Adams
STRUCTURAL AND CIVIL ENGINEERING

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Engineers Advice No 01

Date: 19 Sep 2023
Project Address: 6 The Corso & 46-50 East Esplanade, Manly NSW
Project No. 190047
Subject: Re Façade Retention
To: Meegan Clancy
Cc:
Attachments: Structural drawings, Geotechnical report, Architectural drawings

Message:

Introduction

Adams Consulting Engineers Pty Ltd (Adams) has been engaged by Aspiring Properties Pty Ltd to provide Structural Engineering advice on the façade retention of the building located at 6 The Corso and 46-50 East Esplanade, Manly. Adams was previously engaged to produce a structural documentation package for pricing for the proposed works which consisted of demolition of the existing building on site and the construction of a new building featuring 3 Ground Floor Retail tenancies and 17 Commercial tenancies over 4 levels. The existing façade along 6 The Corso and 46-50 East Esplanade was to be retained and integrated into the new development.

The proposed development is subject to Northern Beaches Council Development Application number DA2019/0997. The consent for the Development Application is not operative under the following deferred commencement conditions have been satisfied:

- Demolition and Construction Management Plan
- Structural Engineering Report on the Heritage Façade

This letter of Structural Engineering Advice seeks to address the requirements of the Structural Engineering Report on the Heritage Façade. The requirement of this report is that it must undertake an assessment of the heritage listed façade on 6 The Corso, Manly and outline their structural adequacy and the methodology for retention and how they will be conserved, including any works require to achieve this. This letter provides advice on the methodology for retaining the façade and any advice contained within this document will need to be reviewed and developed into For Construction drawings prior to the commencement of construction works on site.

This letter will be broken down into sections dealing with each of the following conditions:

- **DA2019/0997 Condition 22**

  The existing façade of 6 The Corso is to be retained in accordance with the recommendations of the Structural Engineer referenced in Deferred Commencement

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Condition 2. A suitably qualified and practising Structural Engineer is to be appointed to oversee these works during demolition and construction works.

A suitably qualified and practising heritage architect is to be appointed to oversee the conservation and retention of the façade at 6 The Corso and the building at 46-48 East Esplanade, Manly during demolition and construction works.

Details demonstrating compliance with this condition are to be submitted to the Principal Certifying Authority.

Reason: To protect heritage significant fabric during demolition and construction.

- **DA2019/0997 Condition 19**

  The heritage items located outside the property in The Corso, including items I102 - 2 cast iron pedestals, I103 - war memorial (cenotaph) and I114 - cast iron letter box are to be protected and must not be damaged.

  Details demonstrating compliance with this condition are to be provided to the Principal Certifying Authority.

  Reason: To preserve and protect heritage items located within The Corso during demolition and construction work.

In order to address these items this letter has been broken down into the following items:

1. Façade Retention Method – The Corso
2. Façade Retention Method – The Esplanade
3. Potential underpinning of neighbouring building heritage walls.
4. Protection of heritage items within the Corso

Item 1: Method of Façade Retention – The Corso (Condition 22)

The Corso façade is a masonry façade wall featuring arches, approximately 13.9m high and currently laterally braced by the floor diaphragm at each of the existing four storeys with a parapet extending above the fourth floor. The masonry wall is around 520mm thick based on the architectural drawings produced by Wolski Chopin. This suggests that the heritage façade is several leaves of masonry thick with cavities. Currently the masonry wall spans between each level floor diaphragm. The façade is provided below as Figure 1 for reference.

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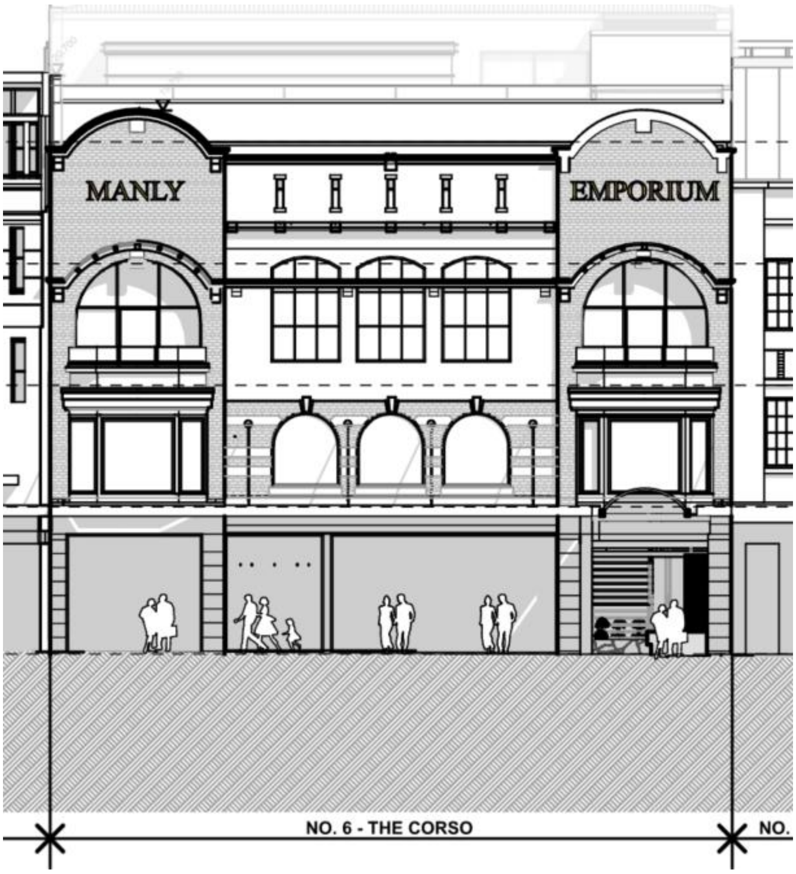

Figure 1: View of 6 The Corso Façade

Adams has produced a retention methodology to allow for support of the façade during the demolition and construction of the new building. It is assumed that the façade is currently laterally supported at each floor level by the floor diaphragm and is supported by a lintel beam at level 1. These assumptions would need to be confirmed prior to construction.

The structural design philosophy is to provide alternative supports to façade wall at spacings not exceeding the current lateral restraint spacing and limit deflection to a suitably low value of 15mm to the top of the façade wall which is in the order of height on 1000 as recommended by AS1170 Structural Desing Actions for the deflection of members supporting brittle elements. This is achieved by providing waler beams at each floor level and the top of the parapet to maintain the structure in an equivalent support condition to the current condition and propping these waler beams with A frames down to the new foundations. The facade retention methodology is documented on drawing 190047- TW001- A and can be summarized by the following construction methodology.

Construction Methodology:

1. Gain access and expose façade structure. Structural Engineer to be invited to inspect structure. Allow for the installation of new wall ties between the masonry leaves with Python Fixings (MT or C as appropriate pending cavity) to bond the leaves of masonry together. Works are to be done from the inside face of the façade. Inspection to also determine the existing façade structural system.

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2. Install screw piles SP1 in accordance with drawing S010. Note the foundations under the existing façade are not to be completed until TSC1 and TSC2 and temporary propping under façade is in place.

3. Construct the pile caps nominated to be constructed before demolition. A Geotechnical Engineer should be engaged to inspect, locate and determine the size and founding level of the existing façade footings prior to construction of these pile caps. The results of this investigation may trigger the requirement for strengthening works or underpinning works to the footings.

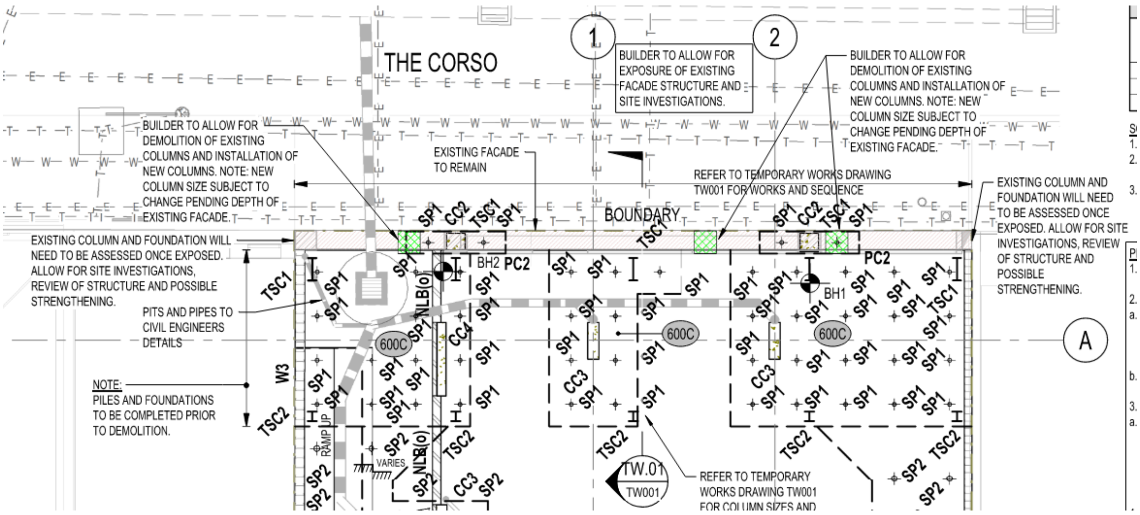

Figure 2: Screw Piles and pile caps to be installed.

4. Install WB1 and connect to wall as detailed on drawing TW001, splice as required to allow for installation. Note all fixings for WB1 are to be internal for compliance with the heritage architect's requirement that all fixings be to the inside face. The WB1 locations are to be coordinated on site prior to construction and the spacings between the new waler beams is not to exceed the spacings between the floor diaphragms. Allow for potential Python fixings at WB1 location.

5. Cut holes in existing floors to allow for installation of TSC1 and TSC2. The existing floor shall be inspected by a Structural Engineer prior to cutting of holes, and if required propping shall be supplied. It is anticipated that temporary propping works will need to be installed to allow for the cutting of penetrations through the floor diaphragms. This will need to be in place prior to any demolition works of the floor.

6. Crane in TSC1 and connect to pile cap (Detail C on TW001) and WB1 (Detail A on TW001).

7. Install TSC2 and connect to pile cap (Detail D) and TSC1 (Detail A).

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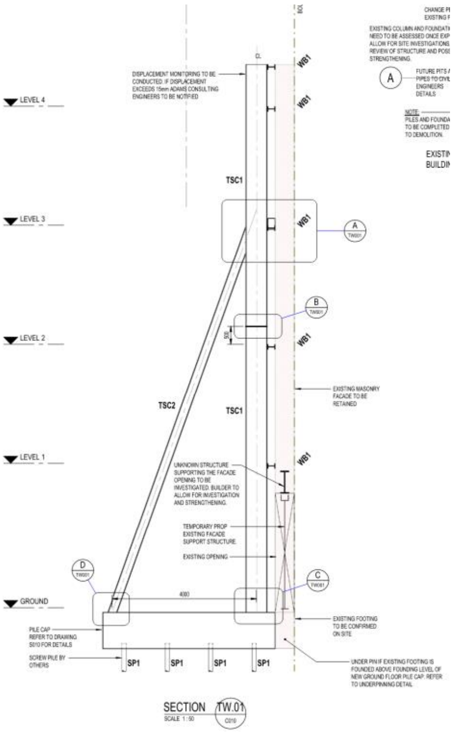

Figure 3: Installed Temporary bracing scheme.

Figure 4: The location of the temporary steel column and the waler beams shown internally on the elevation.

8. Temporarily prop existing façade structure for the vertical weight of the wall to allow for demolition of the existing masonry columns as required architecturally. Note at this stage the existing lintel will need to be reviewed to determine its structural adequacy for the future support condition. It may require strengthening and this shall be determined by the Structural Engineer, along with a proposed methodology if required. The investigations to the existing lintel beam will also need to determine how it can be supported and integrated by the future structure. Additionally temporary footings may be required for the propping subject to the findings of the existing footings in Item 3 above.

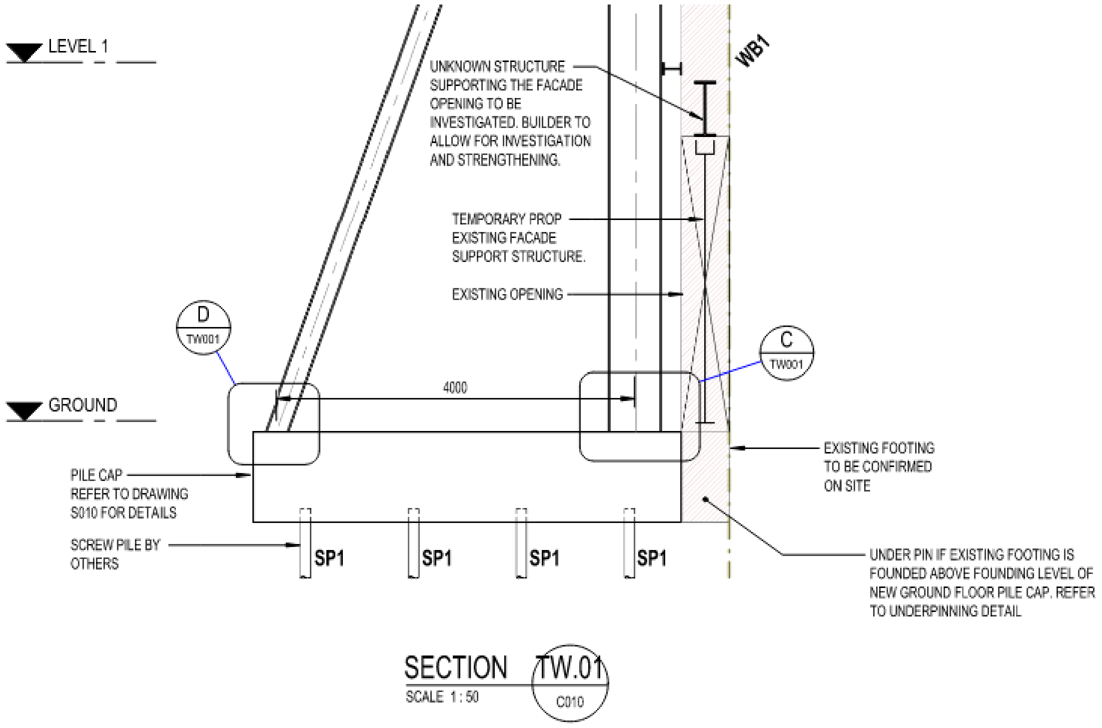

Figure 5: Temporary Propping of the existing facade

9. Demolish existing columns supporting façade.

10. Install remaining screw piles and pile caps. Note no information about the existing façade wall footings is available. Site investigations and local exposure of footings may be required to determine the installation method of piles and pile cap.

11. Strengthen existing façade support structure as/if required. Details will need be provided upon gaining access to façade.

12. Install new columns as per plans and details. Grout pack tight to soffit of façade support beam.

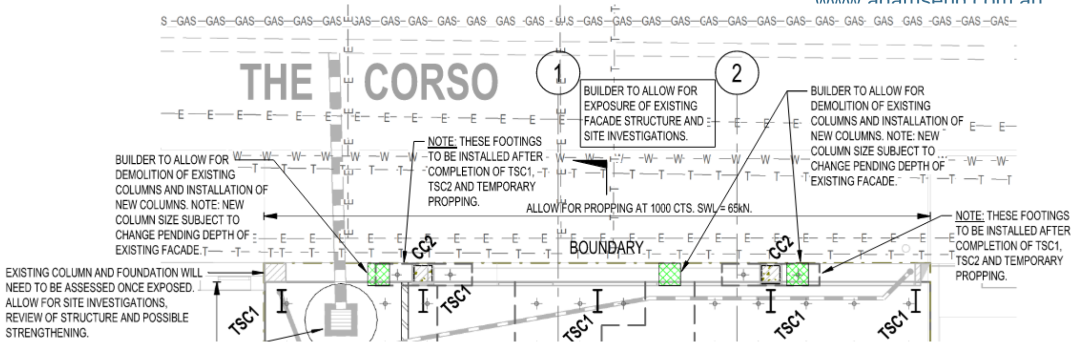

Figure 6: Demolition of existing columns and provision of new support columns and footings

13. Demolish existing building.

14. Maintain survey point at top of parapet on existing façade and monitor deflections of existing façade wall. If deflection exceeds 15mm notify Structural Engineer for advice.

15. Construct building to level 4. Remove TSC1, TSC2 and WB1 and install level 4 pergola. Provide temporary propping to existing masonry parapet during this process. The proposed permanent propping of the façade is to occur at each level. Refer to drawing 190047-S046-A for the 70% design of how this may be accomplished at each floor. Further development of these details will be required based on the site inspection works above and the philosophy of releasing the vertical and in plane support of the wall should be followed so that the new structure only provides out of plane support.

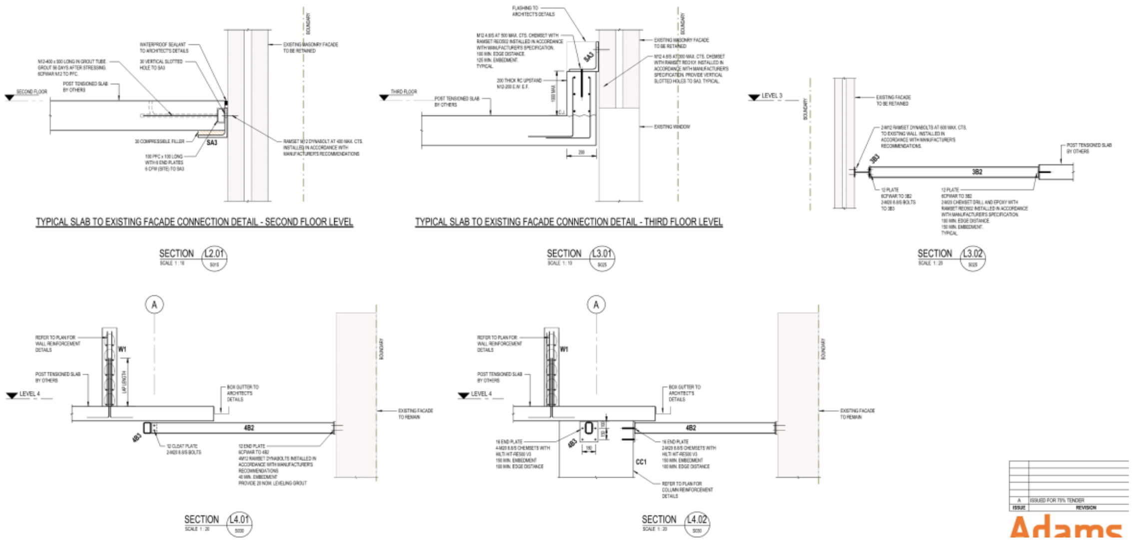

Figure 7: View of the proposed propping of the existing facade at each new floor

16. Infill the voids in the post tensioned slab.

In addition to the above protection works there will be works required by the heritage façade consultant to remediate the façade. The works shall be developed by the heritage consultant and the methodology of these works shall be coordinated between all relevant stakeholders including the heritage consultant, builder, architect and engineers.

Item 2: Method of Façade Retention – East Esplanade (Condition 22)

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Along East Esplanade the façade that needs to be maintained is two storeys high, approximately 9.4m tall. It is constructed of masonry and currently supported by the timber floor diaphragms and the return walls, also constructed of masonry along the boundary. The width of the façade is in the order of 6.5m.

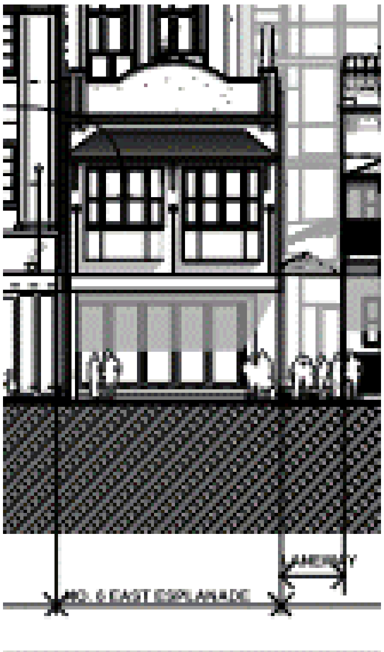

Figure 8: Typical View of the East Esplanade

In order to retain this façade, it is proposed that the boundary walls be maintained to continue the support of the façade until the new concrete floor slabs are constructed and provide the support for the wall. Similarly, to the Corso elevation the masonry wall should also be supported by a waler beam or truss spanning between the external boundary walls at the existing floor levels to allow for their removal. This waler beam should be internal to the façade so not to damage the existing masonry's appearance from the streetscape.

The proposed construction sequence would be:

1. Gain access and expose façade structure. Structural Engineer to be invited to inspect structure. Allow for the addition of the wall ties between the masonry leaves with Python Fixings (MT or C as appropriate pending cavity) to bond the leaves of masonry together. Works are to be done from the inside of the façade.
2. Install the temporary waler beams/truss and connect it to the façade return walls. Indicative locations are shown on the elevation below. Allow for a 300 PFC waler beam. This option will need to be further detailed prior to construction.

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Figure 9: Proposed location of waler beams

3. Demolish the existing structure, leaving the required return walls.
4. As per the Corso elevation a Geotechnical Engineer should be engaged to inspect, locate and determine the size and founding level of the existing façade footings prior to construction of these pile caps
5. Construct the new structure. Once each floor diagram has been done the waler beam/truss can be removed.

In addition to the above protection works there will be works required by the heritage façade consultant to remediate the façade. The works shall be developed by the heritage consultant and the methodology of these works shall be coordinated between all relevant stakeholders including the heritage consultant, builder, architect, and engineers.

Item 3: Potential Underpinning of the neighbouring buildings

The construction of the proposed building will require the construction of new foundations which includes the foundations against the boundary to support the new proposed boundary walls. The foundation system consists of screw piles with a 1000 thick pile cap to transfer the superstructure loads to the pile system.

As the construction of the pile cap is against the boundary there is the possibility that the excavation for the new footings will undermine the footings of the neighbouring buildings. We note that no investigation into the neighbouring footing level has been conducted at this stage to determine the founding level of the neighbouring buildings. It is likely that the neighbouring founding level is below the level of our proposed excavation as the requirements for founding the building on piles is set out in the geotechnical report prepared by JK Geotechnics Pty Ltd (Report

#29060Vrpt.Rev 1) which states that the building will need to be founded on deep piled foundations. We would assume that a similar approach was taken on the neighbouring buildings.

As a conservative measure Adams has noted that further investigations would need to be undertaken to confirm the neighbouring footing levels and if necessary, underpin the neighbouring footings. Figure 10 below shows the potential location of underpinning required if the neighbouring building is founded above the excavation depth. The proposed underpinning detail is included as Figure 11 below. The final underpinning detail will need to be reviewed during the construction and provided for each specific situation where required. This detail will need to be developed with coordination between the Geotechnical Engineer and the Structural Engineer and builder.

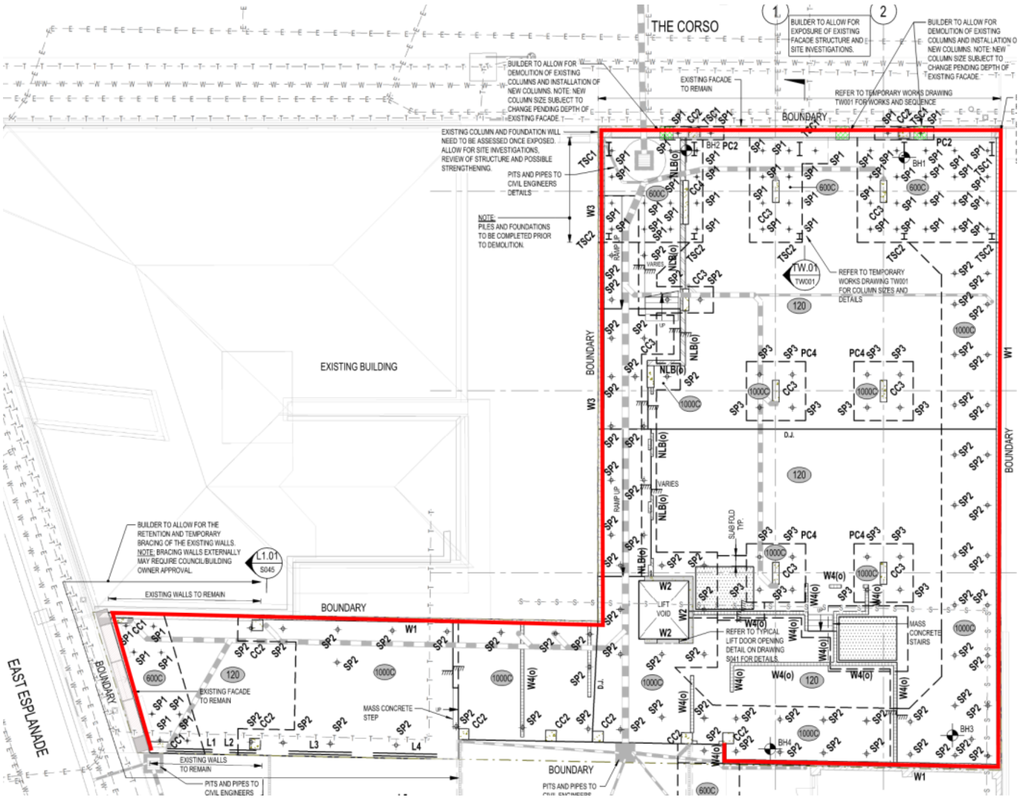

Figure 10: Potential Underpinning locations

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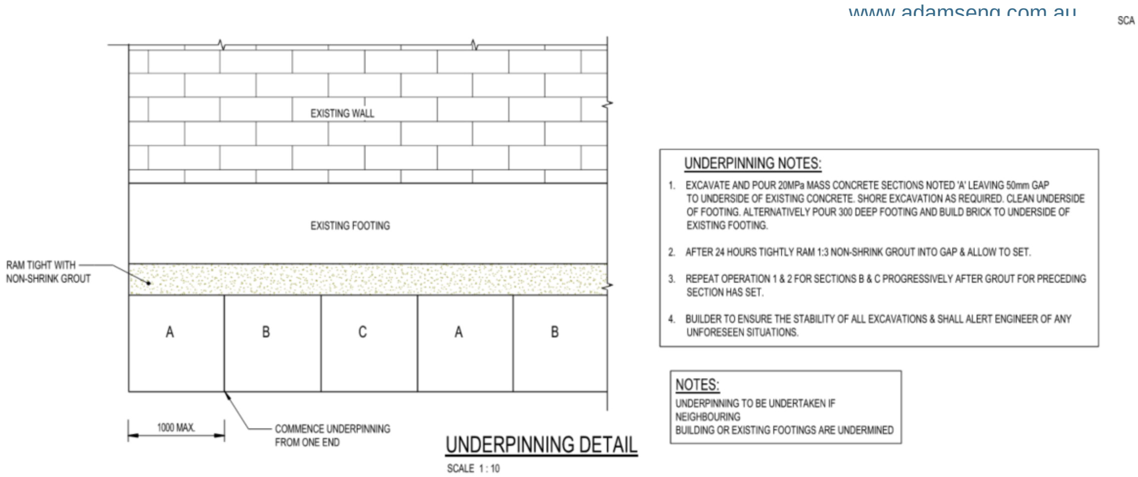

Figure 11: Underpinning detail proposed.

Item 3: Design Supervision and Construction Supervision

Adams recommends that prior to construction a design for the above façade retention and footings is produced "For Construction" and certified by an appropriately qualified Structural Engineer. Adams also recommends that due to the complexity of the façade retention and the high-profile nature of the work that the construction is supervised on a regular basis by an appropriately qualified Structural Engineer.

Item 4: Protection of Heritage Items (Condition 19)

In order to fulfil condition 19 of the DA consent conditions the builder, prior to construction, should submit details of the protection of the following items to the satisfaction of the Private Certifying Authority.

- Item I102 – 2 x cast iron pedestals
- Item I103 – War memorial – cenotaph
- Item I114 – Cast iron letter box

Protective measures are likely to include:

- Management plans in place to detail the movement of equipment around the heritage items. This management plan is to be prepared by the builder prior to commencement of the works and shall be submitted to the council and PCA for approval.
- Temporary works such as wrapping the above items with protective materials, such as timber cladding and a high visibility meshing.

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Conclusion

The above report summarises the structural items to be consider in the maintenance of the heritage façade and associated items of the development at 6 The Corso. This letter should be read in conjunction with advice produced by the heritage architect.

Please contact us should you have any queries.

Yours faithfully

Adams Consulting Engineers Pty Ltd

Andew Sporn

Associate
BE (Hons)/ B Comm, MIEAust, DP0003272, PRE0002021

Project No.190047

MIXED USE DEVELOPMENT
6 THE CORSO & 46-50 EAST ESPLANADE, MANLY

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DRAWING LIST - STRUCTURAL

DRAWING LIST - CIVIL

DRAWING LIST - TEMPORARY WORKS

ISSUE	REVISION	DATE
A	ISSUED FOR 75% TENDER	22/10/19

GENERAL

G1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS SHALL BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY ON THESE DRAWINGS MUST BE REFERRED TO THE ENGINEER, ADAMS CONSULTING ENGINEERS PTY LTD, FOR RESOLUTION PRIOR TO PROCEEDING WITH THE WORK.

G2. THESE DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION UNTIL ISSUED AS "ISSUED FOR CONSTRUCTION" BY THIS OFFICE.

G3. THE CONTRACTOR AND/OR SUB-CONTRACTORS ARE RESPONSIBLE FOR VERIFYING ALL DATUM POINTS, LEVELS AND DIMENSIONS INCLUDING SETOUT DIMENSIONS PRIOR TO COMMENCING EITHER ON SITE CONSTRUCTION OR OFF SITE FABRICATION. ALL SETOUT AND OVERALL DIMENSION SHALL BE OBTAINED FROM THE ARCHITECTURAL DRAWINGS. DO NOT SCALE THESE DRAWINGS.

G4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE. ALL LEVELS ARE EXPRESSED IN METRES.

G5. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE STRUCTURE AND ALL EXCAVATIONS IN A STABLE CONDITION AND ENSURING NO PART IS OVER STRESSED BY CONSTRUCTION ACTIVITIES.

G6. WORKMANSHIP AND MATERIALS ARE TO BE IN ACCORDANCE WITH THE RELEVANT CURRENT NATIONAL CONSTRUCTION CODES, THE BUILDING CODE OF AUSTRALIA, OCCUPATIONAL HEALTH AND SAFETY REGULATIONS AND THE LOCAL STATUTORY AUTHORITIES REQUIREMENTS.

G7. THE APPROVAL OF ANY SUBSTITUTION BY THE ENGINEER IS NOT AN AUTHORIZATION FOR AN EXTRA. ANY EXTRAS INVOLVED MUST BE TAKEN UP WITH THE CLIENT AND/OR PROJECT MANAGER BEFORE WORK COMMENCES.

G8. WHERE ADDITIONAL CONSTRUCTION LOADS SUCH AS MOBILE CRANES ETC. ARE TO BE IMPOSED ON THE STRUCTURE, THE CONTRACTOR SHALL PROVIDE FULL DETAILS OF THE PROPOSED TEMPORARY SUPPORTS TO THE ENGINEER FOR APPROVAL, A MINIMUM OF 7 DAYS PRIOR TO THE PROPOSED WORKS COMMENCING.

G9. THE IMPORTANCE LEVEL OF THE STRUCTURE IN ACCORDANCE WITH NCC IS AS BELOW:

IMPORTANCE LEVEL	IL2

G10. THE STRUCTURAL WORK ON THESE DRAWINGS HAS BEEN DESIGNED FOR THE FOLLOWING LOADS U.N.O:

AREA	LIVE LOAD (kPa)	SUPERIMPOSED DEAD LOAD - SDL (kPa)
ROOF - LIGHT WEIGHT	0.25 kPa	0.5 kPa
ROOF - CONCRETE	2.0 kPa	1.0 kPa
FLOORS - COMMERCIAL	3.0 kPa	1.0 kPa
FLOORS - LOBBY / CORRIDOR	4.0 kPa	1.0 kPa
STAIRS	4.0 kPa	1.0 kPa
BALCONY DECKS	3.0 kPa	1.0 kPa
PLANT PLATFORM	5.0 kPa	1.0 kPa

G11.

THE STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING WIND LOAD PARAMETERS.	
ULTIMATE REGIONAL WIND SPEED V(R500)	45m/s
TERRAIN CATEGORY	2

G12.

THE STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING:	
EARTHQUAKE DESIGN CATEGORY	EDCII

G13. THE ROOF STRUCTURE HAS BEEN DESIGNED FOR THE ROOF LOADS AS STATED ABOVE ONLY AND NO ALLOWANCE HAS BEEN MADE FOR ANY ADDITIONAL LOADS SUCH AS HOISTS, MONORAILS AND MECHANICAL EQUIPMENT UNLESS SUCH ITEMS ARE SHOWN ON THE DRAWINGS.

G14. THE EXTENT AND TYPE OF ALL WATERPROOFING OF STRUCTURAL ELEMENTS INCLUDING RETAINING WALLS ARE TO BE SPECIFIED BY THE ARCHITECT.

G15. ALL COSTS INCURRED BY THE ENGINEER FOR ASSESSMENT OR APPROVAL OF SUBSTITUTION, ALTERATIONS OR ADDITIONAL WORKS SHALL BE BORNE BY THE CONTRACTOR.

G16. NO HOLES, RECESSES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE WITHOUT PRIOR APPROVAL OF THE ENGINEER.

G17. THE BUILDING STRUCTURE HAS BEEN DESIGNED TO SATISFY THE STRUCTURAL RELIABILITY AND ROBUSTNESS REQUIREMENTS OF SECTIONS BP1.1 AND BP1.2 OF THE NCC-2016, VIA COMPLIANCE WITH RELEVANT AUSTRALIAN STANDARDS TO SUIT A DEEMED TO SATISFY SOLUTION.

TREE CONSIDERATIONS:

PLANTING OF TREES SHOULD BE AVOIDED NEAR THE FOUNDATION OF A STRUCTURE (INCLUDING FENCES) OR NEIGHBORING STRUCTURE ON REACTIVE SITES AS THEY CAN CAUSE DAMAGE DUE TO DRYING OF THE CLAY AT SUBSTANTIAL DISTANCES TO REDUCE, BUT NOT ELIMINATE, THE POSSIBILITY OF DAMAGE, TREE PLANTING SHOULD BE RESTRICTED TO A DISTANCE FROM THE STRUCTURE OF:

CLASS OF SITE	MINIMUM DISTANCE OF A SINGLE TREE FROM THE FOOTING
S	0.50 x MATURE TREE HEIGHT
M	0.75 x MATURE TREE HEIGHT
H	1.0 x MATURE TREE HEIGHT
P	1.0 x MATURE TREE HEIGHT
E	1.5 x MATURE TREE HEIGHT

WHEN ROWS OR GROUPS OF TREES ARE INVOLVED, THE DISTANCE AS PER ABOVE VALUES SHOULD BE INCREASED BY 50%.
A GROUP OF TREES WOULD BE DEFINED AS MORE THAN ONE TREE GROWING WITHIN THE MINIMUM CRITICAL DISTANCES DEFINED IN IN THE VALUES ABOVE FROM EACH OTHER.

WHERE THIS REQUIREMENT IS NOT ACHIEVED ALL FOOTINGS ARE TO BE DEEPENED IN ACCORDANCE WITH THE REQUIREMENTS NOTED IN THE GEOTECHNICAL REPORT, OR A ROOT BARRIER INSTALLED UNDER THE DIRECTION OF THE GEOTECHNICAL ENGINEER.

SLAB ON GROUND AND FOOTINGS

F1.

SOIL CLASSIFICATION FOR THE SITE IS:	
STRIP AND PAD FOOTINGS	CLASS 'A' TBC
SLAB ON GROUND	CLASS 'A' TBC
SITE CLASSIFICATION TO AS2870 - 2011 RESIDENTIAL SLABS AND FOOTINGS TO BE CONFIRMED ON SITE BY THE BUILDER.	
GEOTECHNICAL ENGINEER:	JK GEOTECHNICS PTY LTD
REPORT NUMBER:	29060Vrpt.rev1-Manly
DATED:	16th MARCH 2016

F2.

EARTHQUAKE CLASSIFICATION FOR THE SITE IS:	
SUB-SOIL CLASS	CLASS 'D'
HAZARD FACTOR	Z= 0.08

F3.

FOUNDING MATERIAL AND DEPTH:	
FOUNDING MATERIAL FOR FOOTINGS	MEDIUM DENSE SAND
THE MINIMUM FOUNDING DEPTHS ARE TO BE AS NOTED IN THE SOIL REPORT.	

F4.

BORED PIERS ARE TO BE FOUND INTO MEDIUM DENSE SAND WITH THE FOLLOWING BEARING CAPACITY:	
ISOLATED PIER FOOTING	800 kPa
THE MINIMUM FOUNDING DEPTHS ARE TO BE AS NOTED IN THE GEOTECHNICAL REPORT UNLESS NOTED OTHERWISE ON PLAN.	

F5. BEFORE ANY CONCRETE IS POURED THE SAFE BEARING CAPACITY SOIL PROFILE AND SITE CLASSIFICATION SHALL BE VERIFIED BY THE PROJECT GEOTECHNICAL ENGINEER AT THE CONTRACTORS EXPENSE.

F6. PRIOR TO ANY COMPACTED FILLING BEING PLACED THE GROUND BELOW THE SLAB SHALL BE PROOF ROLLED WITH A 3 TONNE SHEEPSFOOT ROLLER COMPACTOR. ANY "SOFT SPOTS" ENCOUNTERED SHALL BE DUG OUT AND REPLACED WITH COMPACTED CRUSHED ROCK IN ACCORDANCE WITH AS2870. FILLING USED IN THE CONSTRUCTION OF THE SLAB, EXCEPT WHERE THE SLAB IS SUSPENDED SHALL CONSIST OF CONTROLLED FILL AS FOLLOWS:

(a) CONTROLLED FILL IS MATERIAL THAT HAS BEEN PLACED AND COMPACTED IN LAYERS BY COMPACTION EQUIPMENT WITHIN DEFINED MOISTURE RANGE TO A DEFINED DENSITY REQUIREMENT. EXCEPT AS PROVIDED BELOW, CONTROLLED FILL SHALL BE PLACED IN ACCORDANCE WITH AS3798. SAND FILL UP TO 0.8m DEEP, WELL COMPACTED IN NOT MORE THAN 0.3m THICK LAYERS BY A VIBRATING PLATE OR VIBRATING ROLLER, SHALL BE DEEMED TO COMPLY WITH THIS REQUIREMENT. A SATISFACTORY TEST FOR SAND FILL NOT CONTAINING GRAVEL SIZED MATERIAL IS THE ACHIEVEMENT OF A BLOW COUNT OF 7 OR MORE PER 0.3m USING THE PENETROMETER TEST DESCRIBED IN AS1289.F3.3. NON-SAND FILL UP TO 0.4m DEEP, WELL COMPACTED IN NOT MORE THAN 0.15m LAYERS BY A MECHANICAL ROLLER, SHALL BE DEEMED TO COMPLY WITH THIS REQUIREMENT. CLAY FILL SHALL BE MOIST DURING COMPACTION.

(b) ROLLED FILL CONSISTS OF MATERIAL COMPACTED IN LAYERS BY REPEATED ROLLING WITH AN EXCAVATOR. ROLLED FILL SHALL NOT EXCEED 0.6m COMPACTED IN LAYERS NOT MORE THAN 0.3m THICK FOR SAND OR 0.3m COMPACTED IN LAYERS NOT MORE THAN 0.15m THICK FOR OTHER MATERIAL.

(c) THE EXTENT OF UNCONTROLLED AND CONTROLLED FILL REQUIRED ON THE SITE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

(d) FOR SLAB ON GROUND THAT IS TO BE SUPPORTED ON AN ENGINEERED FILL PLATFORM WITH FILL DEPTH THICKER THAN THE CONTROLLED FILL SPECIFIED IN (a), PLACEMENT OF THE FILL IS TO BE IN ACCORDANCE WITH AS3798 AND SUBJECTED TO LEVEL 1 SUPERVISION. COMPACTION IS TO ACHIEVE 98% MAXIMUM DRY DENSITY. FILL MATERIAL IS TO BE NON-REACTIVE IN NATURE AND COMPLIES WITH THE FOLLOWING REQUIREMENTS:

i) THE PLASTICITY INDEX SHALL NOT EXCEED 6.
ii) THE PRODUCT OF THE PLASTICITY INDEX AND THE PERCENTAGE OF MATERIAL PASSING THROUGH A 0.425mm (MAXIMUM) SIEVE SHALL NOT EXCEED 200.
iii) THE MATERIAL SHALL BE WELL GRADED WITH A MAXIMUM PARTICLE SIZE OF 20mm.

THE PROPOSED FILL MATERIAL SHALL BE TESTED TO ENSURE THAT THE MATERIAL COMPLIES WITH THE ABOVE SPECIFICATION IN AN APPROVED NATA LABORATORY, AND THE EXPENSE FOR THE TESTING SHALL BE INCLUDED IN THE TENDER PRICE. SAMPLES OF THE FILL MATERIAL ACCOMPANIED WITH THE TESTING LABORATORY ANALYSIS SHALL BE SUBMITTED TO THE SUPERINTENDENT FOR APPROVAL PRIOR TO DELIVERING THE FILL MATERIAL TO SITE.
ALL FILL TO BE PLACED IN LAYERS NOT EXCEEDING 200mm LOOSE MATERIAL.

F7. POLYTHENE MEMBRANE UNDER SLAB IS TO BE 0.2mm THICK BRANDED AS CONCRETE UNDERLAY, CONTINUOUS, LAPPED 200mm MINIMUM WHERE REQUIRED AND TAPED AT LAPS, PUNCTURES AND SERVICE AND PIPE PENETRATIONS.

F8. WHERE SURFACE SILTS AND SANDS MAY BECOME UNWORKABLE DURING THE WET WINTER MONTHS, ALLOWANCE SHALL BE MADE FOR THE IMMEDIATE PLACEMENT OF A GRANULAR WORKING SURFACE OF AT LEAST 200mm THICK.

F9. EXCAVATIONS NEAR THE BUILDING EDGE SHALL BE BACKFILLED IN SUCH A MANNER TO PREVENT READY ACCESS OF WATER TO THE FOUNDATIONS.

F10. THE GROUND SURROUNDING THE SLAB SHALL HAVE ITS SURFACE AT LEAST 150mm BELOW THE SLAB SURFACE AND BE SLOPED AWAY FROM THE SLAB EDGE SO THAT SURFACE WATER WILL BE RUN VIA IMPERMEABLE SPOON DRAINS TO SUITABLE DRAINAGE POINTS.

F11. ALL RELEVANT CODES AND REGULATIONS MUST BE COMPLIED WITH INCLUDING AS2870 AND AS3600.

F12. ALL GRASS ROOTS, VEGETATION AND COMPRESSIBLE TOPSOIL MUST BE REMOVED FROM THE AREA OF THE SLAB.

F13. HOT WATER HEATING PIPES MAY BE EMBEDDED IN THE SLAB IF THE THICKNESS IS INCREASED BY 25mm AND LAID ON SL52 MESH.

F14. TERMITE PROTECTION SHALL BE PROVIDED AS REQUIRED BY THE LOCAL AUTHORITY.

F15. OWNERS MUST RECOGNIZE THEIR RESPONSIBILITIES NOTED IN AS2870 AND IN MORE DETAIL IN THE C.S.I.R.O PUBLICATION "FOUNDATION MAINTENANCE AND FOOTING PERFORMANCE : A HOMEOWNER'S GUIDE".

F16. ROOT BARRIERS, DRAINAGE AND OTHER MEASURES RECOMMENDED IN THE GEOTECHNICAL REPORT ARE TO BE INCLUDED IN THE BUILDERS WORKS.

F17. ALL EXCAVATIONS SHOULD BE CAREFULLY INSPECTED BY A COMPETENT PERSON AND THIS OFFICE CONTACTED IMMEDIATELY IF CONDITIONS OTHER THAN THOSE DESCRIBED IN THE SOIL REPORT ARE ENCOUNTERED OR ANY FILLING IS FOUND.

CONCRETE

C1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 & AS1379. CONCRETE TESTING SHALL BE BY THE PROJECT ASSESSMENT METHOD.

C2. COVER (MILLIMETERS) TO ALL REINFORCEMENT INCLUDING FITMENTS (MILLIMETERS FINISHES) SHALL BE AS FOLLOWS UNLESS OTHERWISE SHOWN.

ELEMENT	FORMED INTERNAL	FINISHED EXTERNAL	CAST AGAINST GROUND
FOOTINGS	-	50	75
BORED OR CAST PIERS	-	50	75
COLUMNS / PEDESTALS	30	40	50
WALLS	30(40)*	40	50
BEAMS	30	40	50
SLABS	20	40	30
STAIRS	20	40	30

*WALLS - 40mm COVER TO VERTICAL REINFORCEMENT. WHERE MEMBERS HAVE AT LEAST ONE FACE EXPOSED TO THE WEATHER OR POSSIBLE CORROSIVE ATTACK, THIS CONCRETE REQUIRES A SPECIAL TOLERANCE FOR THE ABOVE COVERS -0mm+10mm. MEMBERS MAY REQUIRE EXTRA COVER APPLICABLE. FOR FIRE-RATING PURPOSES. THIS WILL BE NOTED ON DRAWINGS WHERE APPLICABLE.

C3. SIZES OF CONCRETE MEMBERS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.

C4. DEPTHS OF BEAMS ARE GIVEN FIRST AND INCLUDE SLAB THICKNESS.

C5. BEAMS AND SLAB SHALL BE POURED TOGETHER IN ONE OPERATION.

C6. NO HOLES CHASES OR EMBEDMENT OF PIPES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT PRIOR APPROVAL OF THE ENGINEER.

C7. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY SHOWN IN TRUE PROJECTION. REINFORCEMENT IS DENOTED BY A SYMBOL IN ACCORDANCE WITH AS4671 FOR STEEL REINFORCING MATERIALS AND AS4672 FOR STEEL PRESTRESSING MATERIALS

C8. SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITION AS SHOWN OR AS OTHERWISE APPROVED BY THE ENGINEER. WHERE LAP LENGTH IS NOT SHOWN, IT SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCEMENT. LAPS TO FABRIC SHALL BE TWO TRANSVERSE WIRES PLUS 100mm.

C9. WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED WITHOUT THE APPROVAL OF THE ENGINEER.

C10. ALL REINFORCEMENT SHALL BE SUPPORTED IN ITS CORRECT POSITION DURING CONCRETING BY APPROVED BAR CHAIRS, SPACERS OR SUPPORT BARS. FOR ALL EXTERNAL SURFACES, PROVIDE FULLY PLASTIC BAR CHAIRS, TIE WIRE SHALL NOT BE NAILED TO THE FORMS, REINFORCING BARS SHALL NOT BE USED TO KEEP FORMS APART AND A THROUGH TIE SYSTEM SHALL BE USED TO TIE FORMS.

C11.

DISTRIBUTION BARS SHALL BE PROVIDED IN SLABS AS FOLLOWS U.N.O:	
SLABS UP TO 250mm THICKNESS	N12-300
SLABS 250 TO 300mm THICKNESS	N12-250
SLABS 300 TO 500 THICKNESS	N12-150
PROVIDE 2N16 x 1200 LONG DIAGONAL TRIMMING BARS IN EACH FACE OF SLAB AROUND OPENINGS	

C12. CAMBER -UNLESS NOTED OTHERWISE ON THE DRAWINGS, SLABS SHALL BE GIVEN A POSITIVE UPWARD CAMBER AT MID-SPAN OF 3mm PER 1000mm SPAN. THE METHOD OF CAMBERING IS TO BE AGREED WITH THE ENGINEER. BEAMS SHALL BE CAMBERED AS SHOWN ON THE DRAWINGS (NEGATIVE CAMBERING IS NOT ALLOWED).

C13. FORMWORK SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH AS3610. FORMWORK SHALL REMAIN IN POSITION FOR A MINIMUM OF 28 DAYS AFTER POURING OF CONCRETE UNLESS WRITTEN APPROVAL BY THE ENGINEER STATING OTHERWISE IS OBTAINED.

C14. UNLESS NOTED OTHERWISE, CONCRETE GRADES SHALL BE AS FOLLOWS.

ELEMENT	F'c (MPa)	SLUMP (mm)	AGGREGATE (mm)
FOOTINGS	32	75	20
PIERS/ PILES	32	75	20
COLUMNS	40	75	20
SLABS / BEAMS	40	75	20
STAIRS / INTERNAL	32	75	20
EXTERNAL SLAB/BEAM/STAIR			
-EXPOSED TO WEATHER	32	75	20
GROUND SLAB			
-OFFICE, COMMERCIAL	25	65	20

EXTERNAL ELEMENTS ARE THOSE EXPOSED TO WEATHER RAIN & WATER PENETRATION AND ARE CLASSIFIED B1 UNLESS NOTED OTHERWISE. CONCRETE TO BE MINIMUM GRADE 25 FOR FOOTINGS AND MINIMUM GRADE 32 FOR ALL OTHER ELEMENTS.

C15. GROUND SLABS, EXTERNAL CONCRETE ELEMENTS, GRADE S32 MINIMUM, SHALL MEET THE FOLLOWING REQUIREMENTS - MINIMUM PORTLAND CEMENT CONTENT 330kg/m³ (NO FLY-ASH TO BE USED) MAXIMUM WATER:CEMENT RATIO 0.5, SHRINKAGE LIMIT 600 MICRO-STRAIN AFTER 56 DAYS, AND CHLORIDE CONTENT TO BE RESTRICTED AS PER AS 3600, CLAUSE 4.9.

C16. CONCRETE MUST BE CURED BY AN APPROVED METHOD FOR SEVEN DAYS AFTER POURING AND CURING MUST COMMENCE WITHIN 2 HOURS OF PLACEMENT.

C17. ADDITIVES MUST NOT BE ADDED TO THE CONCRETE WITHOUT THE APPROVAL OF THE ENGINEER.

C18. CONSTRUCTION JOINTS SHALL BE PROPERLY FORMED AND CONSTRUCTED ONLY WHERE SHOWN OR APPROVED BY THE ENGINEER.

C19. ALL CONCRETE SHALL BE MECHANICALLY VIBRATED. THE VIBRATORS SHALL NOT BE USED TO VIBRATE THE FORMS NOR SHALL THEY BE USED TO SPREAD THE CONCRETE.

C20. CONCRETE SHALL BE SEPARATED FROM SUPPORTING MASONRY BY TWO LAYERS OF MALTHOID (OR AN APPROVED EQUIVALENT). FOR SLABS ON GROUND AND PAVING, VERTICAL FACES OF SLABS, MASONRY WALLS AND COLUMNS ARE TO BE SEPARATED BY 10mm THICK BITUMINOUS CANITE OR SIMILAR.

C21. PROVIDE A 20mm x 20mm CHAMFER TO ALL VISIBLE JUNCTIONS OF CONCRETE FACES, EXCEPT FOR PRECAST PANELS WHICH SHALL HAVE A 12mm X 12mm CHAMFER. - REFER TO ARCHITECTS DRAWINGS FOR FURTHER DETAILS.

C22. ALL PROPS AND FORMWORK FOR BEAMS AND SLABS SHALL BE REMOVED BEFORE CONSTRUCTION OF ANY MASONRY WALLS OR PARTITIONS ON THE FLOOR.

C23. ALL NON LOAD BEARING WALLS SHALL BE KEPT CLEAR OF THE UNDERSIDE OF SLABS AND BEAMS BY 20mm UNLESS OTHERWISE SHOWN.

C24. UNLESS OTHERWISE SPECIFIED THE SURFACE FINISH TO CONCRETE ELEMENTS SHALL BE CLASS 2 IN ACCORDANCE WITH AS3610

C25. INSTALLATION OF ALL POST INSTALLED FASTENINGS MUST BE CARRIED OUT BY AEFAC CERTIFIED ANCHOR INSTALLERS.

MASONRY

M1. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF AS3700, SAA MASONRY CODE.

M2. LOAD BEARING BRICKS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH F'uc OF 30MPa.

M3. LOAD BEARING BLOCKS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH F'uc OF 15MPa

M4. MORTAR SHALL BE FRESHLY PREPARED AND UNIFORMLY MIXED IN THE FOLLOWING RATIOS UNLESS NOTED OTHERWISE ON THE STRUCTURAL DRAWING.

M5. FOR REINFORCED WALLS - 1 PART CEMENT, 1 PART LIME AND 6 PARTS SAND AND HAVE AN AVERAGE 28 DAY COMPRESSIVE STRENGTH OF 11.0MPa.

M6. FOR UNREINFORCED WALLS ABOVE GROUND LEVEL - 1 PART CEMENT, 1 PART HYDRATED LIME AND 6 PARTS OF WELL GRADED SAND COMPLYING WITH AS2758.

M7. FOR UNREINFORCED WALLS BELOW GROUND LEVEL - 1 PART CEMENT, 1/2 PART HYDRATED LIME AND 4.5 PARTS OF WELL GRADED SAND COMPLYING WITH AS 2758.

M8.

IMPORTANT NOTE:
ALL CAVITY FILL IS TO BE WITH GROUT COMPRISING - 1 PART CEMENT,2.5 PARTS SAND AND 1.5 PARTS 10mm AGGREGATE (POURED IN 1000mm MAXIMUM LIFTS). GROUT TO HAVE A CHARACTERISTIC COMPRESSIVE STRENGTH (F'c) OF 20 MPa AND SHALL HAVE A SLUMP OF 230 PLUS OR MINUS 30mm AT THE TIME OF POURING.

M9. MASONRY SUPPORTING CONCRETE SHALL BE SMOOTH AND LEVEL WITH ALL DEPRESSIONS FILLED WITH MORTAR AND SHALL BE SEPARATED AT THE BEARING SURFACE BY TWO LAYERS OF BITUMINOUS BUILDING PAPER (MALTHOID OR EQUIVALENT).

M10. VERTICAL FACES BETWEEN MASONRY WALLS AND CONCRETE SHALL BE SEPARATED BY 10mm THICK ABELFLEX.

M11. ALL NON-LOAD BEARING MASONRY WALLS SHALL BE KEPT CLEAR OF THE UNDERSIDE OF SLABS, SHELF ANGLES OR BEAMS BY MINIMUM OF 20mm.

M12. NO MASONRY SUPPORTED BY CONCRETE SHALL BE ERECTED UNTIL SUPPORTING FORMWORK, ETC. HAS BEEN REMOVED.

M13. WHERE MASONRY WALLS ARE TO BE CONSTRUCTED ON SUSPENDED SLABS, THE MATERIALS TO BE USED IN THE WALL ARE TO BE STACKED AS NEAR AS POSSIBLE TO THE FINAL POSITION OF THE WALL.

M14. NO MATERIALS ARE TO BE STACKED ON CANTILEVERED SLABS. NO MATERIALS ARE TO BE STACKED ON SUSPENDED CONCRETE WORK UNTIL ALL PROPS HAVE BEEN REMOVED. STACKING LOADS SHALL NOT EXCEED THE DESIGN LIVE LOAD AS INDICATED IN THE GENERAL NOTES.

M15. PROVIDE FULL-HEIGHT, ARTICULATION JOINTS IN ACCORDANCE WITH CEMENT AND CONCRETE ASSOCIATION CONSTRUCTION NOTE TN61, AT 6.0m CENTERS UNLESS SHOWN OTHERWISE. JOINTS SHALL BE 15mm WIDE WITH 20mm DIAMETER CLOSED CELL POLYETHYLENE FOAM BACKING ROD AND POLYSULPHIDE BASED CAULKING SEALANT TO EXTERNAL FACE.

M16. CAVITY WALL TIES TO BE AS FOLLOWS:
a) FOR MASONRY VENEER WALLS - AT 600mm VERTICAL CENTRES GENERALLY AND REDUCE TO 300mm CENTRES AROUND OPENINGS AND AT CONTROL JOINTS, HORIZONTAL SPACING TO BE AT AVERAGE 450mm CENTRES, MAX. 600mm
b) FOR CAVITY WALLS - AT 600mm MAXIMUM CENTRES IN EACH DIRECTION. REDUCE VERTICAL TIE SPACINGS TO AVERAGE 300mm (MAX 400mm) AROUND OPENINGS OR AT CONTROL JOINTS.
c) TIES BETWEEN LEAVES OF MASONRY FORMING SOLID WALLS OR ENGAGED PIERS SHALL BE AT 400mm MAXIMUM CENTRES IN EACH DIRECTION.
TIES ARE TO BE MEDIUM DUTY FOR THE APPROPRIATE CAVITY WIDTH AND ARE TO BE GALVANIZED TO R2 RATING IN ACCORDANCE WITH AS3700 AND AS2699. USE 3.15mm DIAMETER GALVANIZED STEEL WIRE TIES FOR CAVITY WIDTHS LESS THAN 65mm. USE 6mm DIAMETER GALVANIZED STEEL WIRE TIES FOR CAVITY WIDTHS FROM 65mm TO 130mm. TYPICAL TIES AS REQUIRED ON DETAILS ABUTTING STEEL OR CONCRETE TO BE 6mm DIAMETER GALVANIZED STEEL WIRE AT 400 MAXIMUM CENTERS.

