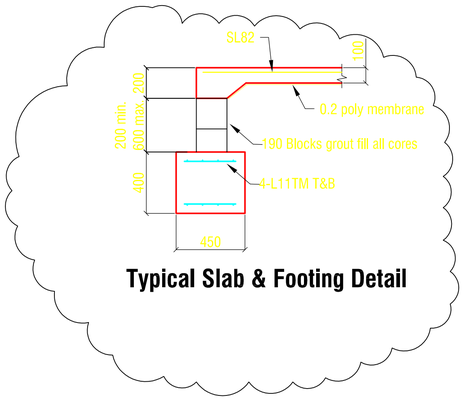


Slab Joint (SJ)

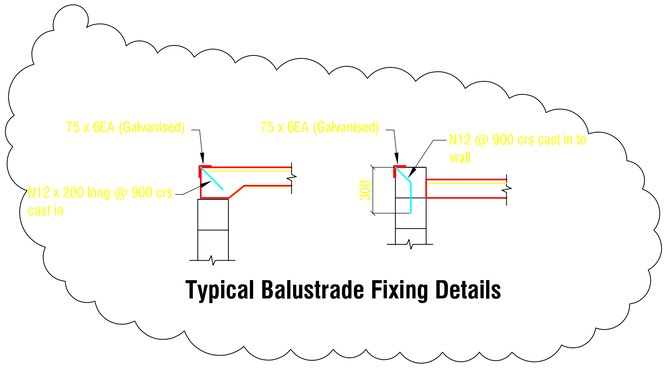
Saw joint as soon as concrete has hardened sufficiently that it will not be damaged. Fill with elastomeric sealant at least 30 days later.