FIRE RATING

FR1. THE FOLLOWING CONCRETE STRUCTURAL ELEMENTS HAVE BEEN DESIGNED FOR FIRE RESISTANCE LEVEL (FRL) IN ACCORDANCE WITH BCA AND FIRE ENGINEERS REQUIREMENTS:

LEVEL	USE	ELEMENT	FRL
GROUND FLOOR	COMMERCIAL	EXTERNAL WALLS	120/120/120
GROUND FLOOR	COMMERCIAL	INTERNAL WALLS	120/120/120
GROUND FLOOR	COMMERCIAL	SLABS & BEAMS ABOVE RETAIL FLOORS	120/120/120
GROUND FLOOR	COMMERCIAL	EXTERNAL & INTERNAL COLUMNS	120/120/120
LEVEL 1 - LEVEL 4	COMMERCIAL	EXTERNAL & INTERNAL WALLS	120/120/120
LEVEL 1 - LEVEL 4	COMMERCIAL	SLABS & BEAMS ABOVE APARTMENT FLOORS	120/120/120
LEVEL 1 - LEVEL 4	COMMERCIAL	EXTERNAL & INTERNAL COLUMNS	120/120/120
ROOF	ROOF	ROOF SLABS & BEAMS ABOVE COMMERCIAL	120/120/120
ALL AREAS	ALL USAGE	STAIR FLIGHTS & LANDINGS PROTECTED BY FIRE RATED WALLS	-/-/-

FR2. THE FOLLOWING MASONRY STRUCTURAL ELEMENTS HAVE BEEN DESIGNED FOR THE FOLLOWING FIRE RESISTANCE LEVELS:

LEVEL	USE	ELEMENT	FRL
GROUND FLOOR	COMMERCIAL	EXTERNAL WALLS	120/120/120
GROUND FLOOR	COMMERCIAL	INTERNAL WALLS	120/120/120
LEVEL 1 - LEVEL 4	COMMERCIAL	EXTERNAL & INTERNAL WALLS	120/120/120

ABBREVIATIONS LEGEND

ABBREVIATION	DESCRIPTION
B	BOTTOM FACE
B/S	BOTH SIDES
CENT	CENTRALLY PLACED
CFW	CONTINUOUS FILLET WELD
CL	CENTRE LINE
CTS	CENTRES
d	DEPTH/DEEP
DL	SUPERIMPOSED DEAD LOAD
DWG	DRAWING
EF	EACH FACE
EW	EACH WAY
EQ	EQUAL
FF	FAR FACE
F/S	FAR SIDE
FSBW	FULL STRENGTH BUTT WELD
H	HORIZONTAL
h	HEIGHT/HIGH
HDG	HOT DIP GALVANIZED
LG	LONG/LENGTH
LL	LIVE LOAD
NF	NEAR FACE
NGL	NATURAL GROUND LINE
NLB	NON-LOADBEARING
NOM	NOMINAL
N/S	NEAR SIDE
NTS	NOT TO SCALE
OPP	OPPOSITE
PL	PLATE
PT	POST TENSION
SIM	SIMILAR
T	TOP FACE
T&B	TOP AND BOTTOM
TBC	TO BE CONFIRMED
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
U/S	UNDERSIDE
V	VERTICAL
w	WIDTH/WIDE

LEGEND

LEGEND APPLIES TO ALL STRUCTURAL DRAWINGS UNLESS NOTED OTHERWISE

200 PROPOSED SLAB THICKNESS.
STEP IN SLAB. REFER ARCHITECTS DRAWINGS
STUD WORK OVER
LOADBEARING WALL UNDER
LOADBEARING WALL UNDER & OVER
BLOCKWORK OVER
BRICKWORK OVER
CONCRETE WALL OVER
PRECAST WALL OVER
EXISTING WALL TO BE DEMOLISHED
1B3 STEEL BEAM (FIRST FLOOR SUPPORT BEAM No B3)
1L2 LINTEL (LINTEL TO FIRST FLOOR OPENING No 2)
1FJ1 FLOOR JOIST (FIRST FLOOR JOIST No FJ1)
CONCRETE COLUMN UNDER ONLY.
CC1 CONCRETE COLUMN UNDER & OVER
CC1 CONCRETE COLUMN OVER ONLY

LEVEL
LEVEL
LEVEL
FOUNDATION
C1(o) C1 C1(o) C1(u) C1
STEEL/TIMBER COLUMN NAMING CONVENTION

PB PLY BRACE
WB WALL BRACE

NOTE:
ALL BRACING SHOWN ON PLANS TO BE CONSTRUCTED ON WALLS BELOW LEVEL DRAWN

600d x 1800w
CONCRETE BEAM UNDER

N12-300-B(UL),(LL)-T(UL),(LL)-EF-FF-NF
NEAR FACE
FAR FACE
EACH FACE
TOP
LOWER LAYER
UPPER LAYER
BOTTOM
SPACING
BAR DIAMETER
BAR TYPE

7.03
S024
FLOOR LEVEL INDICATOR
SECTION NUMBER
DRAWING SECTION LOCATED ON

ISSUE	REVISION	DATE
A	ISSUED FOR 75% TENDER	22/10/19

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CLIENT
ASPIRING PROPERTIES

ARCHITECT
WOLSKI . COPPIN
ARCHITECTURE

TITLE
GENERAL NOTES SHEET 1

Designed	AS	Drawn	CB	North
Project Leader	AS	Sheet Size	A1	
Project Director	MW	Certified	-	
Printed 22/10/2019 3:20:48 PM		Version	R18	

75% TENDER ISSUE
NOT FOR CONSTRUCTION

Project	Drawing	Revision
190047	S001	A

MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY

STEELWORK

S1. ALL MATERIALS, WORKMANSHIP, INSPECTIONS, TESTING, PROTECTIVE COATINGS, FABRICATION AND ERECTION SHALL COMPLY WITH AS4100 STEEL STRUCTURES CODE AND AS/NZS5131 WITH THE FOLLOWING CATEGORIES:

SERVICE CATEGORY	FABRICATION CATEGORY	CONSTRUCTION CATEGORY
SC1	FC1	CC2

MATERIAL IDENTIFICATION AND TRACEABILITY DOCUMENTATION AS STATED IN AS/NZS5131 SECTION 4.7 IS REQUIRED TO BE SUBMITTED FOR THE ABOVE CONSTRUCTION CATEGORY, WHERE:
CC1 - BASIC TRACEABILITY DOCUMENTATION
CC2 - PARTIAL TRACEABILITY DOCUMENTATION
CC3 AND CC4 - FULL TRACEABILITY DOCUMENTATION

UNLESS NOTED OTHERWISE, ALL STEELWORK SHALL BE IN ACCORDANCE WITH THE FOLLOWING:
STRUCTURAL STEEL TO AS/NZS3678 AND AS/NZS3679.

HOT ROLLED PLATES	GRADE 250
UB, UC, PFC, ANGLES, FLATS	GRADE 300PLUS
WB, WC	GRADE 300
HOLLOW SECTIONS TO AS1163	
RHS, CHS	GRADE 350

ALL PLATES THICKER THAN 50mm SHALL BE THROUGH THICKNESS TESTED ULTRASONICALLY IN ACCORDANCE WITH AS1710 LEVEL 3.

S2. ALL WELDING SHALL BE PERFORMED BY AN EXPERIENCED WELDER AND COMPLY WITH AS1553, AS1554 AND AS5131.

S3. ALL WELDS SHALL BE 6mm CONTINUOUS FILLET LAID DOWN WITH AN APPROVED, COVERED ELECTRODE UNLESS NOTED OTHERWISE.

S4. ALL BUTT WELDS SHALL BE FULLY PREPARED, FULL PENETRATION, QUALIFIED WELDS AND SHALL DEVELOP THE FULL STRENGTH OF THE MEMBERS CONNECTED. BUTT WELDED JOINT DETAILS SHALL BE SHOWN ON THE SHOP DRAWINGS.

S5. ALL WELDS TO BE CARRIED OUT WITH E49XX CONSUMABLES.
- ALL WELDING MUST BE AS CATEGORY SP CLASSIFICATION AND IN ACCORDANCE WITH AS5131 AND AS1554.
- ALL SITE BUTT WELDS TO BE TESTED BY RADIOGRAPHY OR ULTRASONIC AS PER TABLE 7.4 OF AS/NZS 1554.1 AND AS5131.

S6.

BOLT DESIGNATION - M20 8.8/s	
M20	DENOTES BOLT DIAMETER
8.8	DENOTES STRENGTH GRADE
S	DENOTES METHOD OF INSTALLATION

S7. ALL BOLTS SHALL BE EITHER COMMERCIAL GRADE BOLTS TO AS1111 (STRENGTH GRADE 4.6) OR HIGH STRENGTH BOLTS TO AS1252 (STRENGTH GRADE 8.8) INSTALLED IN ACCORDANCE WITH AS4100 AND AS5131.

S8.

METHOD OF INSTALLATION	
4.6/S	TIGHTENED USING A STANDARD WRENCH TO A "SNUG TIGHT" CONDITION.
8.8/S	TIGHTENED USING A STANDARD WRENCH TO A "SNUG TIGHT" CONDITION.
8.8/TF	BOLTS IN A FRICTION TYPE JOINT, TIGHTENED BY THE PART TURN METHOD.
8.8/TB	BOLTS IN A BEARING TYPE JOINT, TIGHTENED BY THE PART TURN METHOD.

S9. PROVIDE SUFFICIENT BOLT LENGTH TO ENSURE THAT ONE FULL THREAD IS EXPOSED AFTER TIGHTENING.

S10. LOAD INDICATING WASHERS MUST BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

S11.

STRUCTURAL CONNECTIONS TO BE AS FOLLOWS UNO:	
CLEAT, STIFFENER & GUSSET PLATES	10mm
BOLTS	2M20 8.8/S BOLTS IN 22mm HOLES

S12. HOLDING DOWN BOLTS SHALL BE GRADE 4.6/S IN 6mm CLEARANCE HOLES. PROVIDE OVERSIZE WASHERS TO SUIT.

S13. PROVIDE A WASHER OF APPROPRIATELY LARGER SIZE BETWEEN BOLTS ANY OVERSIZED OR SLOTTED HOLES.

S14. THE CONTRACTOR SHALL PROVIDE AND LEAVE IN PLACE SUCH TEMPORARY BRACING AS IS NECESSARY TO STABILIZE THE STRUCTURE DURING ERECTION AND UNTIL PERMANENT BRACING ELEMENTS ARE CONSTRUCTED.

S15. THE CONTRACTOR IS TO PROVIDE AN ELECTRONIC PDF COPY OR THREE COPIES OF ALL STEELWORK SHOP DRAWINGS TO THIS OFFICE FOR INSPECTION BEFORE COMMENCING FABRICATION. INSPECTION DOES NOT INCLUDE CHECKING OF DIMENSIONS OR LAYOUT, NOR PRECLUDE THE FABRICATOR FROM THE RESPONSIBILITY FOR THE CORRECTNESS OF THE WORK.

S16. STEELWORK SHALL BE ADEQUATELY PROTECTED AGAINST CORROSION TO ACHIEVE A MEDIUM TERM LIFE BEFORE MAINTENANCE. EXTERNAL STEEL OR STEEL SUBJECT TO MOISTURE TO COMPLY WITH AS/NZS 2312-2012. DETAILS OF PROTECTION SYSTEM TO BE SUBMITTED FOR APPROVAL WITH TENDER.

S17. ALL INTERNAL STEELWORK OR STEELWORK IN NON CORROSIVE ENVIRONMENTS, OTHER THAN THAT ENCASED BY CONCRETE OR MATING SURFACES OF FRICTION TYPE CONNECTIONS, SHALL BE THOROUGHLY BRUSHED TO REMOVE ALL RUST AND LOOSE MILL SCALE AND GIVEN ONE COAT OF ZINC RICH PRIMER TO AS4089. AFTER ERECTION, ANY DAMAGED PAINTWORK SHALL BE REPAIRED. PRIMER COLOUR AND FINAL PAINT COATS TO BE AS SPECIFIED BY ARCHITECT.

S18. PROVIDE A CAMBER OF 2mm PER METRE SPAN FOR ALL STEELWORK LONGER THAN 5.0m.

S19. STRUCTURAL STEELWORK TO BE CONCRETE ENCASED FOR FIRE PROTECTION SHALL BE ENCLOSED WITH F41 MESH PLACED 25mm CLEAR OF STEEL MEMBER. ENCASING TO PROVIDE 25mm MINIMUM COVER TO MESH ABOVE GROUND, 50mm MINIMUM COVER BELOW.

S20. ALL EXPOSED STEELWORK MEMBERS SHALL BE HOT DIPPED GALVANISED.

S21. AFTER ERECTION, PAINT NUTS AND BOLT HEADS WITH ONE COAT OF APPROVED PRIMER.

S22. STEELWORK BEARING ON MASONRY OR CONCRETE SHALL BEAR A MINIMUM OF 150mm AND BE SUPPORTED ON 20mm OF GROUT.

S23. PROVIDE HOOK BOLTS FROM EVERY SECOND PURLIN TO ANY ROOF BRACING.

S24. PURLINS AND GIRTS TO BE INSTALLED WITH BRIDGING TO THE PURLIN/GIRT MANUFACTURER'S SPECIFICATIONS.

S25. SUPPLY PURLINS MINIMUM 2 SPANS CONTINUOUS U.N.O.

S26. ALL EXPOSED LINTELS TO BE HOT-DIP GALVANISED.

S27. THE CONTRACTOR SHOULD PROVIDE ALL CLEATS AND DRILL ALL HOLES NECESSARY FOR FIXING STEEL TO STEEL AND TIMBER AND OTHER ELEMENTS TO STEEL WHETHER OR NOT DETAILED IN THE DRAWINGS.
NON-SHRINK GROUT SHALL BE USED TO FILL ALL SPACES BETWEEN CONCRETE OR MASONRY, AND STEEL BEARING PLATES. GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 50MPa AT 28 DAYS.
PROVIDE SEAL PLATES TO ALL HOLLOW SECTIONS, WITH "BREATHER" HOLES IF MEMBER IS TO BE HOT DIP GALVANISED.

S28. ALL OF THE STRUCTURAL STEEL MENTIONED IN THIS PROJECT HAS BEEN DESIGNED TO COMPLY WITH GOOD PRACTICE.
(I) AS WE HAVE NOT VISITED THE SITE WE ARE UNCERTAIN AS TO WHETHER IT COMPLIES WITH EACH AND ALL CONDITIONS REQUIRED FOR SAFETY DURING ERECTION.
(II) WE HAVE NOT BEEN ENGAGED AS AN ERECTION ENGINEER, NOR HAVE WE BEEN ENGAGED TO CHECK ANY OBSERVATIONS OR REQUIREMENTS MADE BY THE ERECTION ENGINEER.
(III) IF APPROVAL OF STRUCTURAL DOCUMENTATION IS REQUIRED BY THE FABRICATOR OR SIMILAR, IT SHALL BE SUBMITTED TO THIS OFFICE WITH A PERIOD OF ONE WEEK'S GRACE AND A FEE WILL BE ARRANGED BEFORE PROCEEDING TO CHECK SAME. ANY GEOMETRIES THAT ARE DIFFICULT OR IMPOSSIBLE TO DOUBLE CHECK WILL BE REFERRED BACK TO THE FABRICATOR FOR CHECKING AND CORRECTION, AND THAT AT NO TIME SHALL A VISITATION TO THE SITE BE MADE TO TAKE OVER THE RESPONSIBILITY OF THE ERECTION ENGINEER UNLESS SUITABLE ARRANGEMENTS HAVE BEEN MADE.

TIMBER

T1. ALL TIMBER MATERIALS, WORKMANSHIP AND CONSTRUCTION SHALL COMPLY WITH THE REQUIREMENTS OF AS1720.1 TIMBER STRUCTURES CODE AND AS1684 RESIDENTIAL TIMBER FRAMED CONSTRUCTION.

T2.

ALL STRUCTURAL TIMBER SHALL BE EITHER:	
DOUGLAS FIR (OREGON)	STRENGTH GROUP SD5
	STRENGTH GRADE F7
	MAXIMUM UNDERSIZE 3mm
SELECTED HARDWOOD (HW)	STRENGTH GROUP SD4
	STRENGTH GRADE F8
	MAXIMUM UNDERSIZE 4mm
M.G.P PINE (SW)	STRENGTH GROUP SD6
	STRENGTH GRADE MGP10
	MAXIMUM UNDERSIZE 0mm
RADIATA PINE (SW F7)	STRENGTH GROUP SD4
	STRENGTH GRADE F7
	MAXIMUM UNDERSIZE 0mm
SEASONED HARDWOOD (KDHW)	STRENGTH GROUP SD3
	STRENGTH GRADE F17
	MAXIMUM UNDERSIZE 0mm
LAMINATED VENEER LUMBER (LVL)	RADIATA PINE VENEER
	STRENGTH GRADE F16
	MAXIMUM UNDERSIZE 0mm
HYBEAM HJ	FLANGES - HYSPAN LVL
	WEBS - F14 STRUCTURAL PLYWOOD TO AS2269
	MAXIMUM UNDERSIZE 0mm
POSI STRUT	TO MITEK AUSTRALIA LTD. SPECIFICATION AND CERTIFICATION

T3. THE MOISTURE CONTENT OF ANY STRUCTURAL TIMBER SHALL NOT EXCEED 15%.

T4. ALL STUD WALLS ARE TO BE CONSTRUCTED AND SECURELY CROSS BRACED AS SPECIFIED IN AS1684.

T5. UNLESS NOTED OTHERWISE ALL FRAMING IS TO BE TIED DOWN, NAILED AND ANCHORED IN ACCORDANCE WITH AS1720.1 AND AS1684. ALL TIMBER RAFTERS SUPPORTING METAL DECK ROOFS AND ALL TIMBER NAILING PLATES ARE TO BE SECURELY TIED DOWN USING APPROVED TRIP-L-GRIP CONNECTORS OR APPROVED EQUIVALENT.

T6. ALL BEAMS AND LINTELS SHALL HAVE A MINIMUM OF 100mm BEARING.

T7. ALL LOAD BEARING TIMBER POSTS SHALL HAVE A CONCRETE STUMP LOCATED DIRECTLY UNDER WITH A 450 x 450 x 200 DEEP MASS CONCRETE FOOTING UNLESS NOTED OTHERWISE.

T8. WHERE TIMBER STRUCTURES HAVE BEEN DETAILED ON THESE DRAWINGS, THREE COPIES OF ALL TIMBER SHOP DRAWINGS MUST BE SUBMITTED TO THIS OFFICE FOR INSPECTION BEFORE COMMENCING FABRICATION. INSPECTION DOES NOT INCLUDE CHECKING DIMENSIONS OR LAYOUT, NOR PRECLUDE THE FABRICATOR FROM RESPONSIBILITY FOR THE CORRECTNESS OF THE WORK.

T9. ROOF TRUSS DESIGN AND LAYOUT BY OTHERS. SHOP DRAWINGS TO BE SUBMITTED AS NOTED IN T8 ABOVE.

T10. ALL EXPOSED TIMBER TO BE PAINTED OR OTHERWISE PROTECTED FROM WEATHER.

FRAMING MEMBERS	
STUDS:	
UPPER STOREY:	90x35 MGP10 PINE AT 450 MAX CTRS
	NOTCHED 20mm FOR BRACING
	(MAX HEIGHT 2700mm)
	90x45 MGP10 PINE AT 450 MAX CTRS
	(HEIGHT 2700-3000mm)
LOWER STOREY:	90x35 MGP10 PINE AT 450 MAX CTRS
	NOTCHED 20mm FOR BRACING
	(MAX HEIGHT 2700mm)
	90x45MGP10 PINE AT 450 MAX CTRS
	(HEIGHT 2700-3000mm)
DOUBLE STUDS	
	2 No. 90x45 MGP10 PINE STUDS
	FIX END STUD WALL TO MASONRY WALLS WITH M10 DYNABOLT AT TOP AND BOTTOM AT 1500mm MAX CTRS. TYPICAL.
WALL PLATES:	
UPPER STOREY:	TOP PLATE - 45x90 MGP10 NOT TRENCHED
	BOTTOM PLATE - 45x90 MGP10 NOT TRENCHED
LOWER STOREY:	TOP PLATE - 45x90 MGP10 NOT TRENCHED
	BOTTOM PLATE - 45x90 MGP10 NOT TRENCHED
	FIXED TO SLAB WITH M10 DYNABOLTS AT 900mm MAX CTRS
STUDS AT SIDES OF OPENINGS	
OPENING WIDTH:	STUDS:
UP TO 1200mm	1No. 90x35 MGP10 PINE
1200mm TO 1800mm	2No. 90x45 MGP10 PINE
1800mm TO 2400mm	2No. 90x45 MGP10 PINE
WALL BRACING:	
BRACING OF ALL STUD WALLS TO BE IN ACCORDANCE WITH AS1684 RESIDENTIAL TIMBER FRAMED CONSTRUCTION	
FIXING REQUIREMENTS:	
REFER TO AS1684 RESIDENTIAL TIMBER FRAMED CONSTRUCTION FOR FIXING REQUIREMENTS	
MIN. JOINT REQUIREMENTS FOR SHEET ROOF STRUCTURES:	
JOINT OR MEMBER:	MINIMUM FIXING DETAILS
RAFTERS AND PURLINS	METAL STRAPS, APPROVED FRAMING ANCHORS OR EQUIVALENT SHALL BE USED TO TIE RAFTERS TO TOP WALL PLATES AND TOP WALL PLATES TO STUDS (OR RAFTERS DIRECTLY TO STUDS) WITH A MINIMUM OF THREE 30mm x 3.15mm DIAMETER NAILS OR CLOUTS INTO THE SIDE GRAIN OF EACH MEMBER. MAXIMUM SPACINGS OF FASTENERS SHALL BE 1800mm OR THREE STUD SPACINGS, WHICHEVER IS THE LESSER.
LARGE SPAN ROOF MEMBERS (SUCH AS TRUSSES OR ROOF BEAMS OF SPAN 6000mm OR GREATER)	AS FOR RAFTERS AND PURLINS. SPACING OF FASTENERS SHALL NOT EXCEED THE SPACING OF THE ROOF MEMBERS.
FIXING FOR STRUCTURES IN AREAS OF RELATIVELY HIGH WINDS:	
REFER TO AS1684 RESIDENTIAL TIMBER FRAMED CONSTRUCTION FOR ADDITIONAL FIXING REQUIREMENTS.	
NOGGINGS	
STUDS IN EACH PANEL OF WALLING SHALL BE STIFFENED BY MEANS OF CLOSELY FITTED SOLID TIMBER NOGGINGS AT VERTICAL SPACING OF NO MORE THAN 1350mm CTRS. CLOSER SPACINGS SHALL BE EMPLOYED WHERE NECESSARY FOR THE SUPPORT OR FIXING OF CLADDING OR LINING. NOGGINGS SHALL BE NO LESS THAN 25mm THICK, OR 38mm THICK WHERE NAIL FIXED SHEET MATERIAL IS TO BE BUTT JOINTED, AND SHALL NOT BE OFFSET BY MORE THAN THEIR OWN THICKNESS FROM THE STRAIGHT LINE. NOGGING DEPTH SHALL NOT BE LESS THAN THE DEPTH OF THE STUD MINUS 25mm.	

POST-TENSIONING (D&C CONTRACT - DESIGNED BY CONTRACTOR)

PT1. GENERAL

1.1 FULL DESIGN, DETAILING AND CERTIFICATION OF POST-TENSIONED SLABS AND BEAMS INCLUDING TENDONS AND REINFORCEMENT SHALL BE BY THE CONTRACTOR. ANY ADDITIONAL REINFORCEMENT SHOWN ON THESE DRAWINGS SHALL BE INCORPORATED INTO THE CONTRACTORS DESIGN.

1.2 ALL SETOUT DIMENSIONS SHALL BE ASCERTAINED FROM THE ARCHITECTURAL DRAWINGS. THE STRUCTURAL DRAWINGS ARE NOT TO BE SCALED. THE CONCRETE OUTLINE DOCUMENTED SHALL NOT BE ALTERED WITHOUT CONSULTING THE ARCHITECT.

1.3 THE POST-TENSIONING DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE RELEVANT ARCHITECTURAL AND STRUCTURAL ENGINEERING DRAWINGS AND ALL DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER BEFORE FORMING THE WORKS.

1.4 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS, THE REQUIREMENTS OF THE SSA STANDARDS, THE BUILDING CODE OF AUSTRALIA AND THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITY.

PT2. CONCRETE

2.1 UNLESS NOTED ELSEWHERE, THE CHARACTERISTIC STRENGTH OF CONCRETE SHALL BE -
AT 28 DAYS F'C =32MPa
AT TRANSFER F'CP=22MPa - MONO STRAND 'SLAB' TENDONS
F'CP=25MPa - MULTI-STRAND TENDONS
MAX. SHRINKAGE STRAIN AT 56 DAYS < 700 MICROSTRAIN.
NO PUMP PRIMING SLURRY SHALL BE ALLOWED TO BECOME INCORPORATED INTO THE PERMANENT WORKS.

2.2 NO HOLES/PENETRATIONS OTHER THAN THOSE SHOWN ON THE POST-TENSIONING DRAWINGS SHALL BE INCORPORATED UNLESS WITH THE WRITTEN APPROVAL OF THE DESIGN ENGINEER.

2.3 HANDLING, PLACING & COMPACTING OF CONCRETE SHALL BE IN ACCORDANCE WITH AS3600, ADDITIONALLY:
a. DAMAGE/DISPLACEMENT TO TENDONS AND/OR REINFORCEMENT SHALL BE PREVENTED. MEASURES SHALL INCLUDE BUT NOT BE LIMITED TO: SUPPORT AND ADEQUATELY RESTRAIN CONCRETE PUMP LINES DIRECTLY OFF THE FORMWORK DECK ON STOOLS.
PROVIDE ACCESS WAYS ACROSS BAND BEAMS USING PLANKS SUPPORTED ON BLOCKS RESTING DIRECTLY ON THE FORMWORK DECK.
ANY DAMAGE/DISPLACEMENT TO TENDONS OR REINFORCEMENT SHALL BE IMMEDIATELY REPORTED TO THE DESIGN ENGINEER AND THE BUILDER RESPECTIVELY AND SUCH DAMAGE/DISPLACEMENT SHALL BE CORRECTED IMMEDIATELY.
b. ENSURE THOROUGH COMPACTION OF THE CONCRETE AROUND THE TENDON ANCHORAGES.

2.4 CURING, SAMPLING AND TESTING OF CONCRETE SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND AS3600. ADDITIONALLY, THE TRANSFER STRENGTH OF THE CONCRETE SHALL BE DETERMINED FROM SAMPLES THAT HAVE BEEN CURED UNDER THE SAME CONDITIONS AS FOR THE CONCRETE POUR ITSELF.

PT3. REINFORCEMENT

3.1 SUPPLY AND FIXING OF ALL REINFORCEMENT INCLUDING TENDONS AND TENDON ANCHORAGE REINFORCEMENT IS TO BE BY THE BUILDER.

3.2 REINFORCEMENT SHALL BE IN ACCORDANCE WITH AS4671.

3.3 REINFORCEMENT ALIGNMENT/LOCATION SHALL BE SECONDARY TO TENDON ALIGNMENT/LOCATION.

3.4 TOP REINFORCEMENT SHALL ONLY BE PLACED AFTER ALL TENDONS IN THAT AREA HAS BEEN PLACED.

3.5 CLEAR COVER TO ANY REINFORCEMENT UNLESS NOTED OTHERWISE SHALL BE:
a. INTERNAL 20mm
b. EXTERNAL (EXPOSED TO WEATHER) 40mm

3.6 LAP LENGTHS UNLESS NOTED OTHERWISE SHALL BE :

BAR	TYPICAL	CONC. DEPTH > 300 BELOW BAR
N12	500mm	650mm
N16	750mm	1000mm
N20	1000mm	1300mm
>N24	1250mm	1600mm

3.7 COGS UNLESS NOTED OTHERWISE
SLABS - 75% OF SLAB DEPTH - MAX 200mm
BEAMS < 400mm - 250mm
> 400mm - 66 % OF BEAM DEPTH - MAX 400mm UNO.

3.8 ALL REINFORCEMENT SHALL BE SECURELY TIED IN ITS CORRECT POSITION DURING CONCRETING USING APPROVED BAR CHAIRS, SPACERS & TIE BARS. THE CONVENTIONAL REINFORCEMENT SHALL BE CHAIRED INDEPENDENTLY OF POST TENSIONING DUCTS.

3.9 TIE/SIDE FACE BARS:
TIE BARS - WHERE NO DISTRIBUTION STEEL IS NOTED ON THE DRAWINGS, PROVIDE MIN N12-1000 CTS
SIDE FACE - PROVIDE N12-200 CTS ON SIDE FACE OF BEAMS > 750mm DEEP.

PT4. LOADINGS

4.1 REFER DRAWING S001 AND LAYOUTS FOR ALL LIVE LOADING REQUIREMENTS. COLUMNS HAVE BEEN DESIGNED ONLY FOR MINIMUM MOMENTS TO AS3600 AND ASSUMED 'PIN ENDED'.

4.2 SERVICEABILITY CRITERIA TO BE TO AS1170 AND AS3600 AND TO THE APPROVAL OF THE ENGINEER.

4.3 PUNCHING SHEAR CHECKS ARE TO BE CARRIED OUT FOR ALL COLUMNS. THE POST TENSIONING CONTRACTOR IS TO PROVIDE ANY ADDITIONAL REQUIRED PUNCHING SHEAR REINFORCEMENT.

4.4 IN ADDITION TO THE SDL ON DRAWING S001, THE SLAB DESIGNER SHALL CONTACT THE STRUCTURAL ENGINEER FROM THIS OFFICE TO CONFIRM LINE LOADS, POINT LOADS, TRANSFER LOADS ETC. PRIOR TO DETAIL DESIGN. EDGE BEAMS AND SLABS ARE TO BE DESIGNED FOR THE APPROPRIATE CLADDING WEIGHTS.
MINIMUM LOADS TO BE:
LIGHT WT. CLADDING = 0.6 KPA x WALL HT.
GLAZED WALLS = 1.0 KPA x WALL HT.
PRECAST PARAPETS = SLAB DESIGNER TO DETERMINE

POST-TENSIONING CONTINUED

PT5. DEFLECTION CRITERIA

5.1 DEFLECTION LIMITS SHALL BE LESS THAN SPECIFIED LIMITS IN TABLE BELOW U.N.O.

ELEMENT	SPANNING CONDITIONS	DEFLECTION LIMITS
FLOOR SYSTEM LONG TERM TOTAL DEFLECTION	MIDSPAN	SPAN / 250 OR 25mm
FLOOR SYSTEM LONG TERM INCREMENTAL DEFLECTION	MIDSPAN	SPAN / 250 OR 25mm
FLOOR SYSTEM LONG TERM TOTAL DEFLECTION	CANTILEVER	SPAN / 125
FLOOR SYSTEM LONG TERM INCREMENTAL DEFLECTION	CANTILEVER	SPAN / 125
MEMBERS SUPPORTING BRITTLE PARTITIONS LONG TERM TOTAL DEFLECTION	MIDSPAN (AFTER ADDITION OF PARTITIONS)	SPAN / 500
MEMBERS SUPPORTING BRITTLE PARTITIONS LONG TERM INCREMENTAL DEFLECTION	CANTILEVER (AFTER ADDITION OF PARTITIONS)	SPAN / 250
FLOOR SYSTEM LIVE LOAD DEFLECTION	MIDSPAN	SPAN / 360
FLOOR SYSTEM LIVE LOAD DEFLECTION	CANTILEVER	SPAN / 200
TRANSFER FLOOR LONG TERM TOTAL DEFLECTION	MIDSPAN	SPAN / 1000 OR 15mm
TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION	MIDSPAN	SPAN / 800 OR 10mm
TRANSFER FLOOR LONG TERM TOTAL DEFLECTION	CANTILEVER	SPAN / 500
TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION	CANTILEVER	SPAN / 400

PT6. ROBUSTNESS

6.1 THE SLAB DESIGNER SHALL BE AWARE AND BE ABLE TO DEMONSTRATE COMPLIANCE WITH STRUCTRUAL ROBUST REQUIREMENTS SPECIFIED IN NATIONAL CONSTRUCTION CODE (NCC) 2016 SECTION BV2, IN PARTICULAR THE FOLLOWING:

(a) ASSESSMENT OF THE STRUCTURE SUCH THAT UPON THE NOTIONAL REMOVAL IN ISOLATION OF:

(i) ANY SUPPORTING COLUMN; OR
(ii) ANY BEAM SUPPORTING ONE OR MORE COLUMNS; OR
(iii) ANY SEGMENT OF A LOAD BEARING WALL OF LENGTH EQUAL TO THE HEIGHT OF THE WALL.

6.2 THE BUILDING REMAINS STABLE AND THE RESULTING COLLAPSE DOES NOT EXTEND FURTHER THAN THE IMMEDIATELY ADJACENT STOREYS.
IT IS ENVISAGED THAT SOME OF THE BOTTOM REINFORCEMENT BARS SHALL CONTINUE THROUGH COLUMN AND WALL SUPPORTS TO ADJACENT SPANS TO SATISFY THIS REQUIREMENT.

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TITLE
GENERAL NOTES SHEET 2

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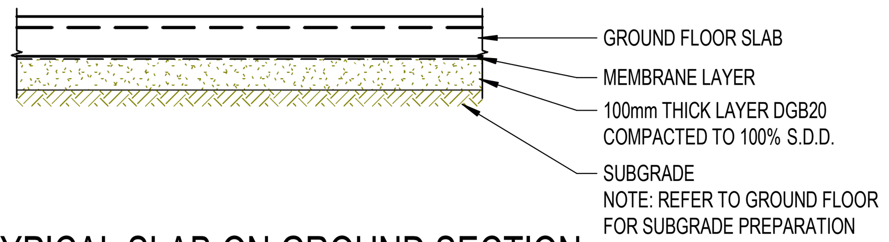
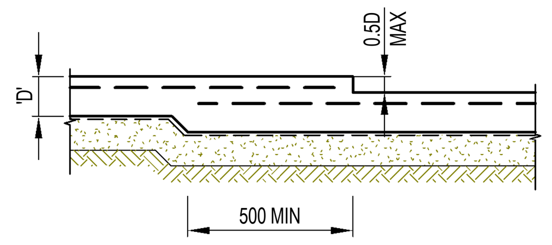
MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY



TYPICAL SLAB ON GROUND SECTION

SCALE 1:20

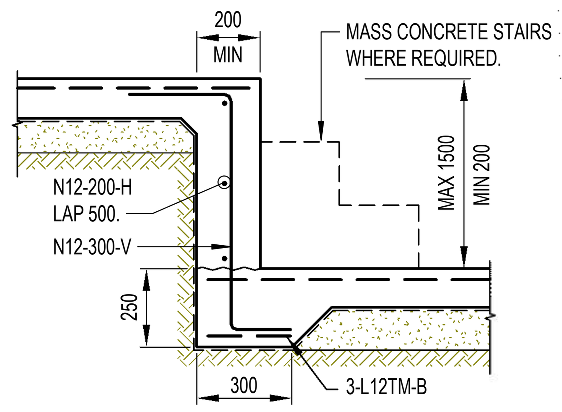
NOTES:
1. SLAB SUBGRADE TO BE PROOF ROLLED TO ENSURE MIN. CBR 4 ANY SOFT SPOT TO BE DUG OUT AND REPLACED WITH CRUSHED ROCK COMPACTED IN 150mm LAYERS.
2. REFER TO PLANS FOR SLAB THICKNESS AND REINFORCEMENT.



SLAB ON GROUND SETDOWN DETAIL

SCALE 1:20

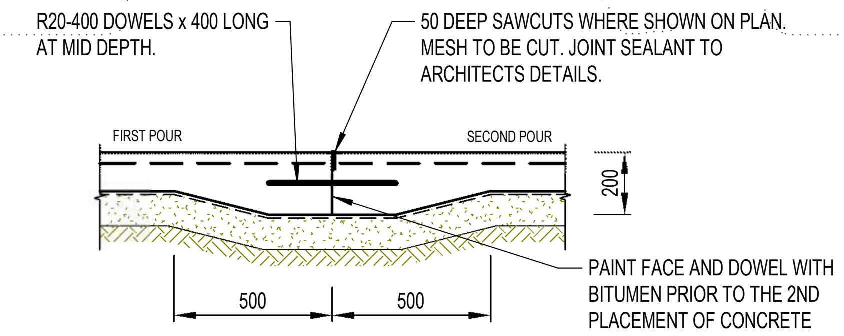
NOTES:
1. REFER ARCHITECTS DRAWINGS FOR SETDOWN LOCATIONS.
2. REFER PLANS FOR SLAB THICKNESS AND REINFORCEMENT.



TYPICAL SLAB ON GROUND STEP DETAIL

SCALE 1:20

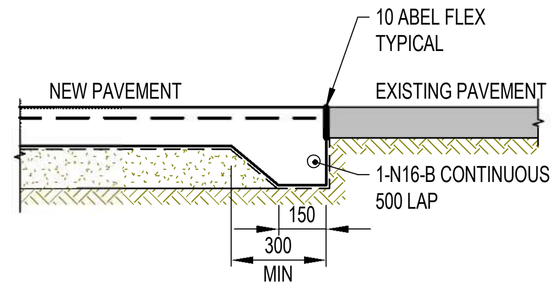
NOTES:
1. REFER TO PLAN FOR STEP LOCATIONS.
2. REFER PLANS FOR SLAB THICKNESS AND REINFORCEMENT.



DOWEL CONSTRUCTION JOINT DETAIL - DJ

SCALE 1:20

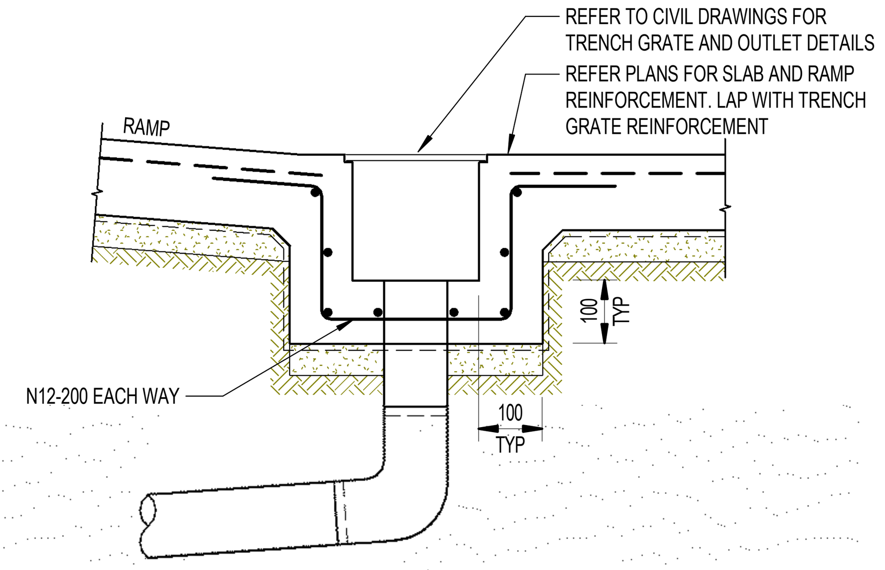
NOTES:
1. 24 HOURS TO ELAPSE BETWEEN POURS OF ADJACENT SLABS.
2. LOCATION OF JOINT TO BE TO THE APPROVAL OF THE ENGINEER.
3. REFER PLANS FOR SLAB THICKNESS AND REINFORCEMENT.



TYPICAL NEW TO EXISTING PAVEMENT DETAIL

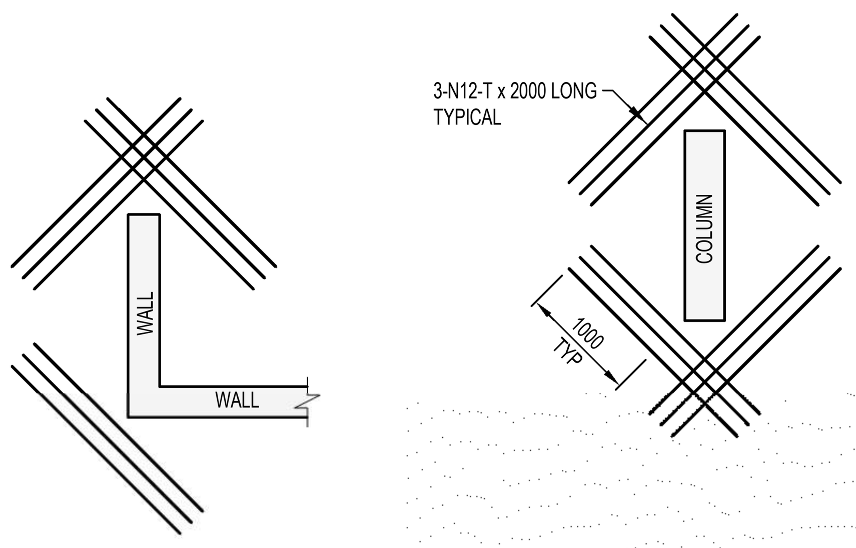
SCALE 1:20

NOTES:
1. REFER PLANS FOR SLAB THICKNESS AND REINFORCEMENT.



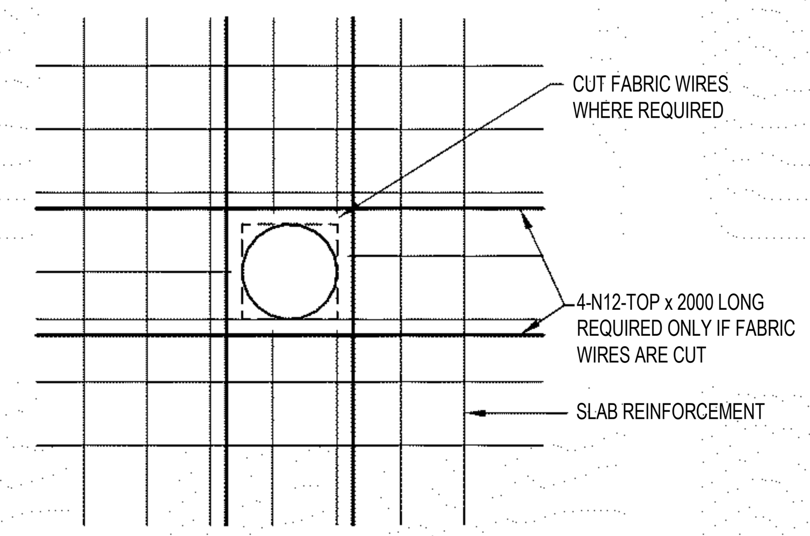
GRATED TRENCH DETAIL

SCALE 1:10



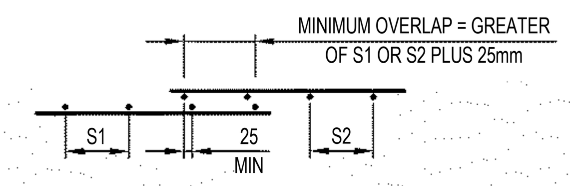
TYPICAL CONCRETE COLUMN-WALL BLOCKOUT DETAIL

SCALE 1:20



TYPICAL SLAB ON GROUND PENETRATION DETAIL

SCALE 1:20



TENSION LAP SPLICE IN CONVENTIONAL FABRIC DETAIL

SCALE 1:20

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TITLE
FOOTING AND SLAB ON GROUND DETAILS SHEET

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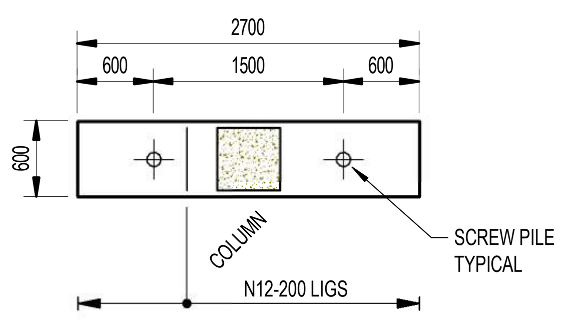
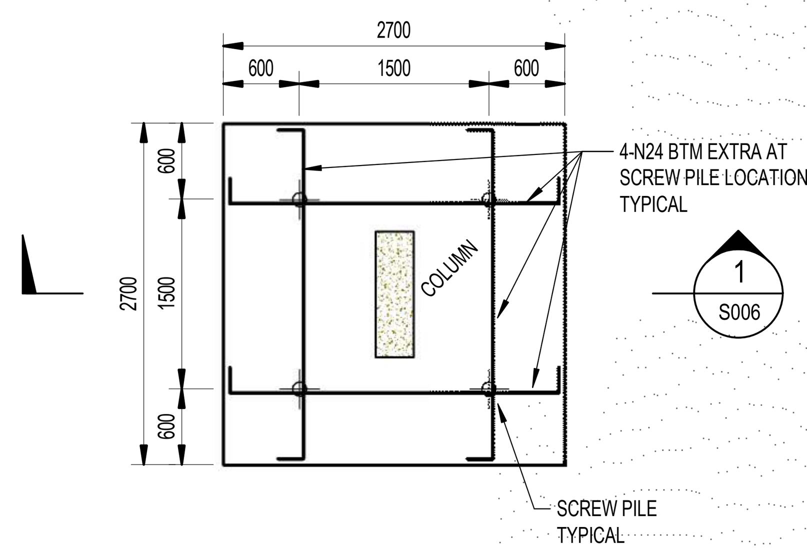


PC2 - PLAN



PC4 - PLAN

PILE CAP - PC2

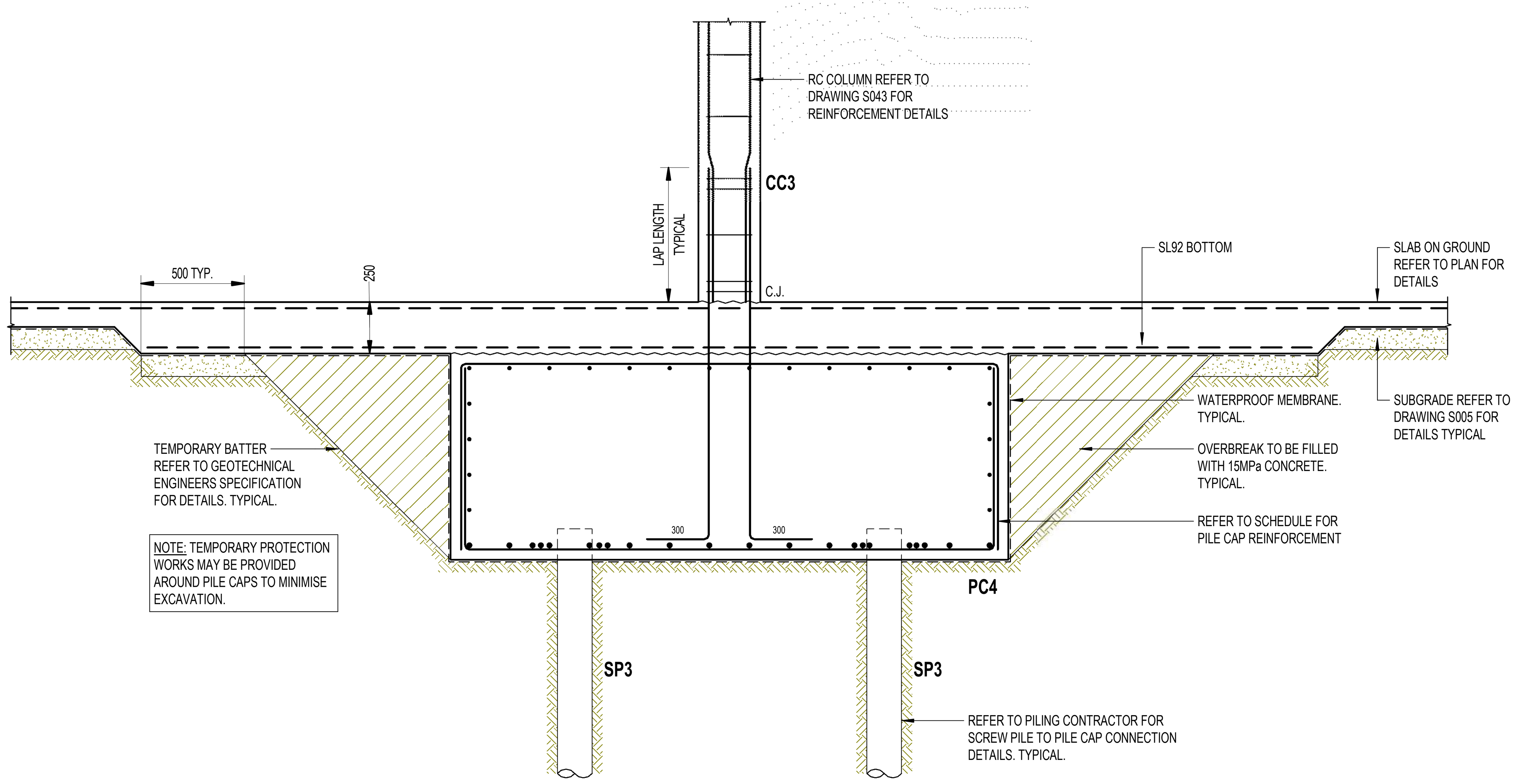
DEPTH	600
BTM REINFORCEMENT X BARS	4-N24
BTM REINFORCEMENT Y BARS	-
TOP REINFORCEMENT	4-N16
SIDE FACE REINFORCEMENT	N16-200 E.F.

NOTES:
1. CONCRETE STRENGTH - f'c = 32 MPa COVER = 50mm.
2. ADDITIONAL BARS SHOWN ON PLAN.

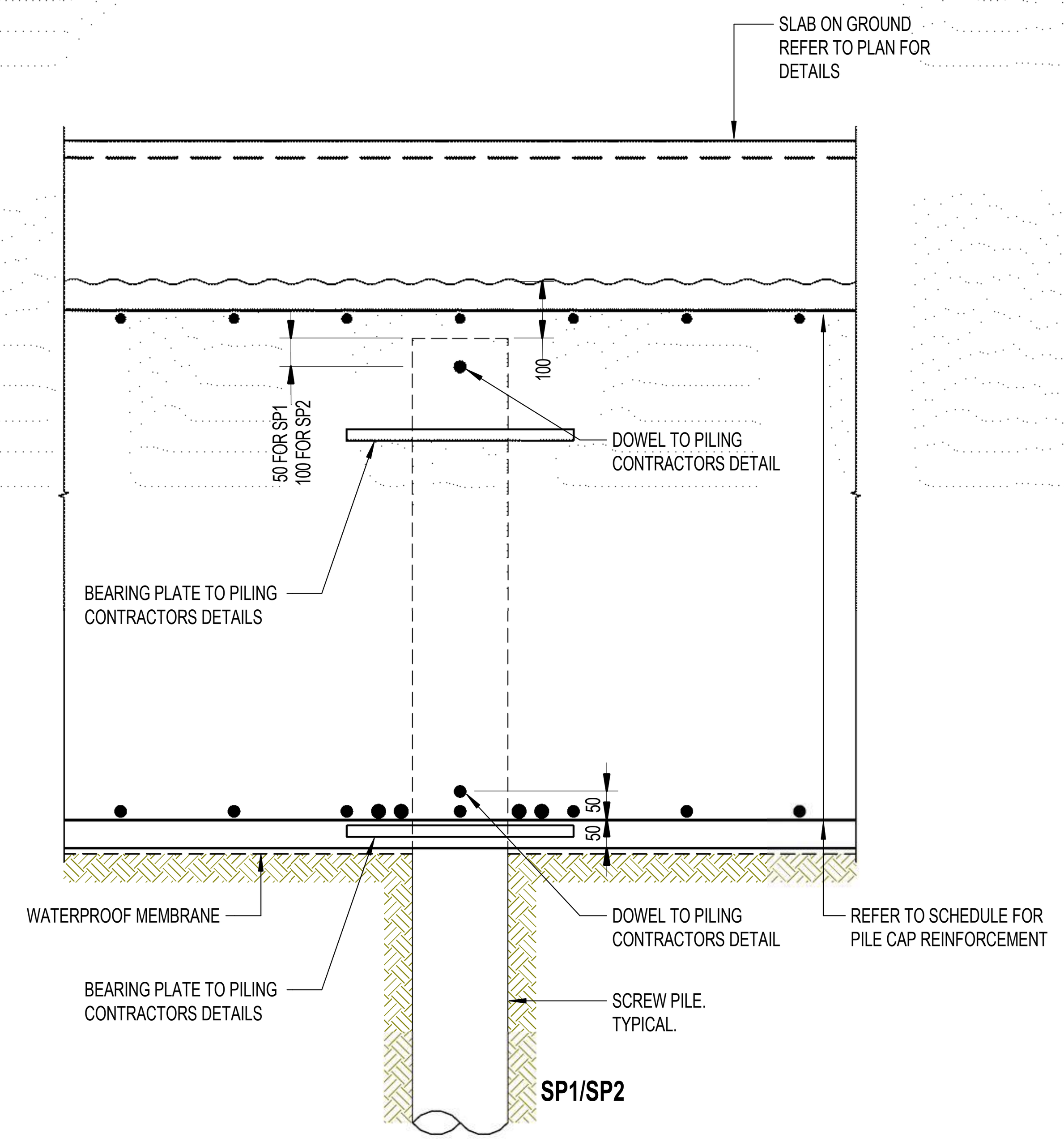
PILE CAP - PC4

DEPTH	1000
BTM REINFORCEMENT X BARS	N16-200
BTM REINFORCEMENT Y BARS	N16-200
TOP REINFORCEMENT	N16-200 E.W.
SIDE FACE REINFORCEMENT	N16-200 E.F.

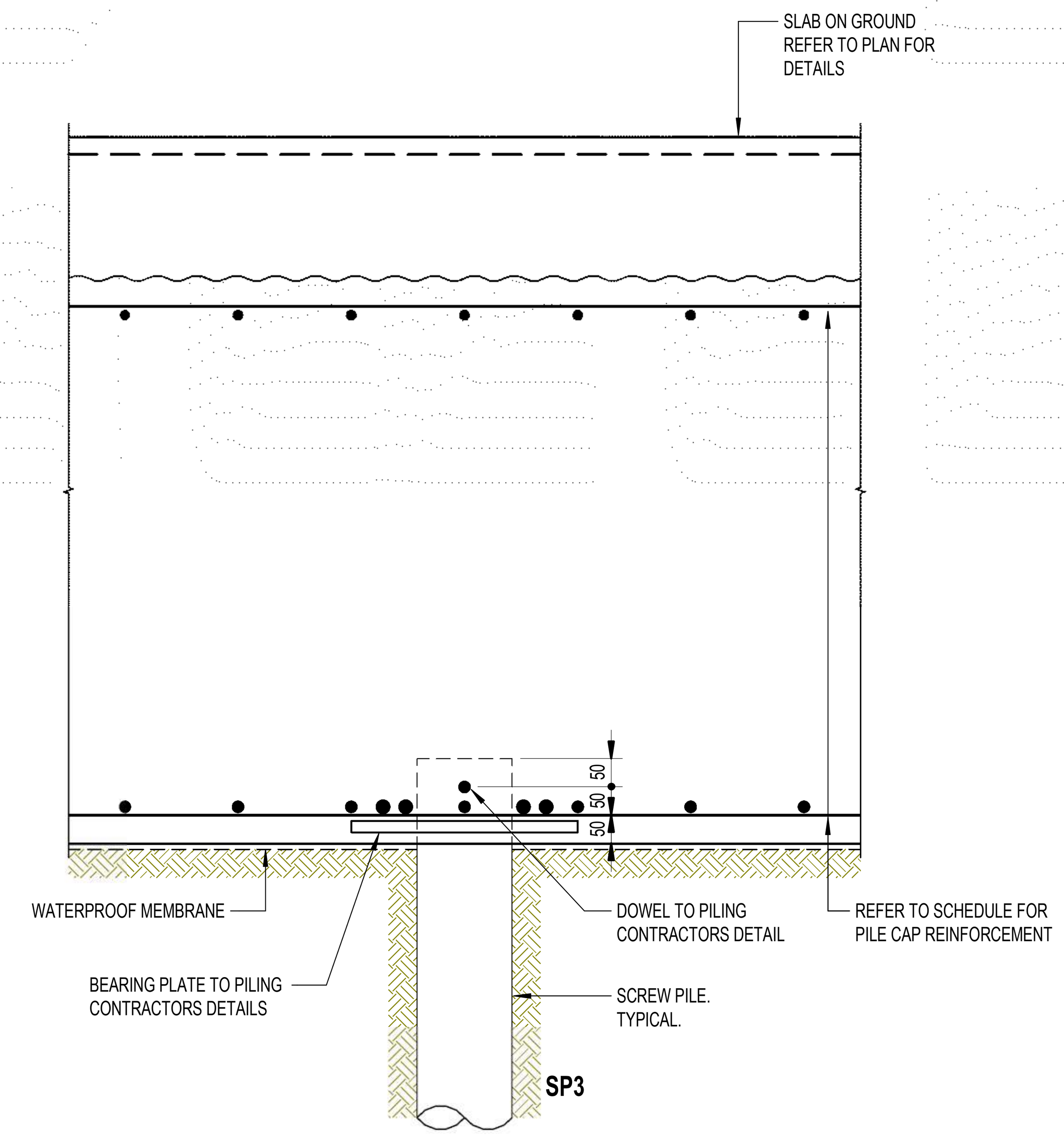
NOTES:
1. CONCRETE STRENGTH - f'c = 32 MPa COVER = 50mm.
2. ADDITIONAL BARS SHOWN ON PLAN.



SECTION 1 S006
SCALE 1 : 20



TYPICAL SP1/SP2 TO PILE CAP DETAIL
SCALE 1 : 10



TYPICAL SP3 TO PILE CAP DETAIL
SCALE 1 : 10

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TITLE
PILE CAP DETAILS SHEET

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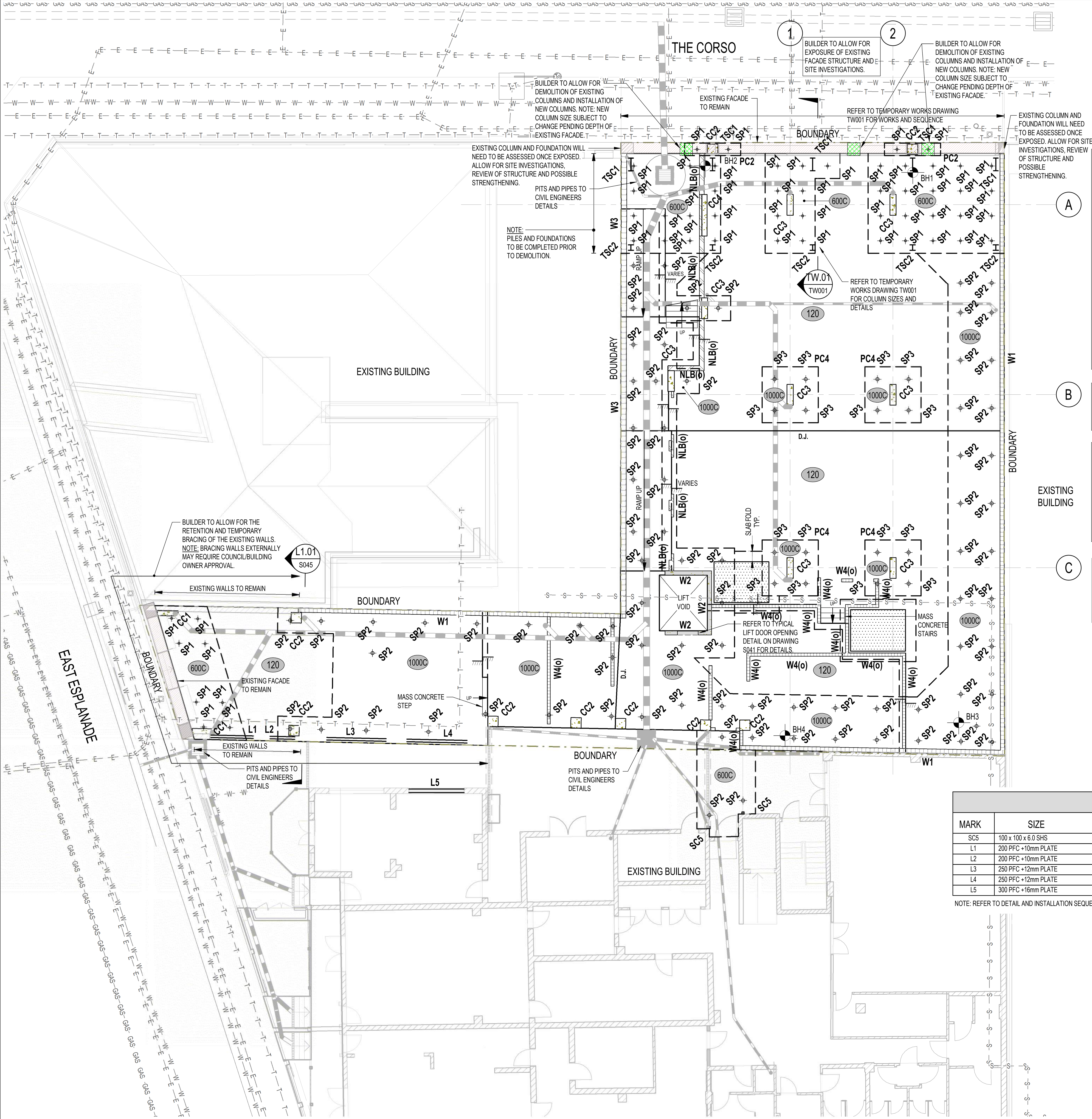

GROUND FLOOR GENERAL ARRANGEMENT PLAN

SCALE 1 : 100

PILE LOAD SCHEDULE				
MARK	SIZE	SWL(kN) COMPRESSION	SWL(kN) TENSION	APPROX. HELIX DIA
SP1		200	60	100
SP2		700	210	300
SP3		700	-	-

SCREW PILE LOADING NOTES:

1. AS2159 MINIMUM DESIGN ACTIONS ARE TO BE CONSIDERED.
2. PILES SHALL BE DESIGNED FOR ADDITIONAL BENDING MOMENTS AND FORCES REQUIRED IN ACCORDANCE WITH AS2159.
3. PILE LOAD TABLE IS TO BE READ IN CONJUNCTION WITH JK GEOTECHNICS GEOTECHNICAL REPORT No. 29060Vrpt.rev1-Manly DATED 16th MARCH 2016.

PILING NOTES

1. ALL DESIGN, WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS2159, AS3600 AND AS4100 CURRENT EDITIONS WITH AMENDMENTS.
2. MINIMUM PILE DETAILS.
   a. PILE SHAFT SHALL:
   MINIMUM SHAFT DIAMETERS SHALL BE AS PROVIDED BY PILING CONTRACTOR DESIGN. BOTTOM OF PILE SHAFT SHALL BE CAPPED OFF. ~~PILE SHALL BE CONCRETE FILLED WITH GRADE N32~~ CONCRETE. PILE TO PILE CAP DETAILS TO PILING CONTRACTOR.
   b. MINIMUM PILE SHAFT EMBEDMENT SHALL BE AT LEAST 4 x PILE DIAMETER INTO MEDIUM DENSE SAND.
3. DESIGN:
   a. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE PILES BASED ON THE FOLLOWING CRITERIA.
      - REQUIRED DESIGN LOADS AS NOTED IN THE PILE LOAD SCHEDULE.
      - MAXIMUM LOAD DISPLACEMENT OF THE PILE, AT THE PILE CUTOFF LEVEL, FOR THE NOMINATED ALLOWABLE LOADS TO BE 10mm.
      - DURABILITY, TO BE ASSESSED IN ACCORDANCE WITH AS215.
4. PRIOR TO THE INSTALLATION OF THE PILES SUBMIT FOR APPROVAL:
   a. DRAWINGS DETAILING PROPOSED PILES.
   b. CALCULATIONS AND GEOTECHNICAL INFORMATION DEMONSTRATING THAT THE PROPOSED PILING WILL MEET THE PERFORMANCE REQUIREMENTS.
   c. A CERTIFICATE OF STRUCTURAL ADEQUACY PREPARED BY A CHARTERED PROFESSIONAL ENGINEER REGISTERED ON THE NATIONAL PROFESSIONAL ENGINEERS REGISTER (NPER), CERTIFYING THAT THE PILES HAVE BEEN DESIGNED IN ACCORDANCE WITH AS2159 AND AS4100, TO SATISFY THE SPECIFIC DESIGN CRITERIA.

TYPICAL PILE CAP CONSTRUCTION SEQUENCE:

1. START EXCAVATION TO DESIGNED PILE CAP DEPTH.
2. INSTALL SCREW PILE AS PER PILE CAP PLAN DETAILS.
3. INSTALL PILE CAP REINFORCEMENT.
4. POUR CONCRETE FOR NEW PILE CAP.

SUBGRADE PREPARATION FOR SLAB ON GROUND:

1. DEMOLISH EXISTING SLAB/GROUND FLOOR ON SITE.
2. WET SOIL TO AID COMPACTION.
3. PROOF ROLL SANDY SUBGRADE WITH A MINIMUM OF 4 PASSES OF A 7 TONNE ROLLER. GEOTECHNICAL ENGINEER SHALL WITNESS PROOF ROLL. ANY SOFT OR HEAVING AREAS SHALL BE REPLACED AT THE INSTRUCTION OF THE GEOTECHNICAL ENGINEER.
4. PLACE 100mm THICK SUBBASE LAYER OF DGB20 OR APPROVED EQUIVALENT GRANULAR MATERIAL. COMPACT SUBBASE TO 100% SMDD.
5. PLACE POLYTHENE MEMBRANE.
6. PLACE SLAB ON GROUND REINFORCEMENT.
7. POUR SLAB ON GROUND.

NOTE:
NO INVESTIGATION OF NEIGHBOURING FOUNDATION LEVELS HAS BEEN UNDERTAKEN TO DATE. PENDING NEIGHBOURING BUILDING FOUNDATION SYSTEMS AND DEPTHS UNDERPINNING MAY BE REQUIRED.

MEMBER SCHEDULE				
MARK	SIZE	CONNECTIONS LEFT	CONNECTIONS RIGHT	REMARKS
SC5	100 x 100 x 6.0 SHS	-	-	STEEL COLUMN.
L1	200 PFC +10mm PLATE	-	-	STEEL LINTEL.
L2	200 PFC +10mm PLATE	-	-	STEEL LINTEL.
L3	250 PFC +12mm PLATE	-	-	STEEL LINTEL.
L4	250 PFC +12mm PLATE	-	-	STEEL LINTEL.
L5	300 PFC +16mm PLATE	-	-	STEEL LINTEL.

NOTE: REFER TO DETAIL AND INSTALLATION SEQUENCE ON DRAWING S057.

LEGEND

REFER TO DRAWING S001 & S002 FOR GENERAL NOTES
REFER TO DRAWING S005 FOR SLAB ON GROUND DETAILS
REFER TO DRAWING S006 FOR PILE CAP DETAILS
REFER TO DRAWING S041 FOR RC WALL DETAILS
REFER TO DRAWING S042 FOR AFS WALL DETAILS
REFER TO DRAWING S043 FOR CONCRETE COLUMN DETAILS
REFER TO DRAWING S056 STEEL STAIR DETAILS
REFER TO DRAWING S057 FOR MASONRY DETAILS
REFER TO DRAWING TW001 FOR TEMPORARY WORKS

120 — 120 THICK SLAB ON GROUND, SL102 TOP, 30 COVER
0.2mm POLYTHENE (LAPPED 200 AND TAPED AT JOINTS)
100mm THICK LAYER (COMPACTED) DGB20 COMPACTED TO 100% S.D.D.
REFER TO GENERAL NOTES FOR SUB-GRADE PREPARATION.

600C — DENOTES 600 THICK PILE CAP.
ALLOW FOR 150kg/m³ REINFORCEMENT.

1000C — DENOTES 1000 THICK PILE CAP - UNDER SLAB.
ALLOW FOR 150kg/m³ REINFORCEMENT.

DENOTES PENETRATION IN SLAB.
REFER TO SERVICES ENGINEERS DRAWINGS FOR DETAILS AND LOCATIONS.
ALL PENETRATIONS TO BE INDIVIDUALLY SLEEVED PIPES.
SLAB DESIGNER TO CO-ORDINATE SLEEVED PIPE PENETRATIONS WITH SERVICES DRAWINGS.

DENOTES STEP IN SLAB.
REFER TO ARCHITECTS DRAWINGS FOR FINAL LOCATION AND DETAILS.

PCX DENOTES PILE CAP. REFER TO DRAWING S006 FOR DETAILS.

SPX DENOTES SCREW PILE. REFER TO SCHEDULE FOR DETAILS.

D.J. DENOTES DOWEL JOINT.
REFER TO DRAWING S005 FOR DETAILS.

DENOTES 3-N12 TOP x 2000 LONG RE-ENTRANT BARS.
PROVIDE AT ALL RE-ENTRANT CORNERS.
REFER TO DRAWING S005 FOR DETAILS.

BHX DENOTES BOREHOLE LOCATION.
REFER TO GEOTECHNICAL REPORT FOR DETAILS.

WALL SCHEDULE:

W1 - LW200D THICK AFS LOGICWALL.
f'c = 40 MPa
N12-200-V EACH FACE
N12-200-H EACH FACE

W2 - 200 THICK RC WALL.
f'c = 40 MPa
N16-200-V EACH FACE
N16-200-H EACH FACE

W3 - LW262D THICK AFS LOGICWALL.
f'c = 40 MPa
N16-200-V EACH FACE
N16-200-H EACH FACE

W4 - LW150 THICK NON LOAD BEARING AFS LOGICWALL.
f'c = 40 MPa
N12-200-V CENTRAL
N12-200-H CENTRAL

NLB - DENOTES NON LOAD BEARING DOUBLE BRICK WALL.

COLUMN SCHEDULE:

CC1 - 1000 x 250
CC2 - 500 x 500
CC3 - 1000 x 300
CC4 - 2000 x 250
CC5 - 500 x 250
REFER TO DRAWING S043 FOR DETAILS.

ISSUE	REVISION	DATE
B	ISSUED FOR 75% TENDER	14/11/19
A	ISSUED FOR 75% TENDER	18/10/19

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ARCHITECTURE

TITLE
GROUND FLOOR GENERAL ARRANGEMENT PLAN

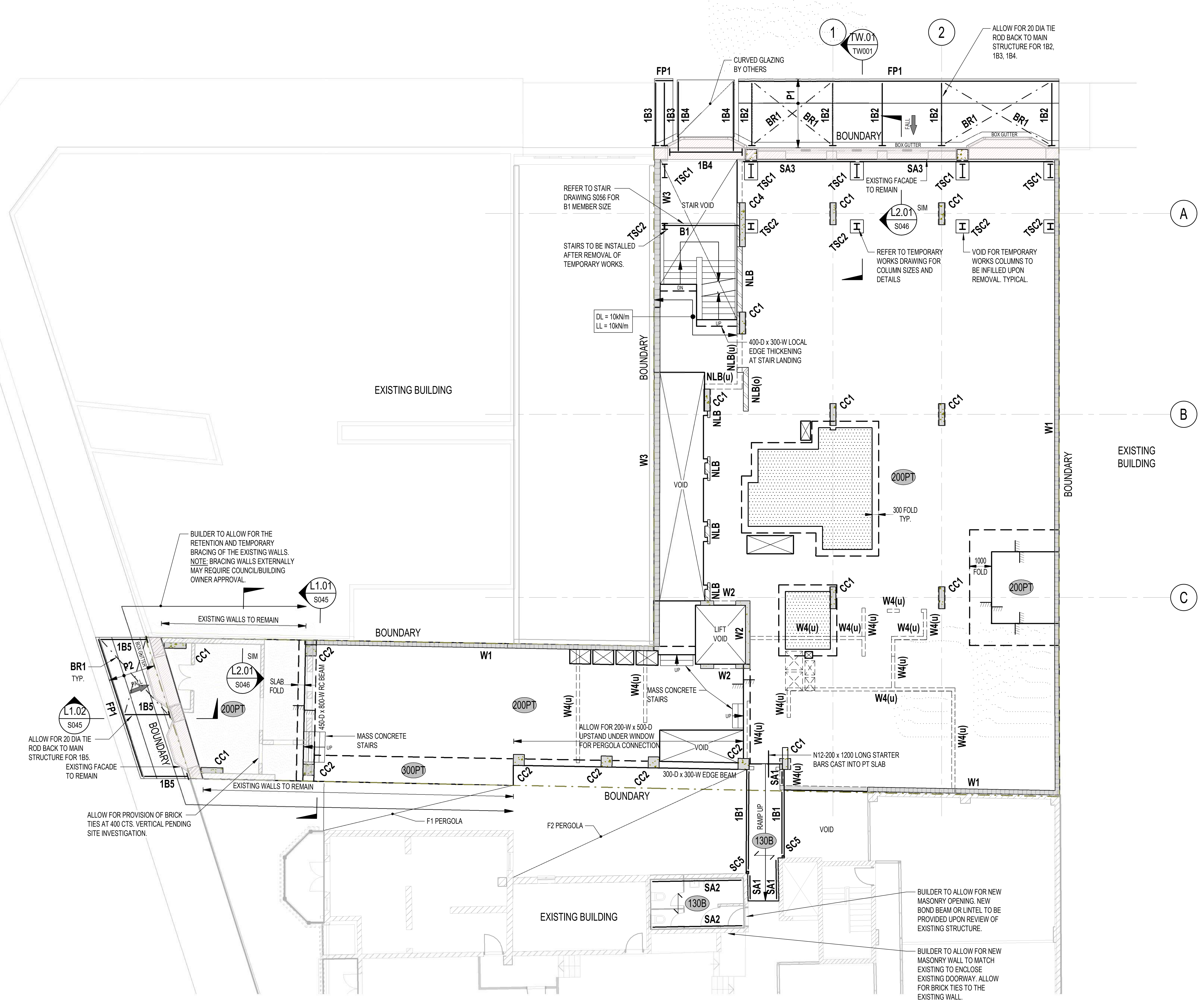
Designed	AS	Drawn	CB	North
Project Leader	AS	Sheet Size	A1	
Project Director	MW	Certified		
Printed 14/11/2019 11:21:08 AM		Version	R18	

DIAL 1100
DIAL BEFORE YOU DIG
CONTRACTOR TO CONFIRM LOCATION OF EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

75% TENDER ISSUE
NOT FOR CONSTRUCTION

Project	Drawing	Revision
190047	S010	B

MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY



FIRST FLOOR GENERAL ARRANGEMENT PLAN

SCALE 1 : 100

MEMBER SCHEDULE

MARK	SIZE	CONNECTIONS LEFT	CONNECTIONS RIGHT	REMARKS
SC5	100 x 100 x 6.0 SHS	-	-	STEEL COLUMN.
1B1	200 PFC	-	-	STEEL BEAM.
1B2	200UB25	-	-	STEEL BEAM.
1B3	200 PFC	-	-	STEEL BEAM.
1B4	100 x 100 x 6.0 SHS	-	-	STEEL BEAM.
1B5	200UB22	-	-	STEEL BEAM.
SA1	100 x 100 x 10 EA	-	-	SHELF ANGLE. M16 DYNABOLT TO EXISTING WALL AT 500 CTS.
SA2	150 x 150 x 12 EA	-	-	SHELF ANGLE. M12 DYNABOLT TO EXISTING WALL AT 300 CTS.
BR1	16 DIA ROD	-	-	HORIZONTAL BRACING.
FP1	300 PFC	-	-	FASCIA BEAM.
P1	Z15019	-	-	PURLINS AT 100 MAX. CTS. LAP 15% OF SPAN WITH 1 ROW BRIDGING WHEN SPAN IS GREATER THAN 4500.
P2	Z15012	-	-	PURLINS AT 1000 MAX. CTS. CONTINUOUS OVER 2 SPANS.

REINFORCEMENT RATES

AREA	POST-TENSION	REINFORCEMENT
TYPICAL SLAB	5.0kg/m²	50kg/m³

NOTES:

THIS DRAWING SHALL BE USED FOR FORMWORK PURPOSES ONLY AND SHALL BE READ IN CONJUNCTION WITH THE POST TENSIONING CONTRACTORS DRAWINGS.
ANY DISCREPANCIES FOUND IN THE SIZING OF CONCRETE ELEMENTS ON THE DRAWING SHALL BE FORWARDED TO THE ENGINEER PRIOR TO ERECTING THE FORMWORK.

POST TENSION SLAB DESIGN CRITERIA

DESIGN LOADING: LIVE LOAD REDUCTIONS SHALL NOT BE USED

FLOOR LOADS - UNLESS NOTED OTHERWISE
NOTE: PARTITION WALL (INCLUDING NON-LOADBEARING MASONRY WALLS)
LINE LOADS NOT INCLUDED
REFER ARCHITECTURAL FOR LOCATIONS.
RESIDENTIAL FLOORS
- SUPERIMPOSED DL: - GENERALLY 1.0kPa
- COMMERCIAL 1.0kPa
- COMMON AREA 1.0kPa
- AMMENITIES 1.0kPa
- SUPERIMPOSED LL: - COMMERCIAL 3.0kPa
- COMMON AREA 4.0kPa
- AMMENITIES 3.0kPa

POINT LOADS - DL++ - DENOTES DEAD LOAD OF ++kN
- LL++ - DENOTES LIVE LOAD OF ++kN

LINE LOADS - DL/m++ - DENOTES DEAD LOAD OF ++kN
- LL/m++ - DENOTES LIVE LOAD OF ++kN

CONCRETE STRENGTH:
UNLESS NOTED OTHERWISE MINIMUM CONCRETE STRENGTH SHALL BE 40MPa U.N.O.

FIRE RATING:
UNLESS NOTED OTHERWISE FIRE RATING SHALL BE 120 MINS.
- WET AREAS 120 MINS.

DEFLECTION LIMITATION:
TOTAL DEFLECTION: L/250 OR 25mm (TYPICAL U.N.O.)
L/125 (CANTILEVER)
INCREMENTAL DEFLECTION: L/500
L/1000 (AT MASONRY WALLS)

TRANSFER FLOOR LONG TERM TOTAL DEFLECTION: MIDSPAN - L/500 OR 15mm

TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION: MIDSPAN - L/800 OR 10mm

TRANSFER FLOOR LONG TERM TOTAL DEFLECTION: CANTILEVER - L/250

TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION: CANTILEVER - L/400

COVER:
INTERNAL: 25mm U.N.O.
EXPOSED SURFACES: 40mm
PROVIDE PLASTIC OR CONCRETE BAR CHAIRS TO ALL EXPOSED SURFACES.

NOTES:
1. THE MINIMUM CONCRETE STRENGTH AS NOTED MAY BE INCREASED BY THE POST TENSIONING DESIGNER TO FACILITATE THE STRESSING PROGRAM.
2. THE POST TENSIONING CONTRACTOR SHALL DESIGN AND DOCUMENT ALL ELEMENTS CAST INTEGRALLY WITH THE POST TENSIONED FLOOR INCLUDING ALL EDGE BEAMS.
3. STRUCTURAL SIZES AND FRAMING AS INDICATED ON PLAN ARE INDICATIVE ONLY, THE POST TENSIONING CONTRACTOR MAY VARY THE INDICATED SIZES AS REQUIRED TO COMPLY WITH AUSTRALIAN STANDARDS OR TO PRODUCE A MORE ECONOMICAL DESIGN.
4. FOR CO-ORDINATION PURPOSES, ANY VARIATIONS TO THIS PLAN/DESIGN MADE BY THE POST TENSIONING CONTRACTOR SHALL BE APPROVED BY ADAMS CONSULTING ENGINEERS PTY LTD.
5. THIS DRAWING SHALL BE USED FOR FORMWORK PURPOSES ONLY AND SHALL BE READ IN CONJUNCTION WITH THE POST-TENSIONING CONTRACTORS DRAWINGS. ANY DISCREPANCIES FOUND IN THE SIZING OF CONCRETE ELEMENTS SHALL BE FORWARDED TO THE ENGINEER PRIOR TO ERECTING FORMWORK.

LEGEND

REFER TO DRAWING S001 & S002 FOR GENERAL NOTES
REFER TO DRAWING S040 FOR CONCRETE DETAILS
REFER TO DRAWING S041 FOR RC WALL DETAILS
REFER TO DRAWING S042 FOR AFS WALL DETAILS
REFER TO DRAWING S043 FOR CONCRETE COLUMN DETAILS
REFER TO DRAWING S045 FOR FIRST FLOOR SECTIONS
REFER TO DRAWING S055 FOR STEELWORK DETAILS
REFER TO DRAWING S056 FOR STEEL STAIR DETAILS
REFER TO DRAWING S057 FOR MASONRY DETAILS

XXXPT DENOTES MIN. THICKNESS OF POST-TENSIONED SLAB.
SLAB TO POST-TENSION CONTRACTORS DETAILS UNLESS NOTED OTHERWISE.

130B DENOTES MIN. THICKNESS OF BONDEK SLAB, 1.0 B.M.T, SL82 TOP (30 COVER)

DENOTES SPAN DIRECTION OF BONDEK SLAB.

DENOTES PENETRATION IN SLAB.
REFER TO SERVICES ENGINEERS DRAWINGS FOR DETAILS AND LOCATIONS.
ALL PENETRATIONS TO BE INDIVIDUALLY SLEEVED PIPES.
SLAB DESIGNER TO CO-ORDINATE SLEEVED PIPE PENETRATIONS WITH SERVICES DRAWINGS.

DENOTES PENETRATION ZONE IN SLAB.
REFER TO SERVICES ENGINEERS DRAWINGS FOR DETAILS AND LOCATIONS.
ALL PENETRATIONS TO BE INDIVIDUALLY SLEEVED PIPES.
SLAB DESIGNER TO CO-ORDINATE SLEEVED PIPE PENETRATIONS WITH SERVICES DRAWINGS.

DENOTES 30mm SETDOWN IN SLAB.
DO NOT STEP SOFFIT.
REFER TO ARCHITECTS DRAWINGS FOR FINAL LOCATION AND DETAILS.

DENOTES STEP IN SLAB.
REFER TO ARCHITECTS DRAWINGS FOR FINAL LOCATION AND DETAILS.

WALL SCHEDULE:

W1 - LW200D THICK AFS LOGICWALL.
f'c = 40 MPa
N12-200-V EACH FACE
N12-200-H EACH FACE

W2 - 200 THICK RC WALL.
f'c = 40 MPa
N16-200-V EACH FACE
N16-200-H EACH FACE

W3 - LW262D THICK AFS LOGICWALL.
f'c = 40 MPa
N16-200-V EACH FACE
N16-200-H EACH FACE

W4 - LW150 THICK NON LOAD BEARING AFS LOGICWALL.
f'c = 40 MPa
N12-200-V CENTRAL
N12-200-H CENTRAL

NLB - DENOTES NON LOAD BEARING DOUBLE BRICK WALL.

COLUMN SCHEDULE:

CC1 - 1000 x 250
CC2 - 500 x 500
CC3 - 1000 x 300
CC4 - 2000 x 250
CC5 - 500 x 250
REFER TO DRAWING S043 FOR DETAILS.

ISSUE	REVISION	DATE
A	ISSUED FOR 75% TENDER	18/10/19

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TITLE
FIRST FLOOR GENERAL ARRANGEMENT PLAN

Designed	AS	Drawn	CB	North
Project Leader	AS	Sheet Size	A1	
Project Director	MW	Certified	-	
Printed	18/10/2019 4:38:47 PM	Version	R18	

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Project	Drawing	Revision
190047	S015	A

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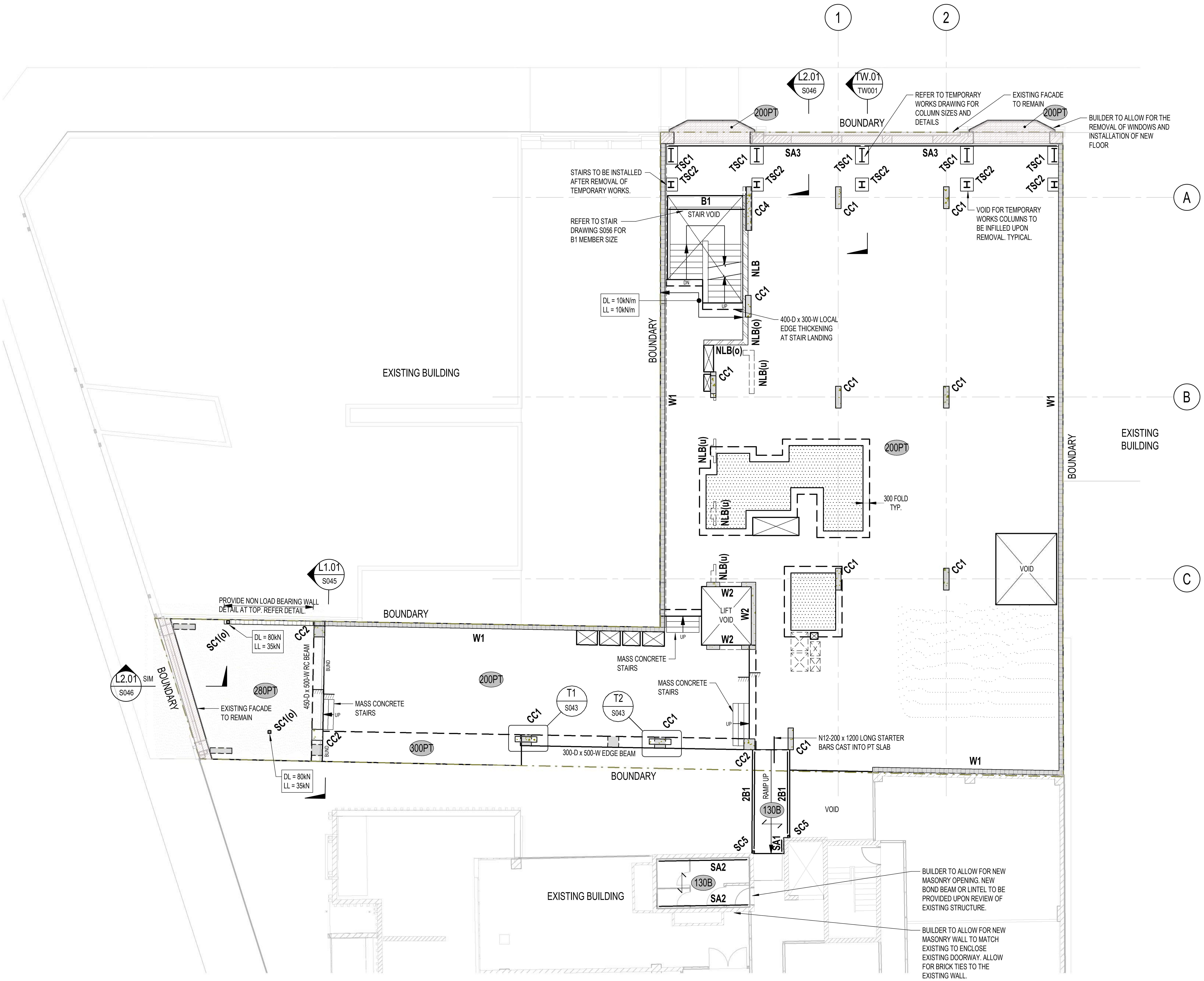

SECOND FLOOR GENERAL ARRANGEMENT PLAN

SCALE 1 : 100

MEMBER SCHEDULE				
MARK	SIZE	CONNECTIONS LEFT	CONNECTIONS RIGHT	REMARKS
SC1	125 x 125 x 8.0 SHS	-	-	STEEL COLUMN. FIRE RATING BY OTHERS.
SC5	100 x 100 x 6.0 SHS	-	-	STEEL COLUMN.
2B1	200 PFC	-	-	STEEL BEAM.
SA1	100 x 100 x 10 EA	-	-	SHELF ANGLE. M16 DYNABOLT TO EXISTING WALL AT 500 CTS.
SA2	150 x 150 x 12 EA	-	-	SHELF ANGLE. M12 DYNABOLT TO EXISTING WALL AT 300 CTS.
SA3	200 x 200 x 13 EA	-	-	SHELF ANGLE.

LEGEND

REFER TO DRAWING S001 & S002 FOR GENERAL NOTES
REFER TO DRAWING S040 FOR CONCRETE DETAILS
REFER TO DRAWING S041 FOR RC WALL DETAILS
REFER TO DRAWING S042 FOR AFS WALL DETAILS
REFER TO DRAWING S043 FOR CONCRETE COLUMN DETAILS
REFER TO DRAWING S046 FOR SECOND FLOOR SECTIONS
REFER TO DRAWING S055 FOR STEELWORK DETAILS
REFER TO DRAWING S056 FOR STEEL STAIR DETAILS
REFER TO DRAWING S057 FOR MASONRY DETAILS

XXXPT DENOTES MIN. THICKNESS OF POST-TENSIONED SLAB. SLAB TO POST-TENSION CONTRACTORS DETAILS UNLESS NOTED OTHERWISE.

130B DENOTES MIN. THICKNESS OF BONDEK SLAB, 1.0 B.M.T, SL82 TOP (30 COVER)

DENOTES SPAN DIRECTION OF BONDEK SLAB.

DENOTES PENETRATION IN SLAB.
REFER TO SERVICES ENGINEERS DRAWINGS FOR DETAILS AND LOCATIONS.
ALL PENETRATIONS TO BE INDIVIDUALLY SLEEVED PIPES.
SLAB DESIGNER TO CO-ORDINATE SLEEVED PIPE PENETRATIONS WITH SERVICES DRAWINGS.

DENOTES PENETRATION ZONE IN SLAB.
REFER TO SERVICES ENGINEERS DRAWINGS FOR DETAILS AND LOCATIONS.
ALL PENETRATIONS TO BE INDIVIDUALLY SLEEVED PIPES.
SLAB DESIGNER TO CO-ORDINATE SLEEVED PIPE PENETRATIONS WITH SERVICES DRAWINGS.

DENOTES 30mm SETDOWN IN SLAB.
DO NOT STEP SOFFIT.
REFER TO ARCHITECTS DRAWINGS FOR FINAL LOCATION AND DETAILS.

DENOTES STEP IN SLAB.
REFER TO ARCHITECTS DRAWINGS FOR FINAL LOCATION AND DETAILS.

BUND DENOTES BUND.
REFER TO DRAWING S040 FOR DETAILS.

WALL SCHEDULE:

W1 - LW200D THICK AFS LOGICWALL.
f'c = 40 MPa
N12-200-V EACH FACE
N12-200-H EACH FACE

W2 - 200 THICK RC WALL.
f'c = 40 MPa
N16-200-V EACH FACE
N16-200-H EACH FACE

W3 - LW262D THICK AFS LOGICWALL.
f'c = 40 MPa
N16-200-V EACH FACE
N16-200-H EACH FACE

NLB - DENOTES NON LOAD BEARING DOUBLE BRICK WALL.

COLUMN SCHEDULE:

CC1 - 1000 x 250
CC2 - 500 x 500
CC3 - 1000 x 300
CC4 - 2000 x 250
CC5 - 500 x 250
REFER TO DRAWING S043 FOR DETAILS.

REINFORCEMENT RATES		
AREA	POST-TENSION	REINFORCEMENT
TYPICAL SLAB	5.0kg/m²	50kg/m³

NOTES:

THIS DRAWING SHALL BE USED FOR FORMWORK PURPOSES ONLY AND SHALL BE READ IN CONJUNCTION WITH THE POST TENSIONING CONTRACTORS DRAWINGS.
ANY DISCREPANCIES FOUND IN THE SIZING OF CONCRETE ELEMENTS ON THE DRAWING SHALL BE FORWARDED TO THE ENGINEER PRIOR TO ERECTING THE FORMWORK.

POST TENSION SLAB DESIGN CRITERIA

DESIGN LOADING: LIVE LOAD REDUCTIONS SHALL NOT BE USED

FLOOR LOADS - UNLESS NOTED OTHERWISE
NOTE: PARTITION WALL (INCLUDING NON-LOADBEARING MASONRY WALLS)
LINE LOADS NOT INCLUDED
REFER ARCHITECTURAL FOR LOCATIONS.
RESIDENTIAL FLOORS
- SUPERIMPOSED DL: - GENERALLY 1.0kPa
- COMMERCIAL 1.0kPa
- COMMON AREA 1.0kPa
- AMMENITIES 1.0kPa
- SUPERIMPOSED LL: - COMMERCIAL 3.0kPa
- COMMON AREA 4.0kPa
- AMMENITIES 3.0kPa

POINT LOADS - DL++ - DENOTES DEAD LOAD OF ++kN
- LL++ - DENOTES LIVE LOAD OF ++kN

LINE LOADS - DL/m++ - DENOTES DEAD LOAD OF ++kN
- LL/m++ - DENOTES LIVE LOAD OF ++kN

CONCRETE STRENGTH:
UNLESS NOTED OTHERWISE MINIMUM CONCRETE STRENGTH SHALL BE 40MPa U.N.O.

FIRE RATING:
UNLESS NOTED OTHERWISE FIRE RATING SHALL BE 120 MINS.
- WET AREAS 120 MINS.

DEFLECTION LIMITATION:
TOTAL DEFLECTION: L/250 OR 25mm (TYPICAL U.N.O.)
L/125 (CANTILEVER)
INCREMENTAL DEFLECTION: L/500

TRANSFER FLOOR LONG TERM TOTAL DEFLECTION: MIDSPAN - L/500 OR 15mm

TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION: MIDSPAN - L/800 OR 10mm

TRANSFER FLOOR LONG TERM TOTAL DEFLECTION: CANTILEVER - L/250

TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION: CANTILEVER - L/400

COVER:
INTERNAL: 25mm U.N.O.
EXPOSED SURFACES: 40mm
PROVIDE PLASTIC OR CONCRETE BAR CHAIRS TO ALL EXPOSED SURFACES.

NOTES:
1. THE MINIMUM CONCRETE STRENGTH AS NOTED MAY BE INCREASED BY THE POST TENSIONING DESIGNER TO FACILITATE THE STRESSING PROGRAM.
2. THE POST TENSIONING CONTRACTOR SHALL DESIGN AND DOCUMENT ALL ELEMENTS CAST INTEGRALLY WITH THE POST TENSIONED FLOOR INCLUDING ALL EDGE BEAMS.
3. STRUCTURAL SIZES AND FRAMING AS INDICATED ON PLAN ARE INDICATIVE ONLY, THE POST TENSIONING CONTRACTOR MAY VARY THE INDICATED SIZES AS REQUIRED TO COMPLY WITH AUSTRALIAN STANDARDS OR TO PRODUCE A MORE ECONOMICAL DESIGN.
4. FOR CO-ORDINATION PURPOSES, ANY VARIATIONS TO THIS PLAN/DESIGN MADE BY THE POST TENSIONING CONTRACTOR SHALL BE APPROVED BY ADAMS CONSULTING ENGINEERS PTY LTD.
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ISSUE	REVISION	DATE
A	ISSUED FOR 75% TENDER	18/10/19

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TITLE
SECOND FLOOR GENERAL ARRANGEMENT PLAN

Designed	AS	Drawn	CB
Project Leader	AS	Sheet Size	A1
Project Director	MW	Certified	-
Printed 18/10/2019 4:38:53 PM		Version	R18

North

75% TENDER ISSUE
NOT FOR CONSTRUCTION

Project	Drawing	Revision
190047	S020	A

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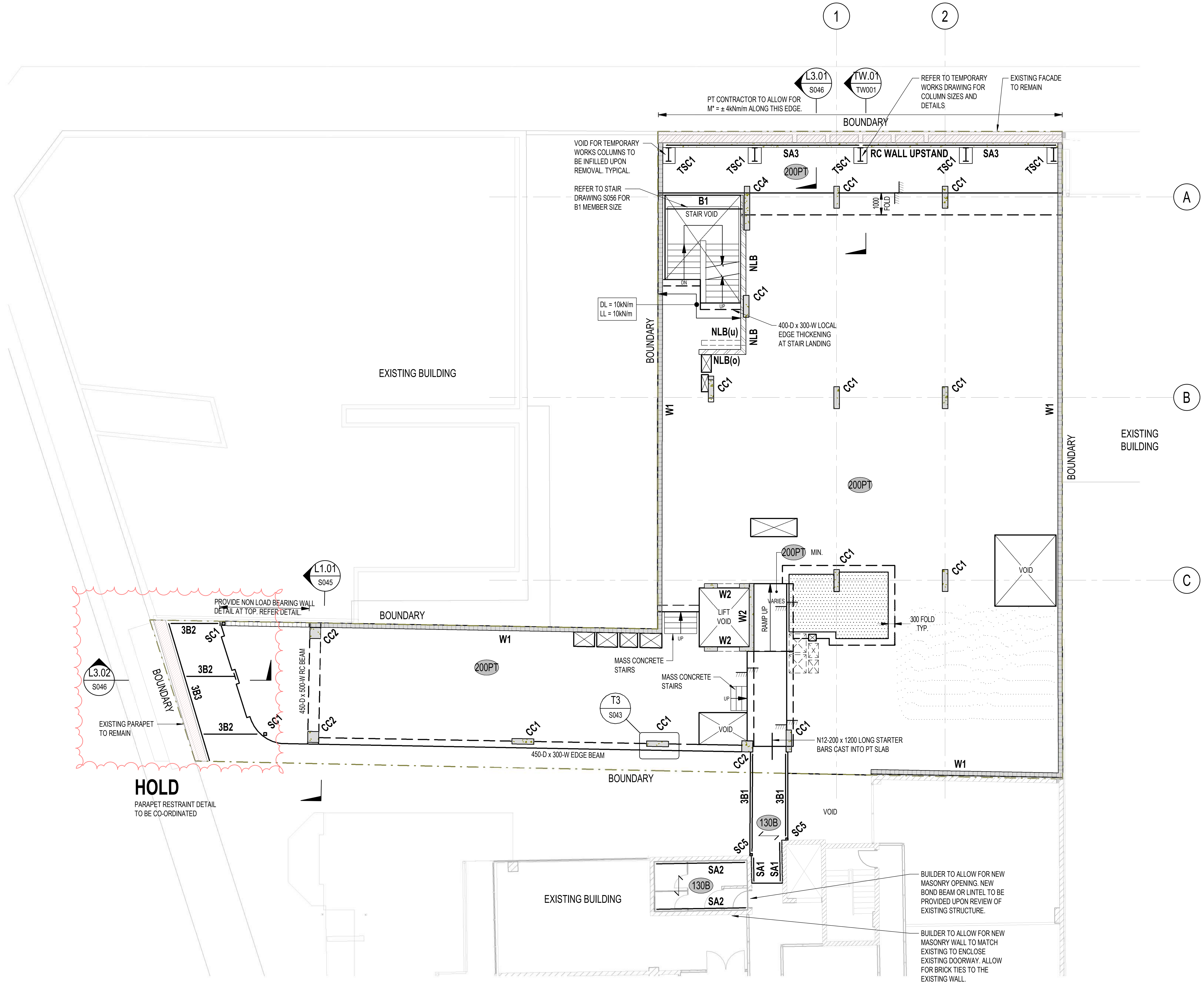
APPENDIX A: STRUCTURAL DRAWINGS



THIRD FLOOR GENERAL ARRANGEMENT PLAN

SCALE 1 : 100

MEMBER SCHEDULE				
MARK	SIZE	CONNECTIONS		REMARKS
		LEFT	RIGHT	
SC1	125 x 125 x 8.0 SHS	-	-	STEEL COLUMN. FIRE RATING BY OTHERS.
SC5	100 x 100 x 6.0 SHS	-	-	STEEL COLUMN.
3B1	200 PFC	-	-	STEEL BEAM.
3B2	150 PFC	-	-	STEEL BEAM.
3B3	200UB25	-	-	STEEL BEAM.
SA1	100 x 100 x 10 EA	-	-	SHELF ANGLE. M16 DYNABOLT TO EXISTING WALL AT 500 CTS.
SA2	150 x 150 x 12 EA	-	-	SHELF ANGLE. M12 DYNABOLT TO EXISTING WALL AT 300 CTS.
SA3	200 x 200 x 13 EA	-	-	SHELF ANGLE.

LEGEND

REFER TO DRAWING S001 & S002 FOR GENERAL NOTES
REFER TO DRAWING S040 FOR CONCRETE DETAILS
REFER TO DRAWING S041 FOR RC WALL DETAILS
REFER TO DRAWING S042 FOR AFS WALL DETAILS
REFER TO DRAWING S043 FOR CONCRETE COLUMN DETAILS
REFER TO DRAWING S045 FOR FIRST FLOOR SECTIONS
REFER TO DRAWING S055 FOR STEELWORK DETAILS
REFER TO DRAWING S056 FOR STEEL STAIR DETAILS
REFER TO DRAWING S057 FOR MASONRY DETAILS

XXXPT DENOTES MIN. THICKNESS OF POST-TENSIONED SLAB. SLAB TO POST-TENSION CONTRACTORS DETAILS UNLESS NOTED OTHERWISE.

130B DENOTES MIN. THICKNESS OF BONDEK SLAB, 1.0 B.M.T, SL82 TOP (30 COVER)

DENOTES SPAN DIRECTION OF BONDEK SLAB.

DENOTES PENETRATION IN SLAB. REFER TO SERVICES ENGINEERS DRAWINGS FOR DETAILS AND LOCATIONS. ALL PENETRATIONS TO BE INDIVIDUALLY SLEEVED PIPES. SLAB DESIGNER TO CO-ORDINATE SLEEVED PIPE PENETRATIONS WITH SERVICES DRAWINGS.

DENOTES PENETRATION ZONE IN SLAB. REFER TO SERVICES ENGINEERS DRAWINGS FOR DETAILS AND LOCATIONS. ALL PENETRATIONS TO BE INDIVIDUALLY SLEEVED PIPES. SLAB DESIGNER TO CO-ORDINATE SLEEVED PIPE PENETRATIONS WITH SERVICES DRAWINGS.

DENOTES 30mm SETDOWN IN SLAB. DO NOT STEP SOFFIT. REFER TO ARCHITECTS DRAWINGS FOR FINAL LOCATION AND DETAILS.

DENOTES STEP IN SLAB. REFER TO ARCHITECTS DRAWINGS FOR FINAL LOCATION AND DETAILS.

WALL SCHEDULE:

W1 - LW200D THICK AFS LOGICWALL.
f'c = 40 MPa
N12-200-V EACH FACE
N12-200-H EACH FACE

W2 - 200 THICK RC WALL.
f'c = 40 MPa
N16-200-V EACH FACE
N16-200-H EACH FACE

W5 - LW162 THICK AFS BALUSTRADE LOGICWALL.
f'c = 40 MPa
N12-200-V CENTRAL
N12-200-H CENTRAL

NLB - DENOTES NON LOAD BEARING DOUBLE BRICK WALL.

COLUMN SCHEDULE:

CC1 - 1000 x 250
CC2 - 500 x 500
CC3 - 1000 x 300
CC4 - 2000 x 250
CC5 - 500 x 250

REFER TO DRAWING S043 FOR DETAILS.

REINFORCEMENT RATES		
AREA	POST-TENSION	REINFORCEMENT
TYPICAL SLAB	5.0kg/m³	50kg/m³

NOTES:

THIS DRAWING SHALL BE USED FOR FORMWORK PURPOSES ONLY AND SHALL BE READ IN CONJUNCTION WITH THE POST TENSIONING CONTRACTORS DRAWINGS.
ANY DISCREPANCIES FOUND IN THE SIZING OF CONCRETE ELEMENTS ON THE DRAWING SHALL BE FORWARDED TO THE ENGINEER PRIOR TO ERECTING THE FORMWORK.

POST TENSION SLAB DESIGN CRITERIA

DESIGN LOADING: LIVE LOAD REDUCTIONS SHALL NOT BE USED

FLOOR LOADS - UNLESS NOTED OTHERWISE
NOTE: PARTITION WALL (INCLUDING NON-LOADBEARING MASONRY WALLS)
LINE LOADS NOT INCLUDED
REFER ARCHITECTURAL FOR LOCATIONS.
RESIDENTIAL FLOORS
- SUPERIMPOSED DL: - GENERALLY 1.0kPa
- COMMERCIAL 1.0kPa
- COMMON AREA 1.0kPa
- AMMENITIES 1.0kPa
- SUPERIMPOSED LL: - COMMERCIAL 3.0kPa
- COMMON AREA 4.0kPa
- AMMENITIES 3.0kPa

POINT LOADS - DL++ - DENOTES DEAD LOAD OF ++kN
- LL++ - DENOTES LIVE LOAD OF ++kN

LINE LOADS - DL/m++ - DENOTES DEAD LOAD OF ++kN
- LL/m++ - DENOTES LIVE LOAD OF ++kN

CONCRETE STRENGTH:
UNLESS NOTED OTHERWISE MINIMUM CONCRETE STRENGTH SHALL BE 40MPa U.N.O.

FIRE RATING:
UNLESS NOTED OTHERWISE FIRE RATING SHALL BE 120 MINS.
- WET AREAS 120 MINS.

DEFLECTION LIMITATION:
TOTAL DEFLECTION: L/250 OR 25mm (TYPICAL U.N.O.)
L/125 (CANTILEVER)
INCREMENTAL DEFLECTION: L/500

TRANSFER FLOOR LONG TERM TOTAL DEFLECTION: MIDSPAN - L/500 OR 15mm

TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION: MIDSPAN - L/800 OR 10mm

TRANSFER FLOOR LONG TERM TOTAL DEFLECTION: CANTILEVER - L/250

TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION: CANTILEVER - L/400

COVER:
INTERNAL: 25mm U.N.O.
EXPOSED SURFACES: 40mm
PROVIDE PLASTIC OR CONCRETE BAR CHAIRS TO ALL EXPOSED SURFACES.

NOTES:
1. THE MINIMUM CONCRETE STRENGTH AS NOTED MAY BE INCREASED BY THE POST TENSIONING DESIGNER TO FACILITATE THE STRESSING PROGRAM.
2. THE POST TENSIONING CONTRACTOR SHALL DESIGN AND DOCUMENT ALL ELEMENTS CAST INTEGRALLY WITH THE POST TENSIONED FLOOR INCLUDING ALL EDGE BEAMS.
3. STRUCTURAL SIZES AND FRAMING AS INDICATED ON PLAN ARE INDICATIVE ONLY, THE POST TENSIONING CONTRACTOR MAY VARY THE INDICATED SIZES AS REQUIRED TO COMPLY WITH AUSTRALIAN STANDARDS OR TO PRODUCE A MORE ECONOMICAL DESIGN.
4. FOR CO-ORDINATION PURPOSES, ANY VARIATIONS TO THIS PLAN/DESIGN MADE BY THE POST TENSIONING CONTRACTOR SHALL BE APPROVED BY ADAMS CONSULTING ENGINEERS PTY LTD.
5. THIS DRAWING SHALL BE USED FOR FORMWORK PURPOSES ONLY AND SHALL BE READ IN CONJUNCTION WITH THE POST-TENSIONING CONTRACTORS DRAWINGS. ANY DISCREPANCIES FOUND IN THE SIZING OF CONCRETE ELEMENTS SHALL BE FORWARDED TO THE ENGINEER PRIOR TO ERECTING FORMWORK.

ISSUE	REVISION	DATE
A	ISSUED FOR 75% TENDER	18/10/19

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ARCHITECT
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ARCHITECTURE

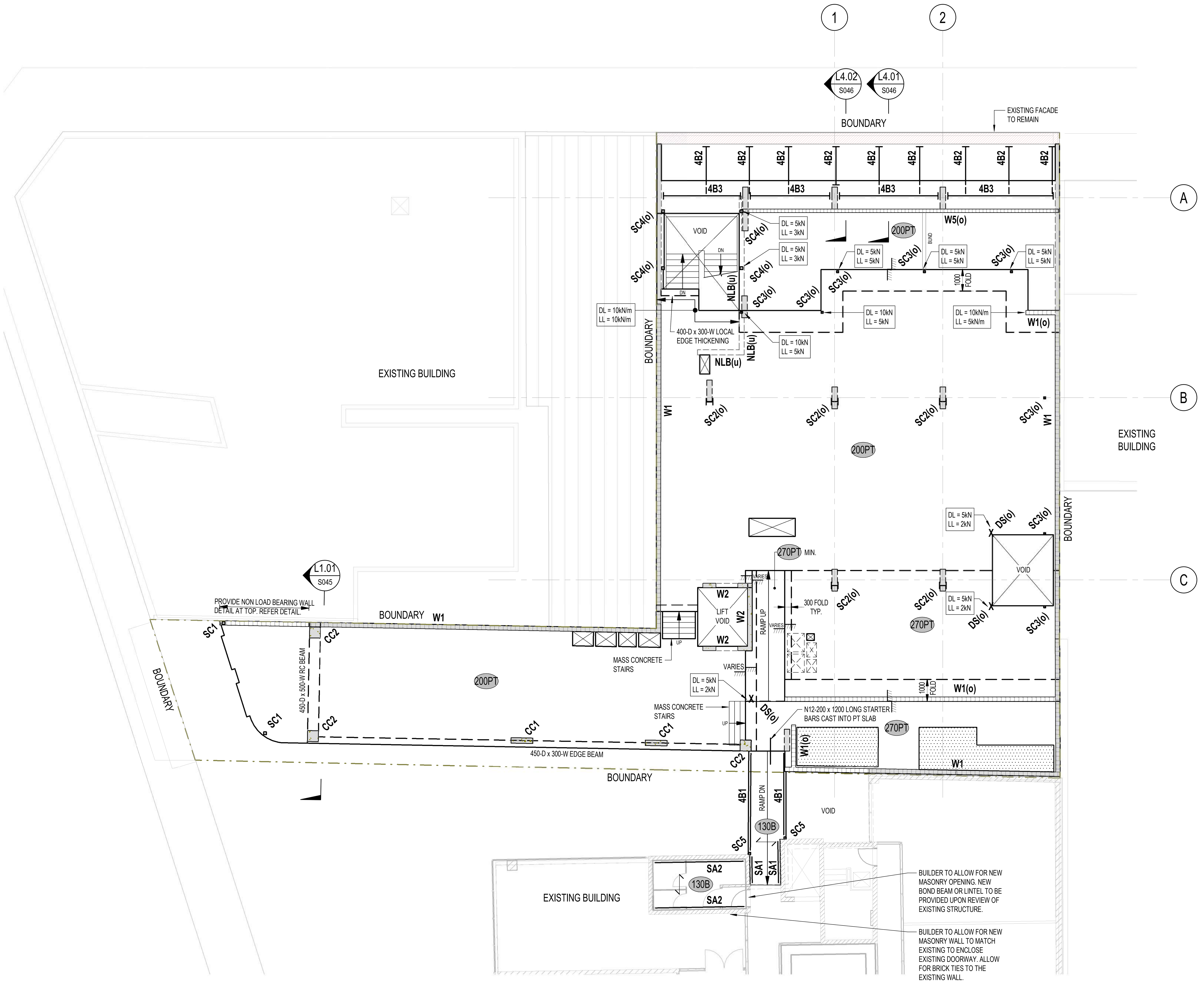
TITLE
THIRD FLOOR GENERAL ARRANGEMENT PLAN

Designed	AS	Drawn	CB	North
Project Leader	AS	Sheet Size	A1	
Project Director	MW	Certified	-	
Printed 18/10/2019 4:38:57 PM		Version	R18	

75% TENDER ISSUE
NOT FOR CONSTRUCTION

Project	Drawing	Revision
190047	S025	A

MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY



FOURTH FLOOR GENERAL ARRANGEMENT PLAN

SCALE 1 : 100

MEMBER SCHEDULE				
MARK	SIZE	CONNECTIONS LEFT	CONNECTIONS RIGHT	REMARKS
SC1	125 x 125 x 8.0 SHS	-	-	STEEL COLUMN. FIRE RATING BY OTHERS.
SC2	310UC96	-	-	STEEL COLUMN. FIRE RATING BY OTHERS.
SC3	89 x 89 x 6.0 SHS	-	-	STEEL COLUMN. FIRE RATING BY OTHERS.
SC4	125 x 125 x 8.0 SHS	-	-	STEEL COLUMN. FIXED BASE DETAIL.
SC5	100 x 100 x 6.0 SHS	-	-	STEEL COLUMN.
DS	DOUBLE STUD	-	-	DOUBLE STUD. REFER TO TYPICAL DETAIL ON DRAWING S060.
4B1	200 PFC	-	-	STEEL BEAM.
4B2	150 PFC	-	-	STEEL BEAM.
4B3	150 x 100 x 10 RHS	-	-	STEEL BEAM.
SA1	100 x 100 x 10 EA	-	-	SHELF ANGLE. M16 DYNABOLT TO EXISTING WALL AT 500 CTS.
SA2	150 x 150 x 12 EA	-	-	SHELF ANGLE. M12 DYNABOLT TO EXISTING WALL AT 300 CTS.

REINFORCEMENT RATES		
AREA	POST-TENSION	REINFORCEMENT
TYPICAL SLAB	5.0kg/m²	50kg/m²

NOTES:

THIS DRAWING SHALL BE USED FOR FORMWORK PURPOSES ONLY AND SHALL BE READ IN CONJUNCTION WITH THE POST TENSIONING CONTRACTORS DRAWINGS.
ANY DISCREPANCIES FOUND IN THE SIZING OF CONCRETE ELEMENTS ON THE DRAWING SHALL BE FORWARDED TO THE ENGINEER PRIOR TO ERECTING THE FORMWORK.

POST TENSION SLAB DESIGN CRITERIA

DESIGN LOADING: LIVE LOAD REDUCTIONS SHALL NOT BE USED

FLOOR LOADS - UNLESS NOTED OTHERWISE
NOTE: PARTITION WALL (INCLUDING NON-LOADBEARING MASONRY WALLS)
LINE LOADS NOT INCLUDED
REFER ARCHITECTURAL FOR LOCATIONS.
RESIDENTIAL FLOORS
- SUPERIMPOSED DL: - GENERALLY 1.0kPa
- COMMERCIAL 1.0kPa
- COMMON AREA 1.0kPa
- AMMENITIES 1.0kPa
- SUPERIMPOSED LL: - COMMERCIAL 3.0kPa
- COMMON AREA 4.0kPa
- AMMENITIES 3.0kPa

POINT LOADS - DL++ - DENOTES DEAD LOAD OF ++kN
- LL++ - DENOTES LIVE LOAD OF ++kN

LINE LOADS - DL/m++ - DENOTES DEAD LOAD OF ++kN
- LL/m++ - DENOTES LIVE LOAD OF ++kN

CONCRETE STRENGTH:
UNLESS NOTED OTHERWISE MINIMUM CONCRETE STRENGTH SHALL BE 40MPa U.N.O.

FIRE RATING:
UNLESS NOTED OTHERWISE FIRE RATING SHALL BE 120 MINS.
- WET AREAS 120 MINS.

DEFLECTION LIMITATION:
TOTAL DEFLECTION: L/250 OR 25mm (TYPICAL U.N.O.)
L/125 (CANTILEVER)
INCREMENTAL DEFLECTION: L/500

TRANSFER FLOOR LONG TERM TOTAL DEFLECTION: MIDSPAN - L/500 OR 15mm

TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION: MIDSPAN - L/800 OR 10mm

TRANSFER FLOOR LONG TERM TOTAL DEFLECTION: CANTILEVER - L/250

TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION: CANTILEVER - L/400

COVER:
INTERNAL: 25mm U.N.O.
EXPOSED SURFACES: 40mm
PROVIDE PLASTIC OR CONCRETE BAR CHAIRS TO ALL EXPOSED SURFACES.

NOTES:
1. THE MINIMUM CONCRETE STRENGTH AS NOTED MAY BE INCREASED BY THE POST TENSIONING DESIGNER TO FACILITATE THE STRESSING PROGRAM.
2. THE POST TENSIONING CONTRACTOR SHALL DESIGN AND DOCUMENT ALL ELEMENTS CAST INTEGRALLY WITH THE POST TENSIONED FLOOR INCLUDING ALL EDGE BEAMS.
3. STRUCTURAL SIZES AND FRAMING AS INDICATED ON PLAN ARE INDICATIVE ONLY, THE POST TENSIONING CONTRACTOR MAY VARY THE INDICATED SIZES AS REQUIRED TO COMPLY WITH AUSTRALIAN STANDARDS OR TO PRODUCE A MORE ECONOMICAL DESIGN.
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LEGEND

REFER TO DRAWING S001 & S002 FOR GENERAL NOTES
REFER TO DRAWING S040 FOR CONCRETE DETAILS
REFER TO DRAWING S041 FOR RC WALL DETAILS
REFER TO DRAWING S042 FOR AFS WALL DETAILS
REFER TO DRAWING S043 FOR CONCRETE COLUMN DETAILS
REFER TO DRAWING S045 FOR FIRST FLOOR SECTIONS
REFER TO DRAWING S055 FOR STEELWORK DETAILS
REFER TO DRAWING S055 FOR TIMBER DETAILS
REFER TO DRAWING S056 FOR STEEL STAIR DETAILS
REFER TO DRAWING S057 FOR MASONRY DETAILS

XXXPT DENOTES MIN. THICKNESS OF POST-TENSIONED SLAB.
SLAB TO POST-TENSION CONTRACTORS DETAILS UNLESS NOTED OTHERWISE.

130B DENOTES MIN. THICKNESS OF BONDEK SLAB, 1.0 B.M.T, SL82 TOP (30 COVER)

DENOTES SPAN DIRECTION OF BONDEK SLAB.

DENOTES PENETRATION IN SLAB.
REFER TO SERVICES ENGINEERS DRAWINGS FOR DETAILS AND LOCATIONS.
ALL PENETRATIONS TO BE INDIVIDUALLY SLEEVED PIPES.
SLAB DESIGNER TO CO-ORDINATE SLEEVED PIPE PENETRATIONS WITH SERVICES DRAWINGS.

DENOTES PENETRATION ZONE IN SLAB.
REFER TO SERVICES ENGINEERS DRAWINGS FOR DETAILS AND LOCATIONS.
ALL PENETRATIONS TO BE INDIVIDUALLY SLEEVED PIPES.
SLAB DESIGNER TO CO-ORDINATE SLEEVED PIPE PENETRATIONS WITH SERVICES DRAWINGS.

DENOTES 30mm SETDOWN IN SLAB.
DO NOT STEP SOFFIT.
REFER TO ARCHITECTS DRAWINGS FOR FINAL LOCATION AND DETAILS.

DENOTES STEP IN SLAB.
REFER TO ARCHITECTS DRAWINGS FOR FINAL LOCATION AND DETAILS.

DS DENOTES DOUBLE STUD.
REFER TO DRAWING S055 FOR DETAILS.

BUND DENOTES BUND.
REFER TO DRAWING S040 FOR DETAILS.

WALL SCHEDULE:

W1 - LW200D THICK AFS LOGICWALL.
f'c = 40 MPa
N12-200-V EACH FACE
N12-200-H EACH FACE

W2 - 200 THICK RC WALL.
f'c = 40 MPa
N16-200-V EACH FACE
N16-200-H EACH FACE

W5 - LW162 THICK AFS BALUSTRADE LOGICWALL.
f'c = 40 MPa
N12-200-V CENTRAL
N12-200-H CENTRAL

NLB - DENOTES NON LOAD BEARING DOUBLE BRICK WALL.

COLUMN SCHEDULE:

CC1 - 1000 x 250
CC2 - 500 x 500
CC3 - 1000 x 300
CC4 - 2000 x 250
CC5 - 500 x 250
REFER TO DRAWING S043 FOR DETAILS.

ISSUE	REVISION	DATE
A	ISSUED FOR 75% TENDER	18/10/19

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TITLE
FOURTH FLOOR GENERAL ARRANGEMENT PLAN

Designed	AS	Drawn	CB	North
Project Leader	AS	Sheet Size	A1	
Project Director	MW	Certified	-	
Printed 18/10/2019 4:42:34 PM		Version	R18	

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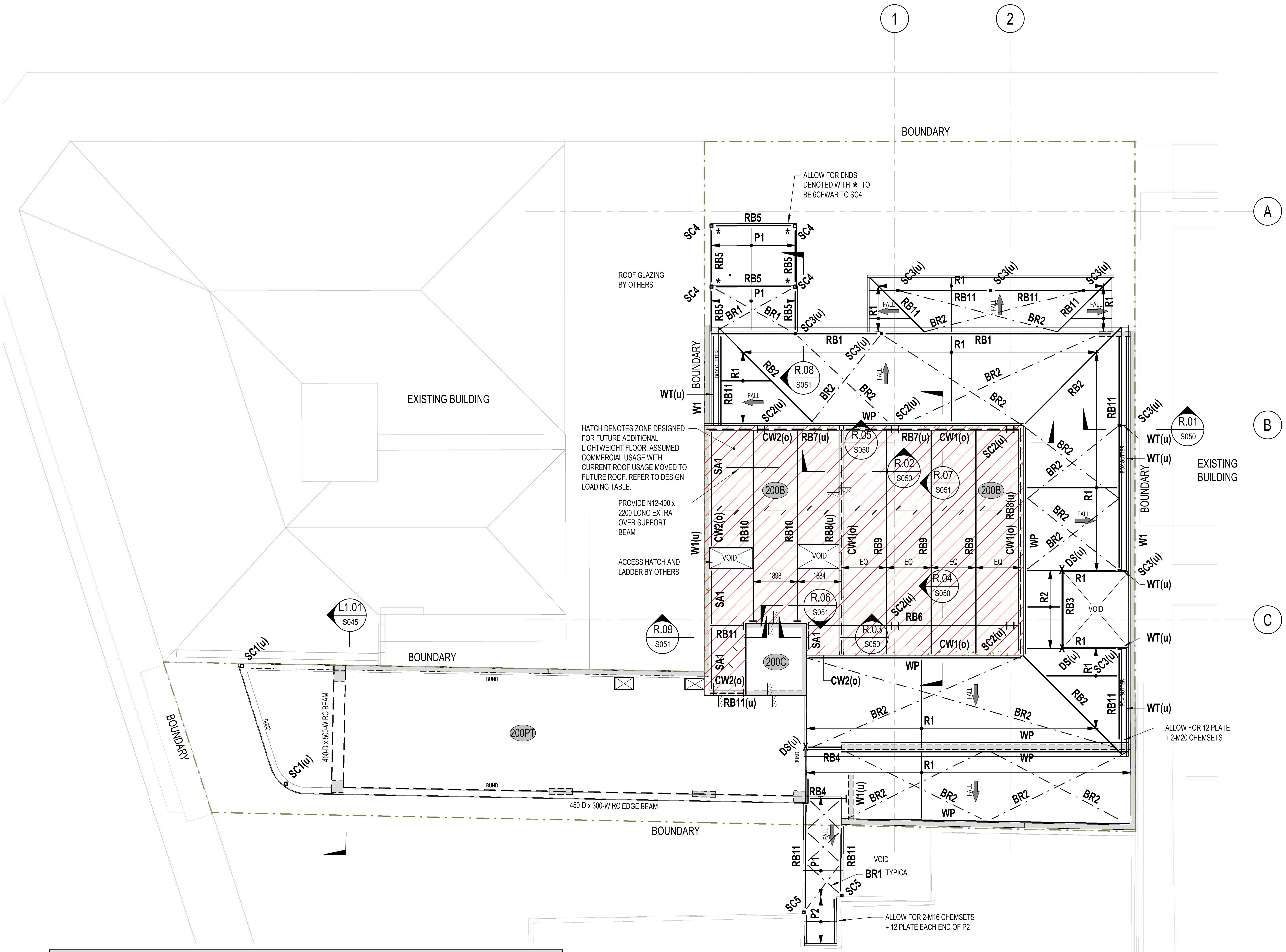
Project	Drawing	Revision
190047	S030	A

MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY



EXISTING BUILDING

ROOF GENERAL ARRANGEMENT PLAN

SCALE 1 : 100

MEMBER SCHEDULE

MARK	SIZE	CONNECTIONS LEFT	CONNECTIONS RIGHT	REMARKS
SC1	125 x 125 x 8.0 SHS	-	-	STEEL COLUMN. FIRE RATING BY OTHERS.
SC2	310UC96	-	-	STEEL COLUMN. FIRE RATING BY OTHERS.
SC3	89 x 89 x 6.0 SHS	-	-	STEEL COLUMN. FIRE RATING BY OTHERS.
SC4	125 x 125 x 8.0 SHS	-	-	STEEL COLUMN. FIXED BASE DETAIL.
SC5	100 x 100 x 6.0 SHS	-	-	STEEL COLUMN.
DS	DOUBLE STUD	-	-	DOUBLE STUD. REFER TO TYPICAL DETAIL ON DRAWING S055.
R1	150 x 63 HYSPAN LVL13 AT 900 CTS.	-	-	RAFTER
R2	90 x 45 HYSPAN LVL13 AT 900 CTS.	-	-	RAFTER
RB1	310UB40	-	-	ROOF BEAM
RB2	250UB31	-	-	ROOF BEAM
RB3	150 x 45 HYSPAN LVL13 AT 900 CTS.	-	-	ROOF BEAM
RB4	150 x 45 HYSPAN LVL13 AT 900 CTS.	-	-	ROOF BEAM
RB5	100 x 100 x 6.0 SHS	-	-	ROOF BEAM
RB6	460UB82	-	-	ROOF BEAM. 19 x 95 SHEAR STUDS AT 300 MAX. CTS.
RB7	460UB82	-	-	ROOF BEAM. 19 x 95 SHEAR STUDS AT 300 MAX. CTS.
RB8	460UB82	-	-	ROOF BEAM. 15mm PRECAMBER. 19 x 95 SHEAR STUDS AT 300 MAX. CTS.
RB9	460UB74	-	-	ROOF BEAM. 19 x 95 SHEAR STUDS AT 300 MAX. CTS.
RB10	460UB74	-	-	ROOF BEAM. 19 x 95 SHEAR STUDS AT 300 MAX. CTS.
RB11	200 PFC	-	-	ROOF BEAM
WP	WALL PLATE TO MATCH RAFTER SIZE	-	-	REFER TO TYPICAL DETAIL ON DRAWING S055.
BR1	16 DIA ROD	-	-	HORIZONTAL BRACING.
BR2	MITEK SPEEDBRACE	-	-	INSTALLED TO MANUFACTURER'S DETAILS.
WT	150 PFC	-	-	WALL TIES, TOES DOWN. BOLT TO WALL AT 600 CTS. WITH M16 CHEMSETS.
SA1	75 x 75 x 12 EA	-	-	SHELF ANGLE. M16 CHEMSETS AT 600 MAX. CTS.
P1	Z/C15010	-	-	PURLINS AT 1000 MAX. CTS.