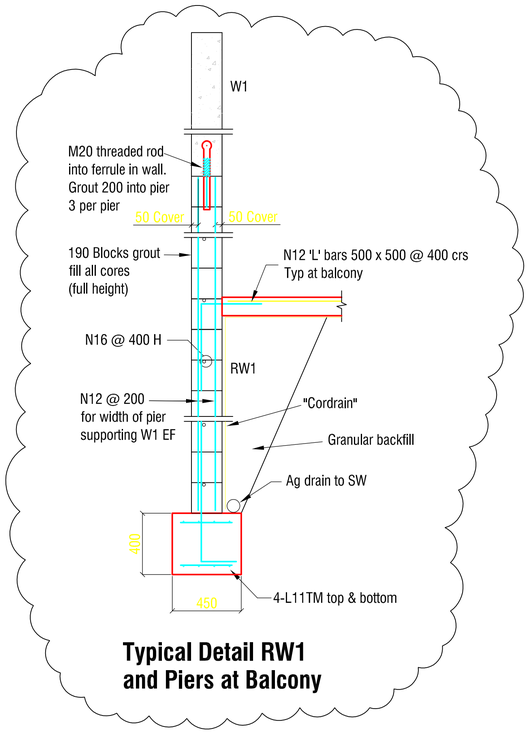
Typical Balcony Slab & Setdown Areas



Typical Slab & Footing Detail



Typical Balustrade Fixing Details



Typical Detail RW1
and Piers at Balcony

DRAWN MR JDL MJJ VERIFIED MJJ JM MJJ

0 1 2 3 4 5m SCALE 1:100 @ A1
0 1 2 3 4 5m SCALE 1:200 @ A3

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PALARANG COUNCIL OFFICES
MAJARA STREET BUNGENDORE

DRAWING TITLE
FOOTINGS & SLABS – SHEET 2

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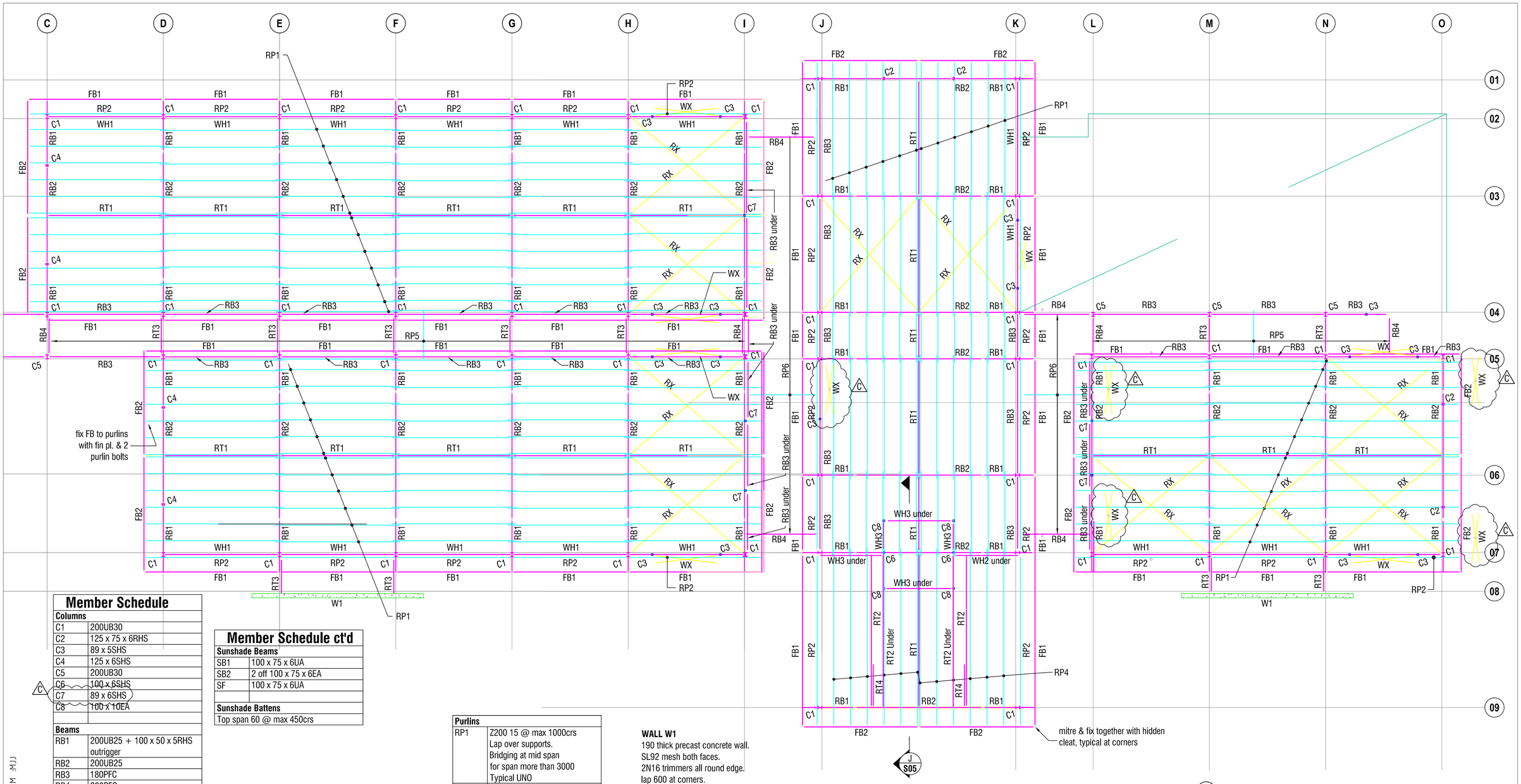
DRAWING NUMBER
S02 B
SIZE: A1



Member Schedule

Columns	
C1	200UB30
C2	125 x 75 x 6RHS
C3	89 x 5SHS
C4	125 x 6SHS
C5	200UB30
C6	100 x 6SHS
C7	89 x 6SHS
C8	100 x 10EA
Beams	
RB1	200UB25 + 100 x 50 x 5RHS outrigger
RB2	200UB25
RB3	180PFC
RB4	200PFC
FB1	200PFC
FB2	200PFC
FB3	C200 24
Window Heads	
WH1	150PFC
WH2	125 x 75 x 6 RHS
WH3	100 x 50 x 6RHS
WH4	125 x 6SHS
Ties	
RT1	10Ø4.0 CHS
RT2	200UB30
RT3	10Ø4.0 CHS
RT4	10Ø4.0 CHS
Bracing	
RX	Roof cross bracing M16 with turnbuckle
WX	Wall cross bracing M16 with turnbuckle