LEGEND

REFER TO DRAWING S001 & S002 FOR GENERAL NOTES
REFER TO DRAWING S040 FOR CONCRETE DETAILS
REFER TO DRAWING S041 FOR RC WALL DETAILS
REFER TO DRAWING S042 FOR AFS WALL DETAILS
REFER TO DRAWING S043 FOR CONCRETE COLUMN DETAILS
REFER TO DRAWING S050-S051 FOR ROOF STEEL SECTIONS
REFER TO DRAWING S055 FOR STEELWORK DETAILS
REFER TO DRAWING S055 FOR TIMBER DETAILS
REFER TO DRAWING S056 FOR STEEL STAIR DETAILS

200PT — DENOTES MIN. THICKNESS OF POST-TENSIONED SLAB. SLAB TO POST-TENSION CONTRACTORS DETAILS UNLESS NOTED OTHERWISE.

200B — DENOTES MIN. THICKNESS OF BONDEK SLAB, 1.0 B.M.T, SL102 TOP (30 COVER) WITH ADDITIONAL REINFORCEMENT SHOWN ON PLAN.

DENOTES SPAN DIRECTION OF BONDEK SLAB.

200C — 200 THICK RC LIFT LID
N12-200 TOP & BOTTOM.
REFER TO DRAWING S040 FOR LIFTING EYE DETAIL.

DENOTES PENETRATION IN SLAB.
REFER TO SERVICES ENGINEERS DRAWINGS FOR DETAILS AND LOCATIONS.
ALL PENETRATIONS TO BE INDIVIDUALLY SLEEVED PIPES.
SLAB DESIGNER TO CO-ORDINATE SLEEVED PIPE PENETRATIONS WITH SERVICES DRAWINGS.

BUND — DENOTES BUND.
REFER TO DRAWING S040 FOR DETAILS.

DENOTES STEP IN SLAB.
REFER TO ARCHITECTS DRAWINGS FOR FINAL LOCATION AND DETAILS.

WALL SCHEDULE:

W1 - LW200D THICK AFS LOGICWALL.
f'c = 40 MPa
N12-200-V EACH FACE
N12-200-H EACH FACE

CW1 - 1200-H x 200-W RC UPSTAND WALL.
f'c = 40 MPa
N12-200-V EACH FACE
N12-200-H EACH FACE

CW2 - 1550-H x 200-W RC UPSTAND WALL.
f'c = 40 MPa
N12-200-V EACH FACE
N12-200-H EACH FACE

COLUMN SCHEDULE:

CC4 - 2000 x 250
CC5 - 500 x 250
REFER TO DRAWING S043 FOR DETAILS.

DESIGN LOAD ALLOWANCES TABLE: (FUTURE ZONE)

- SUPERIMPOSED DL: - PLANT ROOM WITH ADDITIONAL FLOOR 3.0kPa
- SUPERIMPOSED LL: - PLANT ROOM WITH ADDITIONAL FLOOR 6.0kPa

NOTES:

THIS DRAWING SHALL BE USED FOR FORMWORK PURPOSES ONLY AND SHALL BE READ IN CONJUNCTION WITH THE POST TENSIONING CONTRACTORS DRAWINGS.
ANY DISCREPANCIES FOUND IN THE SIZING OF CONCRETE ELEMENTS ON THE DRAWING SHALL BE FORWARDED TO THE ENGINEER PRIOR TO ERECTING THE FORMWORK.

POST TENSION SLAB DESIGN CRITERIA

DESIGN LOADING: LIVE LOAD REDUCTIONS SHALL NOT BE USED

FLOOR LOADS - UNLESS NOTED OTHERWISE
NOTE: PARTITION WALL (INCLUDING NON-LOADBEARING MASONRY WALLS)
LINE LOADS NOT INCLUDED
REFER ARCHITECTURAL FOR LOCATIONS.
RESIDENTIAL FLOORS
- SUPERIMPOSED DL: - NON TRAFFICABLE ROOF 1.5kPa
- SUPERIMPOSED LL: - NON TRAFFICABLE ROOF 2.0kPa

POINT LOADS - DL++ - DENOTES DEAD LOAD OF ++kN
- LL++ - DENOTES LIVE LOAD OF ++kN

LINE LOADS - DL/m++ - DENOTES DEAD LOAD OF ++kN
- LL/m++ - DENOTES LIVE LOAD OF ++kN

CONCRETE STRENGTH:
UNLESS NOTED OTHERWISE MINIMUM CONCRETE STRENGTH SHALL BE 40MPa U.N.O.

FIRE RATING:
UNLESS NOTED OTHERWISE FIRE RATING SHALL BE 120 MINS.
- WET AREAS 120 MINS.

DEFLECTION LIMITATION:
TOTAL DEFLECTION: L/250 OR 25mm (TYPICAL U.N.O.)
L/125 (CANTILEVER)
INCREMENTAL DEFLECTION: L/500

TRANSFER FLOOR LONG TERM TOTAL DEFLECTION: MIDSPAN - L/500 OR 15mm

TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION: MIDSPAN - L/800 OR 10mm

TRANSFER FLOOR LONG TERM TOTAL DEFLECTION: CANTILEVER - L/250

TRANSFER FLOOR LONG TERM INCREMENTAL DEFLECTION: CANTILEVER - L/400

COVER:
INTERNAL: 25mm U.N.O.
EXPOSED SURFACES: 40mm
PROVIDE PLASTIC OR CONCRETE BAR CHAIRS TO ALL EXPOSED SURFACES.

NOTES:
1. THE MINIMUM CONCRETE STRENGTH AS NOTED MAY BE INCREASED BY THE POST TENSIONING DESIGNER TO FACILITATE THE STRESSING PROGRAM.
2. THE POST TENSIONING CONTRACTOR SHALL DESIGN AND DOCUMENT ALL ELEMENTS CAST INTEGRALLY WITH THE POST TENSIONED FLOOR INCLUDING ALL EDGE BEAMS.
3. STRUCTURAL SIZES AND FRAMING AS INDICATED ON PLAN ARE INDICATIVE ONLY, THE POST TENSIONING CONTRACTOR MAY VARY THE INDICATED SIZES AS REQUIRED TO COMPLY WITH AUSTRALIAN STANDARDS OR TO PRODUCE A MORE ECONOMICAL DESIGN.
4. FOR CO-ORDINATION PURPOSES, ANY VARIATIONS TO THIS PLAN/DESIGN MADE BY THE POST TENSIONING CONTRACTOR SHALL BE APPROVED BY ADAMS CONSULTING ENGINEERS PTY LTD.
5. PT CONTRACTOR TO ALLOW FOR BALUSTRADE LOADS OF DL/m = 4kN/m
M* = 1kNm/m
6. THIS DRAWING SHALL BE USED FOR FORMWORK PURPOSES ONLY AND SHALL BE READ IN CONJUNCTION WITH THE POST-TENSIONING CONTRACTORS DRAWINGS. ANY DISCREPANCIES FOUND IN THE SIZING OF CONCRETE ELEMENTS SHALL BE FORWARDED TO THE ENGINEER PRIOR TO ERECTING FORMWORK.

ISSUE	REVISION	DATE
A	ISSUED FOR 75% TENDER	18/10/19

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TITLE
ROOF GENERAL ARRANGEMENT PLAN

Designed	AS	Drawn	CB	North
Project Leader	AS	Sheet Size	A1	
Project Director	MW	Certified	-	
Printed 18/10/2019 4:39:09 PM		Version	R18	

75% TENDER ISSUE
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Project	Drawing	Revision
190047	S035	A

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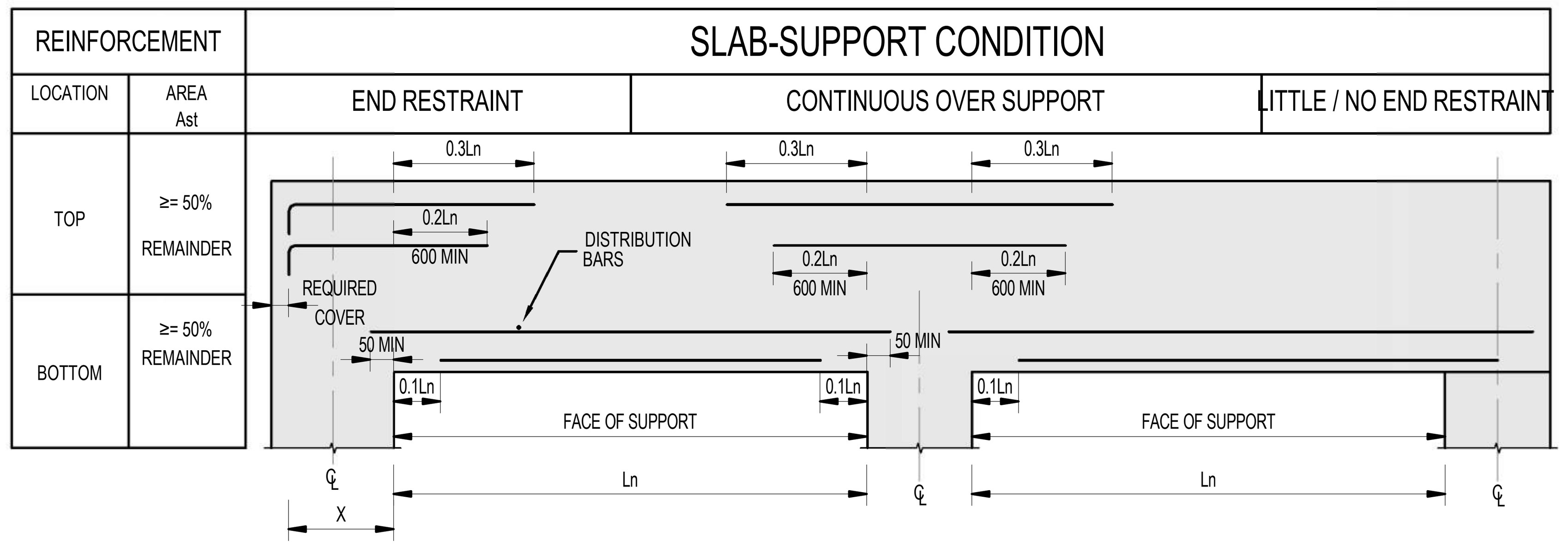
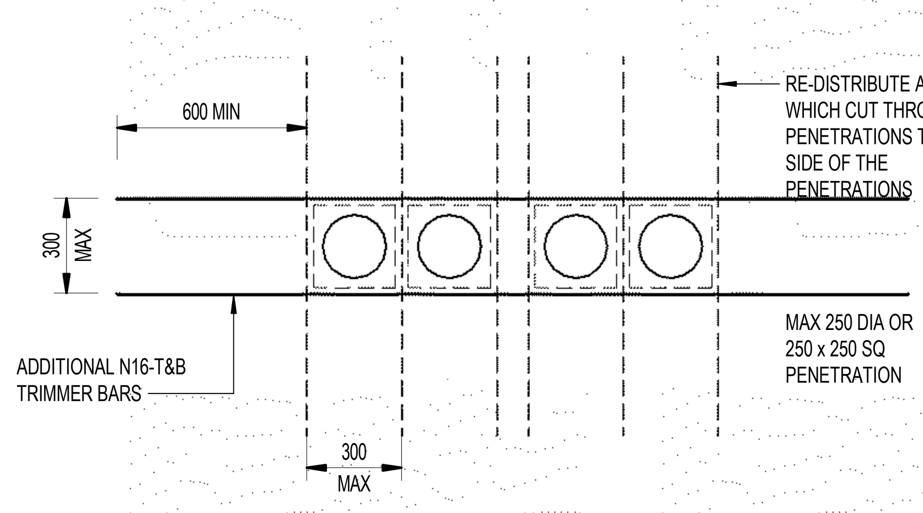


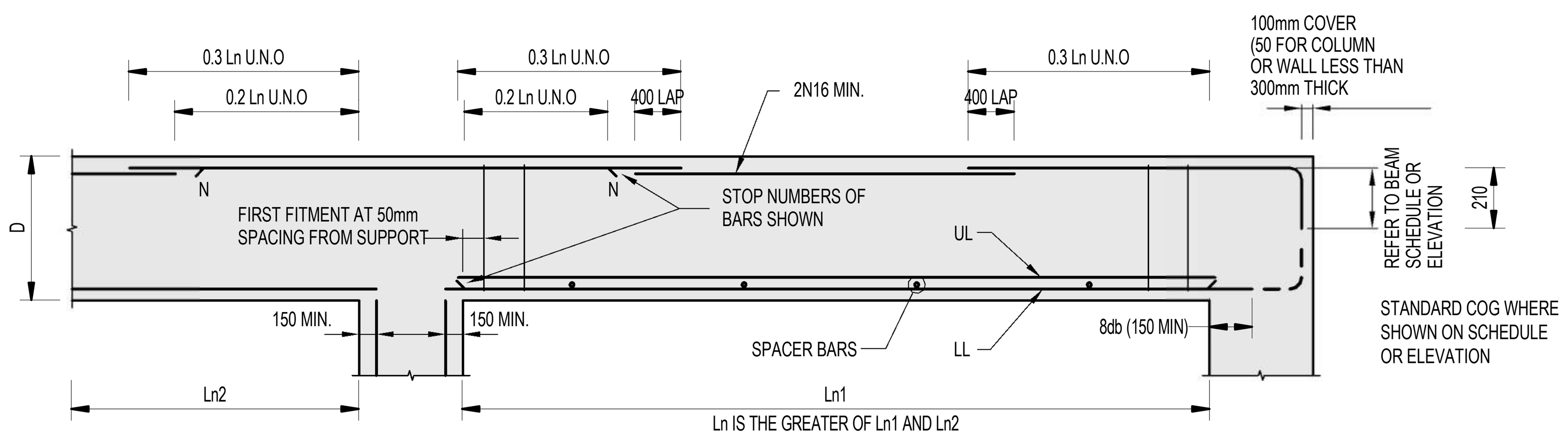
TYPICAL ARRANGEMENT OF SLAB REINFORCEMENT

NOTES

1. X = GREATER OF 12 BAR DIAMETERS AND T



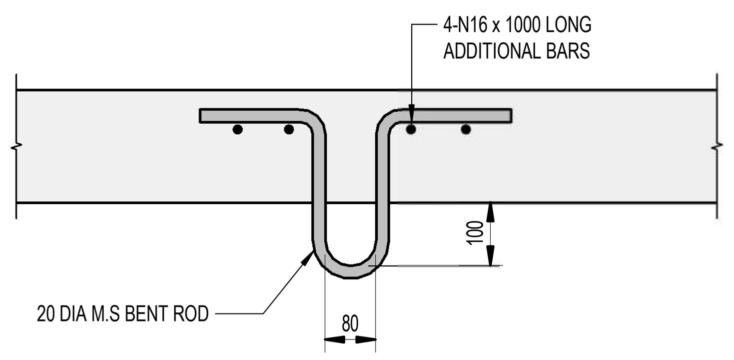
TYPICAL ADDITIONAL REINFORCEMENT DETAIL FOR MULTI-PENETRATIONS



TYPICAL BEAM REINFORCEMENT ARRANGEMENT DETAILS

NOTES

1. FOR REINFORCEMENT, BEAM DIMENSIONS ETC. REFER FLOOR PLANS/SCHEDULE.
2. BEAM DIMENSIONS ARE GIVEN AS DEPTH x WIDTH AND DO NOT INCLUDE FINISHES.
3. BARS ARE TO BE IN ONE LAYER UNLESS SPECIFICALLY NOTED UPPER LAYER (UL) OR LOWER LAYER (LL)
4. BARS AT SLAB LEVEL NEED NOT BE CONFINED TO THE BEAM WIDTH. IF NECESSARY THEY MAY SPREAD INTO THE SLAB WITH 40mm MINIMUM CLEARANCE. REFER FURTHER DETAILS ON PLAN.



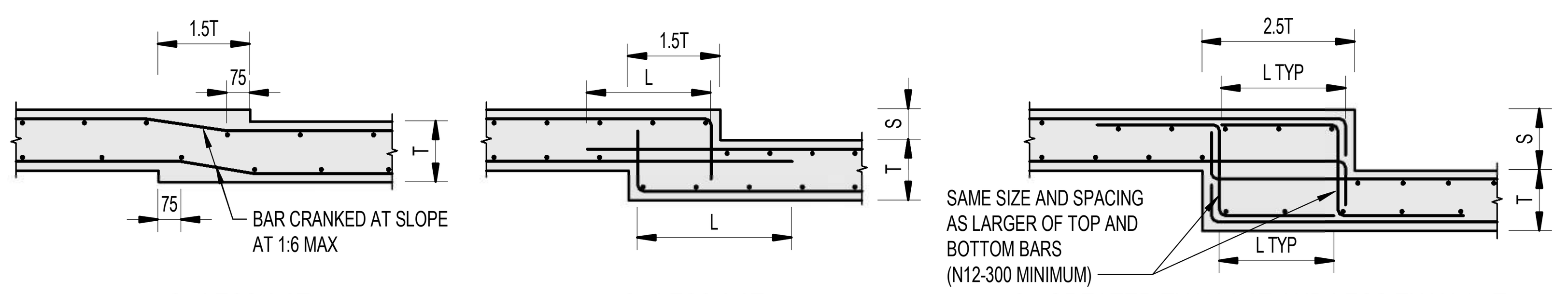
TYPICAL LIFTING EYE DETAIL - 2.5 t S.W.L.

ANCHORAGE / SPLICE LENGTH TABLE

SPLICE LENGTHS OF TENSION BARS IN SLABS AND BEAMS (mm)

BAR SIZE	LESS THAN 300mm OF CONCRETE BELOW BAR OR VERTICAL BAR				MORE THAN 300mm OF CONCRETE BELOW BAR			
	CONCRETE GRADE				CONCRETE GRADE			
	N32		>= N40		N32		>= N40	
	SLAB	BEAM	SLAB	BEAM	SLAB	BEAM	SLAB	BEAM
N10	400	400	400	400	550	500	500	500
N12	500	500	500	500	650	550	600	550
N16	750	650	700	650	1000	850	900	750
N20	1000	900	900	800	1300	1150	1150	1050
N24	1250	1150	1100	1050	1600	1500	1450	1350
N28	1500	1450	1350	1300	2000	1900	1750	1700
N32	1800	1750	1600	1600	2300	2300	2100	2050
N36	2100	2100	1900	1900	2700	2700	2450	2450
APPROXIMATE SPLICE RULE	55 db		50 db		75 db		65 db	
APPROXIMATE ANCHORAGE RULE	45 db		40 db		60 db		55 db	

1. THESE LENGTHS APPLY FOR ALL BARS IN BEAMS AND SLABS.
2. THE MINIMUM COVER TO THE BAR UNDER CONSIDERATION IS TO BE THE GREATER OF 20mm FOR SLABS, 35mm FOR BEAMS, OR THE BAR DIAMETER.
3. THE CLEAR SPACING BETWEEN SPLICED BARS MUST BE LESS THAN ONE BAR DIAMETER.
4. FOR N25 CONCRETE, MULTIPLY THE LENGTHS OF N32 CONCRETE BY 1.15.
5. UNLESS SHOWN ON THE DRAWINGS THE SPLICE LOCATIONS MUST BE APPROVED BY THE ENGINEER.
6. FOR ANCHORAGE LENGTHS OF BARS, MULTIPLY THE SPLICE LENGTHS BY 0.8.
7. DB DENOTES BAR DIAMETER .
8. THE MINIMUM CLEAR SPACING OF BARS TO BE 120mm.



S= LESS 0.2T

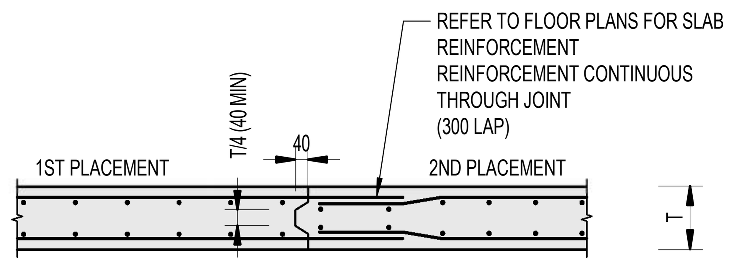
S= LESS 0.8T

S= GREATER THAN 0.8T AND LESS THAN 1.5T

TYPICAL SUSPENDED SLAB SETDOWN REINFORCEMENT SPLICE DETAIL

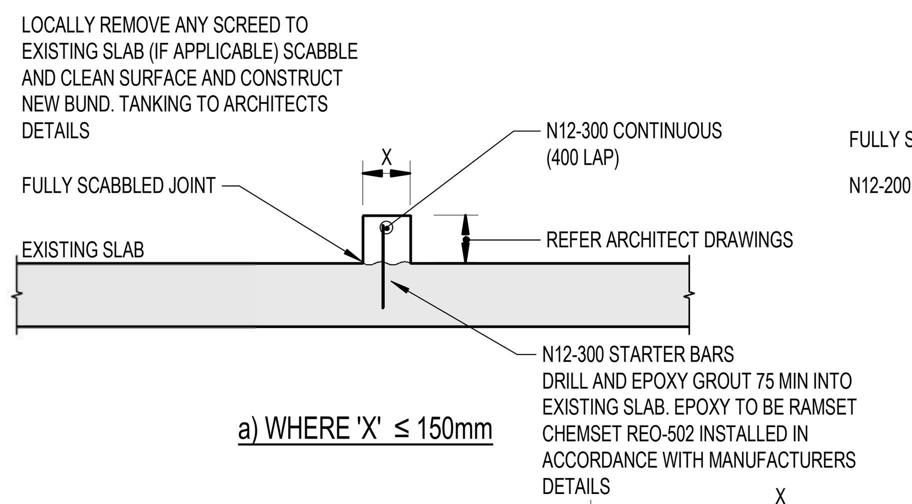
NOTES:

1. DETAILS APPLY UNLESS SHOWN OR NOTED OTHERWISE ON DRAWINGS
2. 'T' REFERS TO SLAB THICKNESS.
3. REFER TO PLANS FOR LOCATIONS OF SETDOWNS AND STEPS.
4. REINFORCEMENT SIZE AND SPACING TO BE AS SHOWN ON PLAN.

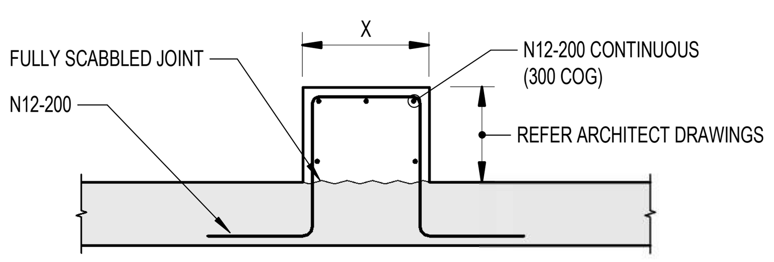


1. LOCATION OF JOINT TO BE TO THE APPROVAL OF THE ENGINEER
2. IF NO REINFORCEMENT AT JOINT, PROVIDE MINIMUM N16-300 x 1200 LONG, LAP 600

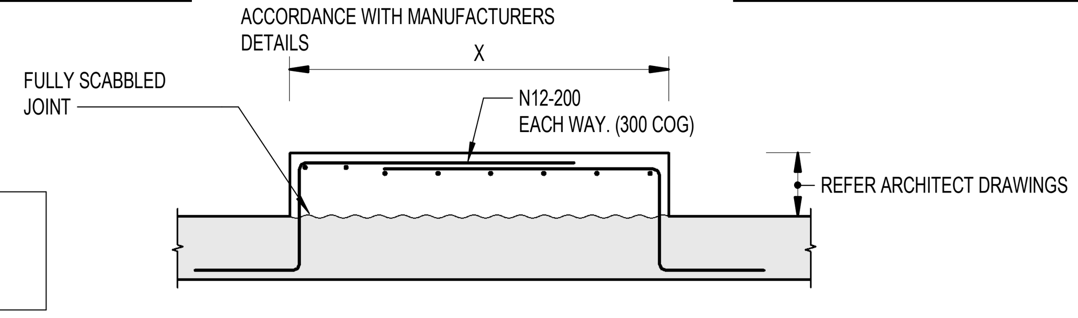
TYPICAL JOINT IN SUSPENDED SLAB DETAIL



a) WHERE 'X' ≤ 150mm



b) WHERE 150mm < 'X' ≤ 1200mm



NOTE:
BUILDER TO LOCATE AND NOT DAMAGE ANY POST-TENSIONING CABLES IN SLAB

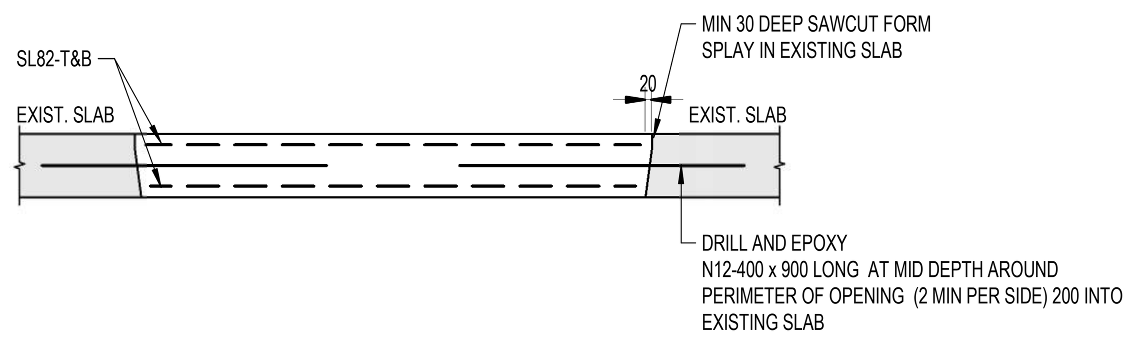
NOTES

1. REFER SPECIFIC DETAIL WHERE HEIGHT LIMITS ARE EXCEEDED.

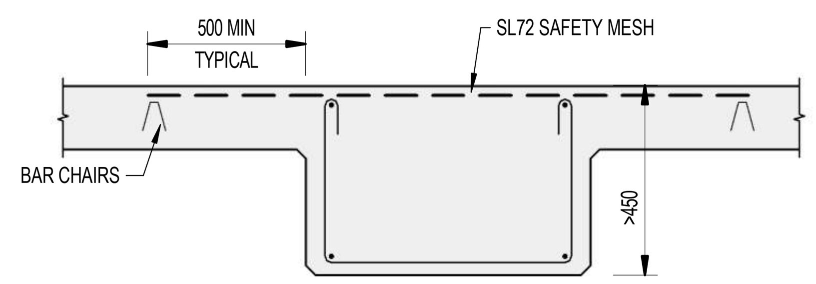
c) WHERE 'X' > 1200mm

TYPICAL BUND / KERB DETAILS

(N.T.S.)



TYPICAL INFILL SUSPENDED SLAB DETAIL



NOTE:
WHERE BEAMS, BAND BEAMS AND SLABS EXCEED 450mm IN DEPTH AND NO TOP REINFORCEMENT HAS BEEN SPECIFIED, PROVIDE SAFETY MESH AS NOTED.
SAFETY MESH SHALL BE SUPPORTED BY BAR CHAIRS AT 1000 CTS. IN ANY DIRECTION.
WHERE BEAM IS > 2100 WIDE, PROVIDE N12-500 BARS TO SUPPORT SAFETY MESH.

CONSTRUCTION SAFETY MESH

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TITLE
CONCRETE DETAILS SHEET

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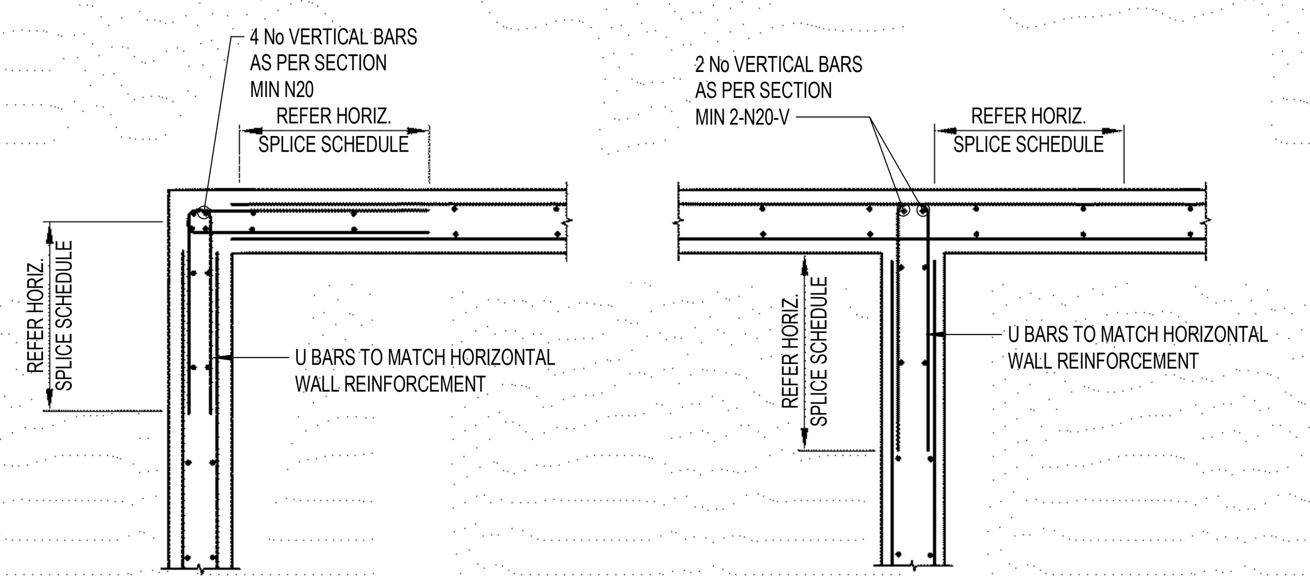
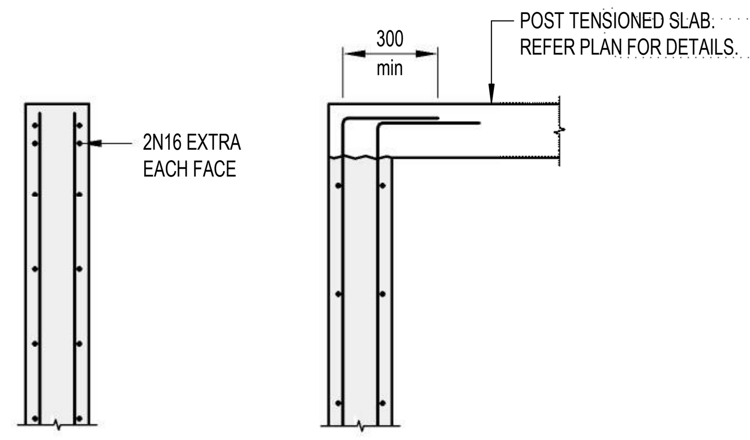
Project	Drawing	Revision
190047	S040	A

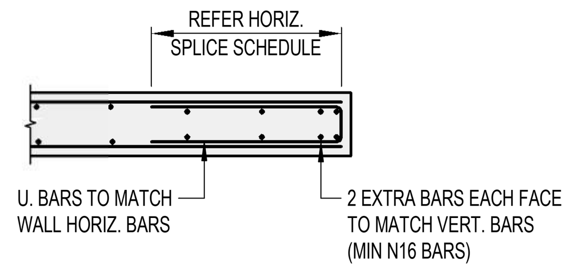
MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY



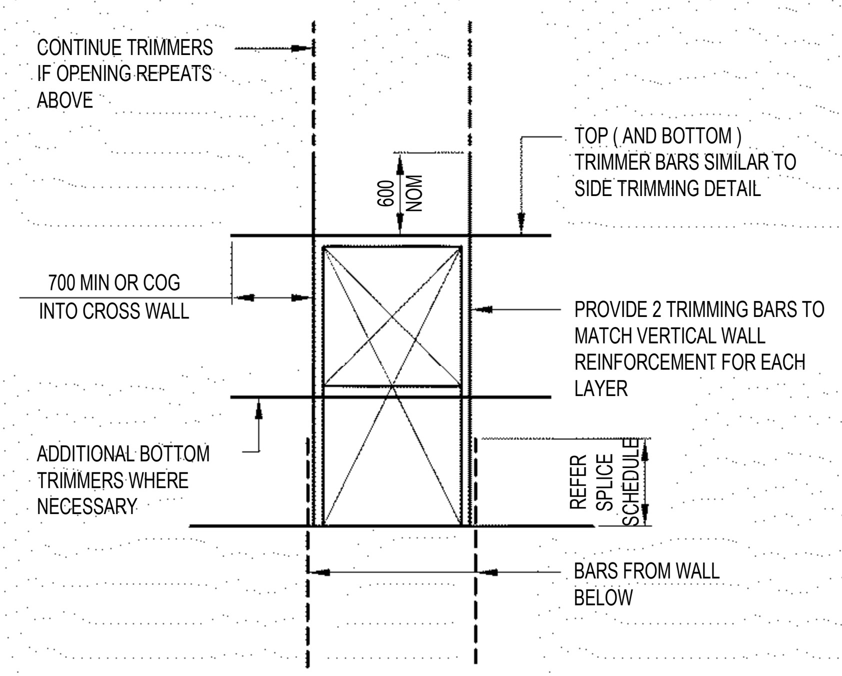
WALL JUNCTION DETAIL



WALL TERMINATION DETAIL

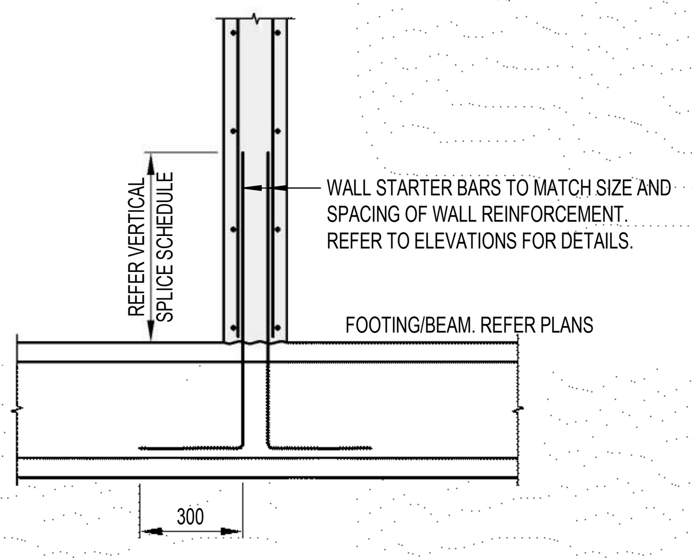


WALL TERMINATION AND AT OPENINGS DETAIL

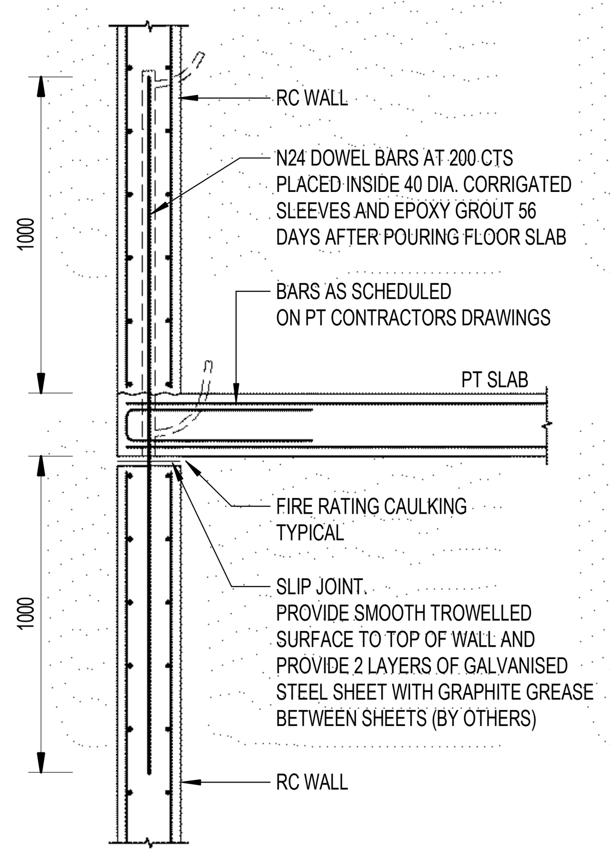


WALL PENETRATION DETAIL >400 x 400

NOTE:
LOCATION OF PENETRATIONS TO BE APPROVED BY ENGINEETR PRIOR TO CONSTRUCTION

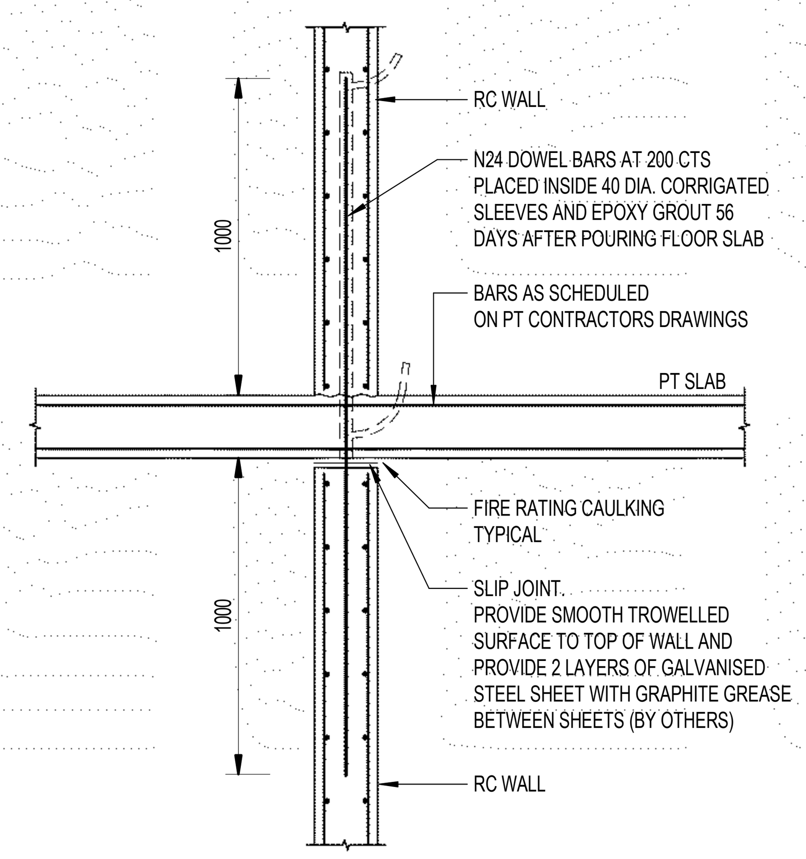


WALL STARTER BAR DETAIL



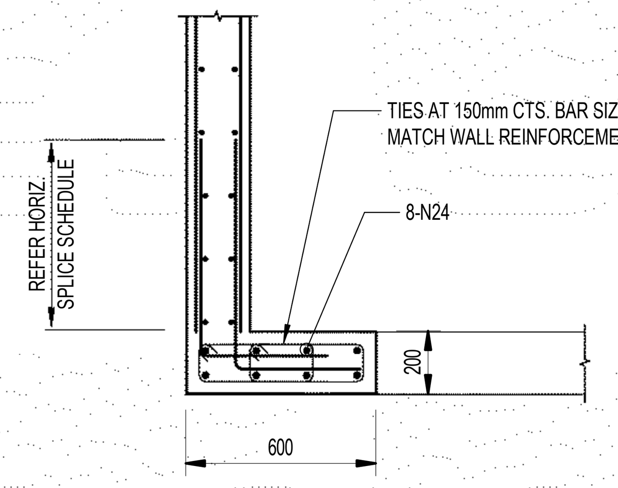
PREFERRED TEMPORARY SLIDING JOINT DETAIL AT SLAB / WALL CONNECTION

(FOR LOCATION REFER TO PLAN)

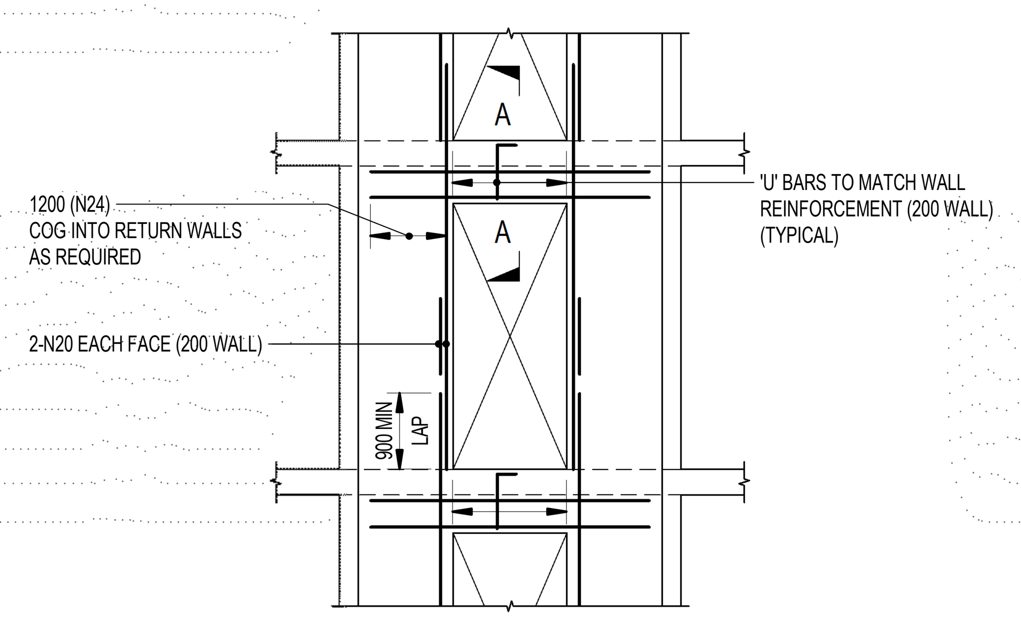


PREFERRED TEMPORARY SLIDING JOINT DETAIL AT SLAB / WALL CONNECTION

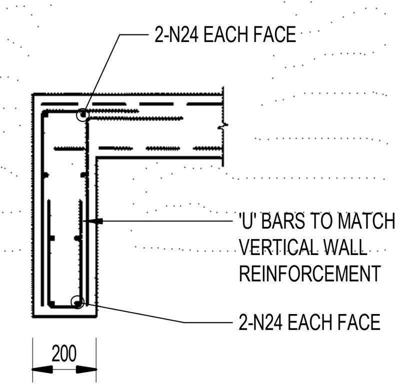
(FOR LOCATION REFER TO PLAN)



TYPICAL LIFT OPENING SECTION DETAIL



TYPICAL DOOR PENETRATION DETAIL



SECTION A-A

(200 THICK WALL)

VERTICAL SPLICE LENGTHS IN WALLS (mm)

BAR DIAMETER	CONCRETE GRADE			
	N32	N40	N50	N65-N100
12	450	450	450	450
16	600	600	600	600
20	850	750	750	750
24	1150	1000	900	900
28	1400	1250	1150	1050
32	1750	1550	1400	1200
36	2050	1850	1650	1450

MAXIMUM CLEAR GAP BETWEEN BARS ONE BAR DIAMETER.
MINIMUM CLEAR SPACING 120mm

HORIZONTAL SPLICE LENGTHS IN WALLS (mm)

BAR DIAMETER	CONCRETE GRADE			
	N32	N40	N50	N65-N100
12	650	600	600	600
16	1000	900	800	800
20	1300	1150	1050	950

MAXIMUM CLEAR GAP BETWEEN BARS ONE BAR DIAMETER.
NOTE: FOR WALLS EXPOSED TO WEATHER REFER GENERAL NOTES.
MINIMUM CLEAR SPACING 120mm

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TITLE
RC WALL DETAILS SHEET

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Project Director	MW	Certified	-	
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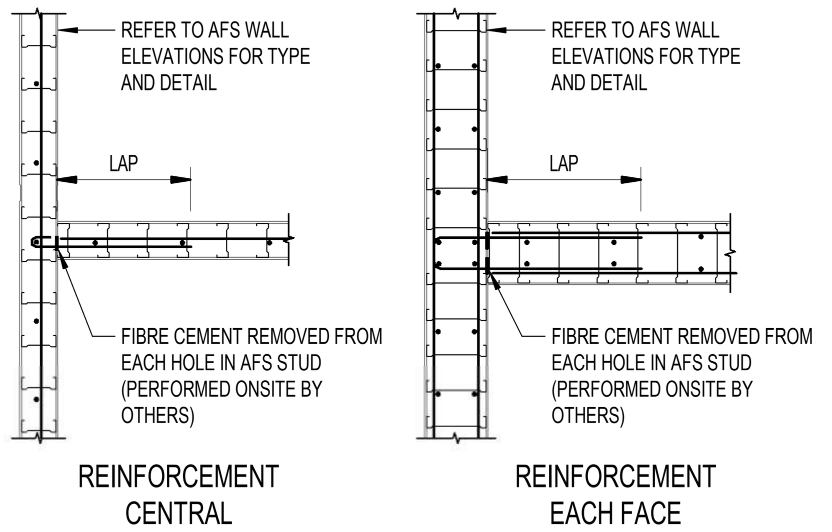
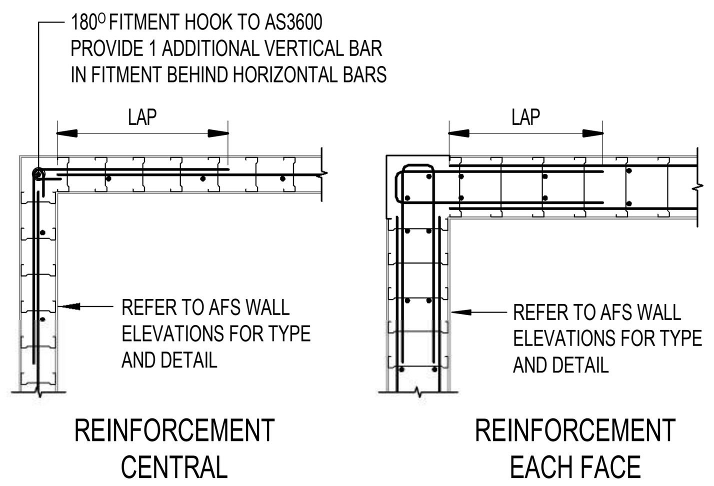
Project	Drawing	Revision
190047	S041	A

MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY



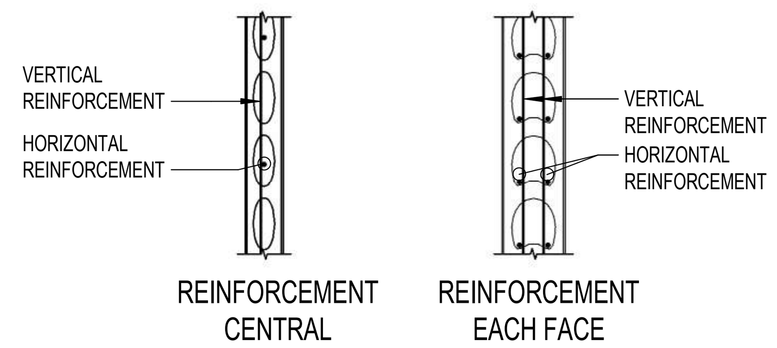
AFS LOGICWALL JUNCTION DETAIL

NOTE:
REFER TO SCHEDULE FOR VERTICAL AND HORIZONTAL REINFORCEMENT
REFER TO HORIZONTAL SPLICE TABLE FOR DEVELOPMENT LENGTHS



AFS LOGICWALL CORNER DETAIL

NOTE:
REFER TO SCHEDULE FOR VERTICAL AND HORIZONTAL REINFORCEMENT
REFER TO HORIZONTAL SPLICE TABLE FOR DEVELOPMENT LENGTHS



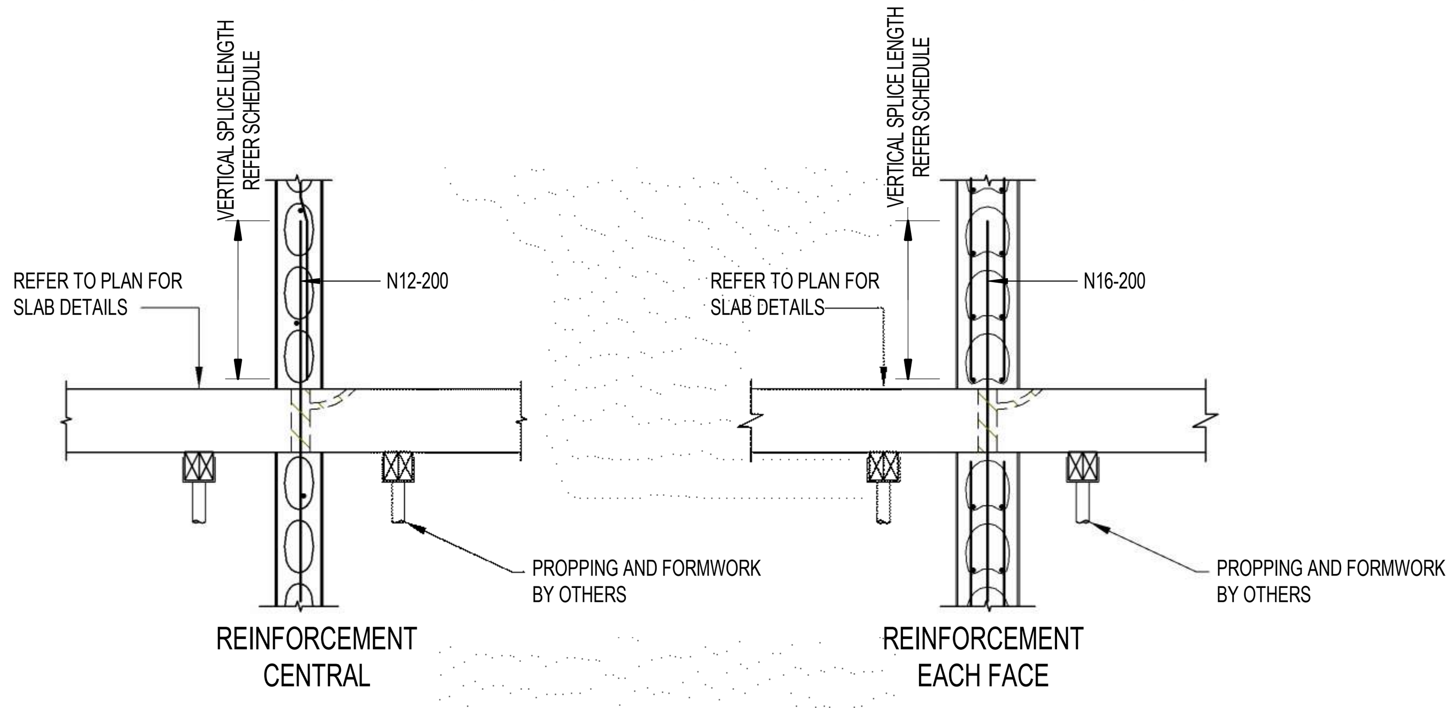
AFS LOGICWALL REINFORCEMENT ARRANGEMENT

VERTICAL SPLICE LENGTHS IN WALLS (mm)				
BAR DIAMETER	CONCRETE GRADE			
	N32	N40	N50	N65-N100
12	450	450	450	450
16	600	600	600	600
20	850	750	750	750
24	1150	1000	900	900
28	1400	1250	1150	1050
32	1750	1550	1400	1200
36	2050	1850	1650	1450

MAXIMUM CLEAR GAP BETWEEN BARS ONE BAR DIAMETER.
MINIMUM CLEAR SPACING 120mm

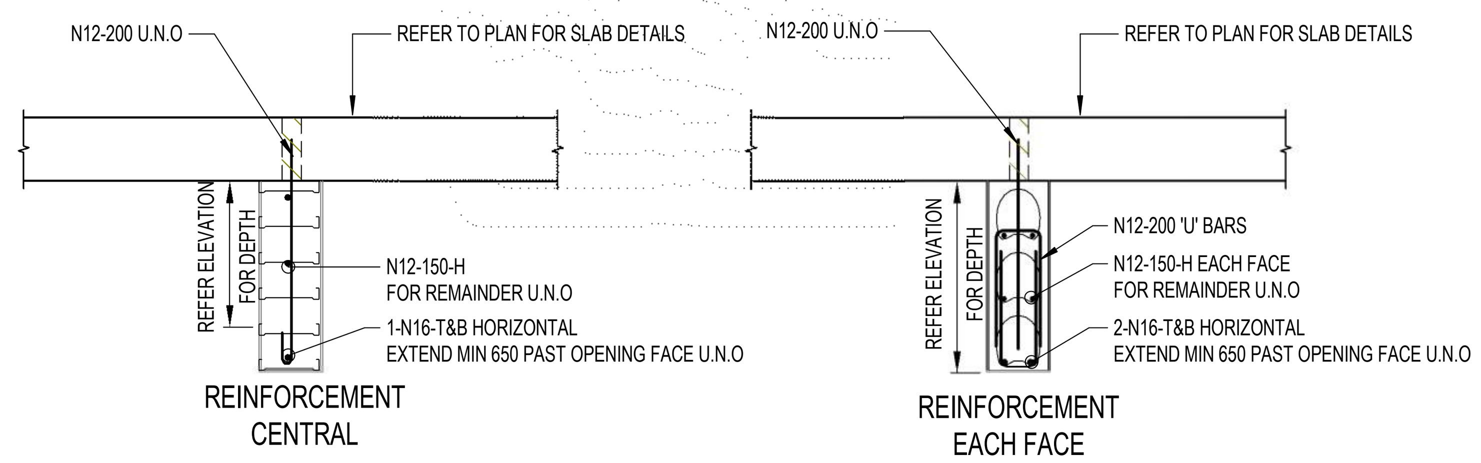
HORIZONTAL SPLICE LENGTHS IN WALLS (mm)				
BAR DIAMETER	CONCRETE GRADE			
	N32	N40	N50	N65-N100
12	650	600	600	600
16	1000	900	800	800
20	1300	1150	1050	950

MAXIMUM CLEAR GAP BETWEEN BARS ONE BAR DIAMETER.
NOTE: FOR WALLS EXPOSED TO WEATHER REFER GENERAL NOTES.
MINIMUM CLEAR SPACING 120mm

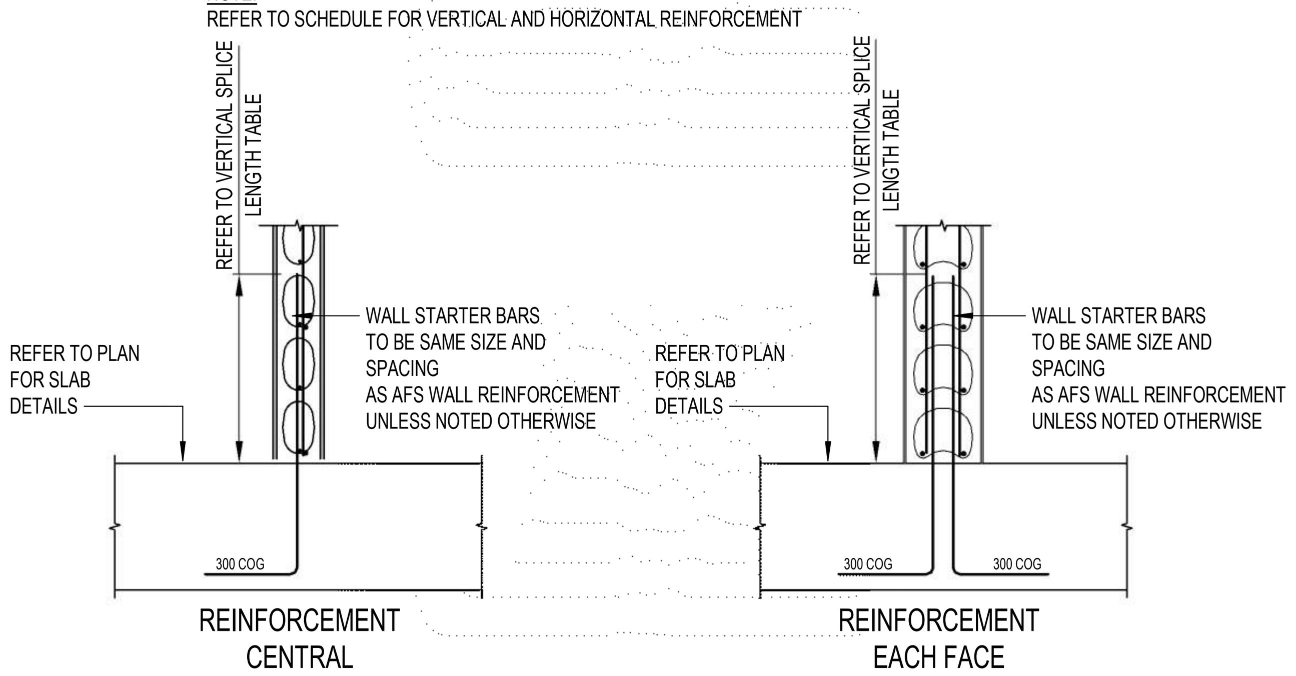


SLAB TO AFS LOGICWALL CONNECTION DETAIL

NOTE:
REFER TO SCHEDULE FOR VERTICAL AND HORIZONTAL REINFORCEMENT

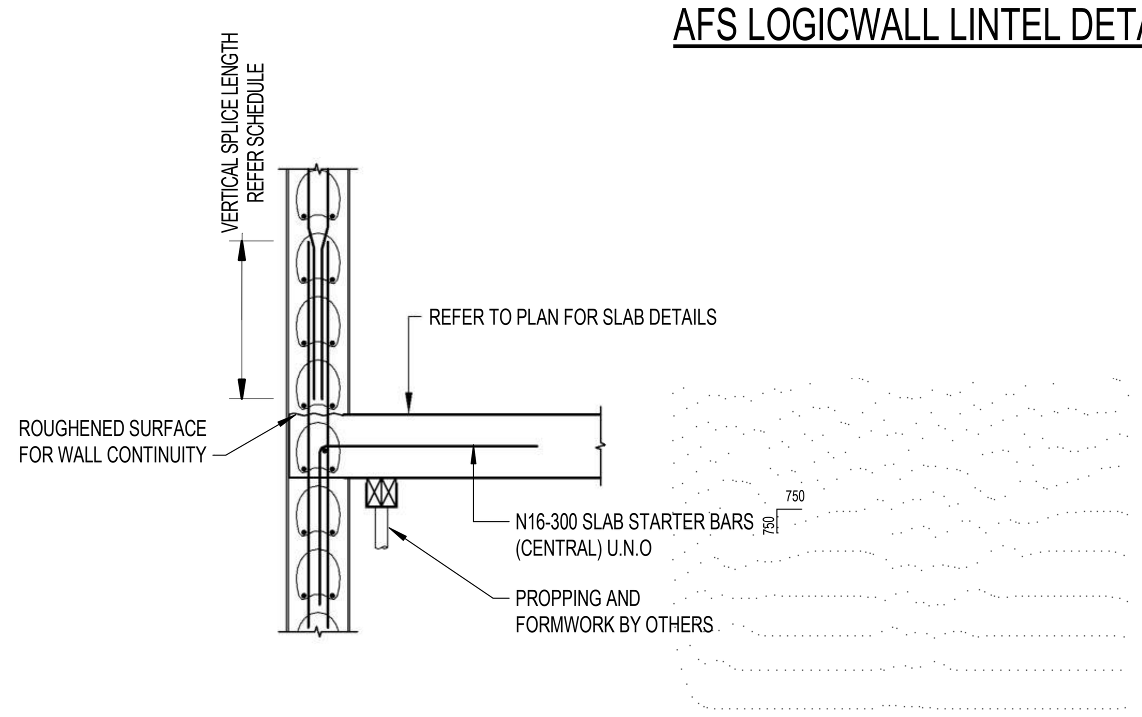


AFS LOGICWALL LINTEL DETAIL



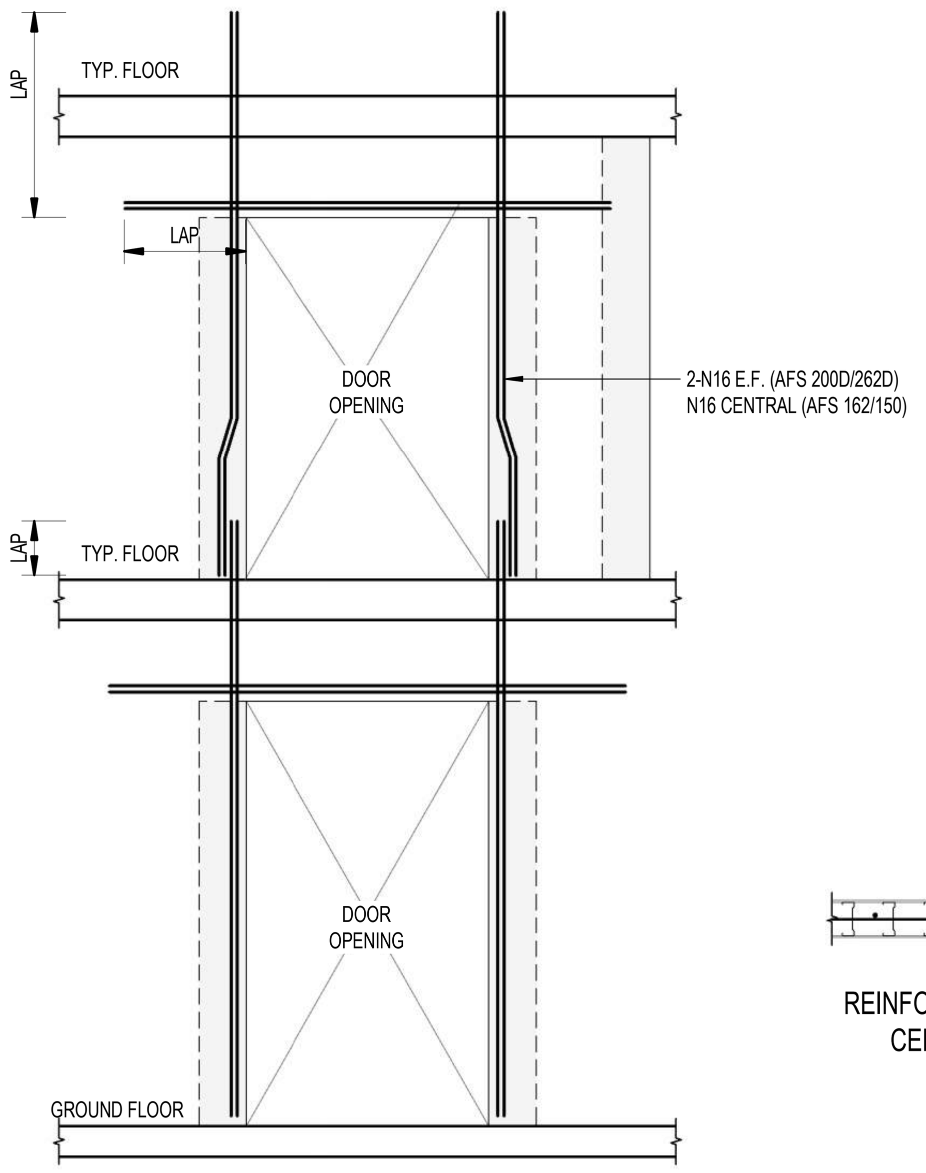
AFS LOGICWALL STARTER BAR DETAIL

NOTE:
REFER TO SCHEDULE FOR VERTICAL AND HORIZONTAL REINFORCEMENT

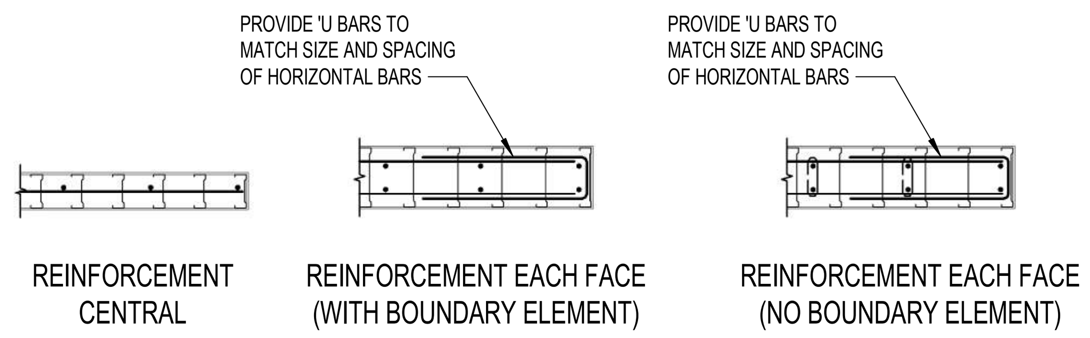


SLAB TO EXTERNAL AFS LOGICWALL CONNECTION DETAIL

NOTE:
REFER TO SCHEDULE FOR VERTICAL AND HORIZONTAL REINFORCEMENT



TYPICAL TRIMMER BAR DETAIL AT DOOR OPENINGS



AFS LOGICWALL TERMINATION DETAILS

NOTE:
REFER TO SCHEDULE FOR VERTICAL AND HORIZONTAL REINFORCEMENT
REFER TO HORIZONTAL SPLICE TABLE FOR DEVELOPMENT LENGTHS

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TITLE
AFS WALL DETAILS SHEET

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Project Director	MW	Certified	-	
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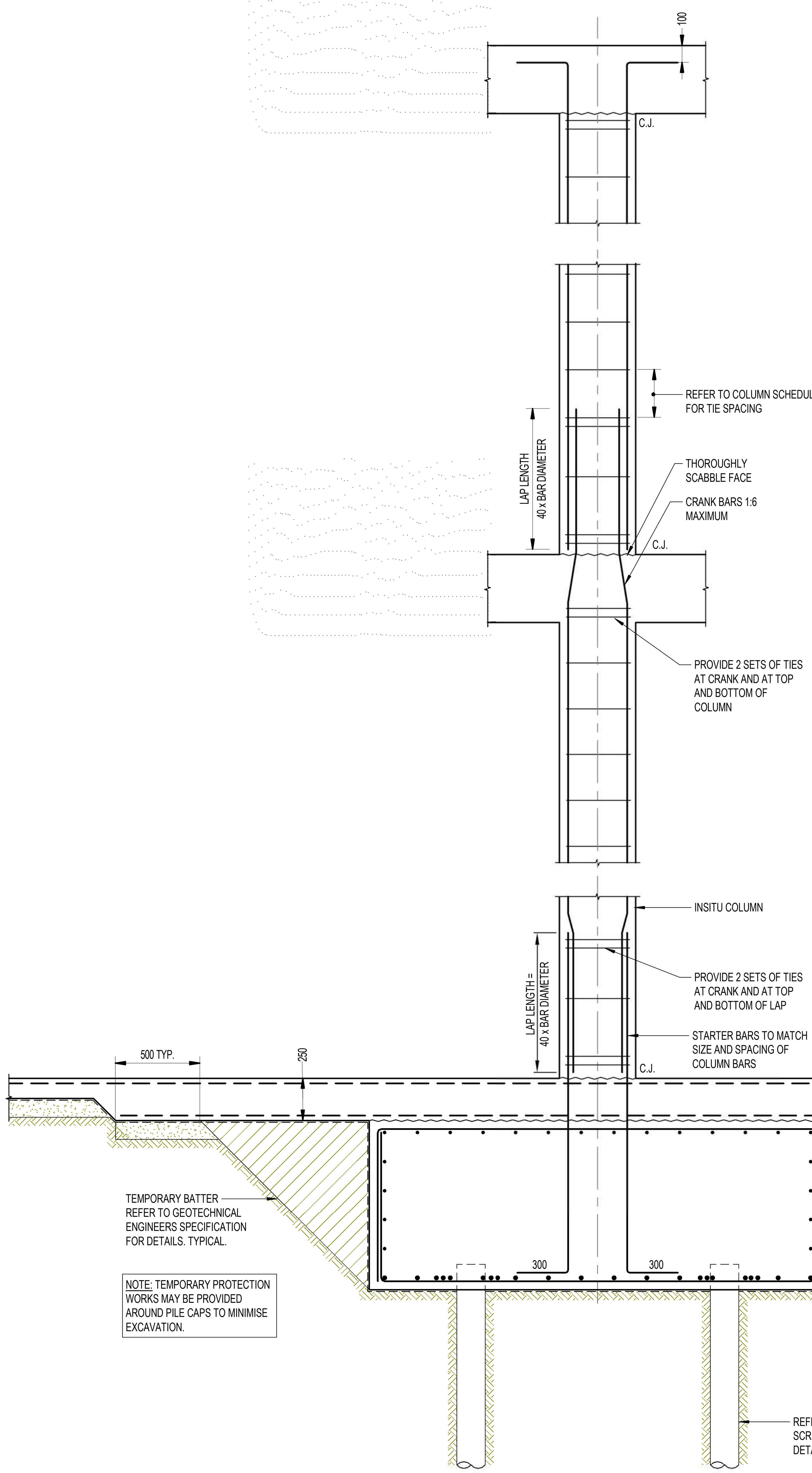
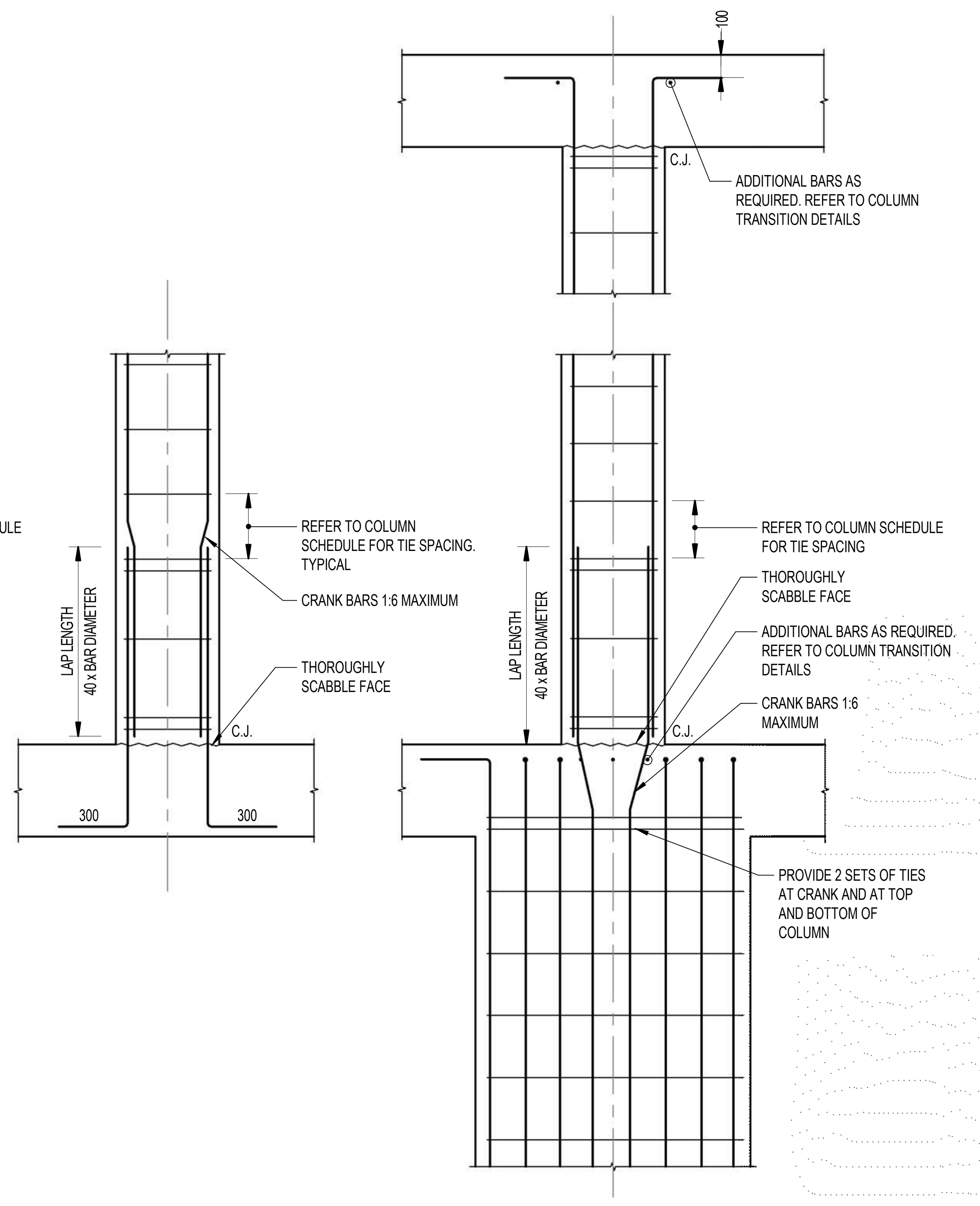
Project	Drawing	Revision
190047	S042	A

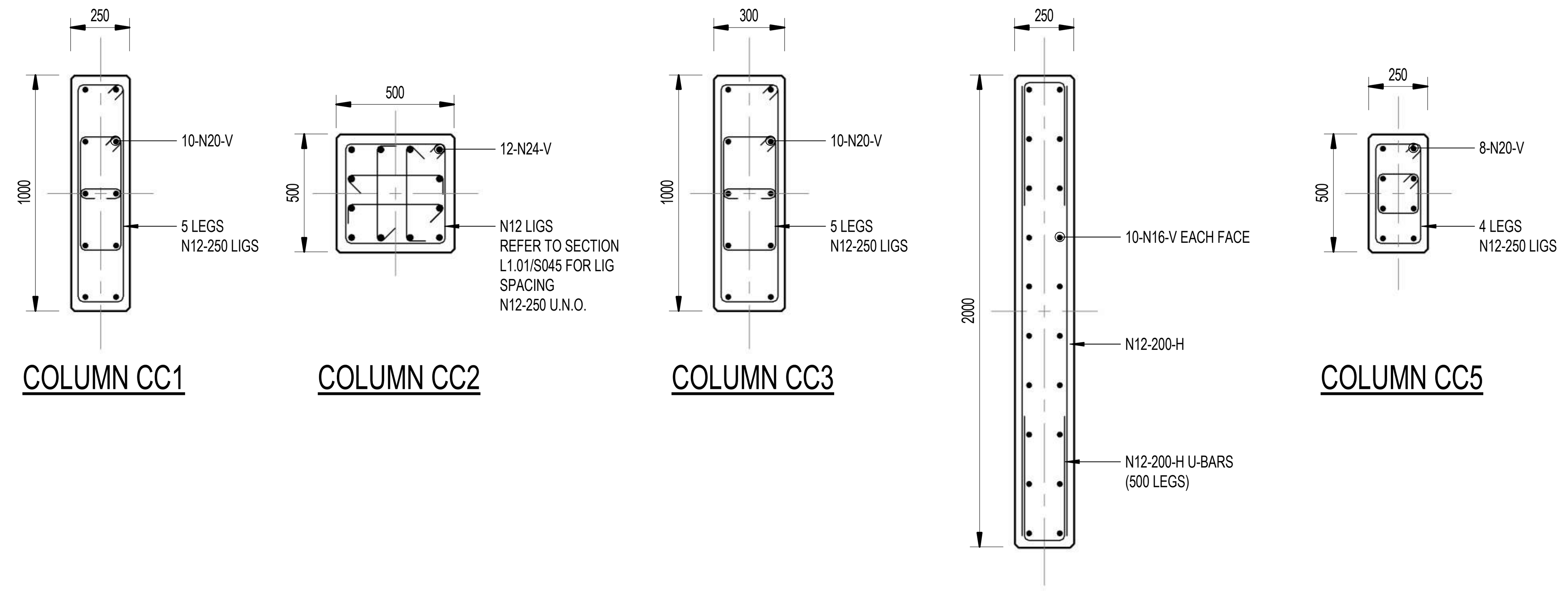
MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY



TYPICAL COLUMN TO PILE CAP DETAIL

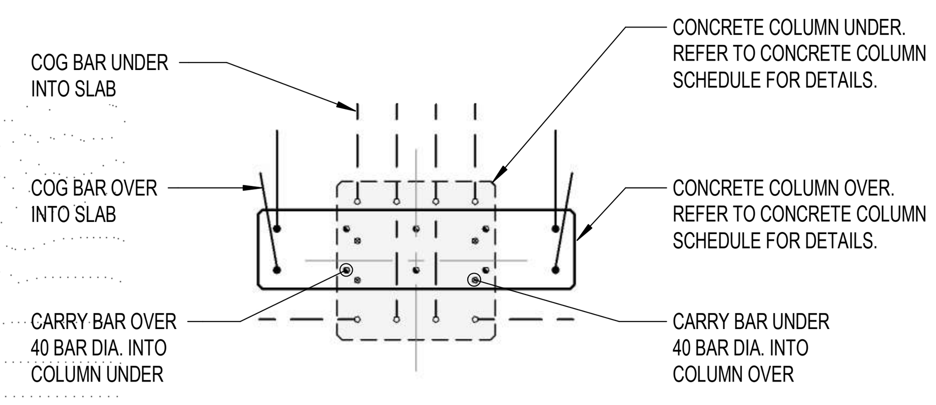


TYPICAL COLUMN TRANSITION DETAIL

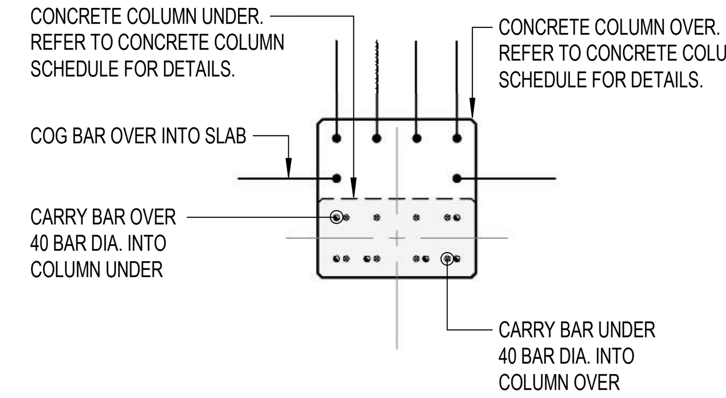


TYPICAL COLUMN TYPE DETAILS

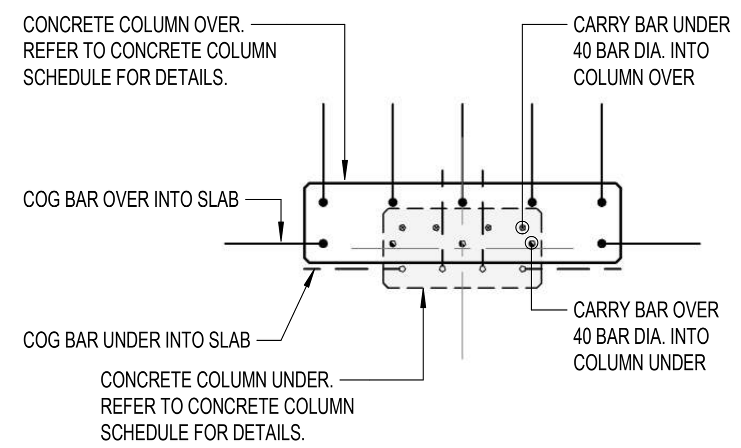
NOTE:
CONCRETE GRADE = 40MPa U.N.O.
COVER = 30mm.



TRANSITION TYPE 1



TRANSITION TYPE 2



TRANSITION TYPE 3

COLUMN TRANSITION DETAILS

- BAR BELOW TERMINATES AND COGS
- CARRY BAR UNDER 40 BAR DIA. INTO COLUMN OVER
- CARRY BAR OVER 40 BAR DIA. INTO COLUMN UNDER
- BAR OVER

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CONCRETE COLUMN DETAILS SHEET

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190047	S043	A

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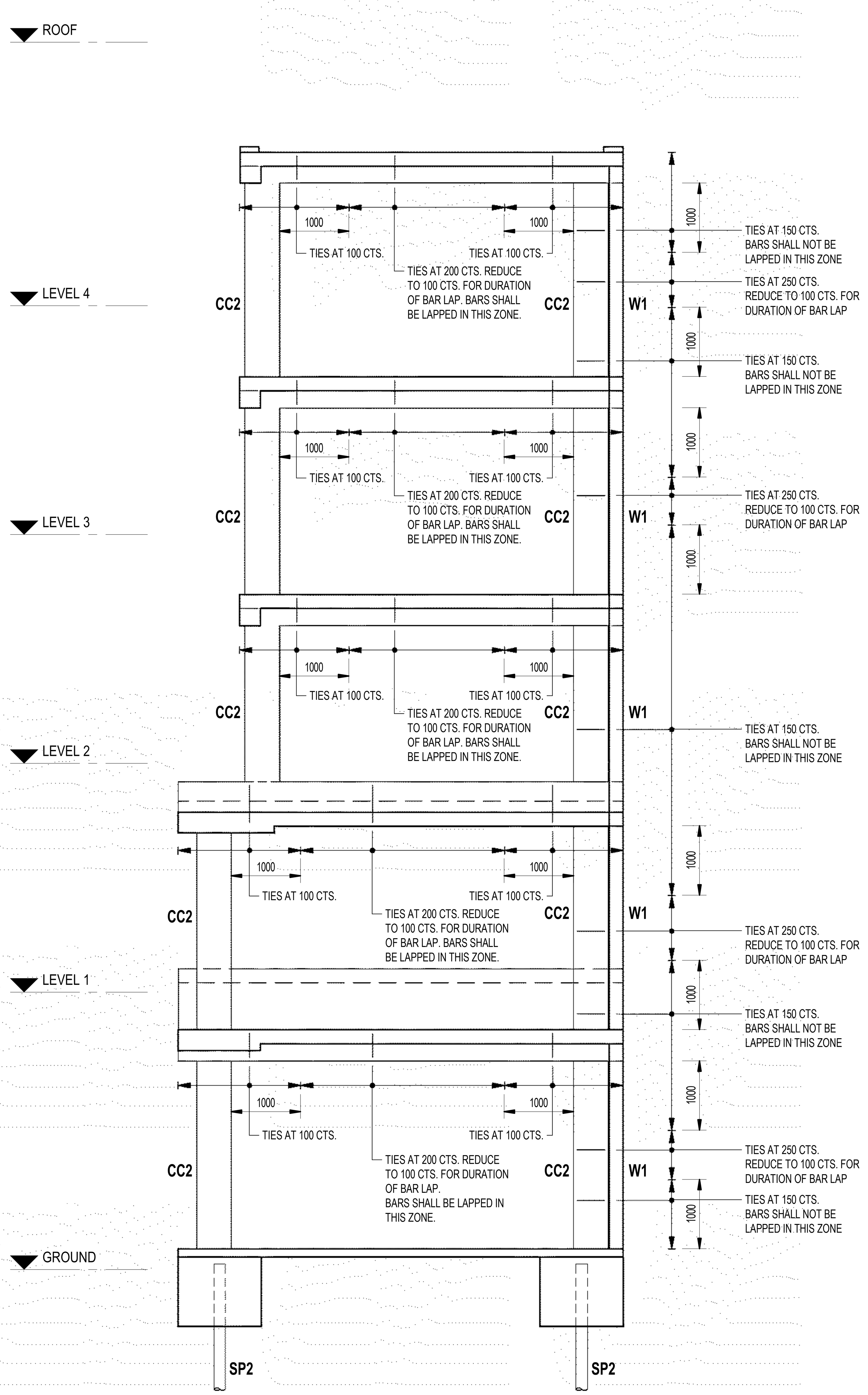
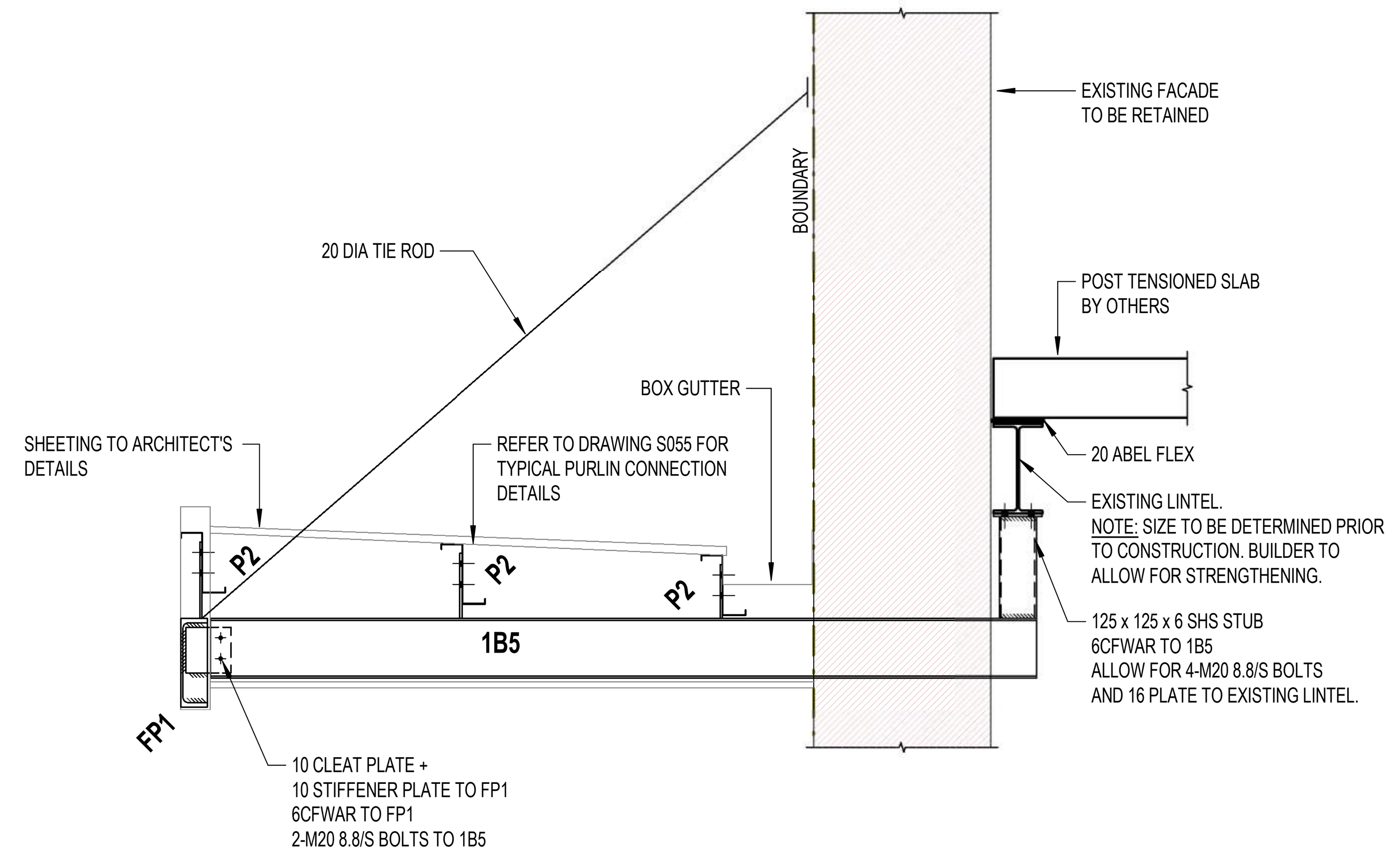
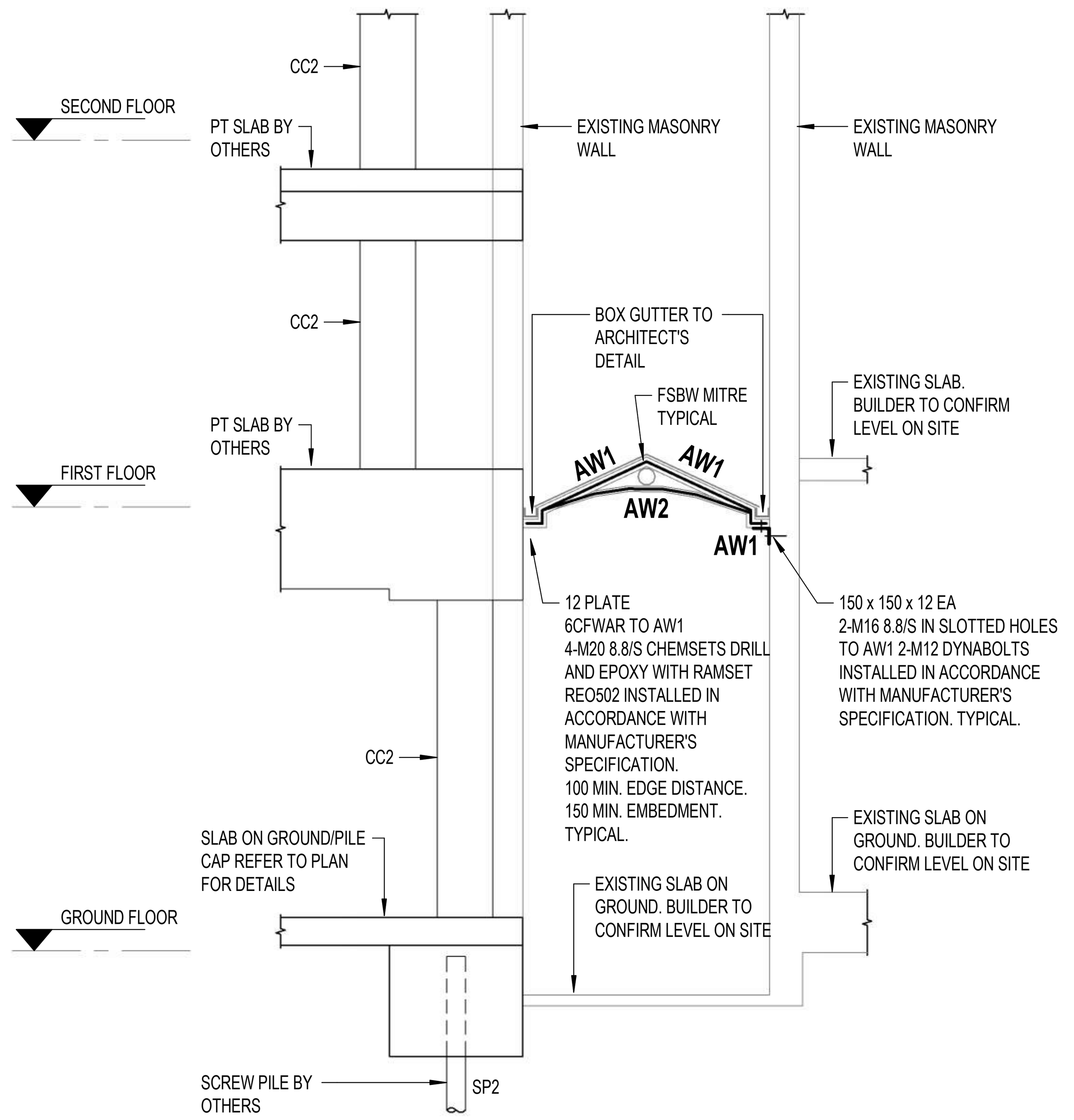


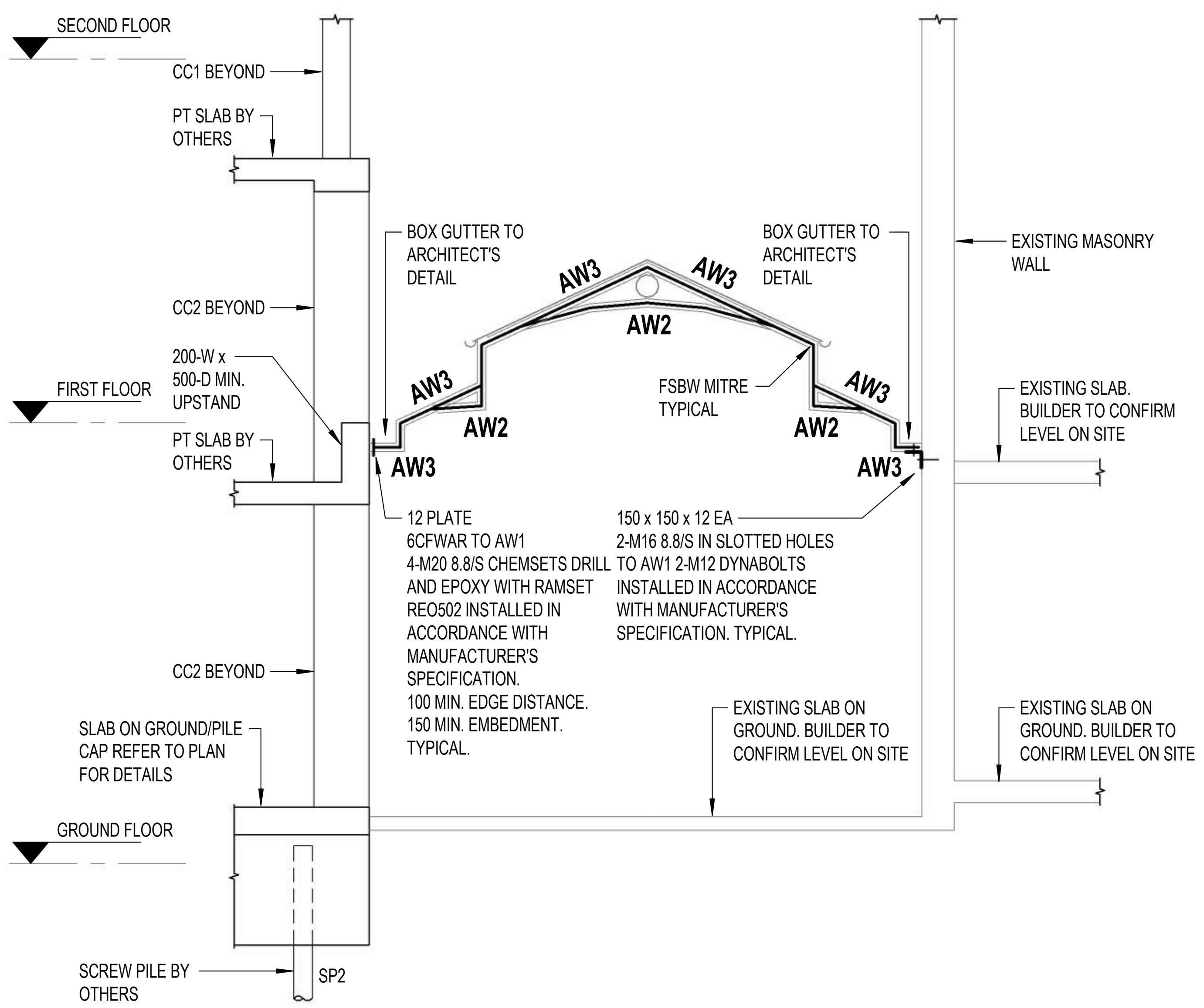
SECTION L1.01 S010
SCALE 1 : 50



SECTION L1.02 S015
SCALE 1 : 20



COURTYARD AWNING TYPE F1 TYPICAL SECTION
SCALE 1 : 50



COURTYARD AWNING TYPE F2 TYPICAL SECTION
SCALE 1 : 50

MEMBER SCHEDULE

MARK	SIZE	CONNECTIONS LEFT	CONNECTIONS RIGHT	REMARKS
AW1	100 x 100 x 8 EA	-	-	BACK TO BACK
AW2	100 x 10 PLATE	-	-	
AW3	125 x 125 x 8 EA	-	-	BACK TO BACK

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190047	S045	A

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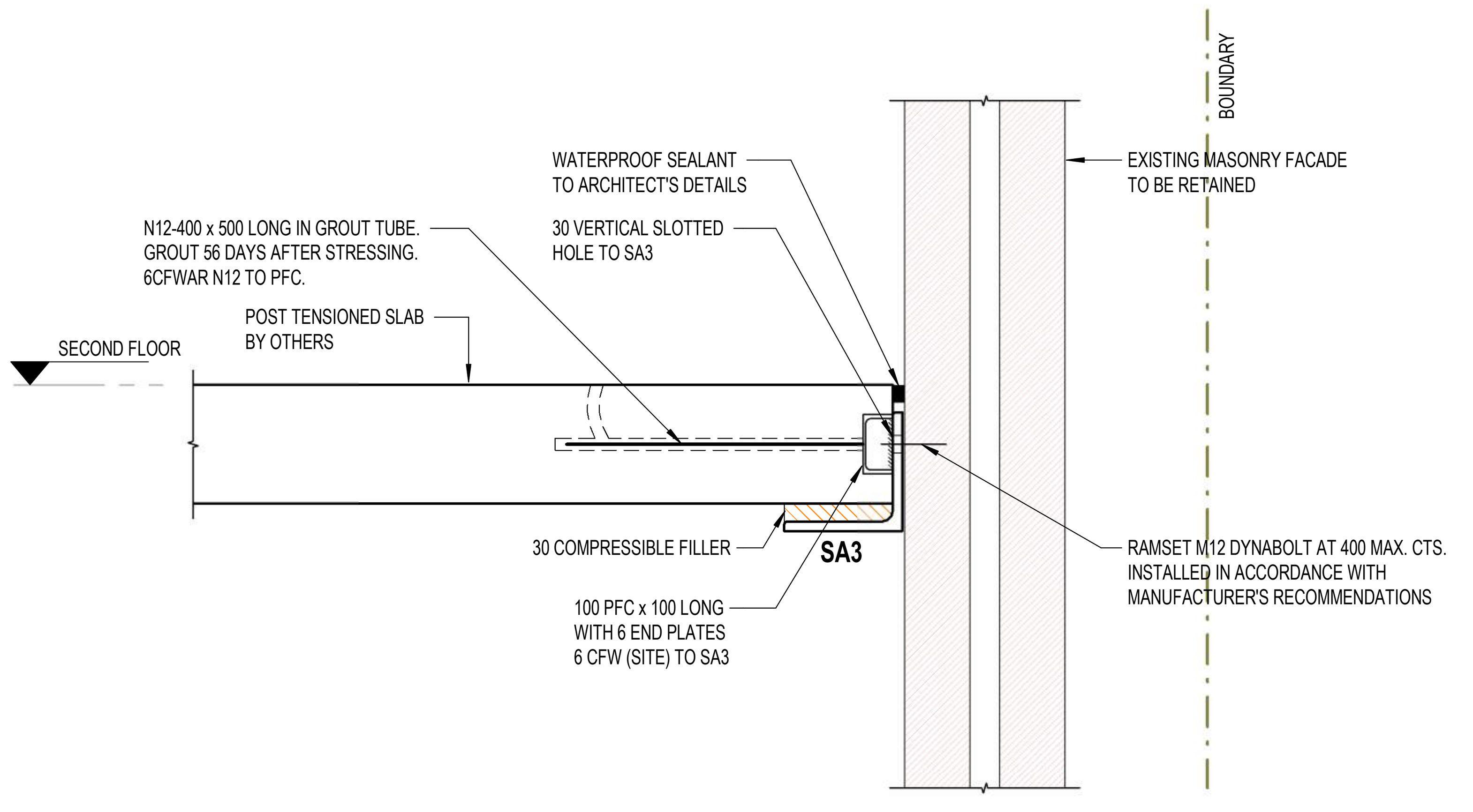
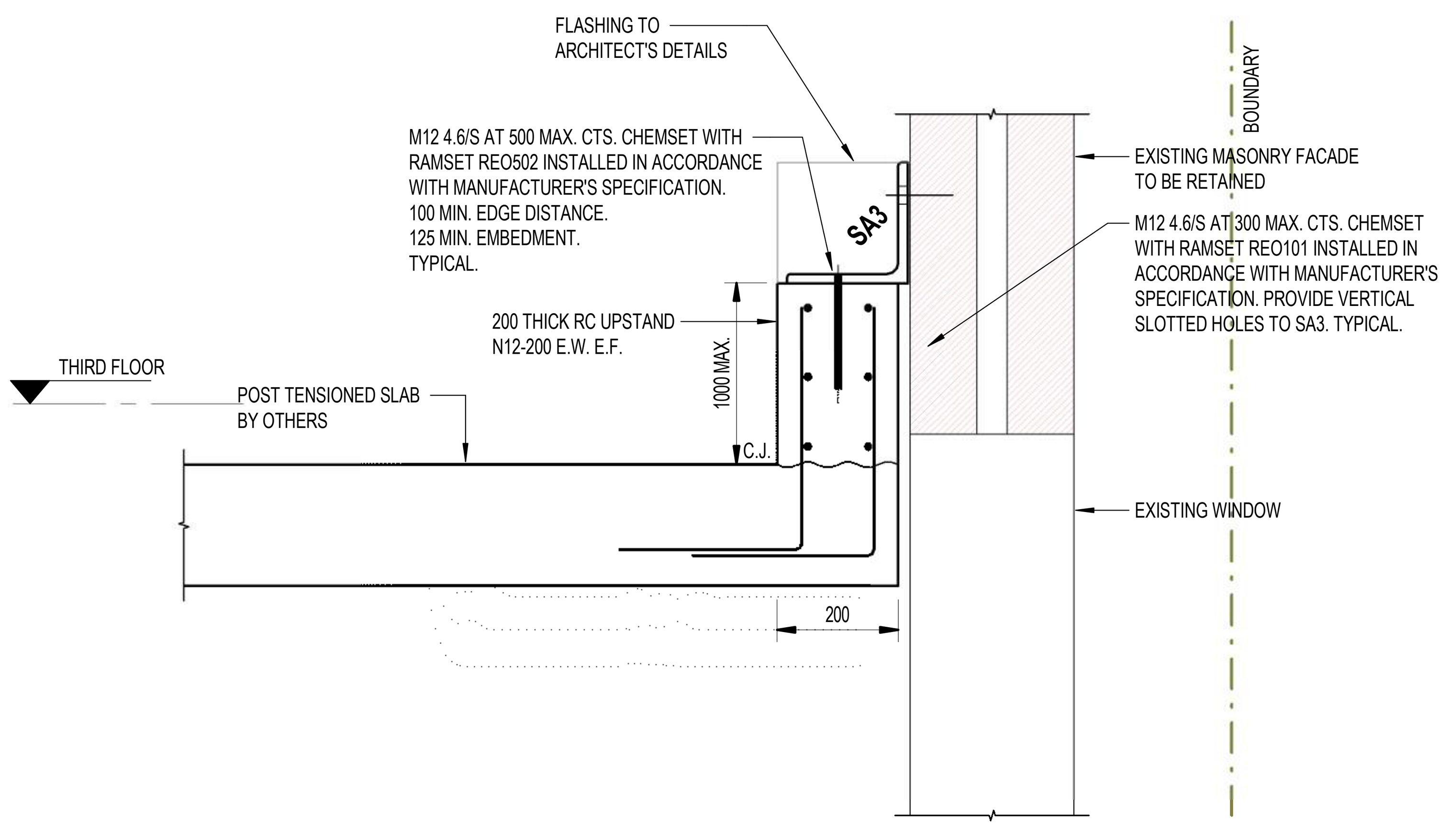


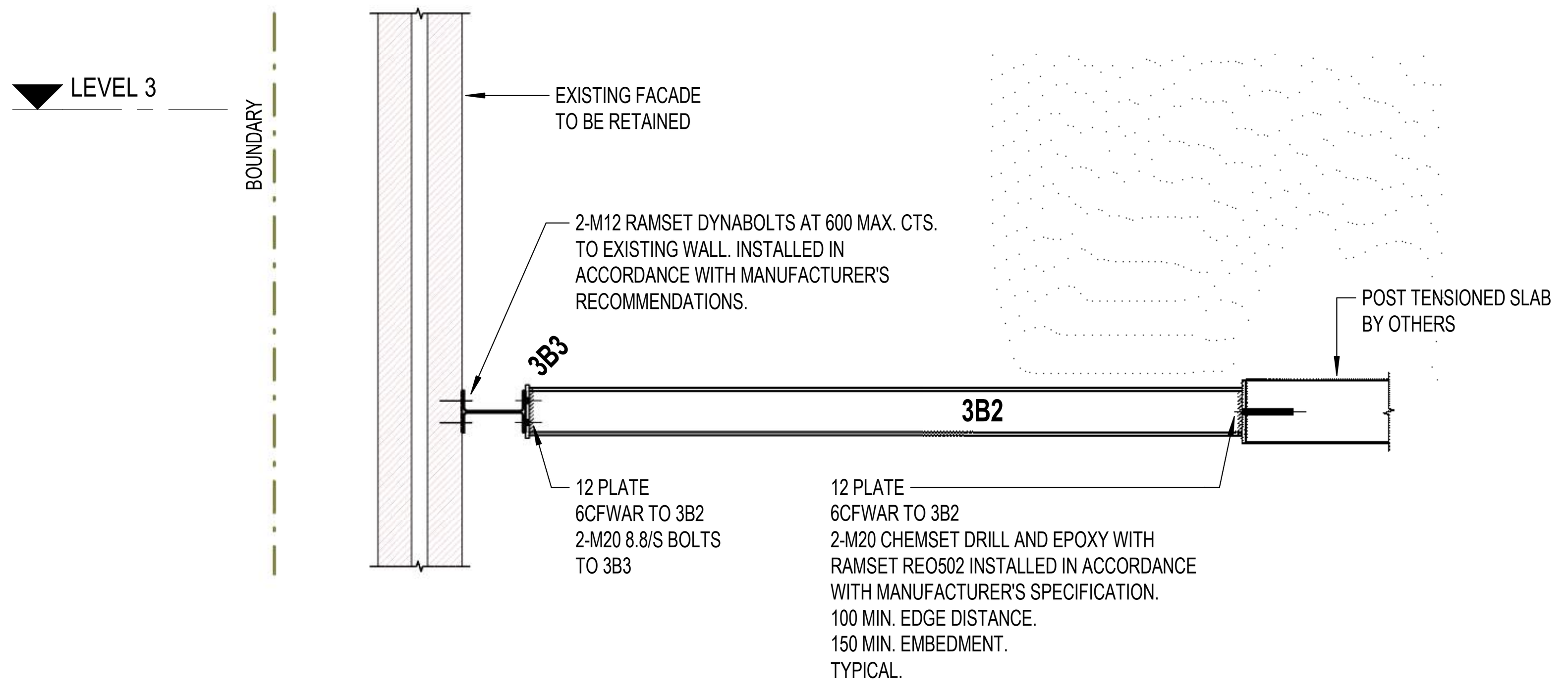
TYPICAL SLAB TO EXISTING FACADE CONNECTION DETAIL - SECOND FLOOR LEVEL

SECTION L2.01 S015
SCALE 1 : 10



TYPICAL SLAB TO EXISTING FACADE CONNECTION DETAIL - THIRD FLOOR LEVEL

SECTION L3.01 S025
SCALE 1 : 10



SECTION L3.02 S025
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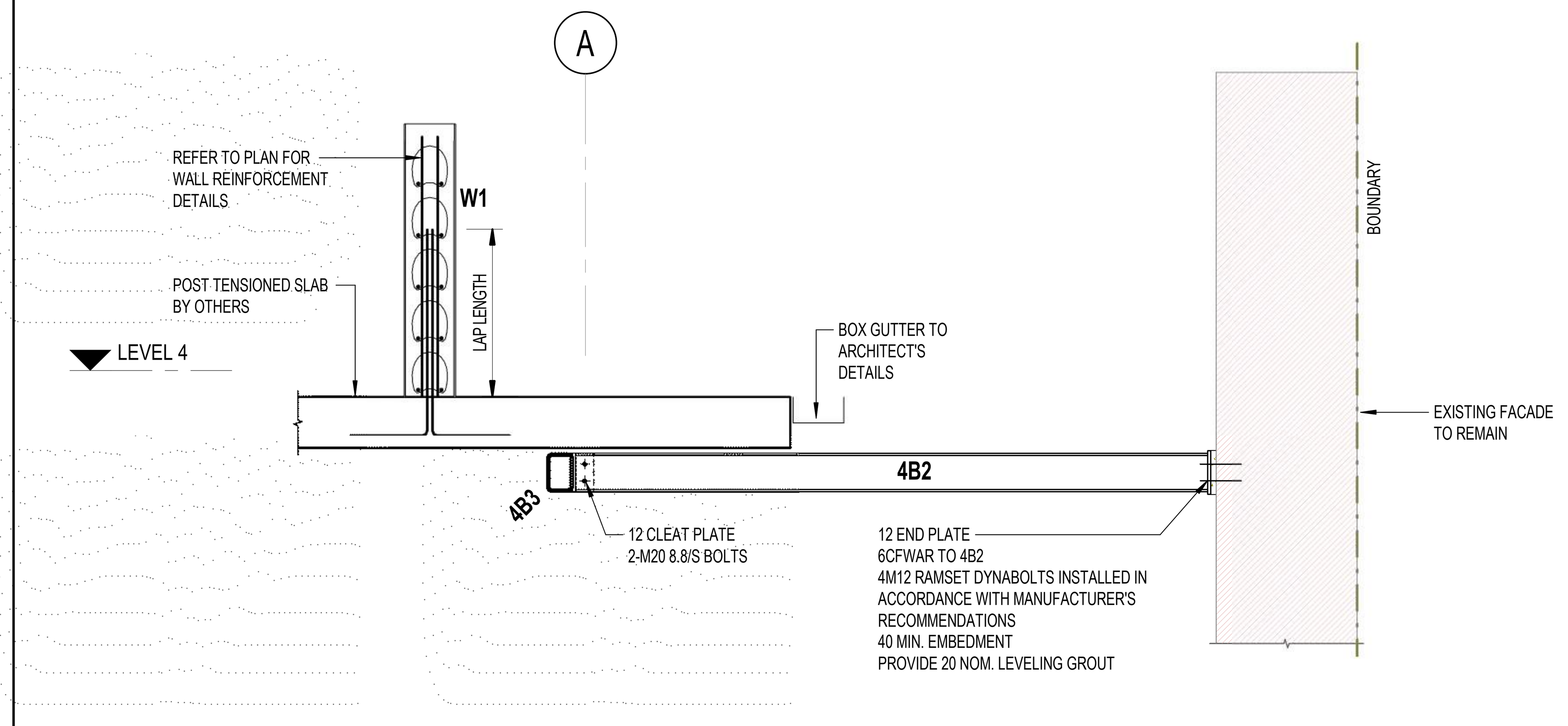

SECTION L4.01 S030
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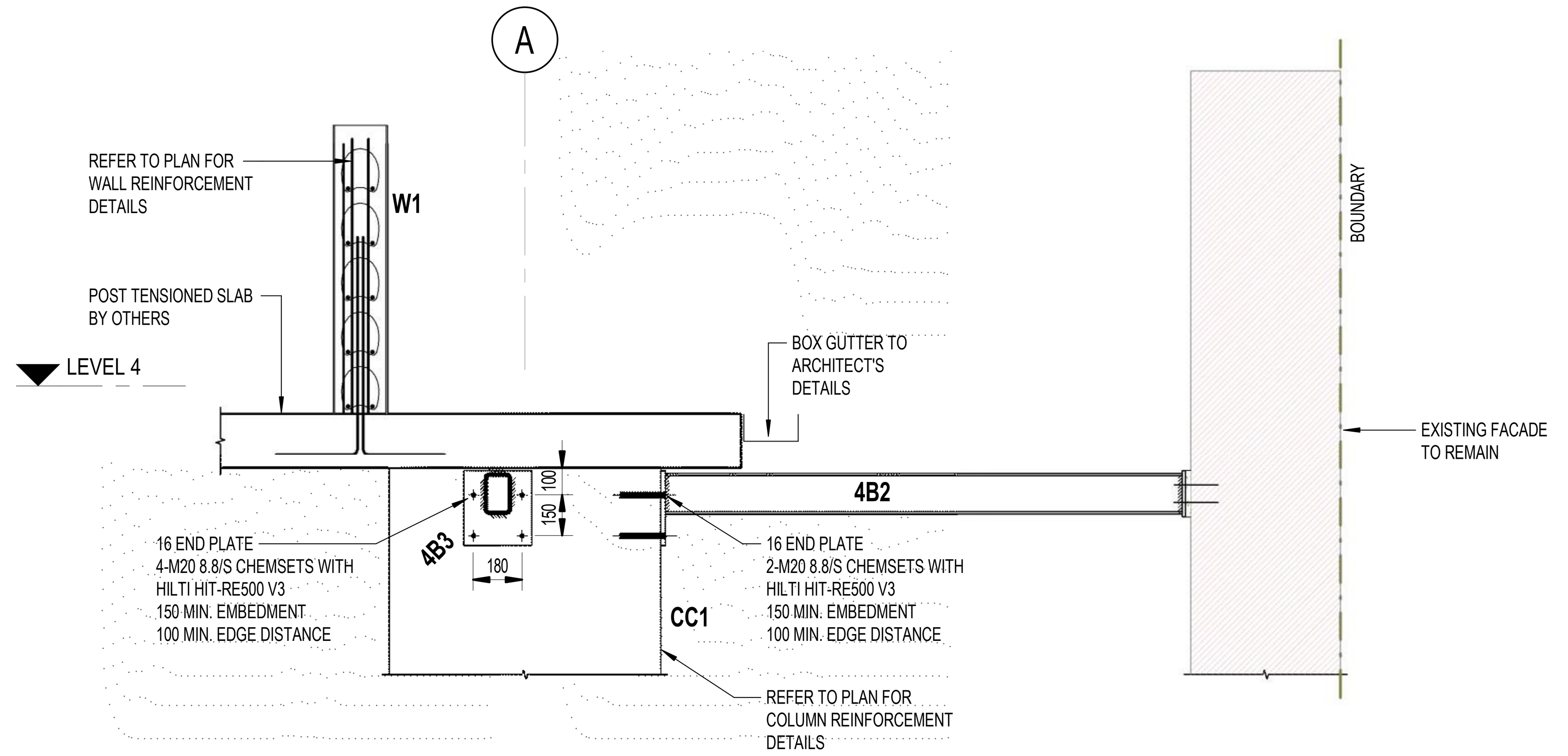

SECTION L4.02 S030
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TITLE
LEVEL 1 TO 4 SECTIONS SHEET 2

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190047	S046	A

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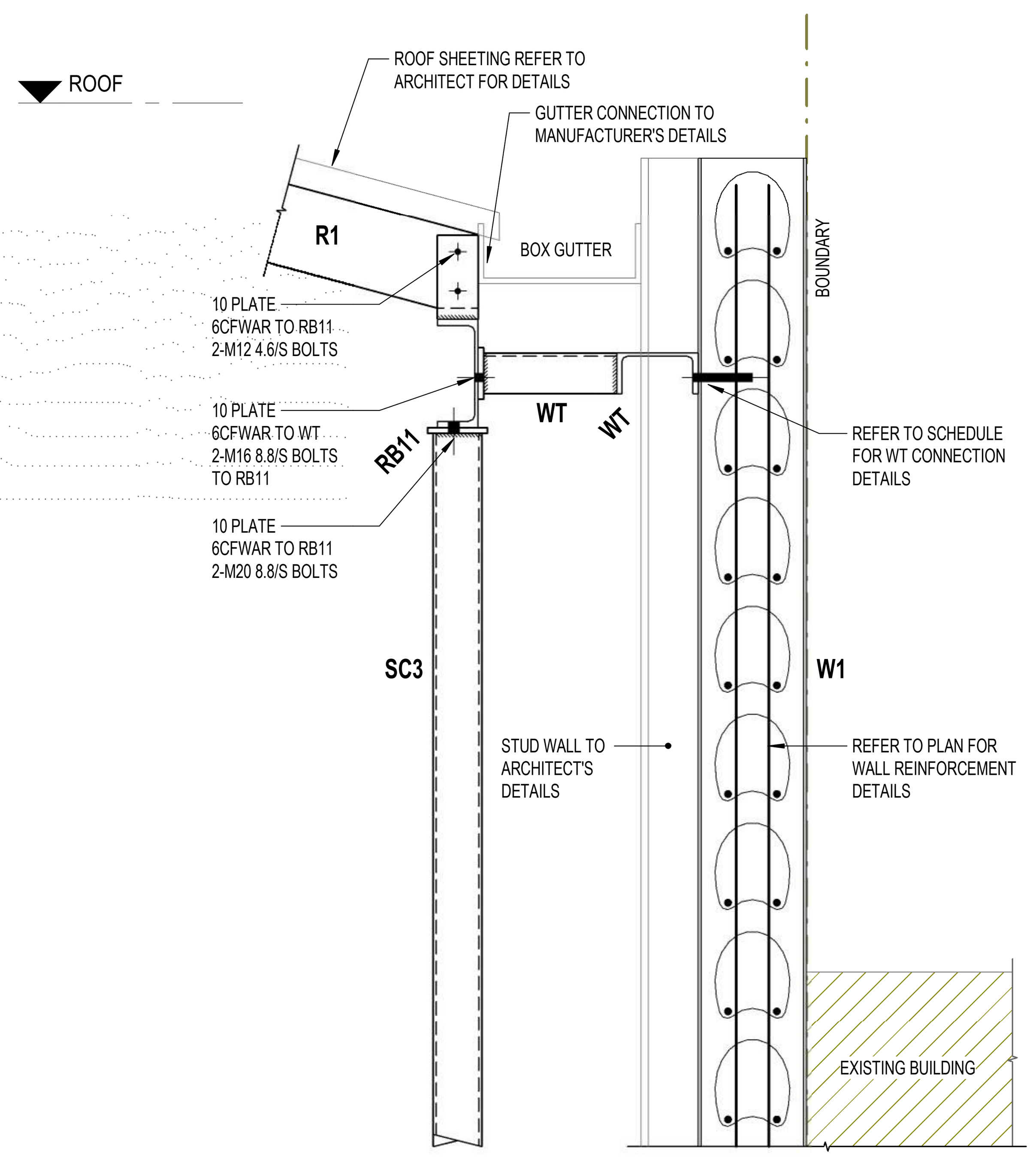