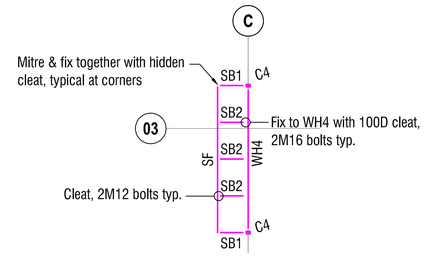
Member Schedule ct'd

Sunshade Beams	
SB1	100 x 75 x 6UA
SB2	2 off 100 x 75 x 6EA
SF	100 x 75 x 6UA
Sunshade Battens	
Top span 60 @ max 450crs	

Purlins	
RP1	Z200 15 @ max 1000crs Lap over supports. Bridging at mid span for span more than 3000 Typical UNO
RP2	C200 24 Bridging at mid span for span more than 3000
RP3	Tee from 200UB18 @max 1000 crs
RP4	Z200 24 @ max 1000crs Lap over supports. Bridging at mid span
RP5	for span more than 3000 C100 15 @ max 900crs Bridging at mid span
RP6	for span more than 3000 C150 15 @ max 900 crs Bridging at mid span for span more than 3000

WALL W1
190 thick precast concrete wall.
SL92 mesh both faces.
2N16 trimmers all round edge.
lap 600 at corners.

Council Offices Roof Framing Plan



PLAN ON SUNSHADE (GRID 'C')
GRID 'D SIMILAR
EAST WALL ENGINEERING STORE SIMILAR

SCALE 1:100 @ A1
SCALE 1:200 @ A3

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PROJECT
PALARANG COUNCIL OFFICES
MAJARA STREET BUNGENDORE

DRAWING TITLE
ROOF FRAMING PLAN – SHEET 1

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JOB NUMBER
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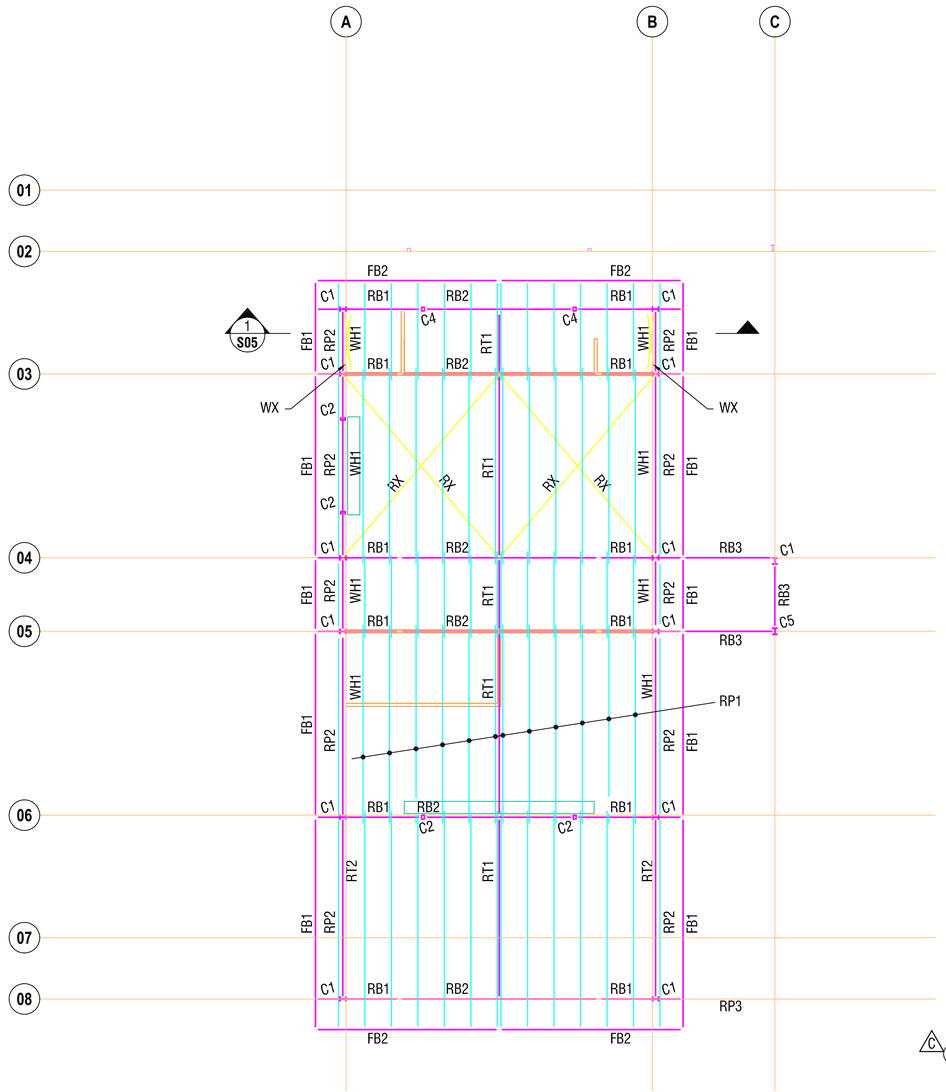
DRAWING NUMBER
S03 C

SIZE: A1



Engineering Store Roof Framing Plan

Member Schedule	
Columns	
C1	200UB30
C2	125 x 75 x 6RHS
C3	89 x 5SHS
C4	125 x 6SHS
C5	200UB30
C6	100 x 6SHS
C7	89 x 6SHS
Beams	
RB1	200UB25 + 100 x 50 x 5RHS outrigger
RB2	200UB25
RB3	180PFC
RB4	200PFC
FB1	200PFC
FB2	200PFC
FB3	C200 24
Window Heads	
WH1	150PFC
WH2	125 x 75 x 6RHS
WH3	100 x 50 x 6RHS
WH4	125 x 6SHS
Ties	
RT1	10210ø4.0 CHS
RT2	200UB30
Bracing	
RX	Roof cross bracing M16 with turnbuckle
WX	Wall cross bracing M16 with turnbuckle

Purlins	
RP1	Z200 15 @ max 1000crs Lap over supports. Bridging at mid span for span more than 3000 Typical UNO
RP2	C200 24 Bridging at mid span for span more than 3000
RP3	Tee from 200UB18 @max 1000 crs
RP4	Z200 24 @ max 1000crs Lap over supports. Bridging at mid span
RP5	for span more than 3000 C100 15 @ max 900crs Bridging at mid span
RP6	for span more than 3000 C150 15 @ max 900 crs Bridging at mid span for span more than 3000