SECTION R.01
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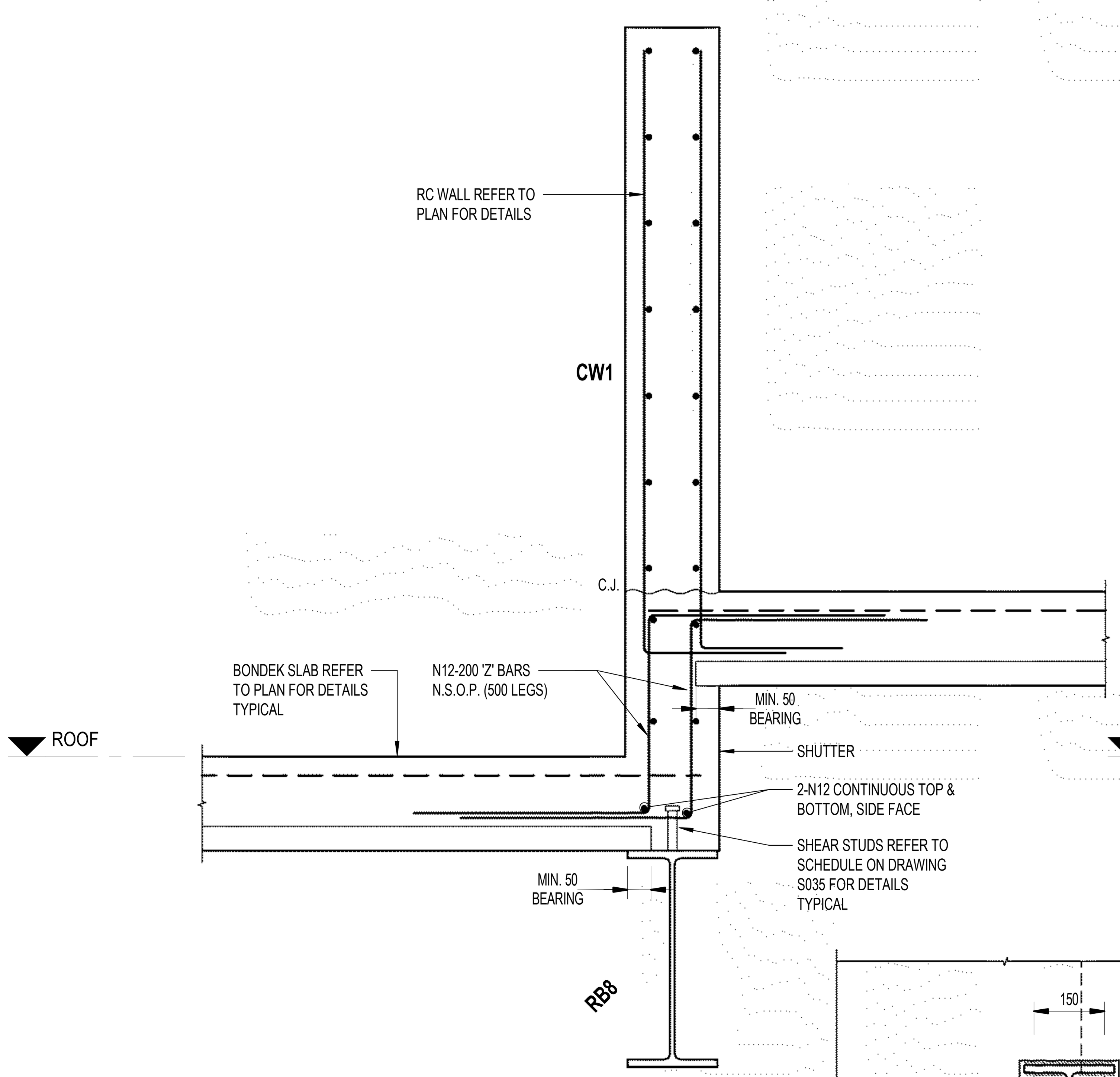

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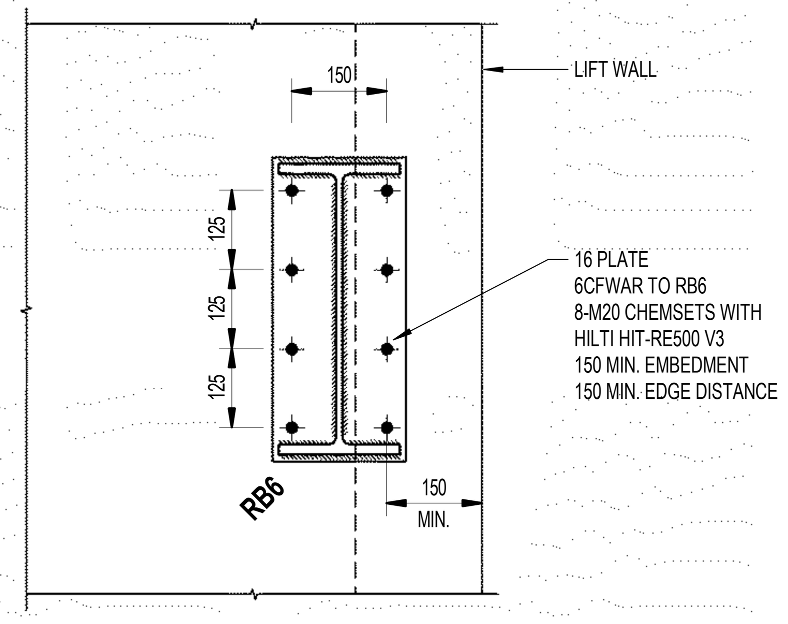
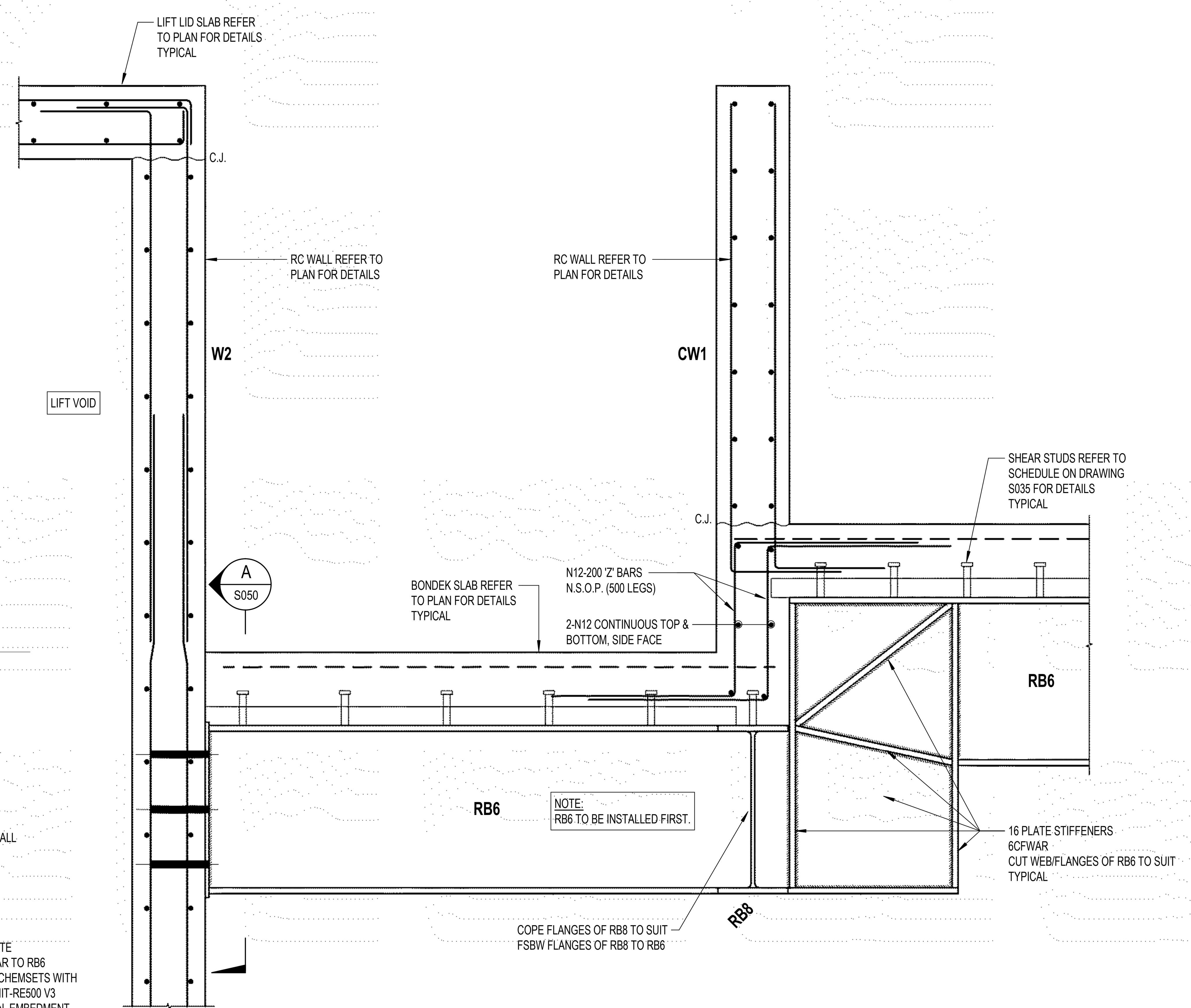


SECTION A
SCALE 1 : 10
S050



SECTION R.03
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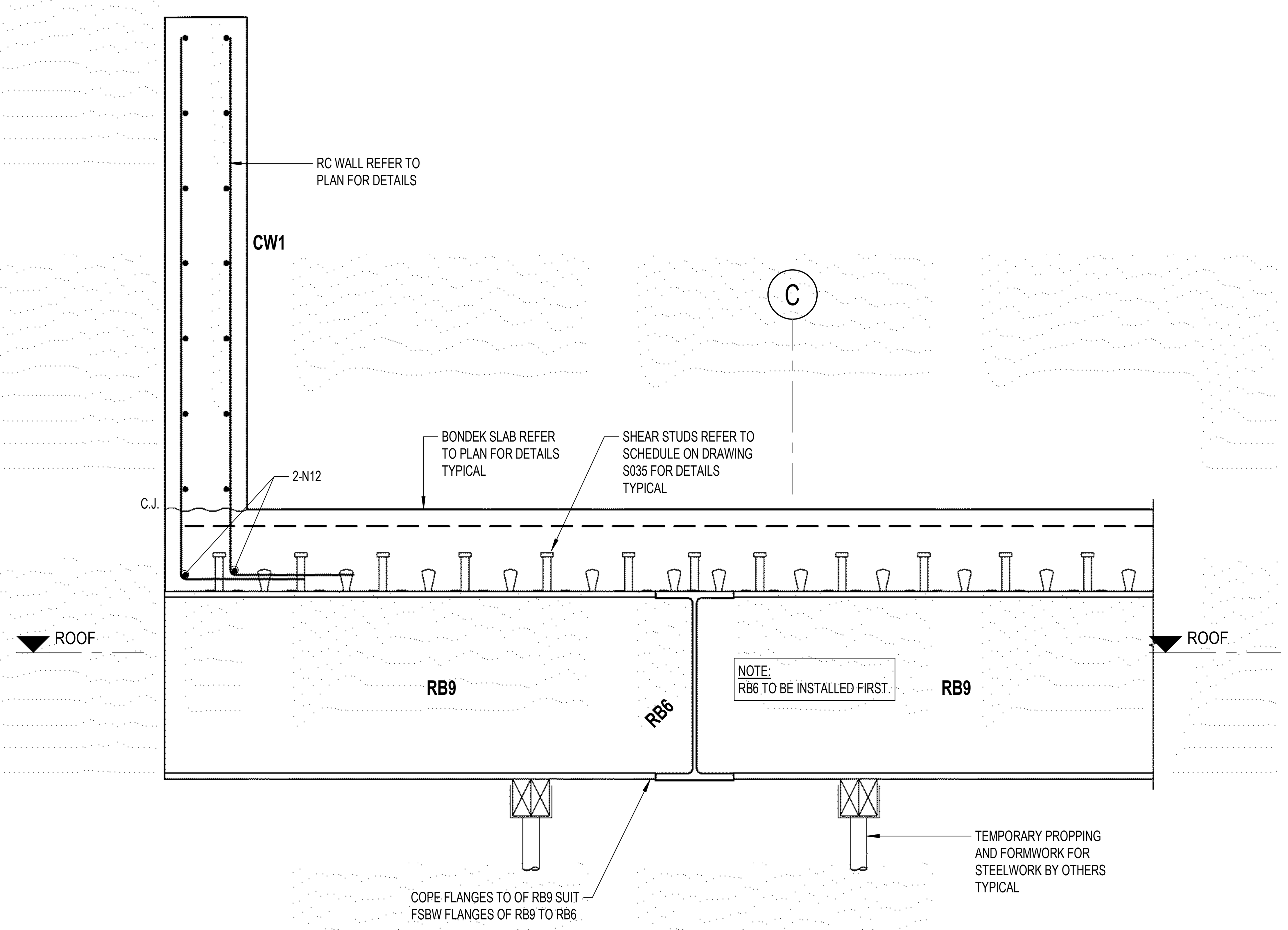

SECTION R.04
SCALE 1 : 10
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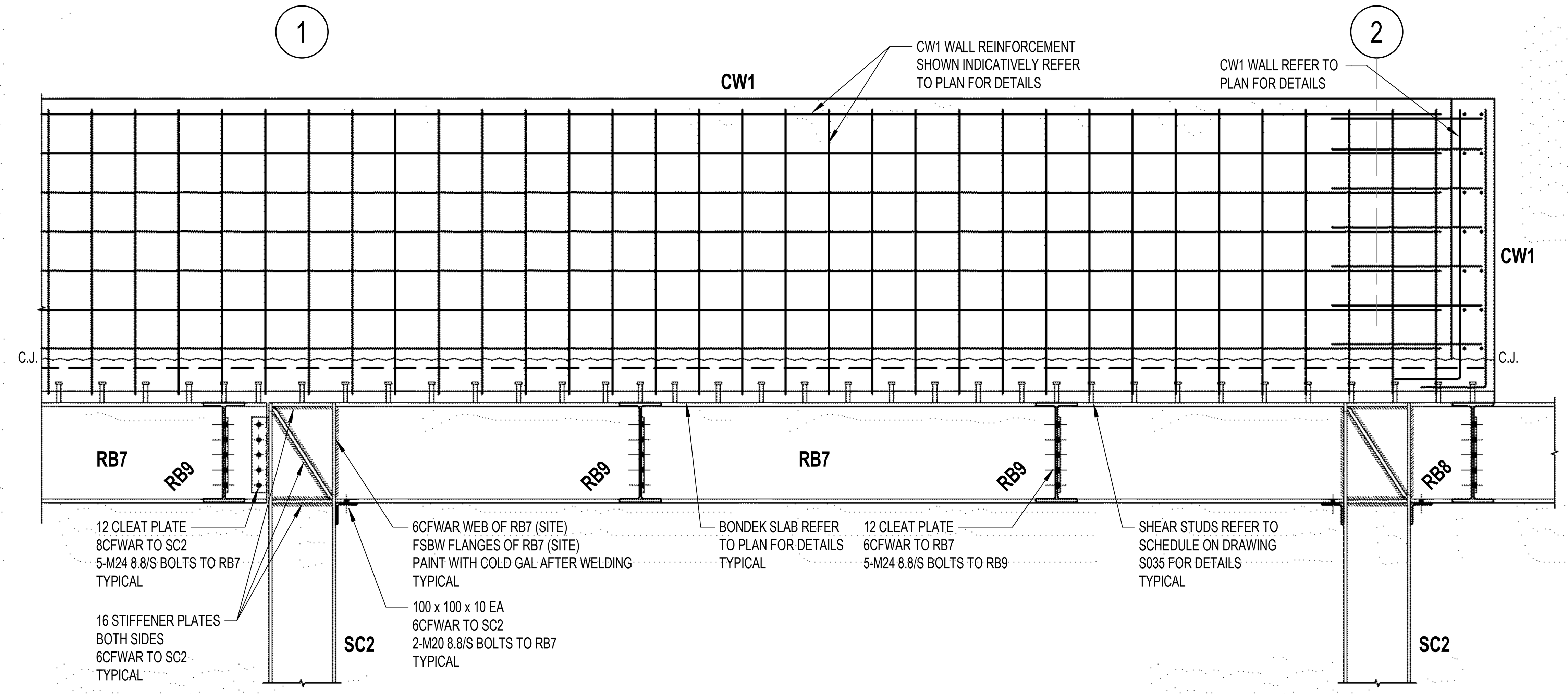

SECTION R.05
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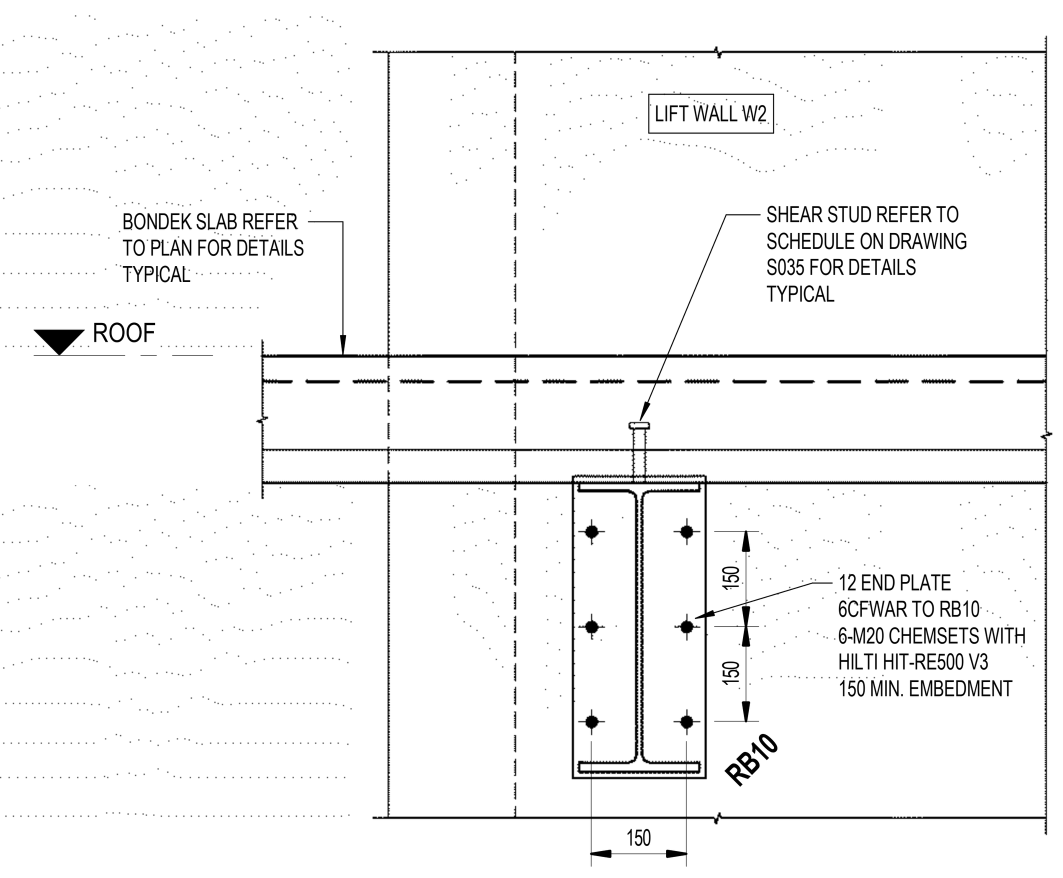

SECTION R.06
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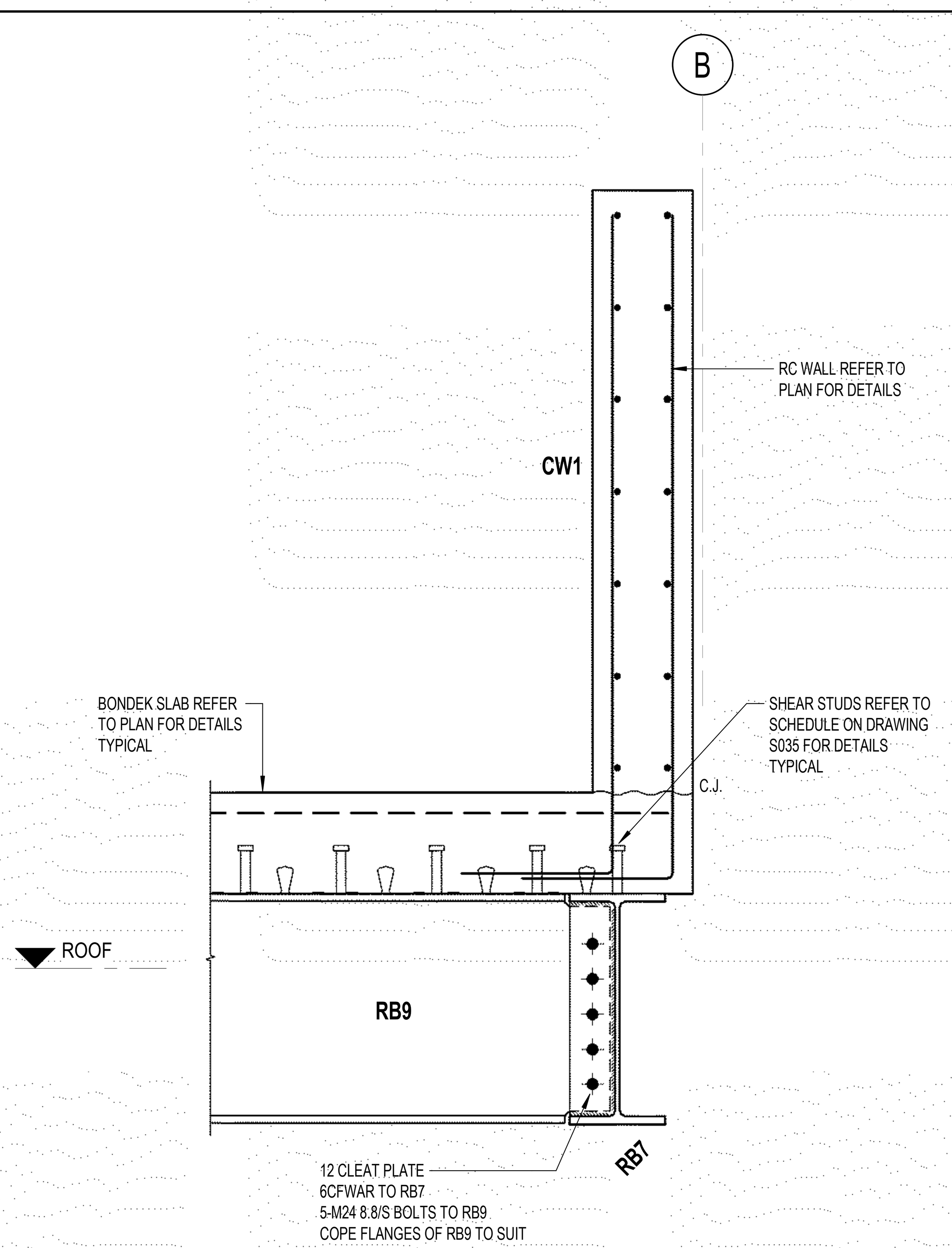

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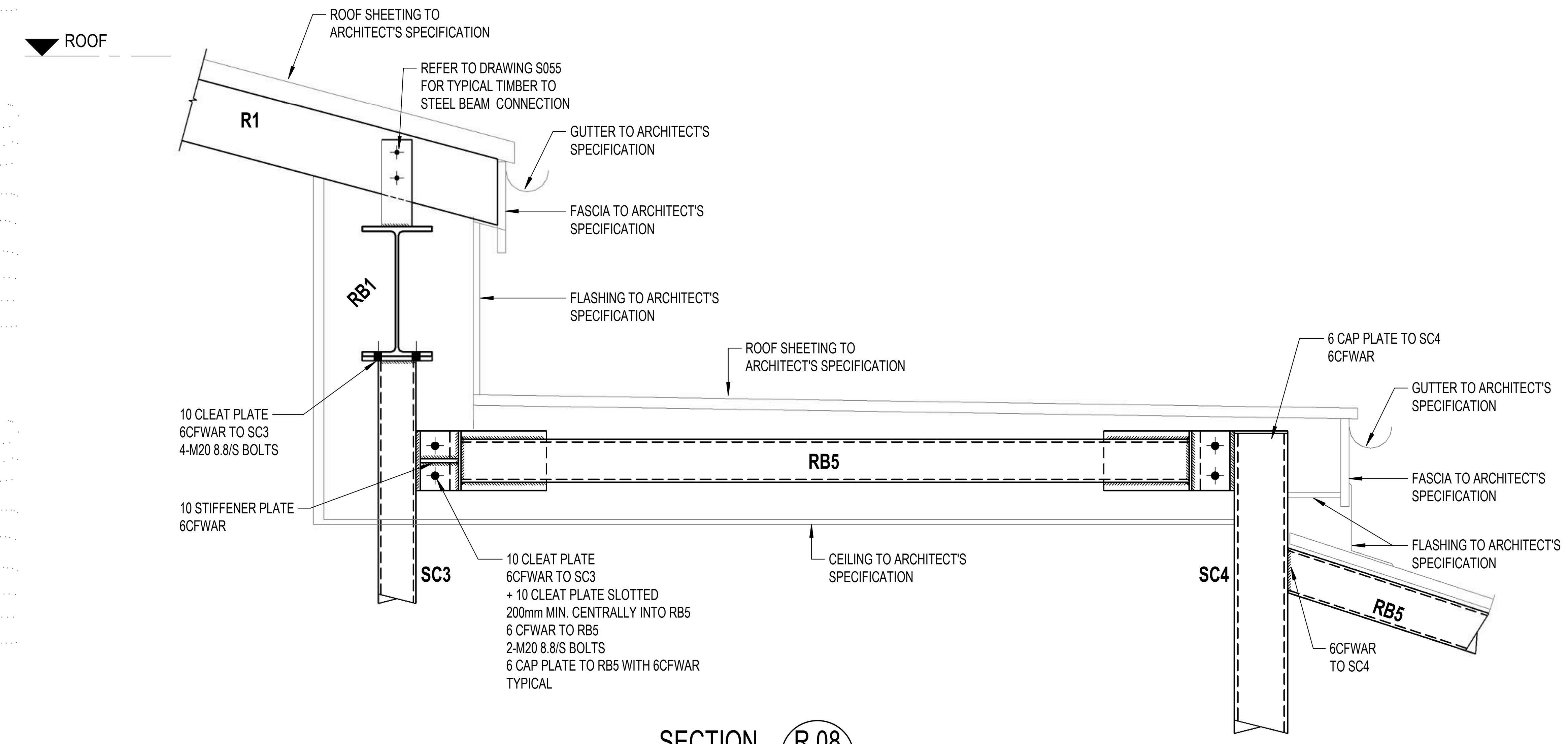

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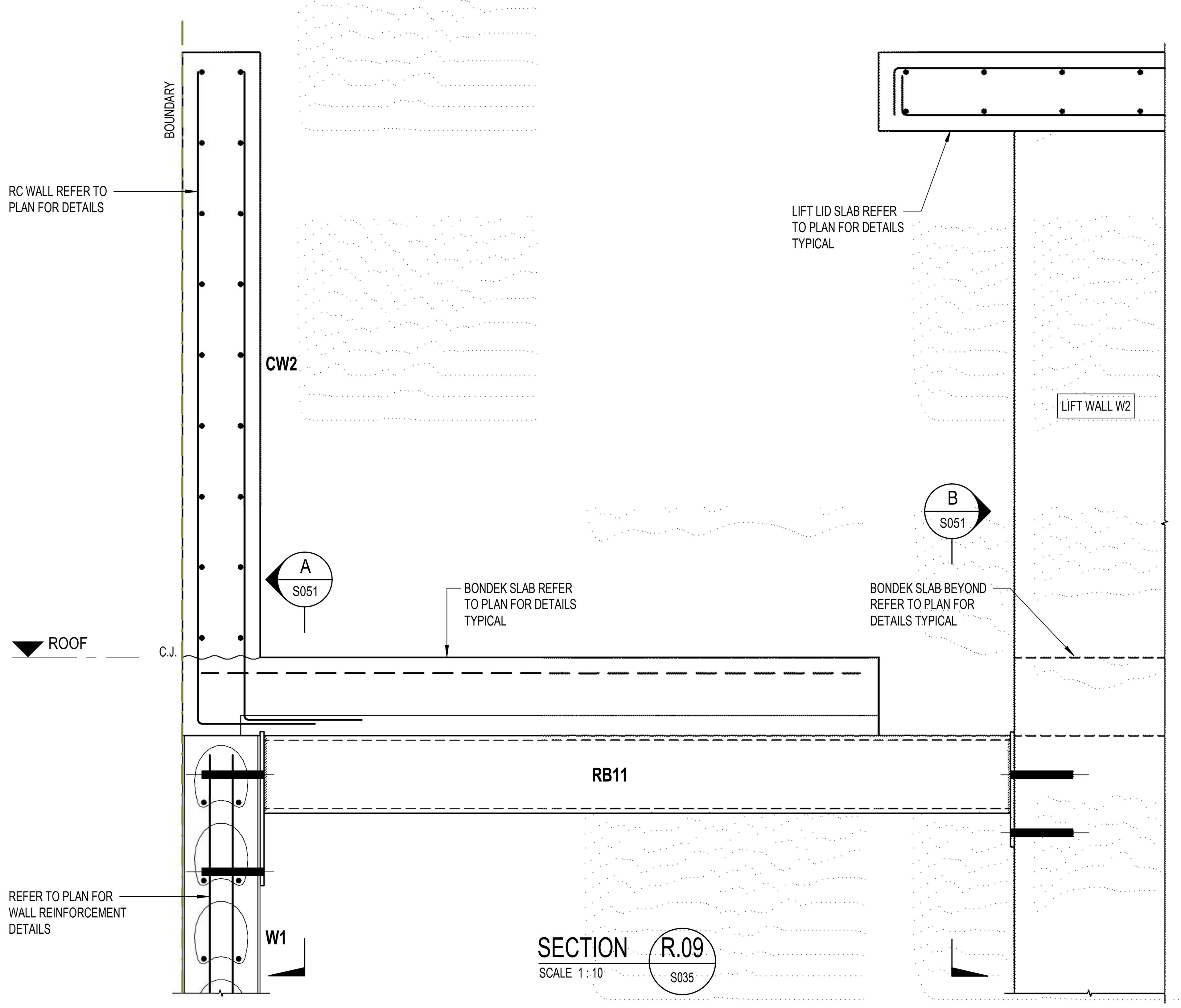

SECTION R.09
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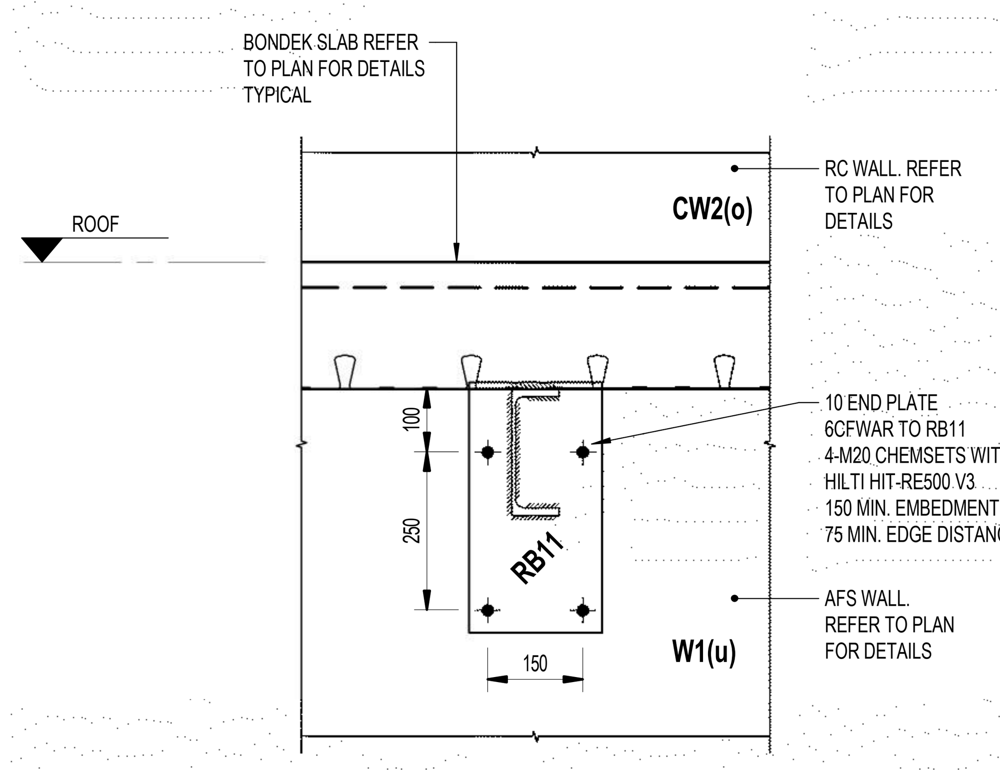

SECTION A
SCALE 1 : 10
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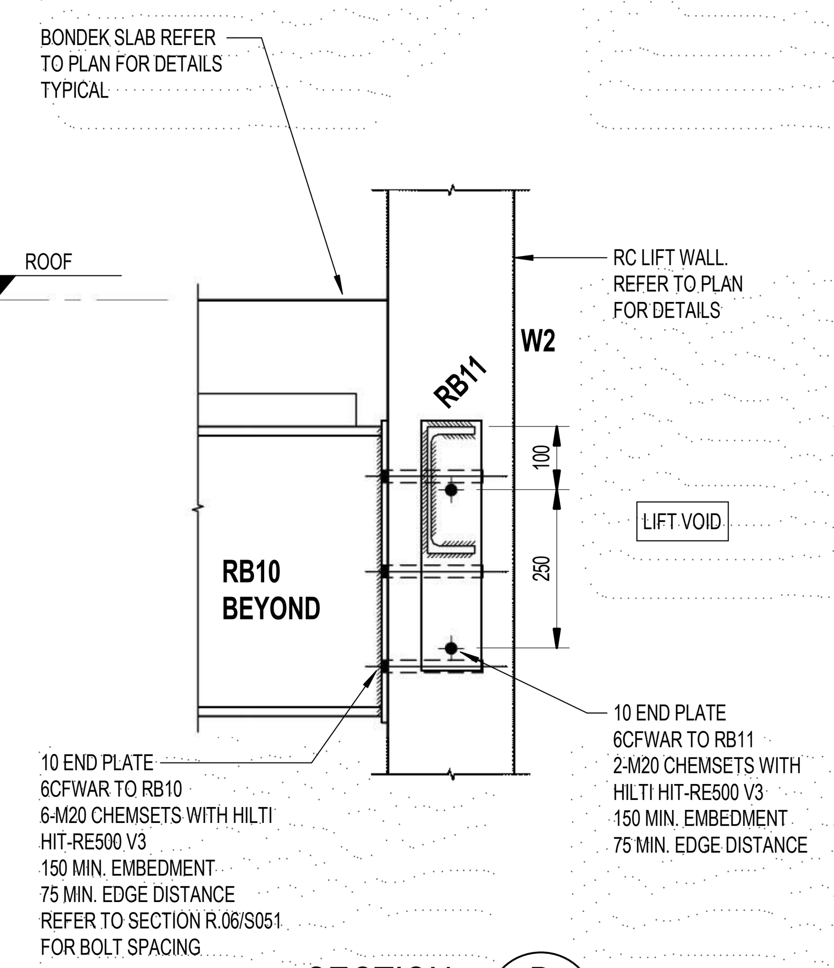

SECTION B
SCALE 1 : 10
S051

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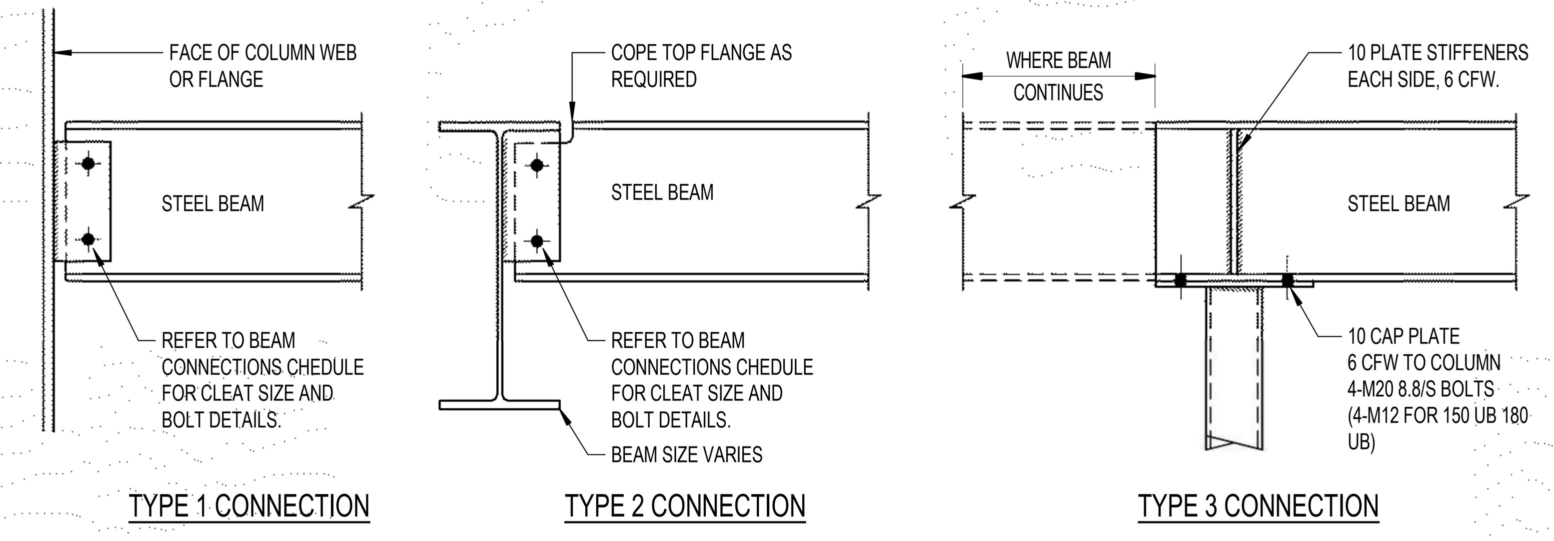
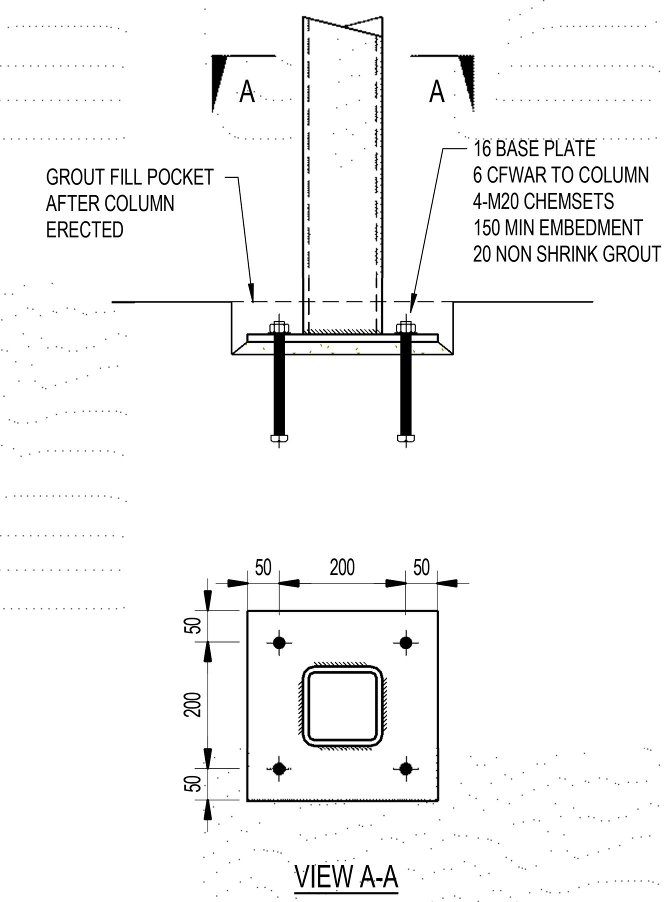


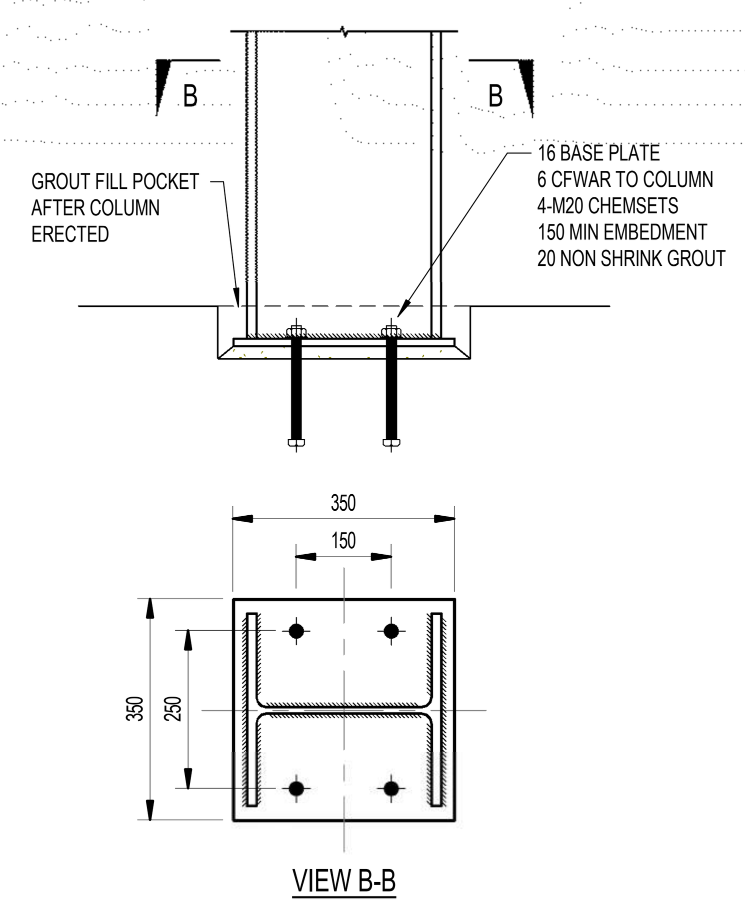
BEAM CONNECTION SCHEDULE		
BEAM SIZE	CLEAT PLATE	BOLTS
150,180, 200 , 230 PFC	10mm	2-M20 8.8/S
200 UB & UC	10mm	2-M20 8.8/S
250 UB & UC	10mm	2-M20 8.8/S
250 PFC	10mm	2-M20 8.8/S
310 UB & UC	10mm	3-M20 8.8/S
460 UB	12mm	5-M20 8.8/S

NOTE:
FOR BEAM CONNECTION TO FACE OF RHS COLUMNS PROVIDE CLEAT AS TEE SECTION WELDED DOWN EACH SIDE OF RHS.

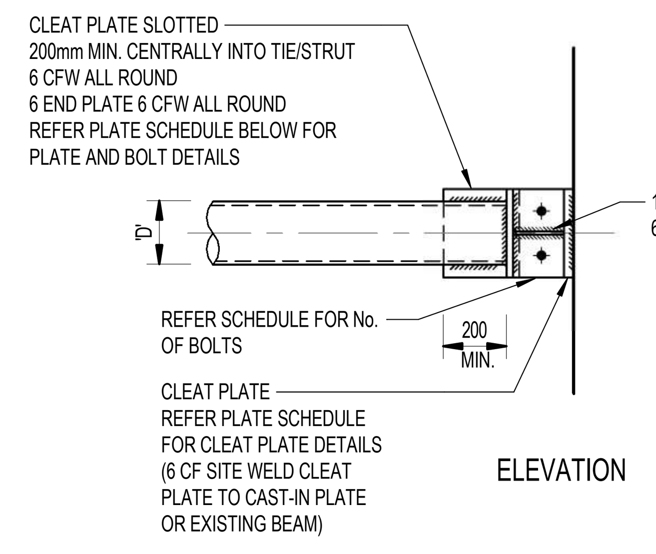
TYPICAL STEEL BEAM CONNECTION DETAILS
NTS



TYPICAL SHS COLUMN BASE PLATE DETAIL



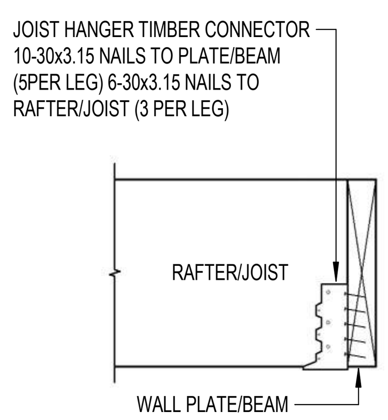
TYPICAL SC2 COLUMN BASE PLATE DETAIL



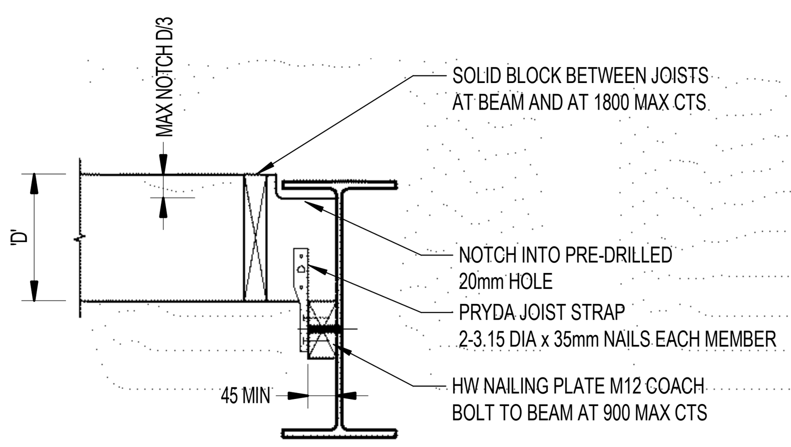
STRUT SIZE (D)			PLATES	BOLTS
75 SHS	75 RHS	76 CHS	10 PLATES	2-M20 8.8/S
90 SHS	100 RHS	89 CHS	10 PLATES	2-M20 8.8/S
100 SHS	125 RHS	102/114 CHS	10 PLATES	2-M20 8.8/S
125 SHS	127 RHS	127/139 CHS	10 PLATES	2-M20 8.8/S
150 SHS	150 RHS	152/165 CHS	16 PLATES	3-M24 8.8/S

TYPICAL STRUT/TIE DETAILS U.N.O.
NTS

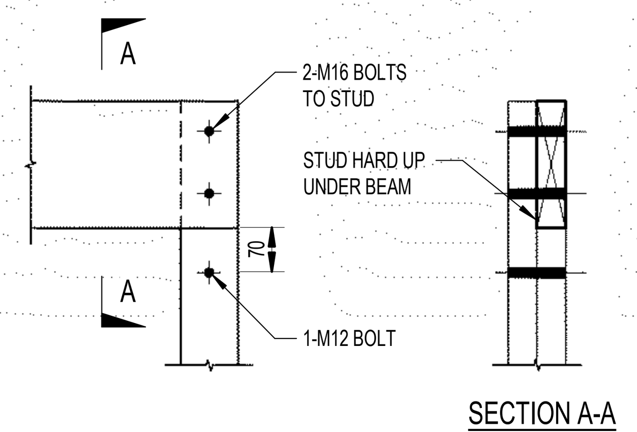
NOTE:
1. AT DOUBLE JOIST TO DOUBLE JOIST USE JOIST HANGER TO ONE JOIST AND TRIPL-GRIP FIXING TO SECOND JOIST WITH 5 NAILS/LEG. (15 NAILS)
2. AT DOUBLE JOIST TO WALL PLATE USE JOIST HANGER TO ONE TRIP-L-GRIP FIXING TO SECOND JOIST WITH 5 NAIL/LEG. (15 NAILS)
3. HYSPAN CONNECTIONS ARE TO BE IN STRICT ACCORDANCE WITH MANUFACTURERS DETAILS.



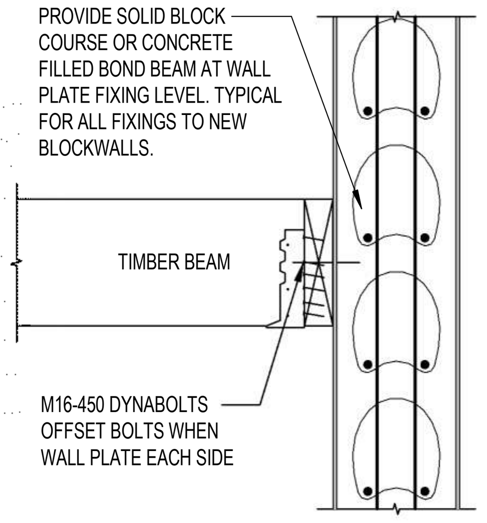
TYPICAL TIMBER TO TIMBER CONNECTION
SCALE 1:10



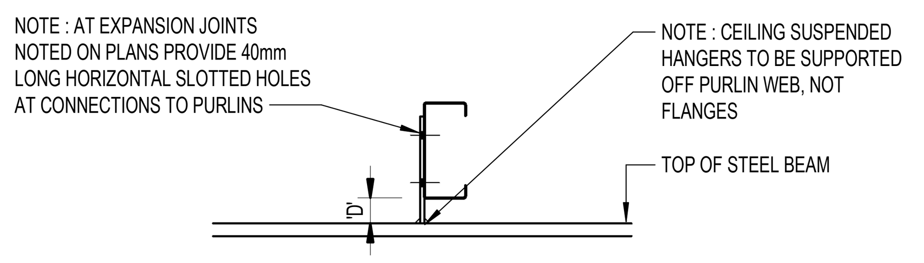
TYPICAL TIMBER TO STEEL BEAM DETAIL
SCALE 1:10



TYPICAL TIMBER BEAM TO DOUBLE STUD
SCALE 1:10

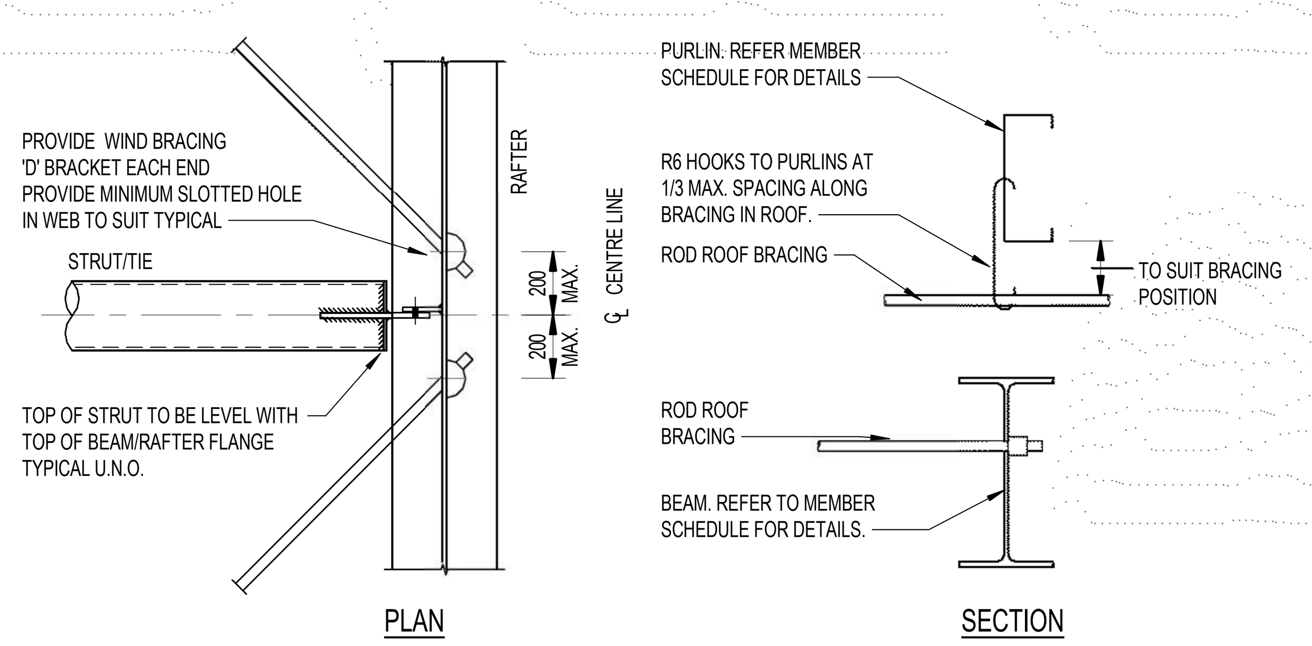


TYPICAL WALL PLATE FIXING TO BLOCK/AFS WALL
SCALE 1:10



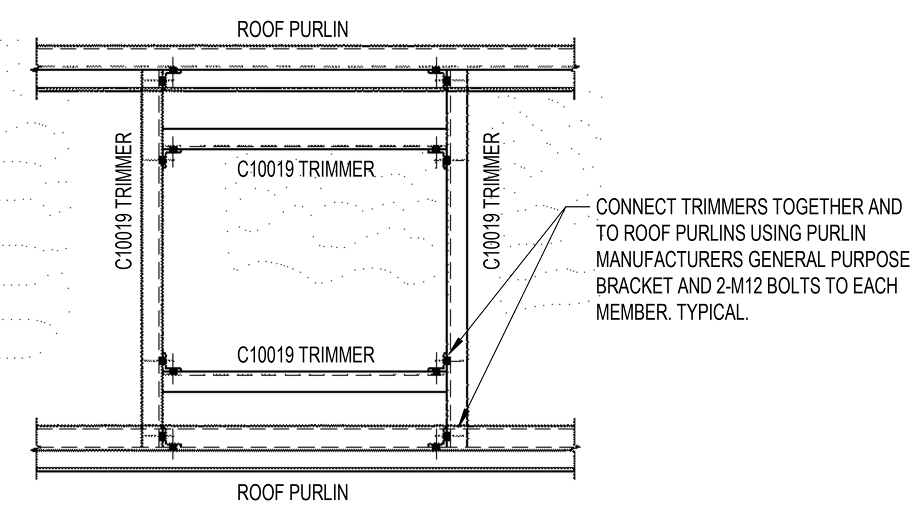
PURLIN SUPPORT SCHEDULE		
DISTANCE 'D'	CLEAT	BOLTS
< 20	8mm CLEAT PL.	2M12 4.6/S BOLTS
20 TO 60	10mm CLEAT PL.	2M12 4.6/S BOLTS
60 TO 300	75 x 75 x 5 EA	2M12 4.6/S BOLTS
300 TO 500	150 x 75 PFC	2M12 4.6/S BOLTS

TYPICAL PURLIN CLEAT DETAIL



TYPICAL ROD ROOF BRACING DETAILS

NOTE:
1. BRACING TO BE TIGHT, STRAIGHT AND CONTINUOUS UNLESS NOTED OTHERWISE
2. ROOF BRACING TO BE WIRED TOGETHER AT CROSS INTERSECTION



TYPICAL ROOF PENETRATION TRIMMER DETAIL.
NTS

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STEELWORK AND TIMBER DETAILS SHEET

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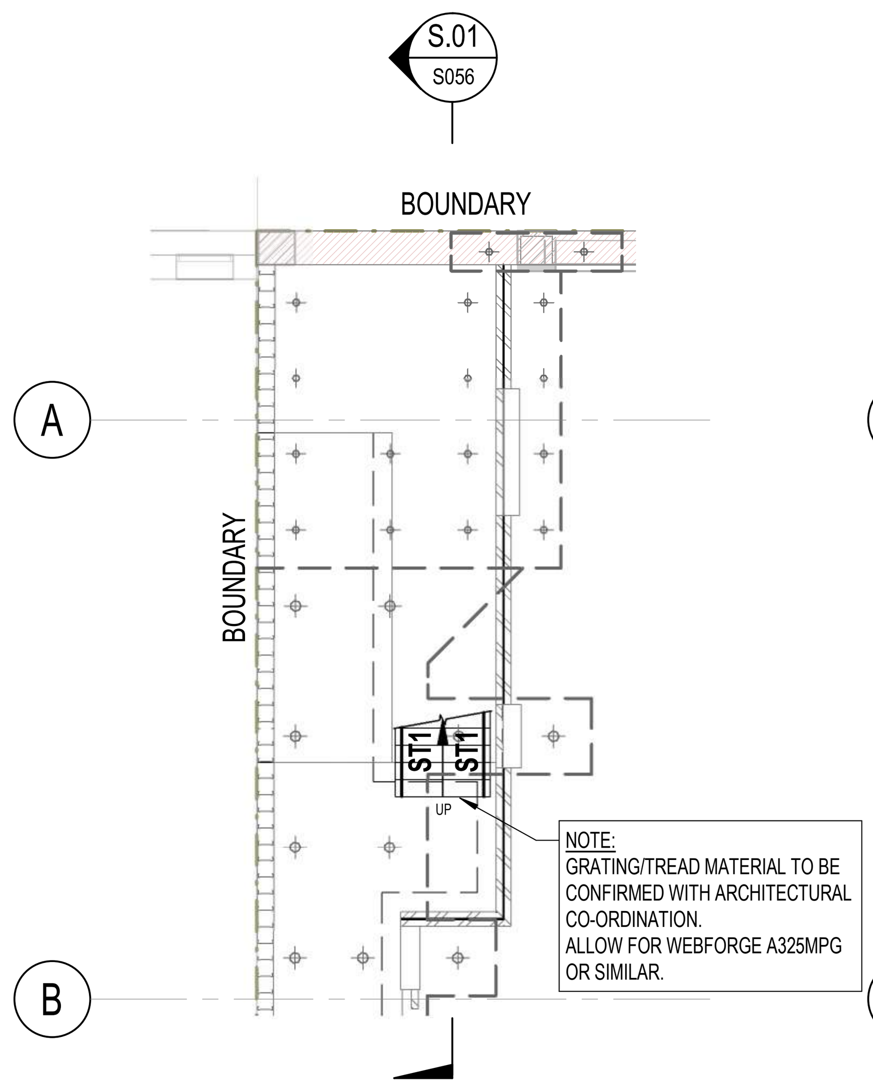
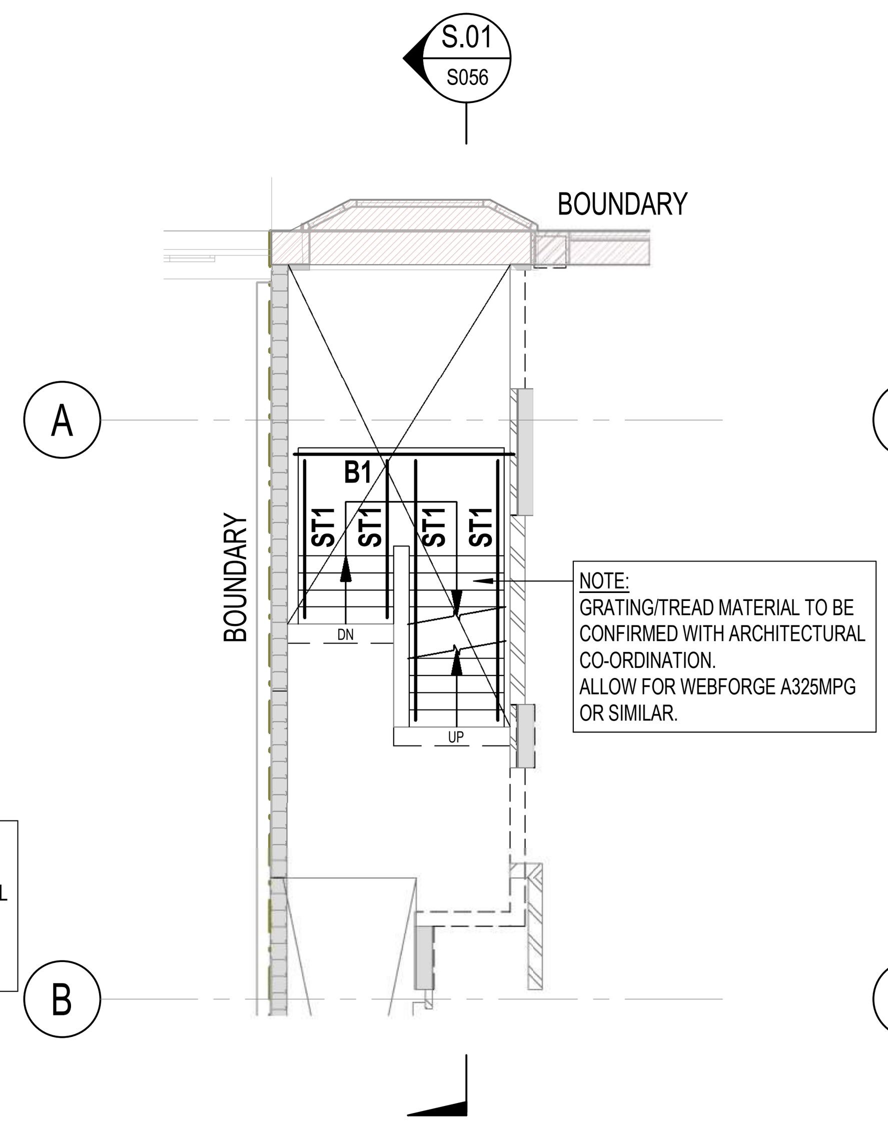
MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY

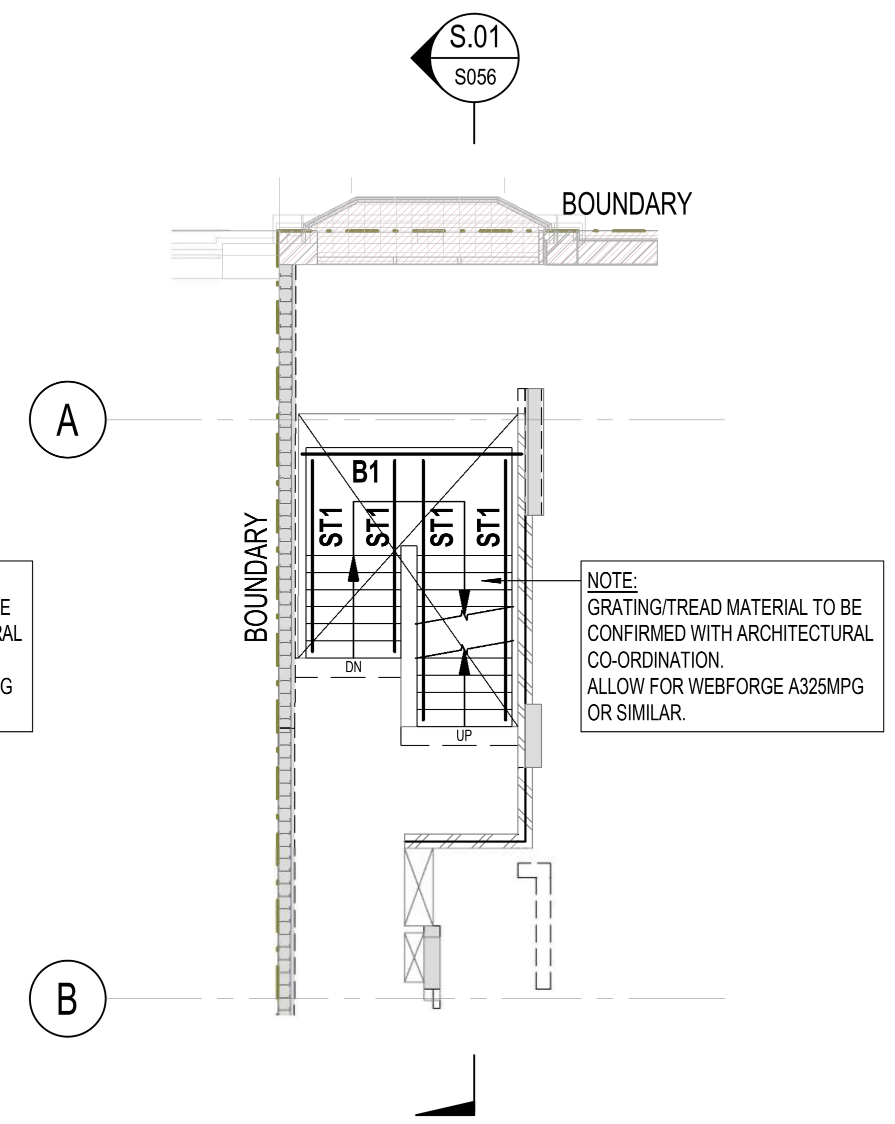
LEGEND
REFER TO DRAWING S001 & S002 FOR GENERAL NOTES



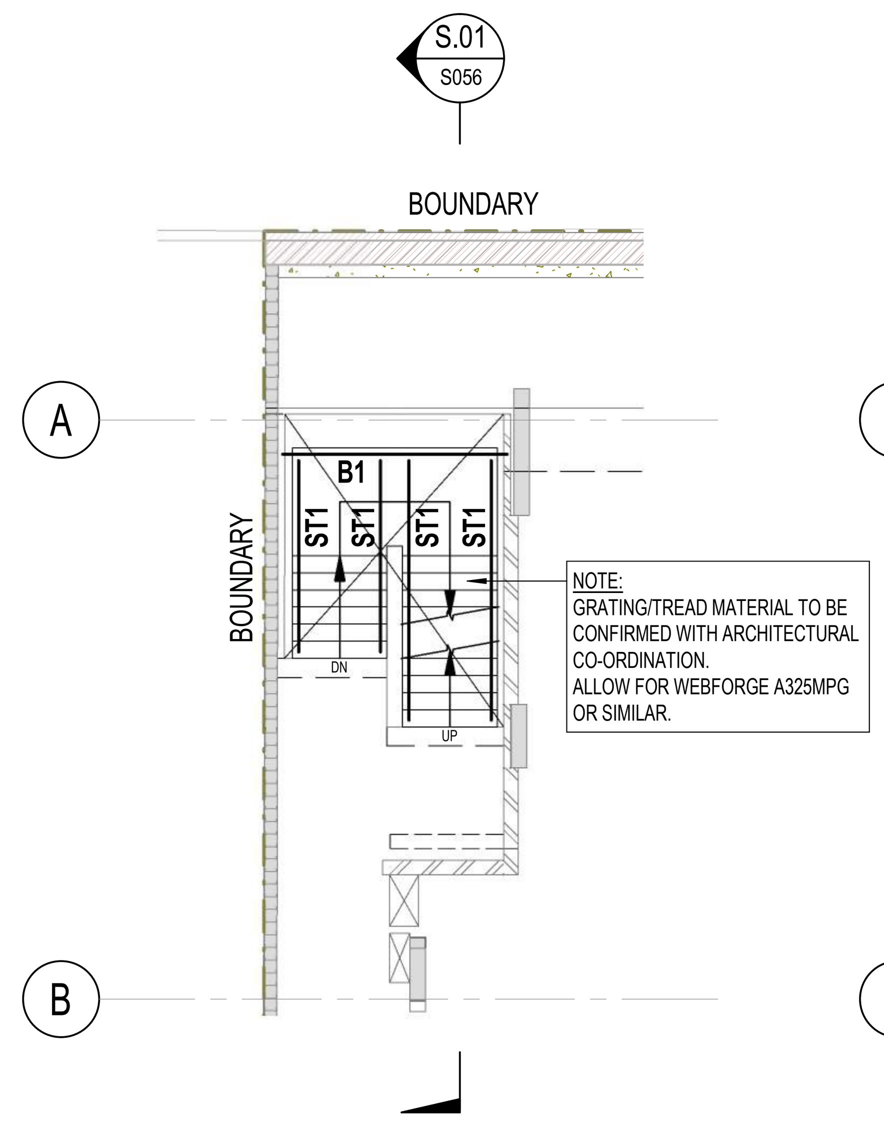
STAIR PART PLAN - GROUND LEVEL
SCALE 1 : 100



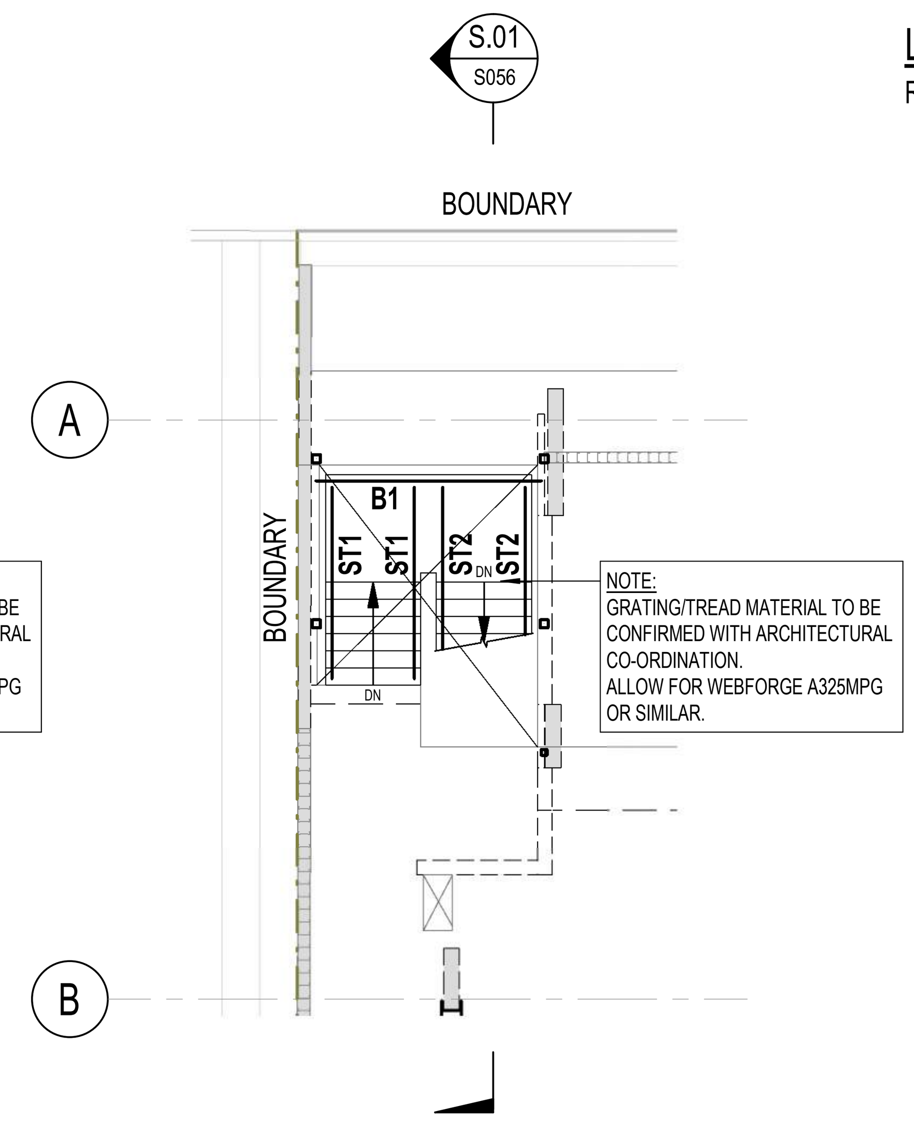
STAIR PART PLAN - FIRST FLOOR LEVEL
SCALE 1 : 100



STAIR PART PLAN - SECOND FLOOR LEVEL
SCALE 1 : 100



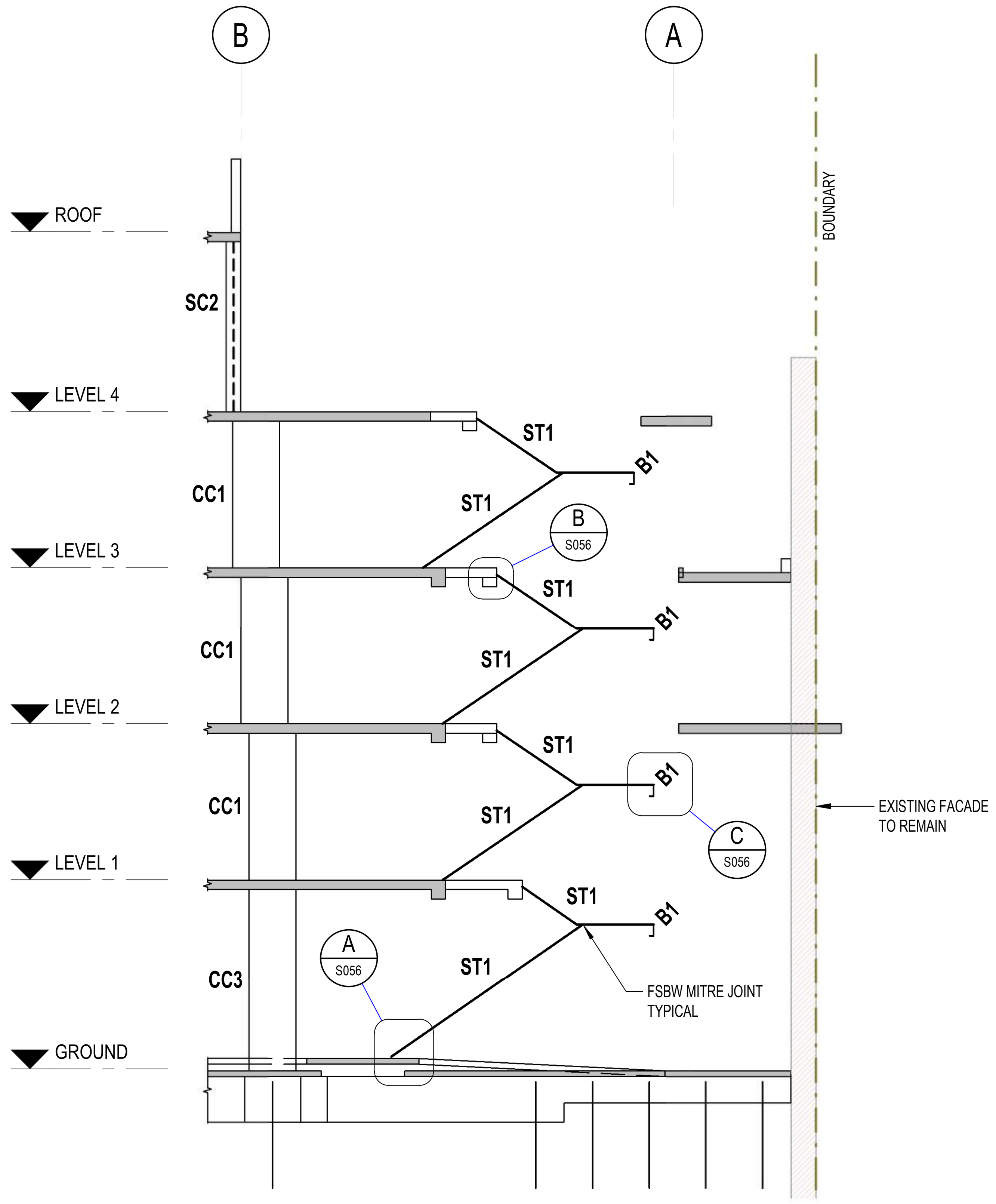
STAIR PART PLAN - THIRD FLOOR LEVEL
SCALE 1 : 100



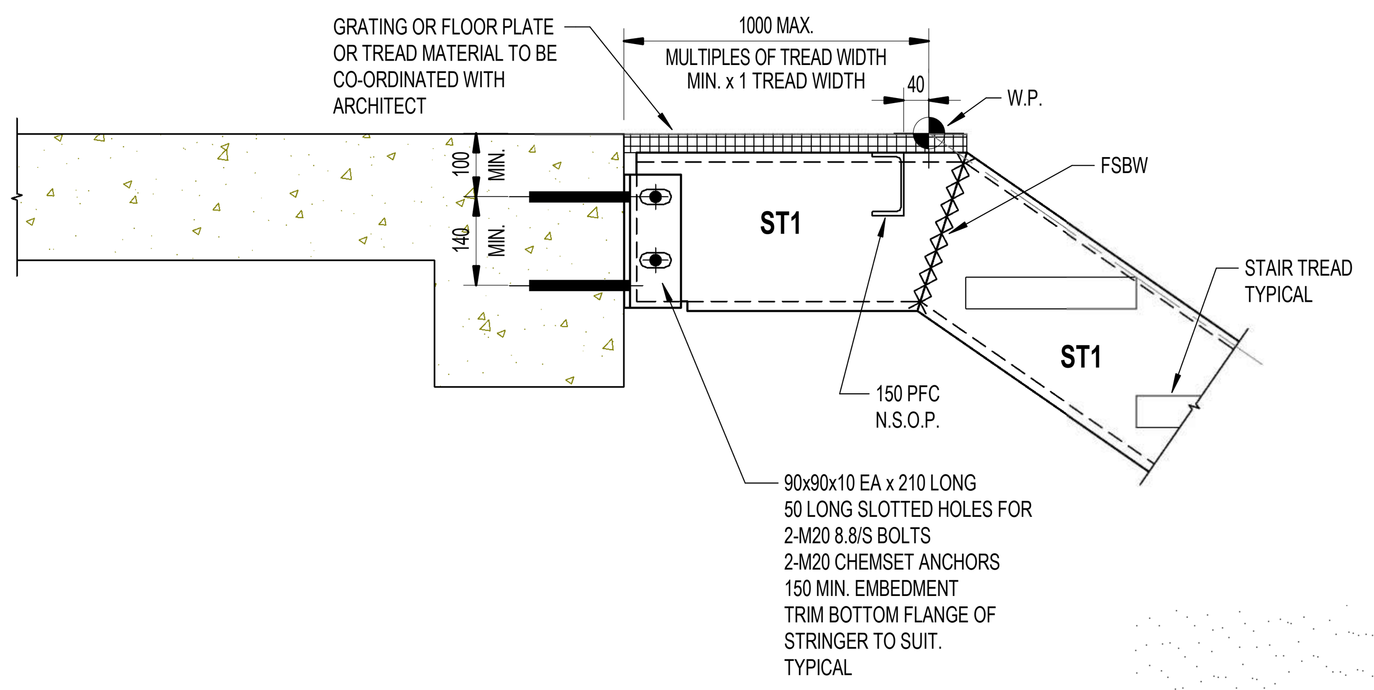
STAIR PART PLAN - FOURTH FLOOR LEVEL
SCALE 1 : 100

MEMBER SCHEDULE

MARK	SIZE	CONNECTIONS LEFT	CONNECTIONS RIGHT	REMARKS
ST1	250 PFC	-	-	STAIR STRINGER.
B1	250 PFC	-	-	STEEL BEAM.

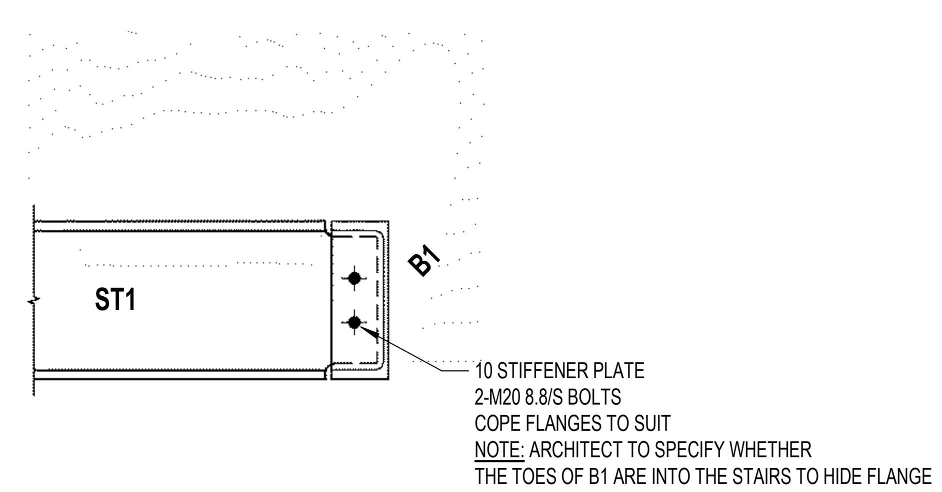


SECTION S.01
SCALE 1 : 100
S056

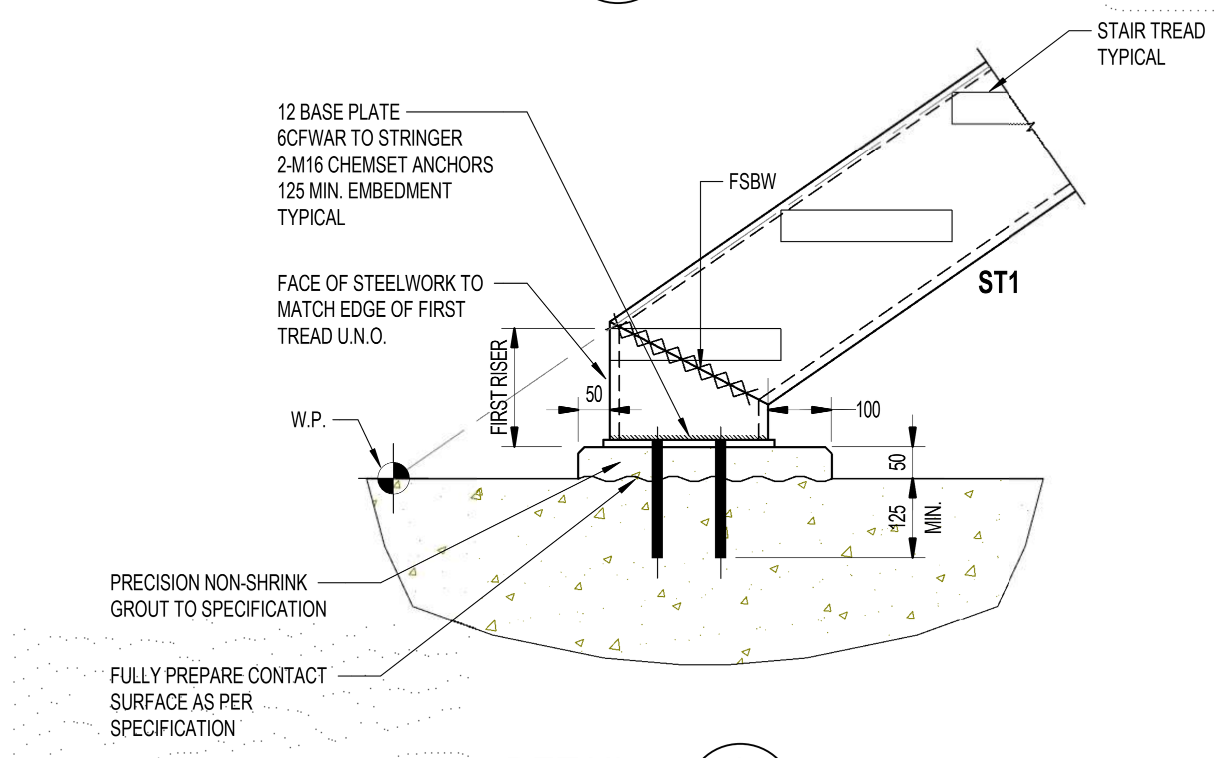


TYPICAL TOP CONNECTION DETAIL INTO CONCRETE

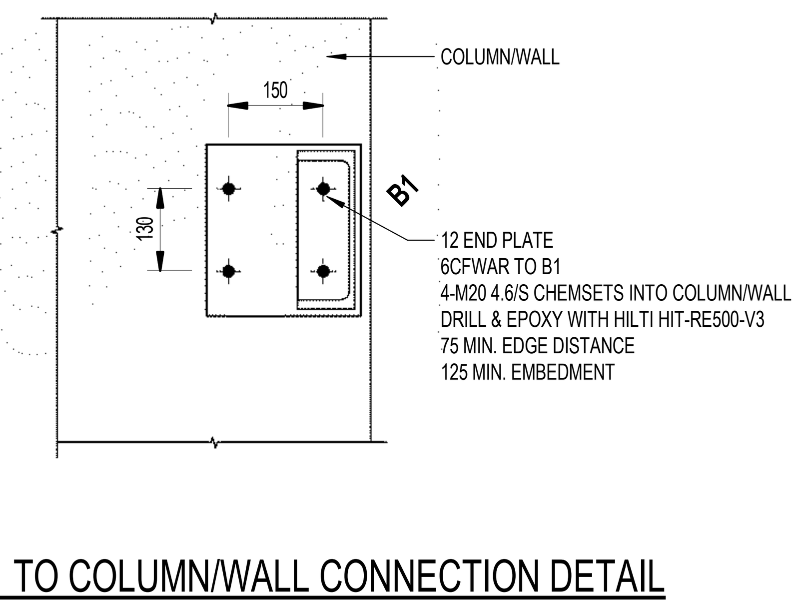
DETAIL B
1 : 10
S056



DETAIL C
1 : 10
S056



DETAIL A
1 : 10
S056



TYPICAL B1 TO COLUMN/WALL CONNECTION DETAIL

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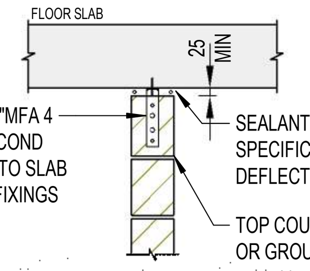
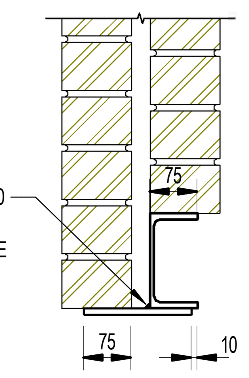


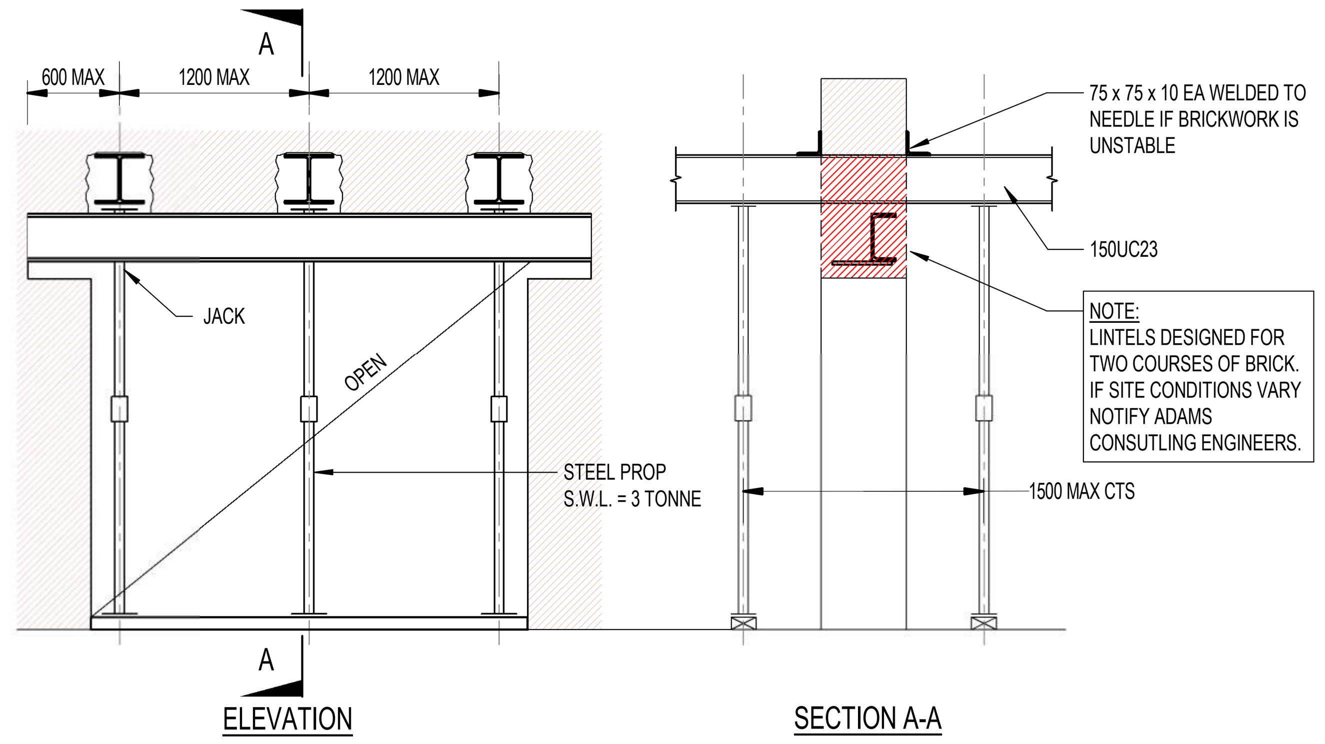
TYPICAL NON-LOADBEARING MASONRY WALL TO SOFFIT OF CONCRETE SLAB



NOTE:
PROVIDE MINIMUM
200 END BEARING

TYPICAL STEEL LINTEL SECTION

SCALE 1:10



PROCEDURE FOR INSTALLATION OF STEEL LINTELS INTO EXISTING MASONRY WALLS

1. MARK FUTURE OPENING OUT AND INSTALL NEEDLES AND PROPS USING SIZES SPECIFIED ABOVE.
2. WEDGE NEEDLES TO WALL TO ENSURE STABILITY AGAINST TWISTING AND SIDE MOVEMENT.
3. PROVIDE SPREADERS UNDER PROPS AND TIGHTEN PROPS SO THAT STEEL NEEDLES ARE FULLY LOADED.
4. SAWCUT AND BREAK OUT WALL.
5. INSTALL NEW STEEL LINTEL AND BRICK DOWN ONTO TOP OF LINTEL BETWEEN NEEDLES.
6. LINTEL TO BE INSTALLED SO THAT IT CAN BE RAISED TO LEVEL AND TO ALLOW FOR ITS DEFLECTION.

MASONRY NOTES:

UNLESS NOTED OTHERWISE, ALL BLOCKWORK TO BE CORE FILLED IN ACCORDANCE WITH NOTE M8 ON DRAWING S001.

UNLESS NOTED OTHERWISE IN WALL SCHEDULE
ALL BLOCKWORK REINFORCEMENT TO BE 140 THICK :
N16-200 VERTICAL.
N12-400 HORIZONTAL.

ALL REINFORCEMENT LAPS TO BE 600mm U.N.O

ARTICULATION JOINTS 'AJ' SPACINGS AS PER NOTE M15 ON S001. REFER TO DETAILS ADJACENT.

WHERE JOINT IS TO HAVE A FIRE RATING USE ROCOR FIREJOINT FILLER TO ARCHITECTS SPECIFICATIONS.
THICKNESS TO SUIT SPECIFIED RATING.

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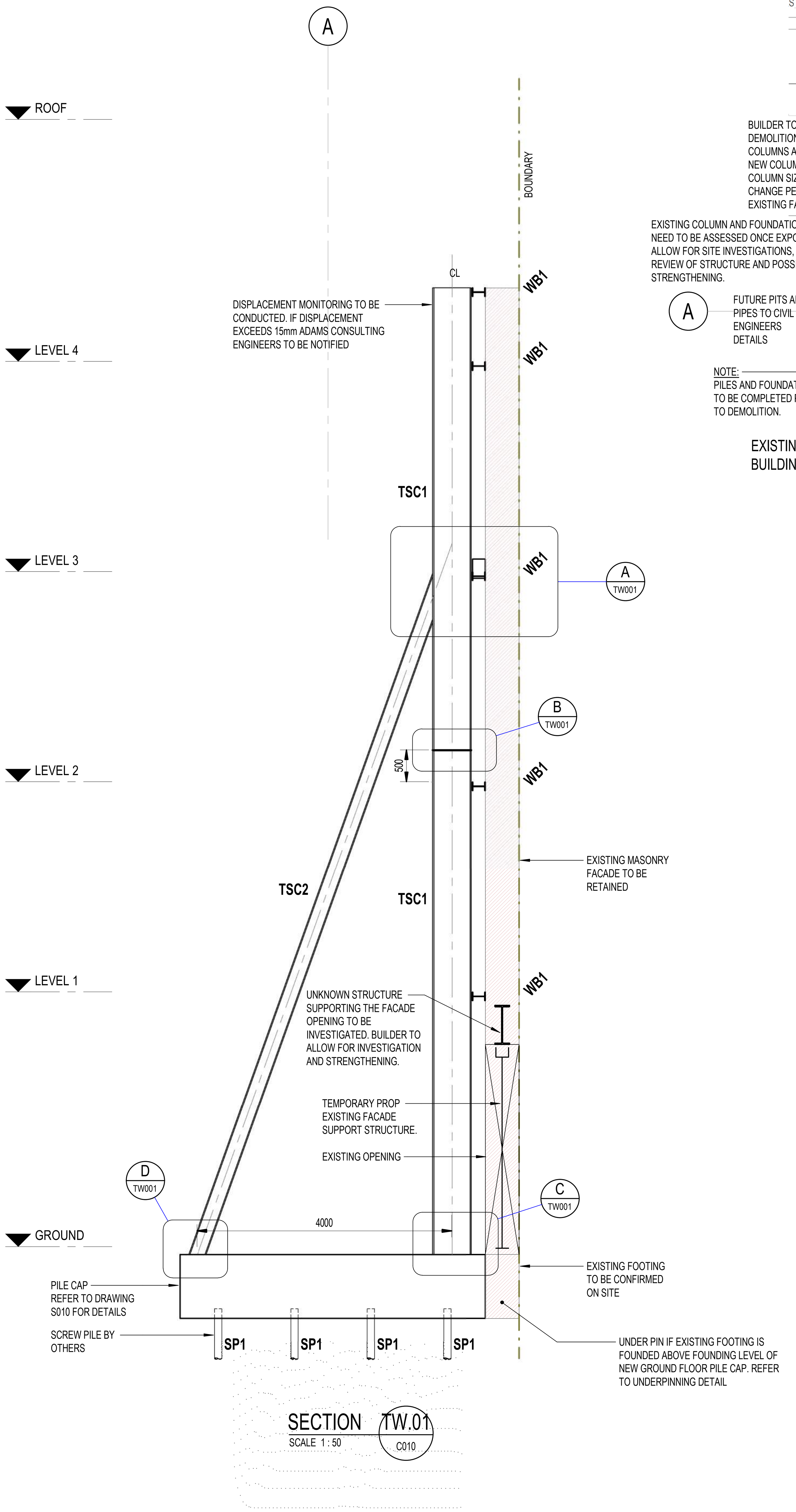
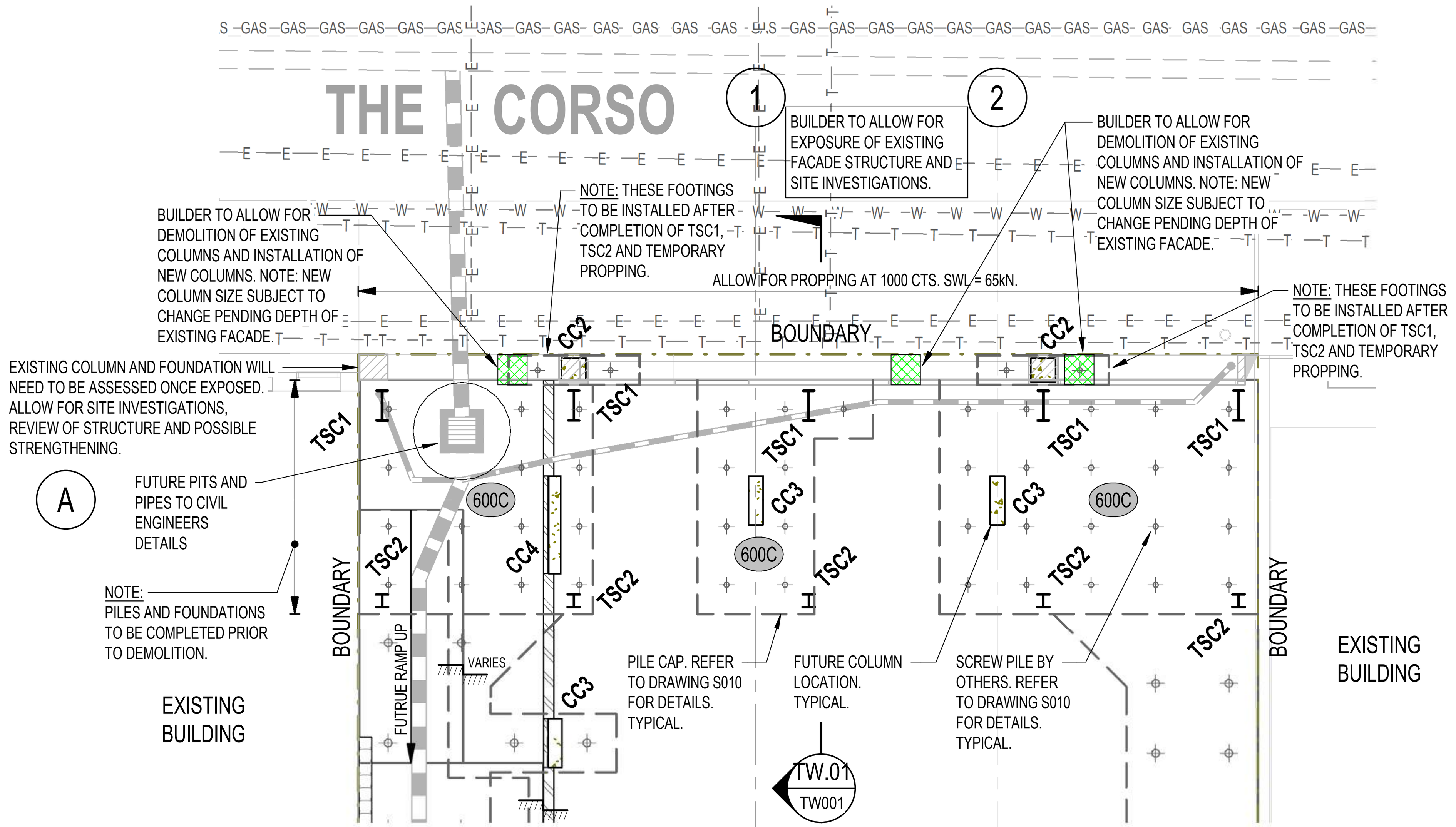
Project	Drawing	Revision
190047	S057	A

MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY



SECTION TW.01 C010
SCALE 1 : 50

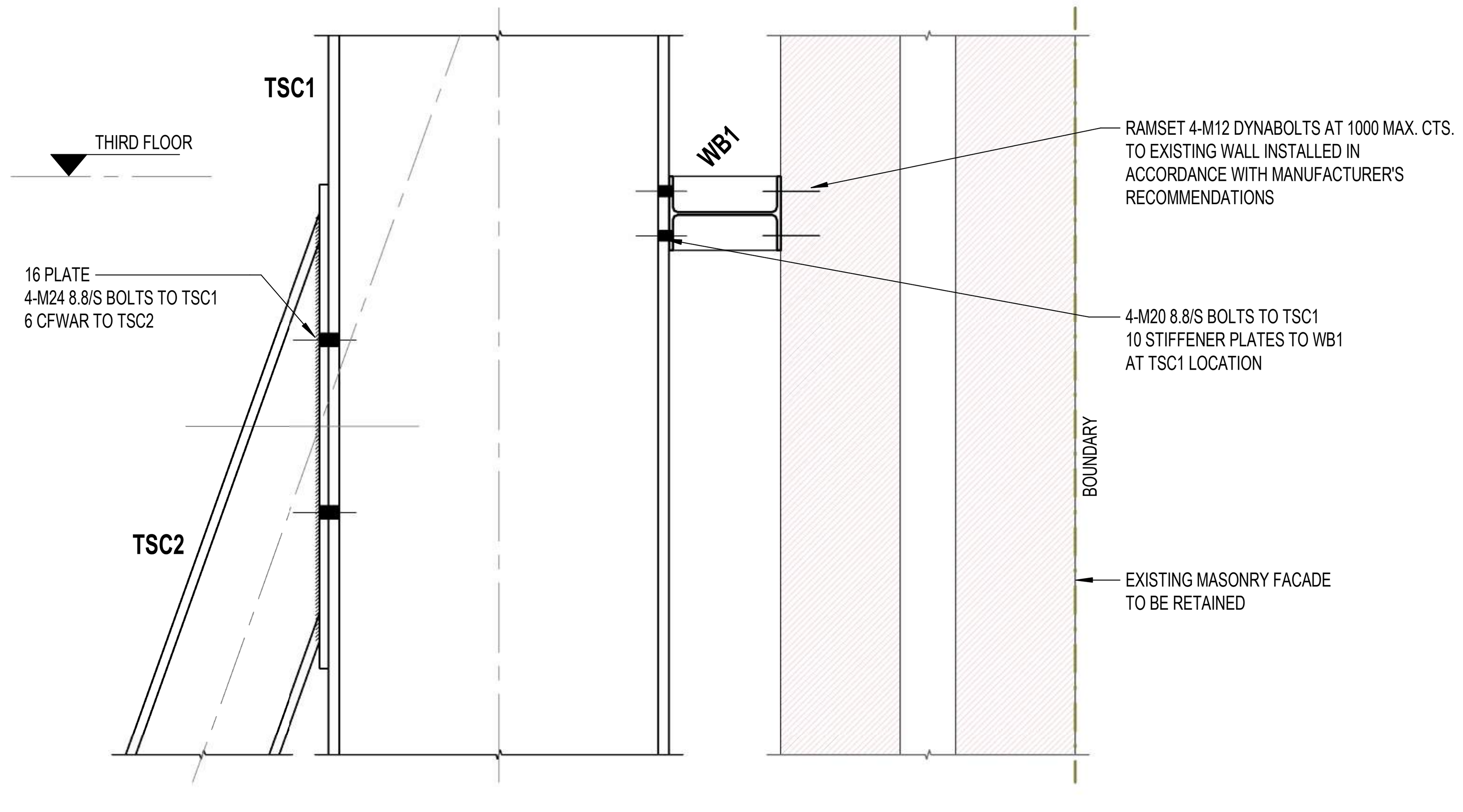


TEMPORARY WORKS GROUND FLOOR PART PLAN
SCALE 1 : 100

MEMBER SCHEDULE				
MARK	SIZE	CONNECTIONS		REMARKS
		LEFT	RIGHT	
TSC1	610UB125	-	-	TEMPORARY WORKS STEEL COLUMN
TSC2	250UC89	-	-	TEMPORARY WORKS STEEL COLUMN
WB1	200UB22	-	-	TEMPORARY WORKS STEEL COLUMN; NOTE SPLICE AS REQUIRED WITH FSBW FLANGES; 6CFW WEB

CONSTRUCTION SEQUENCE:

1. GAIN ACCESS AND EXPOSE FAÇADE STRUCTURE. ENGINEER TO BE INVITED TO INSPECT STRUCTURE.
2. INSTALL SCREW PILES SP1 IN ACCORDANCE WITH DRAWING S010. NOTE THE FOUNDATIONS UNDER THE EXISTING FAÇADE ARE NOT TO BE COMPLETED UNTIL TSC1, TSC2 AND TEMPORARY PROPPING UNDER FAÇADE IS IN PLACE.
3. CONSTRUCT THE PILE CAPS NOMINATED TO BE CONSTRUCTED BEFORE DEMOLITION.
4. INSTALL WB1 AND CONNECT TO WALL, SPLICE AS REQUIRED TO ALLOW FOR INSTALLATION.
5. CUT HOLES IN EXISTING FLOORS TO ALLOW FOR INSTALLATION OF TSC1.
6. CRANE IN TSC1 AND CONNECT TO PILE CAP (DETAIL C) AND WB1 (DETAIL A).
7. INSTALL TSC2 AND CONNECT TO PILE CAP (DETAIL D) AND TSC1 (DETAIL A).
8. TEMPORARILY PROP EXISTING FAÇADE STRUCTURE.
9. DEMOLISH EXISTING COLUMNS SUPPORTING FAÇADE.
10. INSTALL REMAINING SCREW PILES AND PILE CAPS. NOTE NO INFORMATION ABOUT THE EXISTING FAÇADE WALL FOOTINGS IS AVAILABLE. SITE INVESTIGATIONS AND LOCAL EXPOSURE OF FOOTINGS MAY BE REQUIRED TO DETERMINE THE INSTALLATION METHOD OF PILES AND PILE CAP.
11. STRENGTHEN EXISTING FAÇADE SUPPORT STRUCTURE AS/IF REQUIRED. DETAILS WILL BE PROVIDED UPON ACCESS TO FAÇADE.
12. INSTALL NEW COLUMNS AS PER PLANS AND DETAILS. GROUT PACK TIGHT TO SOFFIT OF FAÇADE SUPPORT BEAM.
13. DEMOLISH EXISTING BUILDING.
14. MAINTAIN SURVEY POINT AT TOP OF PARAPET ON EXISTING FAÇADE AND MONITOR DEFLECTIONS OF EXISTING FAÇADE WALL. IF DEFLECTION EXCEEDS 10mm NOTIFY STRUCTURAL ENGINEER.
15. CONSTRUCT BUILDING TO LEVEL 4. REMOVE TSC1, TSC2 AND WB1 AND INSTALL LEVEL 4 PERGOLA. PROVIDE TEMPORARY PROPPING TO EXISTING MASONRY PARAPET DURING THIS PROCESS.
16. INFILL THE VOIDS IN THE PT SLAB.

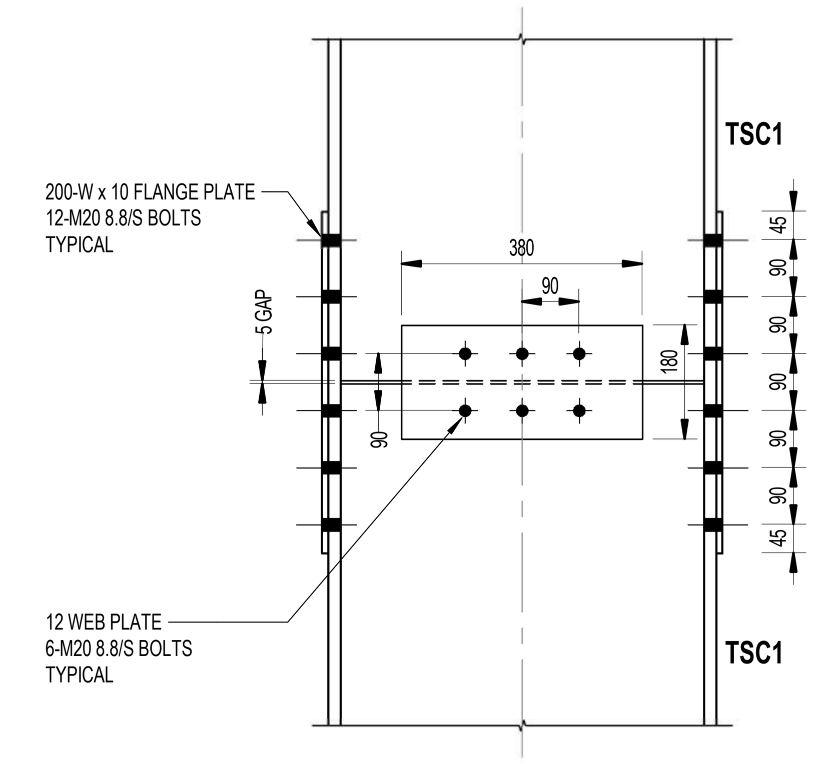


DETAIL A TW001
1 : 10

LEGEND

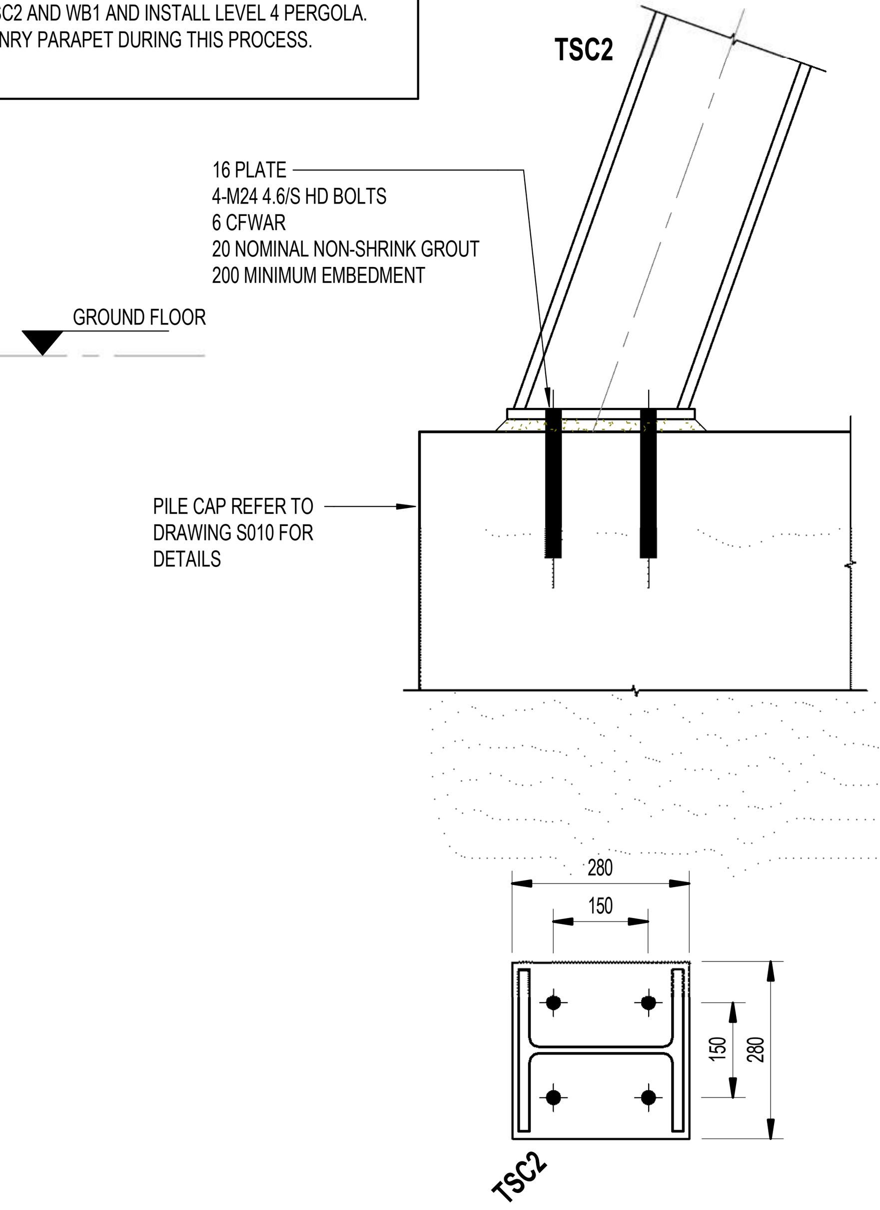
REFER TO DRAWING S001 FOR GENERAL NOTES
REFER TO DRAWING S010 FOR GROUND FLOOR GA PLAN
REFER TO DRAWING S006 FOR PILE CAP DETAILS

XXXC DENOTES PILE CAP THICKNESS. REFER TO DRAWING S010 FOR DETAILS.



TYPICAL TSC1 SPLICE DETAIL

DETAIL B TW001
1 : 10



DETAIL D TW001
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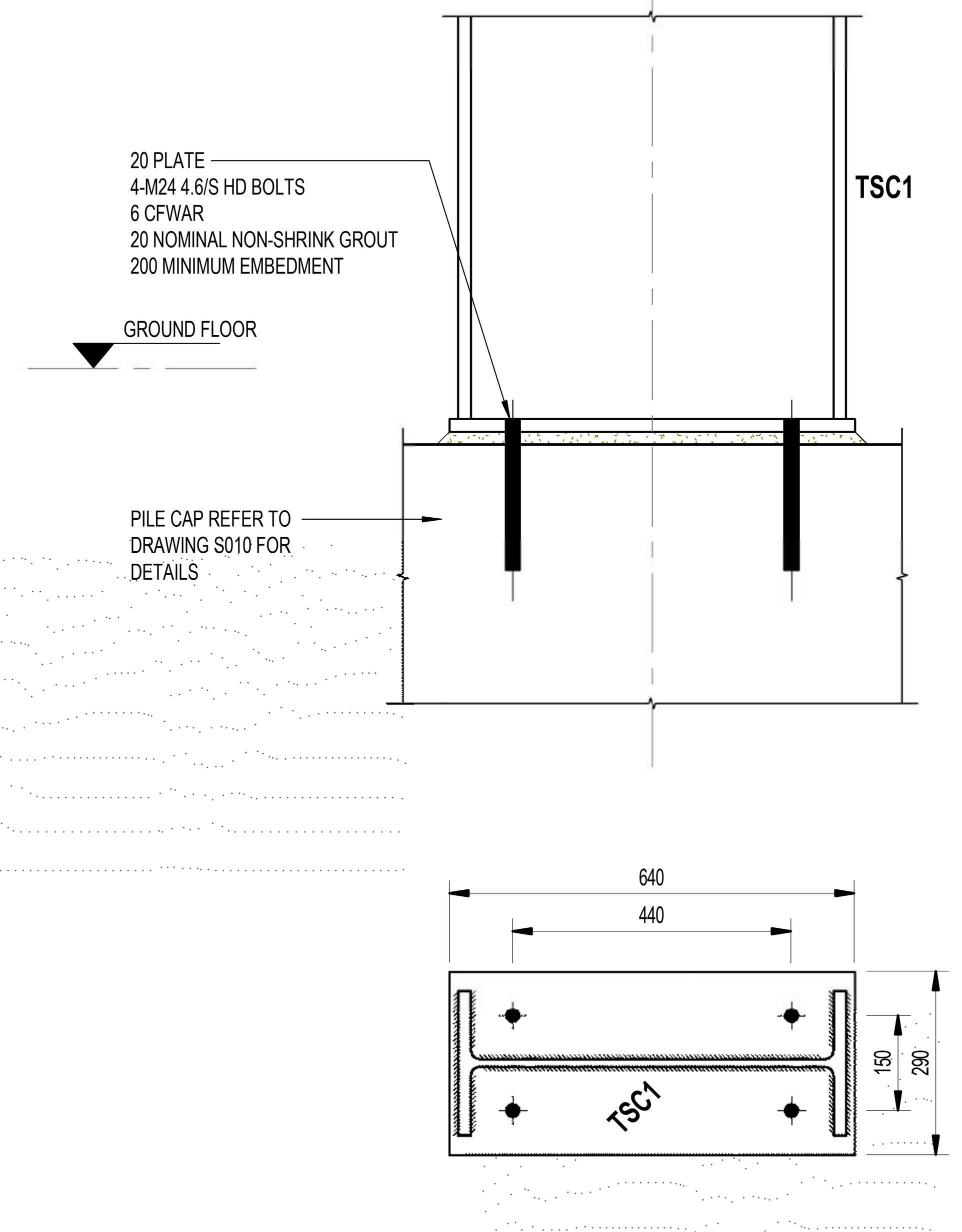

DETAIL C TW001
1 : 10

ISSUE	REVISION	DATE
A	ISSUED FOR 75% TENDER	18/10/19

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DESIGNING THE FUTURE
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WOLSKI . COPPIN ARCHITECTURE

TITLE
TEMPORARY WORKS PLAN AND DETAILS SHEET 1

Designed	AS	Drawn	CB	North
Project Leader	AS	Sheet Size	A1	
Project Director	MW	Certified	-	
Printed 18/10/2019 5:19:06 PM		Version	R18	

75% TENDER ISSUE
NOT FOR CONSTRUCTION

Project	Drawing	Revision
190047	TW001	A

MIXED USE DEVELOPMENT , 6 THE CORSO & 46-50 EAST ESPLANADE, MANLY

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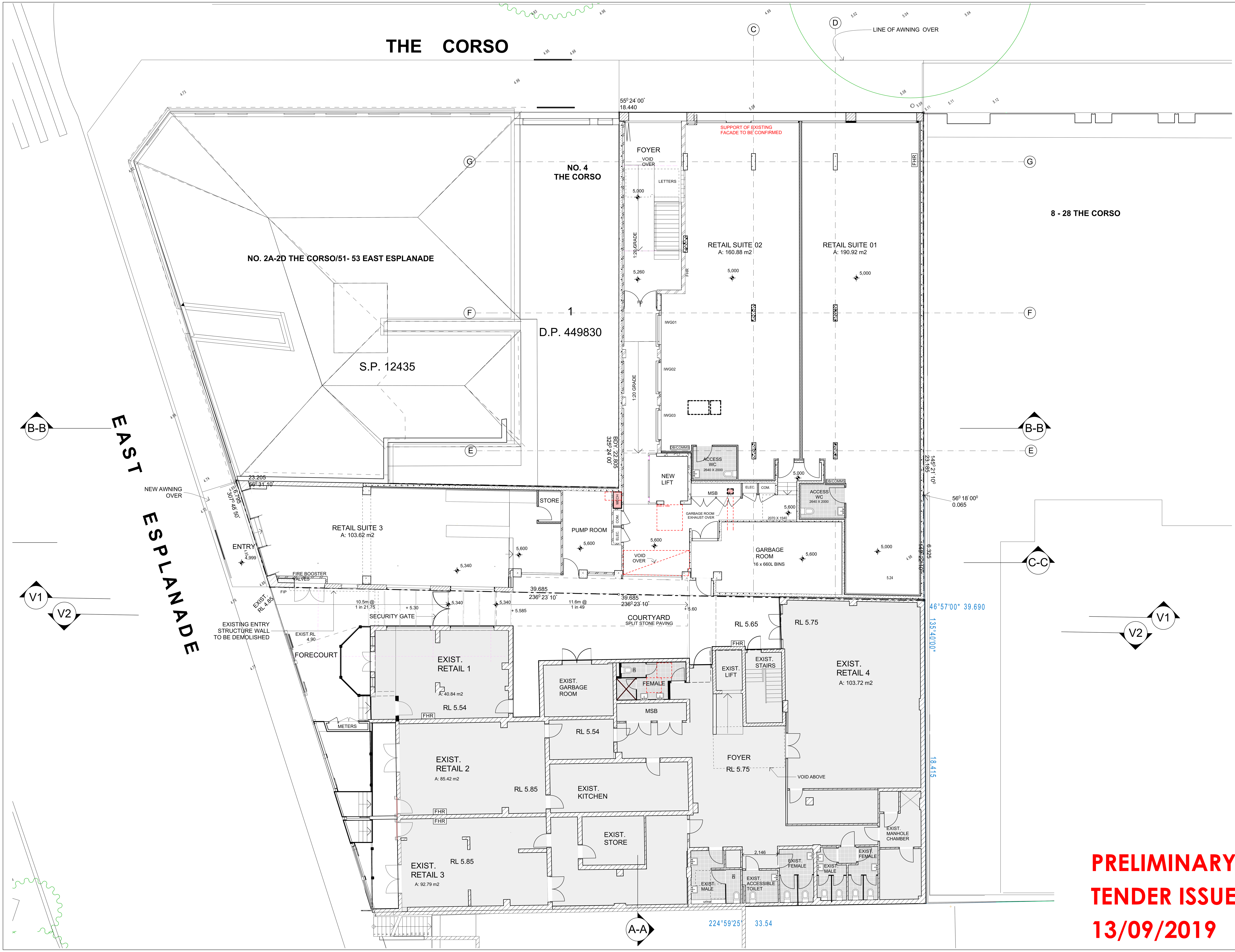
Surry Hills NSW 2010
+61 2 9222 9970
admin@adamseng.com.au
www.adamseng.com.au

APPENDIX A: ARCHITECTURAL DRAWINGS



NOTES:

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REVISIONS:

DATE	REV	DESCRIPTION

NOTE:

SITE BOUNDARY INFO TO BE CONFIRMED

FD	HOLD OPEN FIRE DOOR
NTR	NON TRAFFICABLE ROOF
A	AMBULANT WC STALL
91,100	PROPOSED LEVEL
91.10	EXISTING LEVEL

ARCHITECT:

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DAVID WOLSKI NSW ARB No. 5297

PROJECT TITLE:

Mixed Use Development

PROJECT ADDRESS:

6 The Corso /50 East Esplanade & 46-48 East Esplanade, Manly

CLIENT:

ICMS
(INTERNATIONAL COLLEGE OF MANAGEMENT SYDNEY)