DRAWN MR JDL MJJ VERIFIED MJJ JM MJJ

0 1 2 3 4 5m SCALE 1:100 @ A1

0 1 2 3 4 5m SCALE 1:200 @ A3

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PALARANG COUNCIL OFFICES
MAJARA STREET BUNGENDORE

DRAWING TITLE

ROOF FRAMING PLAN – SHEET 2

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JOB NUMBER CB050308

DRAWING NUMBER S04 C

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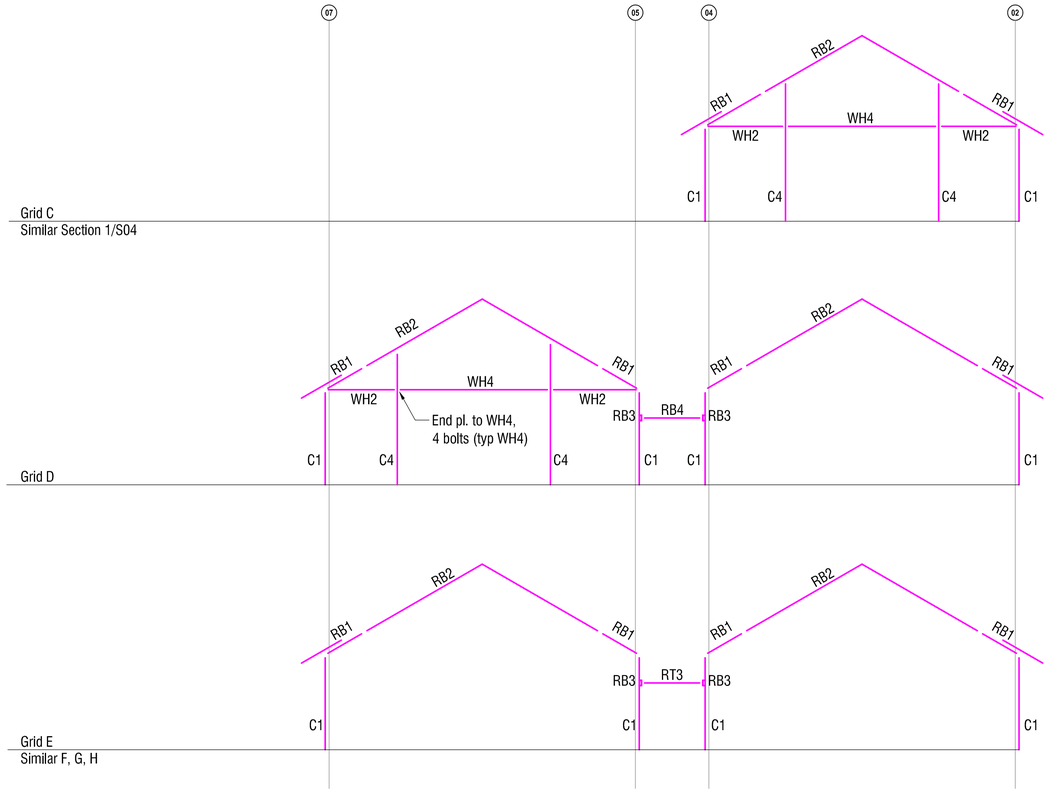

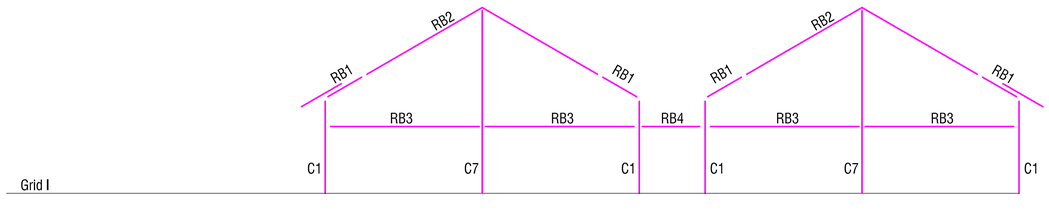

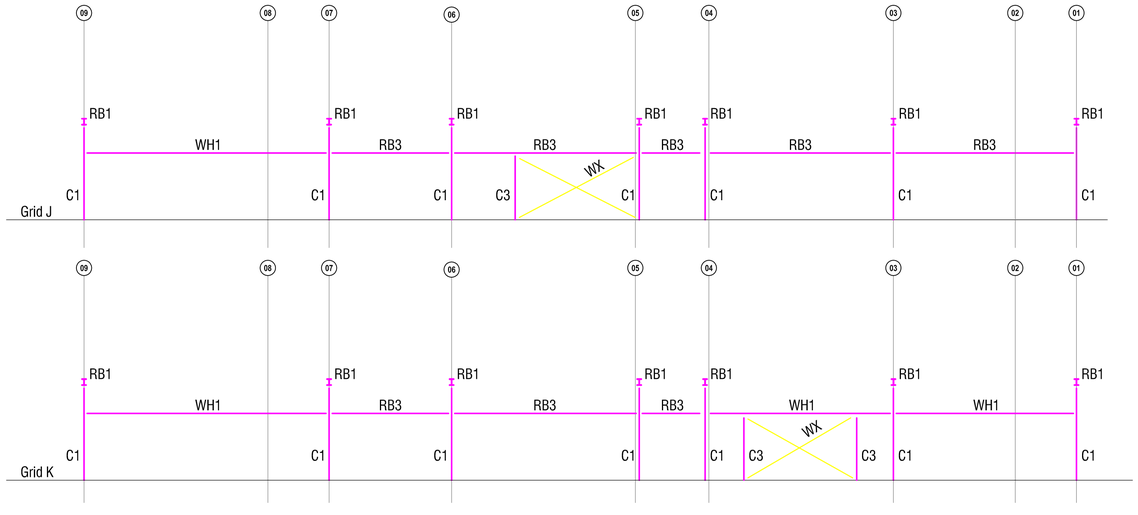

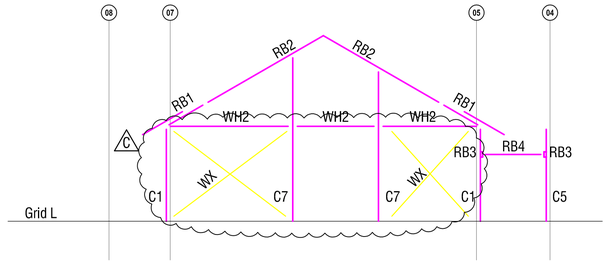

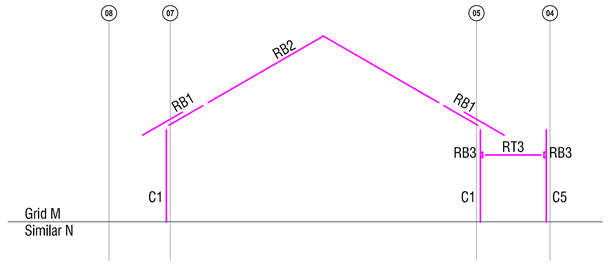

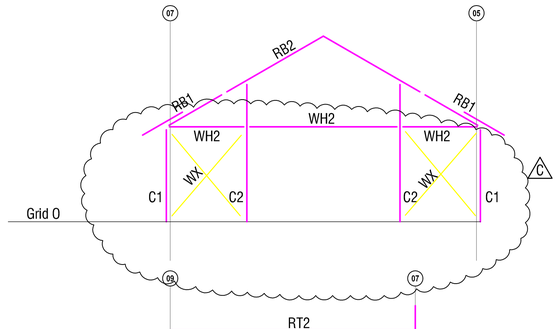

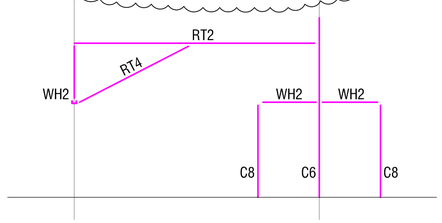

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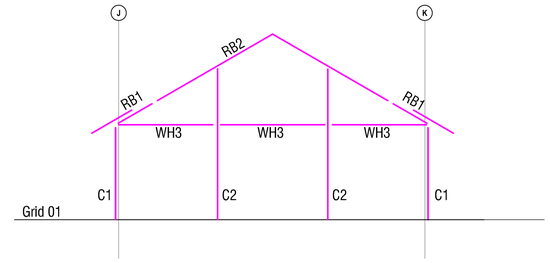

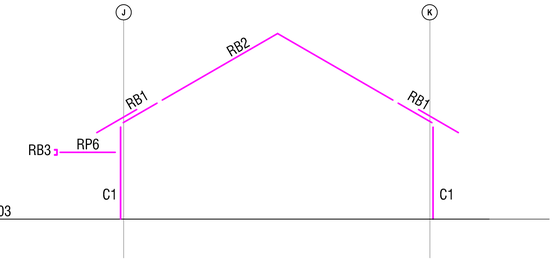

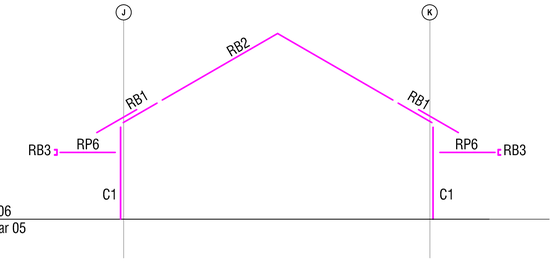

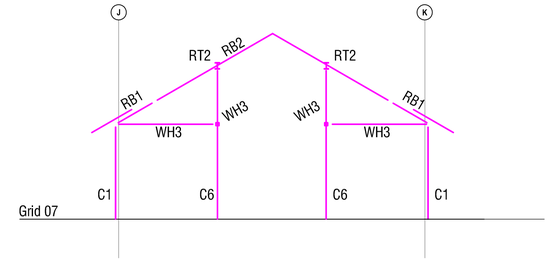

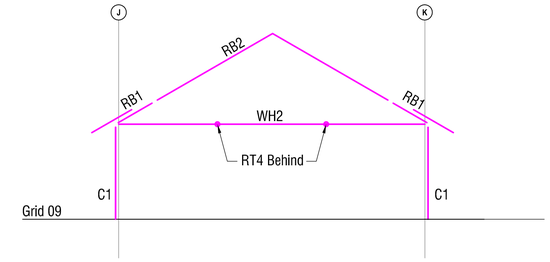

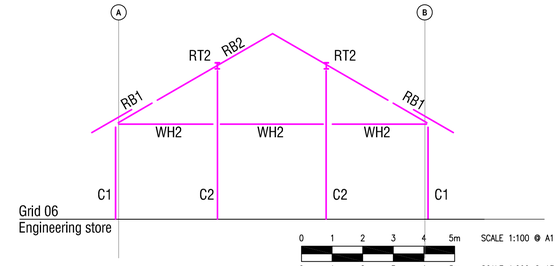

0 1 2 3 4 5m SCALE 1:100 @ A1

0 1 2 3 4 5m SCALE 1:200 @ A3

JM MJJ
VERIFIED MJJ
JDL MJJ
DRAWN MR

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PALARANG COUNCIL OFFICES
MAJARA STREET BUNGENDORE

DRAWING TITLE

ROOF FRAMING DETAILS

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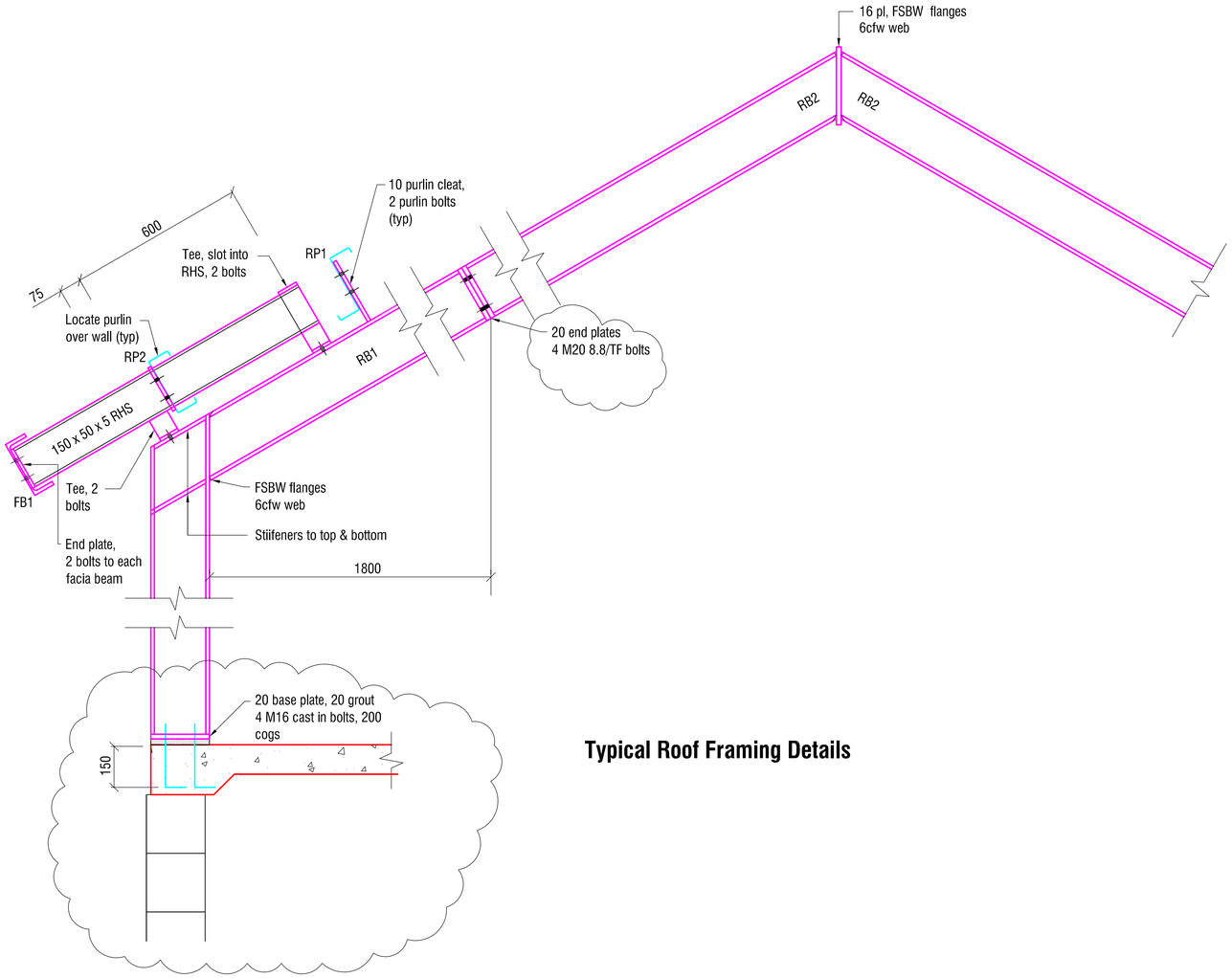
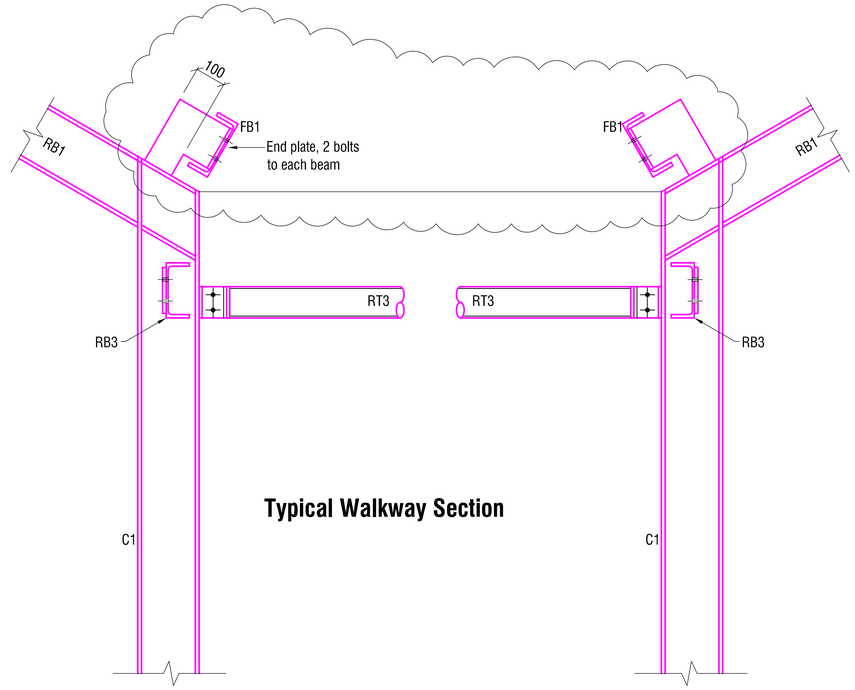


Typical Roof Framing Details



Typical Walkway Section

JM MJJ
VERIFIED MJJ
JDL MJJ
DRAWN MR

0 0.1 0.2 0.3 0.4 0.5m SCALE 1:10 @ A1
0 0.1 0.2 0.3 0.4 0.5m SCALE 1:20 @ A3

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PROJECT

PALARANG COUNCIL OFFICES
MAJARA STREET BUNGENDORE

DRAWING TITLE

STEEL DETAILS – SHEET 1

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S07 B

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