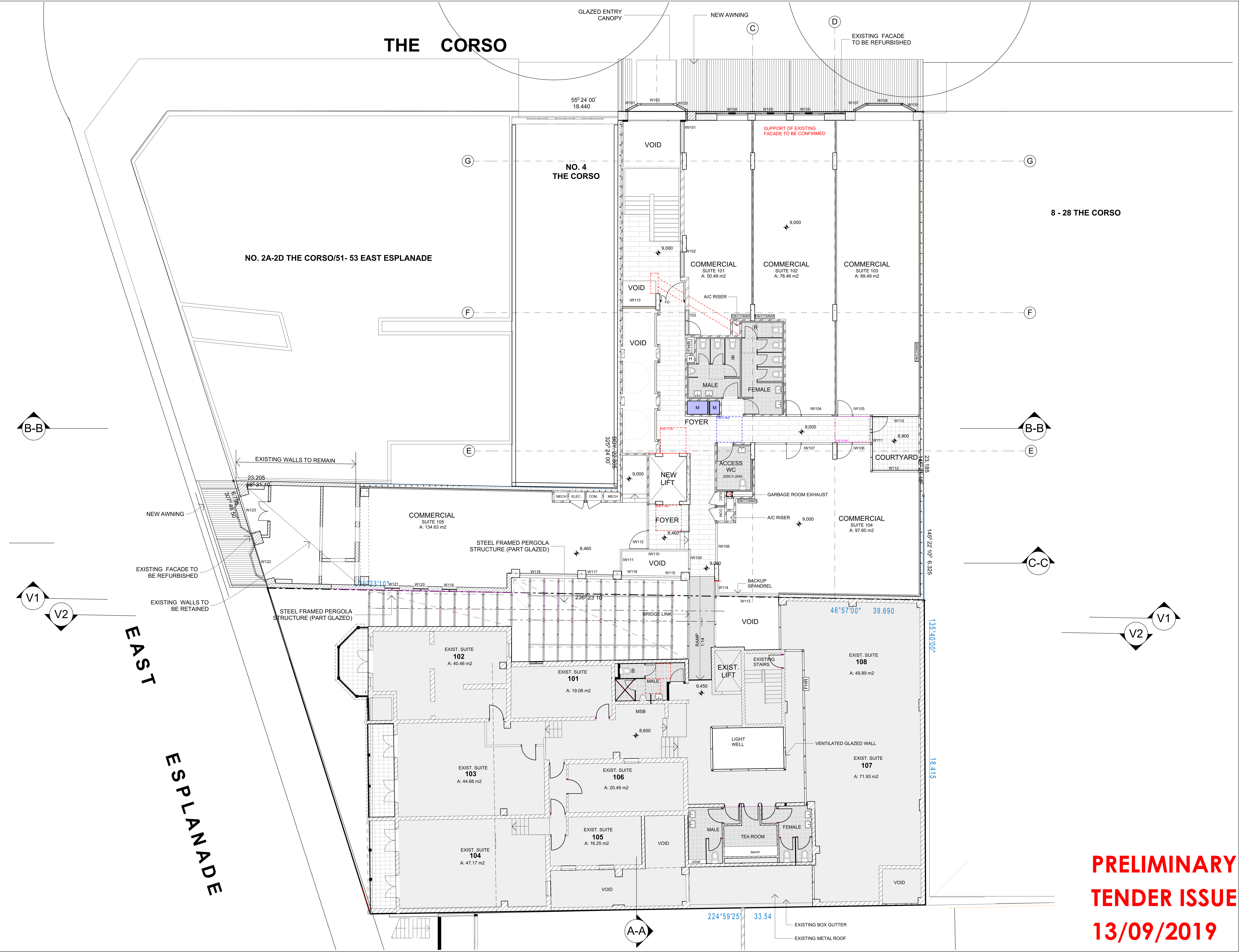
DRAWING TITLE:

GROUND FLOOR PLAN

PROJECT No:	DRAWING No:
21720	TD01
REVISION:	NORTH POINT:
	TN
SCALE:	PLOT DATE:
1:100@A1	13/09/2019

SCALE BAR:

BIM Server: BIMSRV01 - BIM Server 20/21720 6 Corso 48 + 50 East Esplanade Manly CC 280819



NOTE:

SITE BOUNDARY INFO TO BE CONFIRMED

PRELIMINARY TENDER ISSUE 13/09/2019

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FD HOLD OPEN FIRE DOOR
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91,100 PROPOSED LEVEL
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PROJECT TITLE:

Mixed Use Development

PROJECT ADDRESS:

6 The Corso /50 East Esplanade & 46-48 East Esplanade, Manly

CLIENT:

ICMS
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DRAWING TITLE:

FIRST FLOOR PLAN

PROJECT No:	DRAWING No:
21720	TD02
REVISION:	NORTH POINT:
SCALE:	PLOT DATE:
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SCALE BAR:

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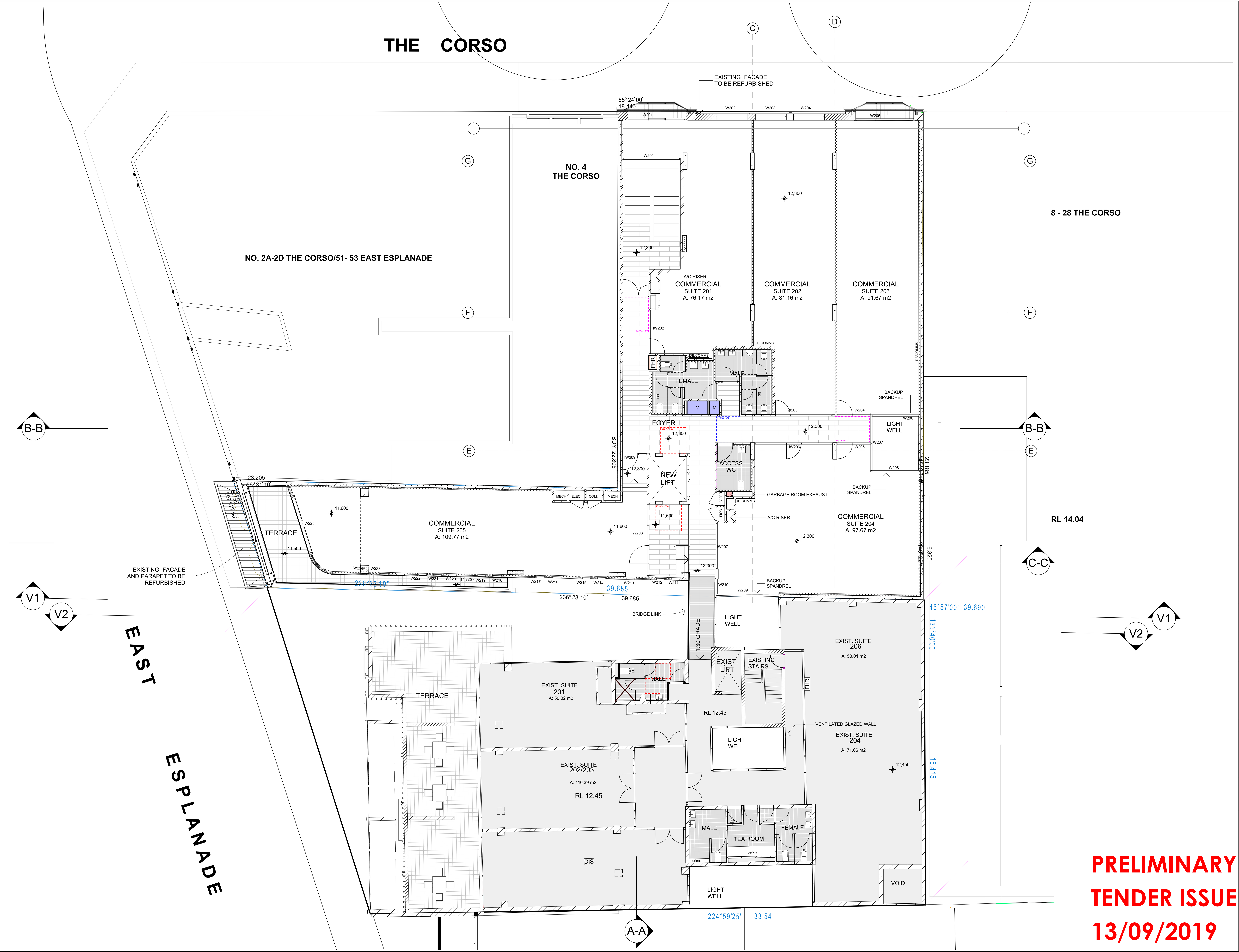

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REVISIONS:

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NOTE:

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FD HOLD OPEN FIRE DOOR
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A AMBULANT WC STALL
91,100 PROPOSED LEVEL
91.10 EXISTING LEVEL

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PROJECT TITLE:
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PROJECT ADDRESS:
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CLIENT:
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DRAWING TITLE:
SECOND FLOOR PLAN

PROJECT No:	DRAWING No:
21720	TD03
REVISION:	NORTH POINT:
SCALE:	PLOT DATE:
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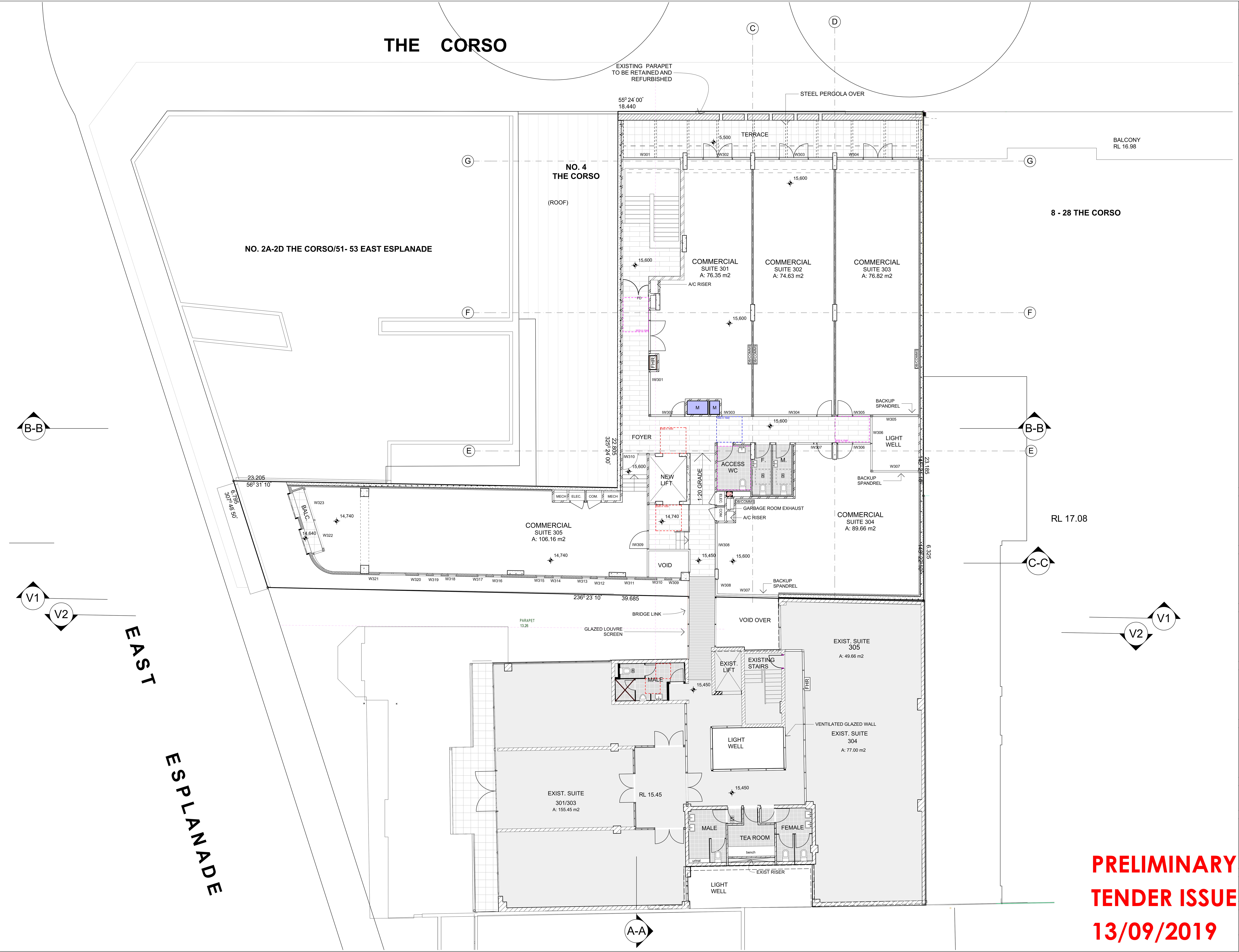

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NOTE:

SITE BOUNDARY INFO TO BE CONFIRMED

FD	HOLD OPEN FIRE DOOR
NTR	NON TRAFFICABLE ROOF
A	AMBULANT WC STALL
91,100	PROPOSED LEVEL
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PROJECT ADDRESS:

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DRAWING TITLE:

THIRD FLOOR PLAN

PROJECT No:	DRAWING No:
21720	TD04
REVISION:	NORTH POINT:
	TN
SCALE:	PLOT DATE:
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SCALE BAR:

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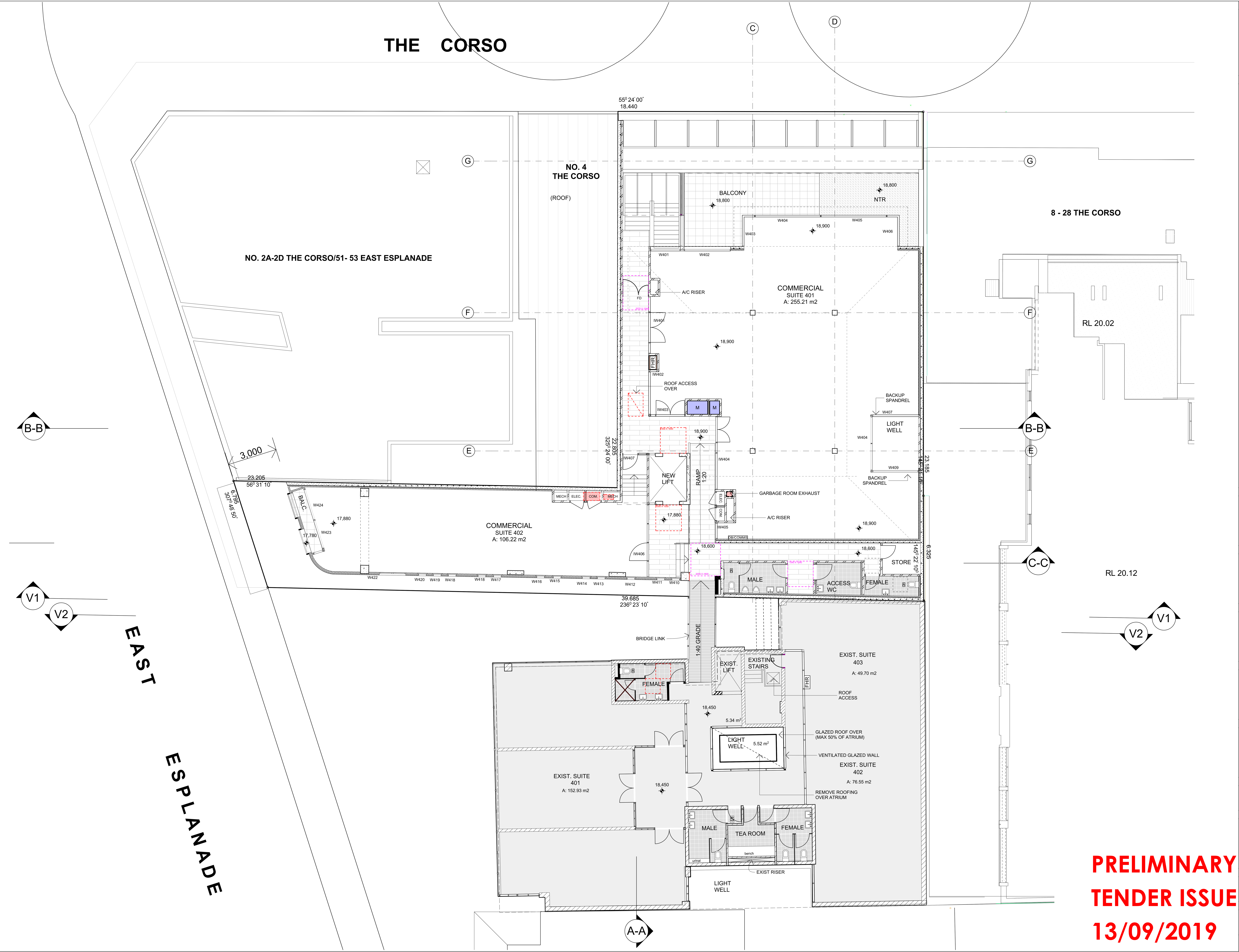

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REVISIONS:

DATE	REV	DESCRIPTION

FD HOLD OPEN FIRE DOOR
NTR NON TRAFFICABLE ROOF
A AMBULANT WC STALL
91,100 PROPOSED LEVEL
91.10 EXISTING LEVEL

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PROJECT TITLE:

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PROJECT ADDRESS:

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CLIENT:

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DRAWING TITLE:

FOURTH FLOOR PLAN

PROJECT No:	DRAWING No:
21720	TD05
REVISION:	NORTH POINT:
	TN
SCALE:	PLOT DATE:
1:100@A1	13/09/2019

SCALE BAR:

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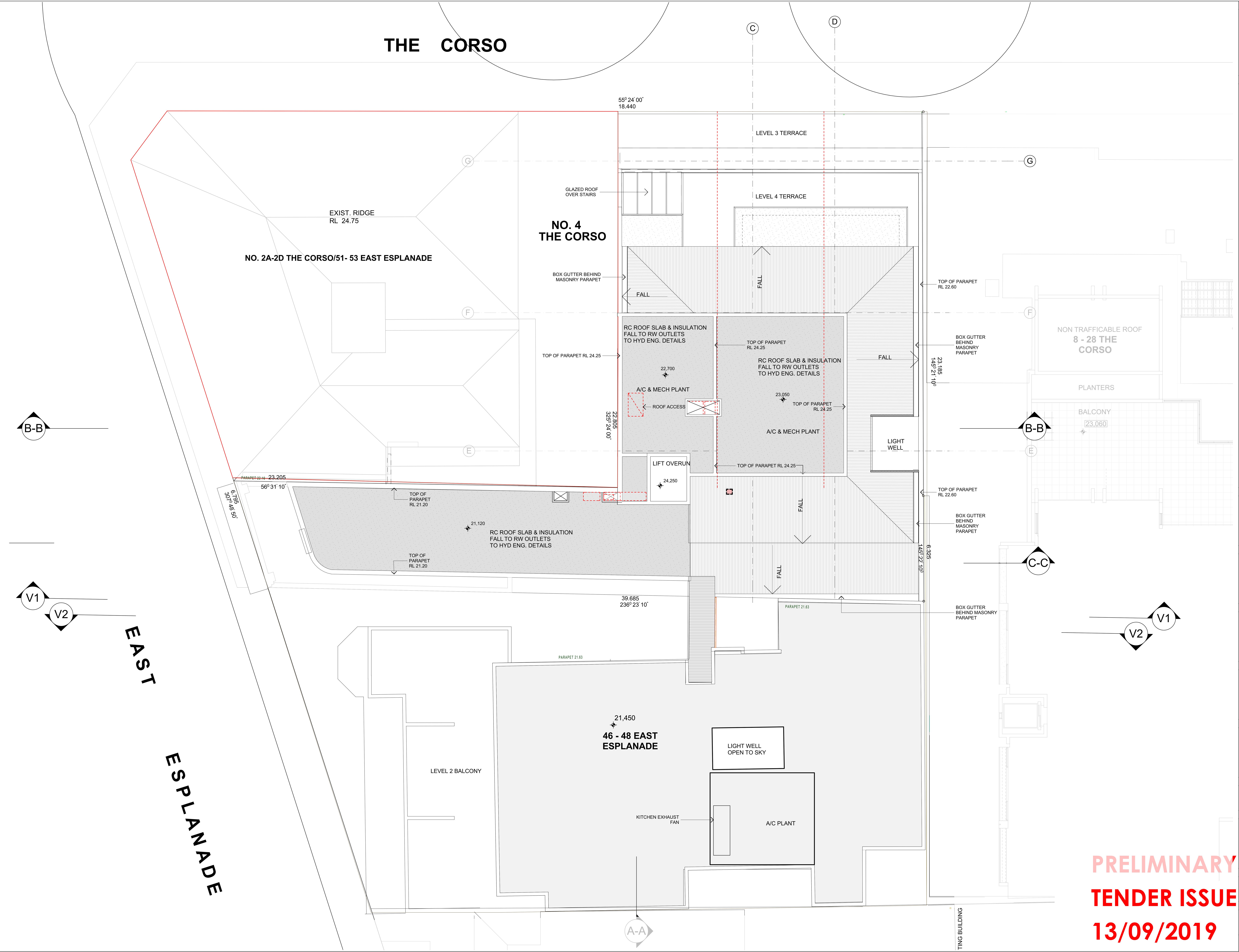

NOTE:

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13/09/2019

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REVISIONS:

DATE	REV	DESCRIPTION

FD	HOLD OPEN FIRE DOOR
NTR	NON TRAFFICABLE ROOF
A	AMBULANT WC STALL
91,100	PROPOSED LEVEL
91.10	EXISTING LEVEL

ARCHITECT:

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PROJECT TITLE:

Mixed Use Development

PROJECT ADDRESS:

6 The Corso /50 East Esplanade & 46-48 East Esplanade, Manly

CLIENT:

ICMS
(INTERNATIONAL COLLEGE OF MANAGEMENT SYDNEY)

DRAWING TITLE:

ROOF PLAN

PROJECT No:	DRAWING No:
21720	TD06
REVISION:	NORTH POINT:
SCALE:	PLOT DATE:
1:100@A1	13/09/2019

SCALE BAR:

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THE CORSO ELEVATION

PRELIMINARY TENDER ISSUE 13/09/2019

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REVISIONS:

DATE	REV	DESCRIPTION

LEGEND

AFG	ALUMINIUM FRAMED GLAZING
CR	CORRUGATED ROOFING
FB	FACE BRICK
GB	GLAZED BALUSTRADE
RM1-5	RENDERED MASONRY
SFM	SPLIT FACE MASONRY FENCE
SFP	STEEL FRAMED PERGOLA
SHR	SHINGLE ROOFING
SMR	SHEET METAL ROOFING
STAL	STACKING LOUVRED SCREEN
VC	VERTICAL CLADDING

91,100 PROPOSED LEVEL

91.10 EXISTING LEVEL

ARCHITECT:

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DAVID WOLSKI NSW ARB No. 5297

PROJECT TITLE:

Mixed Use Development

PROJECT ADDRESS:

6 The Corso /50 East Esplanade & 46-48 East Esplanade, Manly

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DRAWING TITLE:

THE CORSO ELEVATION

PROJECT No:	DRAWING No:
21720	TD07
REVISION:	NORTH POINT:
SCALE:	PLOT DATE:
1:100@A1	13/09/2019

SCALE BAR:

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EAST ESPLANADE ELEVATION

NOTES:

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REVISIONS:

DATE	REV	DESCRIPTION

LEGEND

AFG	ALUMINIUM FRAMED GLAZING
CR	CORRUGATED ROOFING
FB	FACE BRICK
GB	GLAZED BALUSTRADE
RM1-5	RENDERED MASONRY
SFM	SPLIT FACE MASONRY FENCE
SFP	STEEL FRAMED PERGOLA
SHR	SHINGLE ROOFING
SMR	SHEET METAL ROOFING
STAL	STACKING LOUVRED SCREEN
VC	VERTICAL CLADDING

91,100 PROPOSED LEVEL

91.10 EXISTING LEVEL

ARCHITECT:

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DAVID WOLSKI NSW ARB No. 5297

PROJECT TITLE:

Mixed Use Development

PROJECT ADDRESS:

6 The Corso /50 East Esplanade & 46-48 East Esplanade, Manly

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DRAWING TITLE:

EAST ESPLANADE ELEVATION

PROJECT No:	DRAWING No:
21720	TD08
REVISION:	NORTH POINT:
SCALE:	PLOT DATE:
1:100@A1	13/09/2019

SCALE BAR:

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PRELIMINARY TENDER ISSUE 13/09/2019

V1 50 EAST ESPLANADE SE ELEVATION

NOTES:

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REVISIONS:

DATE	REV	DESCRIPTION

LEGEND

AFG	ALUMINIUM FRAMED GLAZING
CR	CORRUGATED ROOFING
FB	FACE BRICK
GB	GLAZED BALUSTRADE
RM1-5	RENDERED MASONRY
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STAL	STACKING LOUVRED SCREEN
VC	VERTICAL CLADDING

91,100 PROPOSED LEVEL

91.10 EXISTING LEVEL

ARCHITECT:

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DAVID WOLSKI NSW ARB No. 5297

PROJECT TITLE:

Mixed Use Development

PROJECT ADDRESS:

6 The Corso /50 East Esplanade & 46-48 East Esplanade, Manly

CLIENT:

ICMS
(INTERNATIONAL COLLEGE OF MANAGEMENT SYDNEY)

DRAWING TITLE:

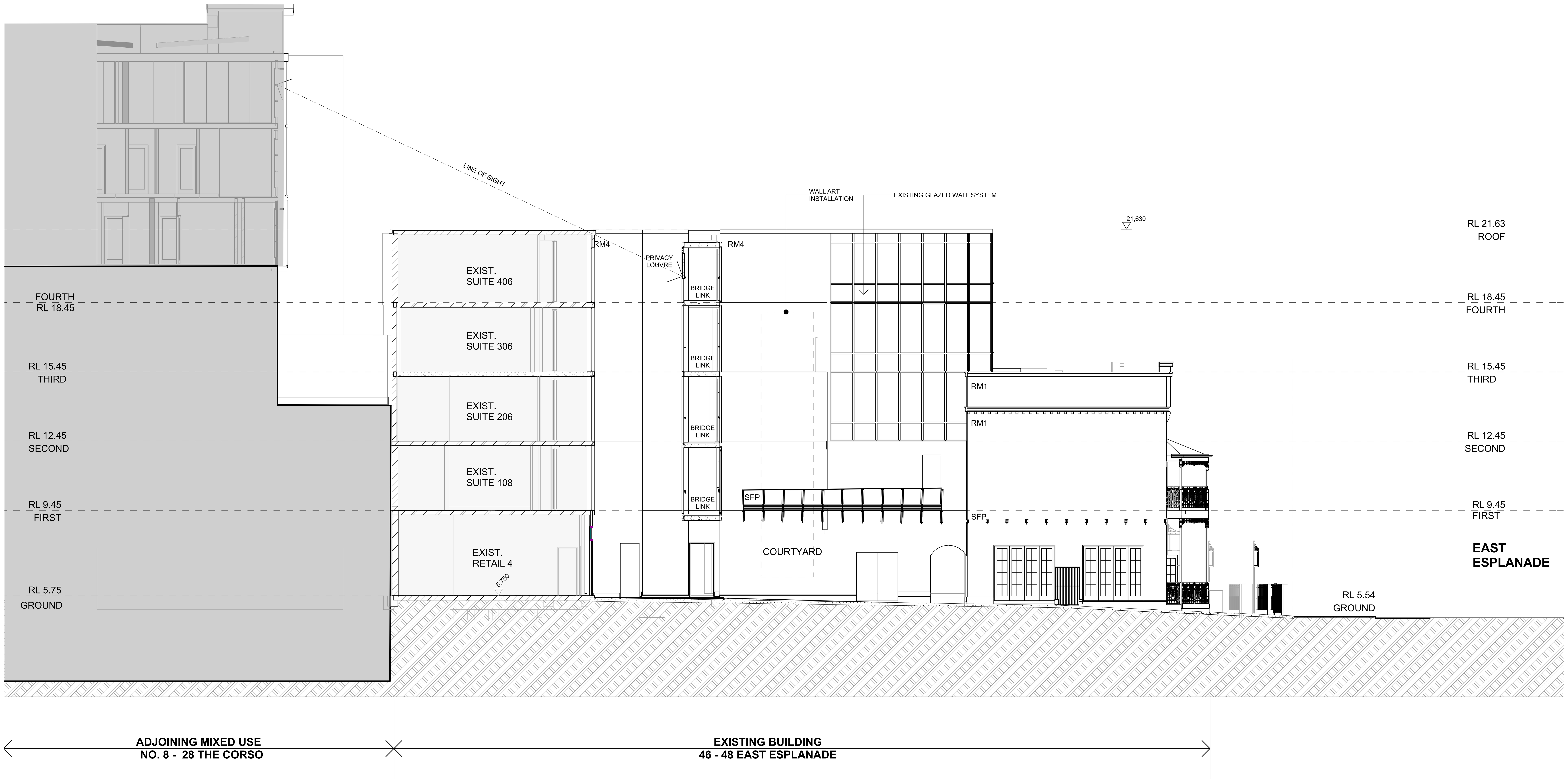
V1-50 EAST EPLANADE SE ELEVATION

PROJECT No:	DRAWING No:
21720	TD09
REVISION:	NORTH POINT:
SCALE:	PLOT DATE:
1:100@A1	13/09/2019

SCALE BAR:

BIM Server: BIMSRV01 - BIM Server 20/21720 6 Corso 48 + 50 East Esplanade Manly CC 280819

PRELIMINARY TENDER ISSUE 13/09/2019



V2 46 - 48 EAST ESPLANADE NW ELEVATION

NOTES:

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REVISIONS:

DATE	REV	DESCRIPTION

LEGEND

AFG	ALUMINIUM FRAMED GLAZING
CR	CORRUGATED ROOFING
FB	FACE BRICK
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RM1-5	RENDERED MASONRY
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STAL	STACKING LOUVRED SCREEN
VC	VERTICAL CLADDING

91,100 PROPOSED LEVEL

91.10 EXISTING LEVEL

ARCHITECT:

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DAVID WOLSKI NSW ARB No. 5297

PROJECT TITLE:

Mixed Use Development

PROJECT ADDRESS:

6 The Corso /50 East Esplanade & 46-48 East Esplanade, Manly

CLIENT:

ICMS
(INTERNATIONAL COLLEGE OF MANAGEMENT SYDNEY)

DRAWING TITLE:

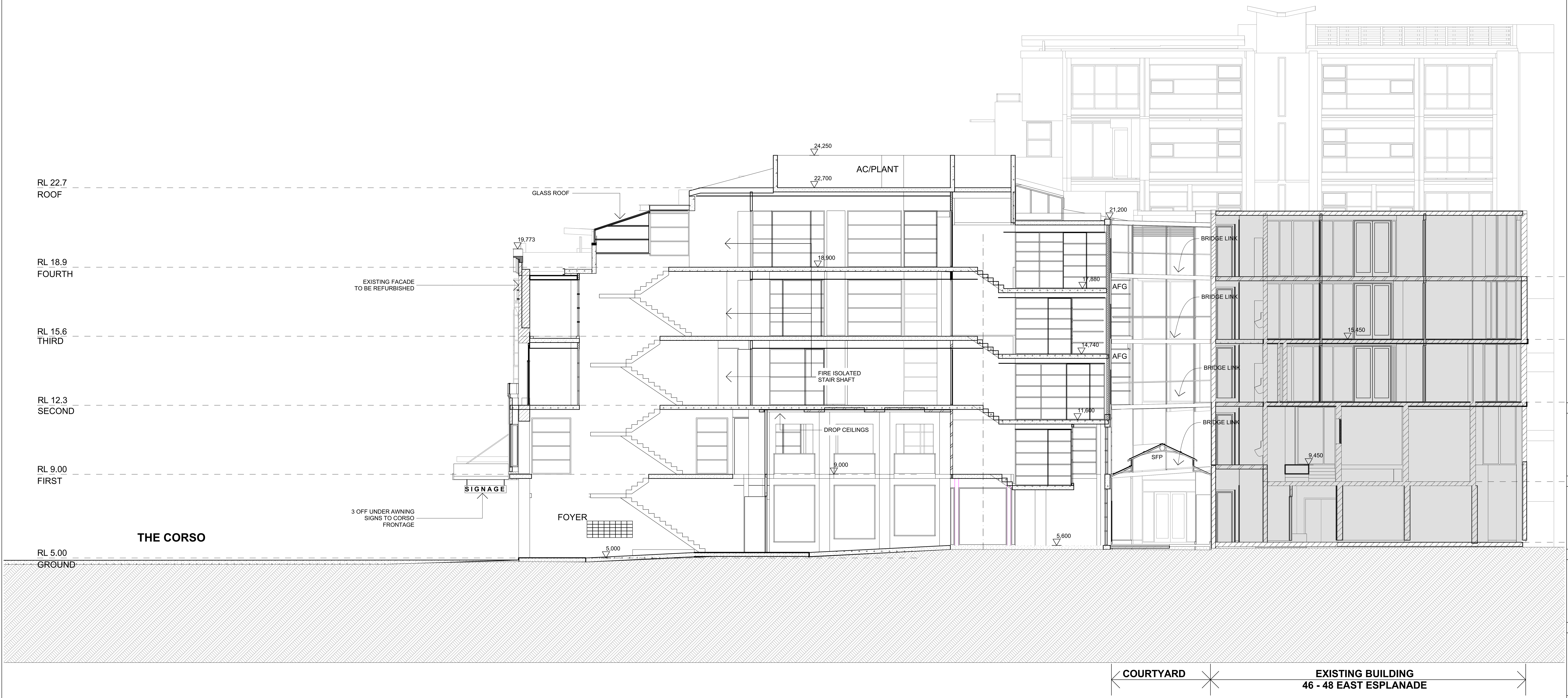
V2 - 46 - 48 EAST ESPLANADE NW ELEVATION

PROJECT No:	DRAWING No:
21720	TD10
REVISION:	NORTH POINT:
SCALE:	PLOT DATE:
1:100@A1	13/09/2019

SCALE BAR:

PRELIMINARY TENDER ISSUE 13/09/2019

BIM Server: BIMSRV01 - BIM Server 20/21720 6 Corso 48 + 50 East Esplanade Manly CC 280819



SECTION A-A

NOTES:

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REVISIONS:

DATE	REV	DESCRIPTION

LEGEND

AFG	ALUMINIUM FRAMED GLAZING
CR	CORRUGATED ROOFING
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VC	VERTICAL CLADDING

91,100	PROPOSED LEVEL
91.10	EXISTING LEVEL

ARCHITECT:

WOLSKI . COPPIN
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DAVID WOLSKI NSW ARB No. 5297

PROJECT TITLE:

Mixed Use Development

PROJECT ADDRESS:

6 The Corso /50 East Esplanade & 46-48 East Esplanade, Manly

CLIENT:

ICMS
(INTERNATIONAL COLLEGE OF MANAGEMENT SYDNEY)

DRAWING TITLE:

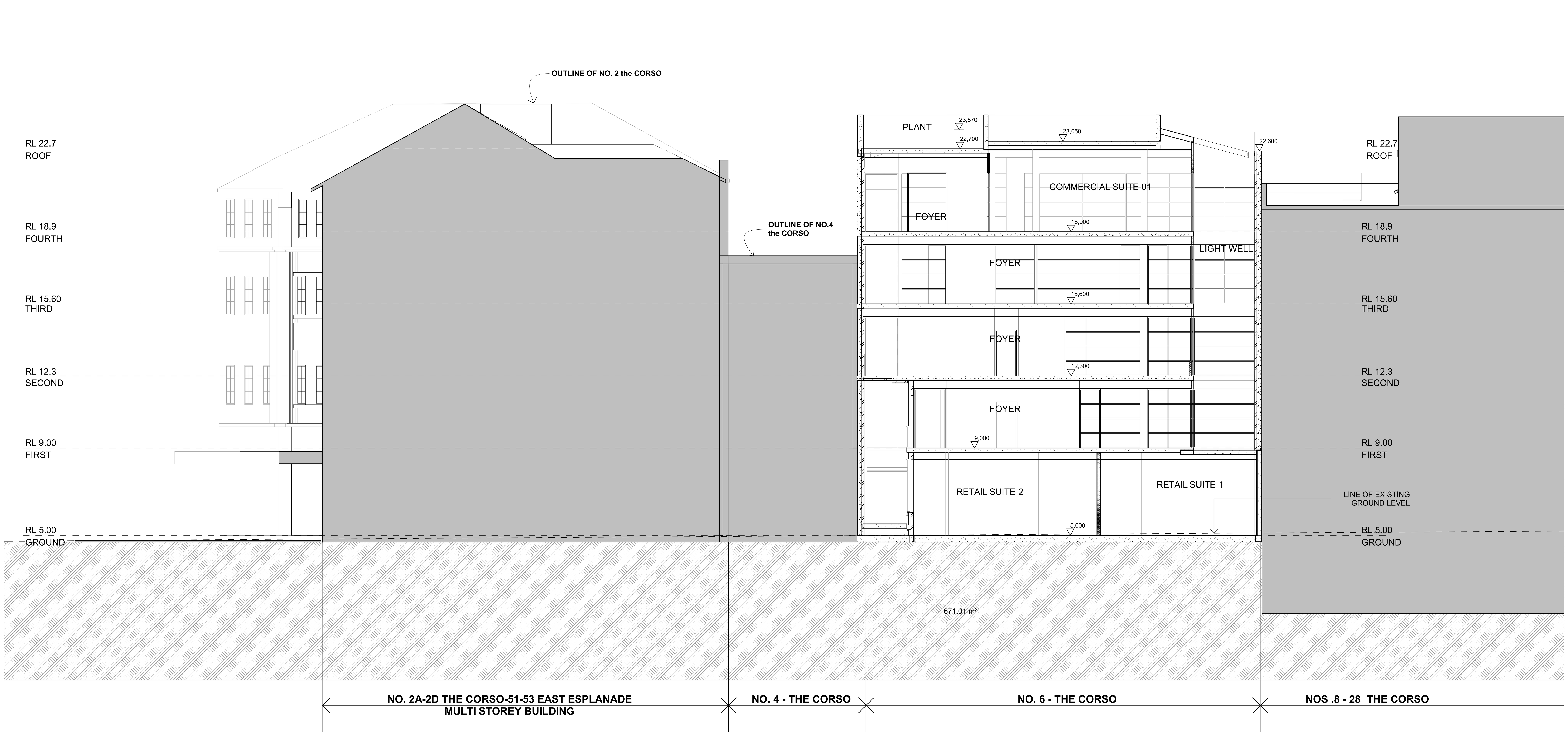
SECTION A-A

PROJECT No:	DRAWING No:
21720	TD11
REVISION:	NORTH POINT:
SCALE:	PLOT DATE:
1:100@A1	13/09/2019

SCALE BAR:

PRELIMINARY TENDER ISSUE 13/09/2019

BIM Server: BIMSRV01 - BIM Server 20/21720 6 Corso 48 + 50 East Esplanade Manly CC 280819



SECTION B-B

NOTES:

FIGURED DIMENSIONS ARE TO BE TAKEN IN PREFERENCE TO SCALED DIMENSIONS.

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REVISIONS:

DATE	REV	DESCRIPTION

LEGEND

AFG	ALUMINIUM FRAMED GLAZING
CR	CORRUGATED ROOFING
FB	FACE BRICK
GB	GLAZED BALUSTRADE
RM1-5	RENDERED MASONRY
SFM	SPLIT FACE MASONRY FENCE
SFP	STEEL FRAMED PERGOLA
SHR	SHINGLE ROOFING
SMR	SHEET METAL ROOFING
STAL	STACKING LOUVRED SCREEN
VC	VERTICAL CLADDING

91,100 PROPOSED LEVEL

91.10 EXISTING LEVEL

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6 The Corso /50 East Esplanade & 46-48 East Esplanade, Manly

CLIENT:

ICMS
(INTERNATIONAL COLLEGE OF MANAGEMENT SYDNEY)

DRAWING TITLE:

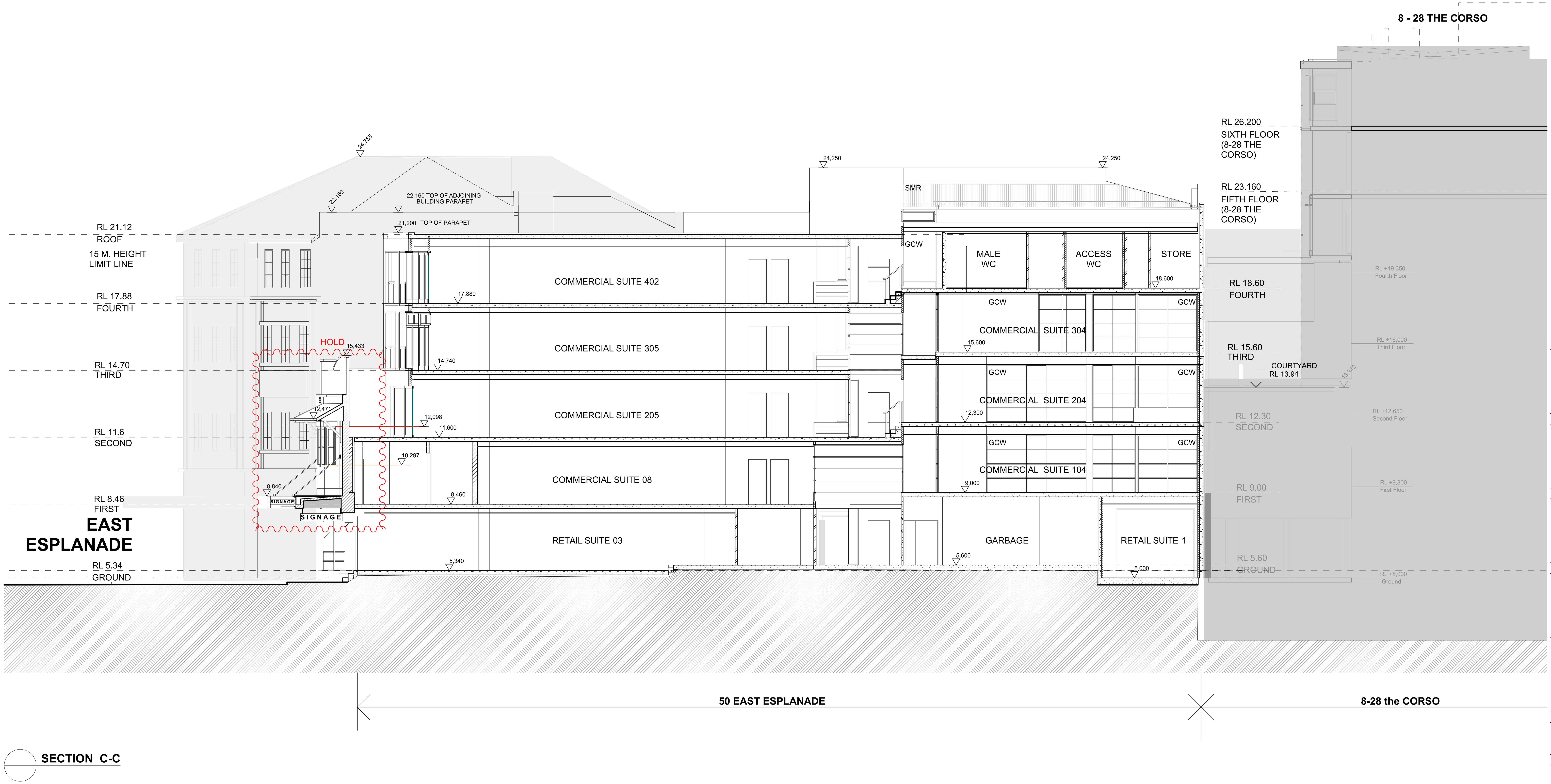
SECTION B-B

PROJECT No:	DRAWING No:
21720	TD12
REVISION:	NORTH POINT:
SCALE:	PLOT DATE:
1:100@A1	13/09/2019

SCALE BAR:

BIM Server: BIMSRV01 - BIM Server 20/21720 6 Corso 48 + 50 East Esplanade Manly CC 280819

PRELIMINARY TENDER ISSUE 13/09/2019



SECTION C-C

NOTES:
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REVISIONS:

DATE	REV	DESCRIPTION

LEGEND

AFG	ALUMINIUM FRAMED GLAZING
CR	CORRUGATED ROOFING
FB	FACE BRICK
GB	GLAZED BALUSTRADE
RM1-5	RENDERED MASONRY
SFM	SPLIT FACE MASONRY FENCE
SFP	STEEL FRAMED PERGOLA
SHR	SHINGLE ROOFING
SMR	SHEET METAL ROOFING
STAL	STACKING LOUVRED SCREEN
VC	VERTICAL CLADDING

91,100 PROPOSED LEVEL
91.10 EXISTING LEVEL

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PROJECT TITLE:
Mixed Use Development

PROJECT ADDRESS:
6 The Corso /50 East Esplanade & 46-48 East Esplanade, Manly

CLIENT:
ICMS
(INTERNATIONAL COLLEGE OF MANAGEMENT SYDNEY)

DRAWING TITLE:
SECTION C-C

PROJECT No:	DRAWING No:
21720	TD13
REVISION:	NORTH POINT:
SCALE:	PLOT DATE:
1:100@A1	13/09/2019

SCALE BAR:

PRELIMINARY TENDER ISSUE 13/09/2019

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APPENDIX C: GEOTECHNICAL REPORT

REPORT

TO
ASPIRING PROPERTIES PTY LTD

ON
GEOTECHNICAL INVESTIGATION

FOR
PROPOSED MIXED USE DEVELOPMENT

AT
6 THE CORSO AND 50 EAST ESPLANADE
MANLY, NSW

16 March 2016
Ref: 29060Vrpt.rev1-Manly

AS/NZS ISO 9001
Certified
Davis Langdon Certification Services

JK Geotechnics
GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

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Date: 16 March 2016
Report No: 29060Vrpt.rev1-Manly
Revision No: 1

Report prepared by:

Fernando Vega
Senior Associate Geotechnical Engineer

And by:

Owen Fraser
Geotechnical Engineer

For and on behalf of
JK GEOTECHNICS
PO Box 976
NORTH RYDE BC NSW 1670

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This Report has been prepared pursuant to a contract between JK and its Client and is therefore subject to:

a) JK's proposal in respect of the work covered by the Report;

b) the limitations defined in the Client's brief to JK;

c) the terms of contract between JK and the Client, including terms limiting the liability of JK.

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TABLE OF CONTENTS

1 INTRODUCTION

JK Geotechnics (JKG) have been commissioned by Aspiring Properties Pty Ltd, in consultation with the project manager, Mr Steve Schinagel of Belbore Project Management, to carry out a geotechnical investigation of the site for a proposed mixed use development at 6 The Corso and 50 East Esplanade, Manly, NSW. The investigation was carried out in accordance to the scope set out in JKG proposal, Ref: P41171S.

The site is mapped within G3 area of the Manly Council Development Control Plan (DCP 2013), which replaces the DCP for Landslip and Subsidence 2001 (in which the site would be classified as Zone D, since site topography is 'beach, foredune or alluvial flats'). Hence, this geotechnical report aims to comply with the requirements of the Council's DCP and Development Consent 46/2012, Conditions 9 and 10, supplementing, including providing site specific subsurface information, on the DA stage Preliminary Geotechnical Report (Ref. 72799 dated 15 February 2012), which was based on a desk study assessment.

The scope of the investigation was limited to providing the following information, comments and recommendations, based on subsurface information obtained from four boreholes and tests completed within the site itself, and from research of relevant geotechnical and geological information contained in our files on nearby sites and the geological map:

1. Detailed logs of the boreholes, penetration test results and groundwater observations;
2. Interpretation of Subsurface Profile;
3. Principal Geotechnical Issues for the Development on this Site;
4. Dilapidation Surveys and Neighbouring Structures;
5. Excavation Methodology;
6. Groundwater Considerations and Drainage
7. Retention Systems;
8. Lateral Pressures;
9. Suitable footings and foundation strata;
10. Further Geotechnical Work post demolition and during construction.

The geotechnical investigation was carried out in conjunction with a preliminary acid sulphate and waste classification assessment carried out by JKG environmental division, Environmental Investigation Services (EIS). These results are presented in a separate EIS report Ref. E29060KD.

1.1 Proposed Development

Based on the drawings, we understand that it is intended to demolish the existing building and construct a five-storey building over a single basement level. The ground floor is proposed close to existing site surface at RL5m AHD. The basement level is proposed to be at RL 1.5m AHD. The basement will cover almost the entire area of No.6 The Corso portion of the site. It is estimated that excavations down to about 3.5m below prevailing ground surface would be required to achieve the basement level. The existing facades to The Corso and to East Esplanade are proposed to be retained as part of the development.

Supplied preliminary structural drawings (refer Item 2 below) show proposed façade and excavation support; these drawings will have to be reviewed by the structural engineer to incorporate the recommendations provided later in this report. The structural loads from the proposed development were not shown on the preliminary structural drawings but typical column loads in the moderate to high range have been assumed to apply for this type of development.

The above information is based on the following supplied drawings:

1. Drawings prepared by Wolski Coppin Architecture, Ref. 21107-S962 to S9615, dated November 2012.
2. Preliminary Structural Drawings by James Taylor & Associates Project 5600, Nos. S03 to S06, Rev A, dated March 2014.

2 INVESTIGATION PROCEDURE

The investigation included the following:

- Completion of four boreholes and Dynamic Cone Penetration tests on 9 February 2016 within the proposed basement area down to maximum depths of 6m below existing ground surface; the test locations are shown on attached Figure 1, which is based on the proposed ground floor of the development, and these were set out by taped measurements from existing surface features and boundary walls of the existing site building. The test borehole locations were agreed during a pre-commencement site meeting on 12 January 2016 between Daniel Robertson, General Manager-Operations, of ICMS, Steve Schinagel of Belbore Project Management and Fernando Vega of JKG.
- Review of the preliminary report, Ref. 72799, based on a desk study completed for DA on 15 February 2012 for the same development; this report contained geotechnical information from adjoining eastern (Coles) site at 8-28 The Corso.

- Review of JKG geotechnical reports containing information from deep boreholes and cone penetration tests (carried down to as much as 25.9m below existing ground surface) at 41-42 East Esplanade (Ref.16011VT2), 46-52 The Corso (Ref.27881SB), 22 Victoria Pde. (Ref.28431SB) and 46 Victoria Pde. (Ref.23960ZRrpt2).

Due to access constraints, the geotechnical subsurface testing was limited to hand operated equipment and comprised the drilling of four boreholes down to refusal at maximum depth of 1.1m and Dynamic Cone Penetration (DCP) tests carried down to maximum depth of 6m below the surface of the existing concrete floor slab at No. 6 The Corso. The purpose of the DCP tests was to interpret the degree of compaction/relative density of the fill and underlying natural sands. Soil samples were obtained from the boreholes for examination/testing by EIS for their waste classification and acid sulphate assessment.

Groundwater observations were made in the boreholes during and on completion of drilling. The DCP rods were observed for water marks on extraction. Longer term monitoring for groundwater was not undertaken.

JKG geotechnical engineer, Owen Fraser, was present full-time during the field work to nominate testing and sampling, and to prepare the borehole logs and record the DCP test results. The borehole logs and DCP test results are attached, together with a set of explanatory notes, which describe the investigation techniques, their limitations and define the logging terms and symbols used.

3 RESULTS OF INVESTIGATION

3.2 Site Description

The site lies in relatively flat coastal topography situated in a low-lying area between Manly Cove and the Pacific Ocean. Manly Cove is located approximately 50 m to the south-west of the site. The site itself is an L-shaped lot with a plan area of approximately 650 m^2 and an about 20m long north-western frontage to The Corso and an about 7m long south-western frontage to East Esplanade. The site surface appears to be relatively level at around RL5m AHD.

At the time of investigation, the site contained a two to three storey brick building that appeared in good condition with no visible defects based upon a cursory external and internal ground level inspection. The building footprint appeared to extend to all boundaries except at the rear of the building along the south-eastern boundary where a narrow outdoor area exists. The outdoor area comprised of concrete pavement that appeared in moderate condition with some cracking up to 5mm wide observed. The internal tiled and concrete floors appeared in good condition with no visible defects.

The Corso comprises of pavers that appear in good condition and with some localised slopes for drainage purposes. East Esplanade comprises of asphaltic concrete (AC) pavement that appears in good condition based upon a cursory inspection from the roadside.

The abutting north-eastern boundary, at No.8 The Corso, is the Coles supermarket building of brick and concrete with several levels including a one level of basement, which is reported to be at RL2m and that the building is supported on piles (although this could not be confirmed on the day of fieldwork). This cement rendered building appears in good condition with no visible defects based upon a cursory inspection form the street frontage. The neighbouring north-western property at No. 4 The Corso consists of a two to three storey brick building. It is understood that the building has no basement. The adjacent south-eastern properties contained a multi-storey building that partially abuts and also set back about 2m from the common boundary. It is reported that the building has no basement and that the building may be supported on piles (although this could not be confirmed on the day of fieldwork). Observations were limited to due to access restraints.

3.3 Geology and Subsurface Conditions

Reference to the Sydney 1:100,000 Geological Series Sheet indicates that the site is underlain by medium to fine grained marine sand deposits with Hawkesbury Sandstone at considerable depth. The site specific boreholes and past investigations by JKG and other consultants on the surrounding areas confirmed the presence of deep sandy soils.

The four boreholes, BHs 1 to 4, penetrated the concrete floor slab at No.6 The Corso, which was determined to be of 140mm to 190mm thickness. Below the concrete fill was encountered to the termination (due to borehole side collapse) or hand auger refusal depths ranging from 0.4m to 1.1m. The fill predominantly comprised silty sand with varying content of sandstone gravel, brick and steel fragments. Based on the DCP test values, the fill was assessed to be poorly compacted. Reference should be made to the borehole logs for detailed descriptions of the subsurface conditions encountered at each borehole.

The DCP tests were more successful in penetrating deeper than the hand augered boreholes. DCPs 1 to 4 penetrated to depths in the range of 5.8m to 6m with exception of DCP 2 which encountered shallow refusal in obstruction within the fill profile at a depth of 0.45m.

We know from our research of other properties (adjoining the site and nearby- refer to Section 2) that the fill is underlain by a natural marine soil profile of predominantly sandy nature. The determined and inferred geotechnical model for the site may be described as follows:

- Fill to at least 1.1m but most likely deeper;
- Natural Sands of very loose to loose relative density to depths of 4.6m in DCP 1, 4.4m in DCP 3 and 5.4m in DCP 4;
- Deep Electrical Friction Cone Penetration (EFCP) tests and boreholes (down to as much as 25.9m at the adjoining site to the rear (Nos. 41-42 East Esplanade) disclosed the natural sands to contain very dense gravelly layers or cemented bands in places, as well as loose density layers were found at 6.4m to 6.9m and generally between depths of 13m and 15m;
- The particle size distribution tests completed on recovered soil samples at the above mentioned site at the rear indicated the natural sands were fine to medium grained with only 1% to 2% of the material finer than 0.075mm; such sands would be expected to have a moderate permeability;
- Hawkesbury sandstone probably at depths in excess of 50 m;
- Groundwater was not encountered in the boreholes drilled at the subject site but the DCP rods were noted to have water marks at around depths of 5m; this depth similar to water levels encountered at nearby sites of approximately 5 m (typically RL0.5 m to RL1.0 m). Within the standpipe installed in one borehole at a nearby site, groundwater was measured 2 hours after completion at a depth of 5.3m and 9 days after completion at a depth of 5.4m. Groundwater levels will fluctuate with climatic conditions and to lesser extent due to tidal influences, and are likely to increase following periods of extended wet weather.

4 COMMENTS AND RECOMMENDATIONS

4.1 Additional Geotechnical Investigation

Due to the existing building on the site access for this geotechnical investigation was limited to the use of portable drilling equipment of limited depth reach. Therefore, we recommend that following demolition an additional geotechnical investigation should be carried out to assess the subsurface conditions in particular conditions below the proposed basement level and below proposed pile foundation levels. The final extent of the additional geotechnical investigation required will depend on the footing system adopted, but piles would be the preferred and recommended footing system and it is important that sufficient deep investigations are carried out to assess the density of the sand throughout the site to guide pile design and construction.

Due to the sand profile, the most appropriate investigation of the site would comprise Electrical Friction Cone Penetrometer (EFCP) tests, but such testing requires a large truck mounted rig and given the apparent restricted access for a large rig into the site, this would to be carefully considered and planned. Therefore, the investigation may need to comprise the drilling of boreholes with SPT or Solid Cone testing equipment using a smaller crawler mounted rig that has sufficient depth reach.

The additional work should also include installation of two slotted PVC standpipes to allow measurement and monitoring of groundwater levels and potential fluctuations.

We recommend that at least three additional boreholes and/or EFCPTs be drilled/tested following demolition of the existing building and provision of rig access. The comments and recommendations provided herein may be used for structural design, but must be further confirmed following completion of the additional boreholes, which have a deeper penetration depth into the subsurface profile.

The recommendations provided in this report should be reviewed following the additional geotechnical work. The preliminary structural drawings (refer Section 1.1, Item 2), which show proposed façade and excavation support, should be reviewed by the structural engineer to incorporate the findings of this investigation and recommendations provided in this report. It is likely that further advice/input will be required during the structural design to address issues that may not have been addressed in this report. To some degree, this is an "iterative" process between evaluation of the geotechnical site conditions and the structural design.

It will be essential during earthworks and construction works that geotechnical inspections be commissioned to check initial assumptions about excavation, subgrade and foundation conditions and possible variations that may occur between inspected and tested locations and to provide further relevant geotechnical advice. Irregular or 'milestone' inspections by a geotechnical engineer are often not adequate for earthworks and foundation works. It is recommended that the Client be made aware of the need to commission a geotechnical engineer for regular frequent inspections. The comments provided in this report should be reviewed following these inspections.

4.2 <u>Support of Existing Façades and Dilapidation Surveys</u>

The existing façades of the building along The Corso and East Esplanade will need to be supported during demolition, excavation and construction of the new building. The structural engineer will need to determine the propping required to support the façades prior and during excavation and construction. Such a determination has been done in March 2014 on a preliminary basis by the structural engineer, James Taylor & Associates, which is shown on their Preliminary Structural Drawings (refer to Section 1.1, Item 2). The support concept, essential 'jet grouting' underpins/walls, shown on these structural drawings may not be sufficiently rigid to reduce excavation induced movements, and, hence, we prefer and recommend the use of support system of a more rigid, closed system such as a secant pile wall (refer to Section 4.4). Perhaps, a combination of both systems may be incorporated. The preliminary structural drawings should be reviewed by the structural engineer to incorporate the findings of this investigation and recommendations provided in this report.

The existing footing details are not known, but we expect that they would comprise shallow footings founded within the sand. Care in detailing and construction of the basement and its excavation will have to be implemented so not to undermine or render unstable the existing footings. However, there will be a risk of differential settlement between the existing façade and the new building as the new building will be supported on piled footings founded within the deeper sand. To assess this risk, we recommend that test pits be excavated following demolition to expose the existing footings and to confirm the foundation material. Testing, such as DCP testing, should be carried out to assess the density of the sand below the footings. Based on these investigations movement joints may need to be incorporated between the façades and the new building to allow for differential movement.

Another issue that should be considered is the risk of vibration induced by construction equipment resulting in settlement below the existing footings, both for the remaining façades and the adjoining buildings. If the footings are founded within loose sand then this settlement can be significant and the demolition and excavation work should be carried out in a way that limits vibrations. Demolition must be carried out with care so that large pieces are not allowed to fall and we do not recommend the use of hydraulic rock hammers for the demolition work. In addition, sudden stop/start movements of tracked plant should be avoided to also limit vibrations.

Dilapidation surveys should be completed on the adjoining buildings prior to demolition to provide a benchmark for claims for damage during the work. The dilapidation surveys should include detailed inspections of the buildings both externally and internally, with all defect rigorously described, i.e. defect type, defect location, crack width, crack length, etc. The respective owners of the adjoining buildings should be asked to confirm that the dilapidation reports represent a fair record of actual conditions.

4.3 Excavation and Groundwater

Excavation and retention recommendations provided in the subsequent subsections of this report should be complemented by reference to most current version of 'Excavation Work – Code of Practice' by Safe Work Australia.

Excavation to the required depths of about 3.5m (as estimated to achieve proposed basement floor level at RL1.5m AHD) will encounter fill and natural sand. Such soils will be able to be excavated using conventional excavation equipment, such as the buckets of hydraulic excavators. It is important to note that the existing fill is a potentially variable material from unknown origins and may contain large inclusions and obstacles which could affect future construction. Such inclusions may not have been encountered within our boreholes of relatively small diameter (about 100mm). Such inclusions can produce significant construction difficulties and delays. Variations in fill quality/nature should be anticipated. Reference is recommended to the EIS report in regards to waste classification and acid sulphate.

Groundwater was not encountered within the boreholes drilled at the site but water marks were noted at depths of 5m on retrieval of the DCP rods; this depth similar to water levels encountered at nearby sites of approximately 5 m (typically RL0.5 m to RL1.0 m). Hence, it is anticipated that excavations to RL1.5 m will be approximately 0.5 m to 1 m above the normal groundwater level. Experience with sites underlain by sand indicate that short term fluctuations in groundwater levels of at least 1 m can occur during periods of heavy rainfall which could result in the groundwater level being close to the excavation depth. It is anticipated that temporary dewatering will generally not be required to lower the groundwater level to allow construction of the basement. Some localised dewatering may be required for isolated deeper excavations (i.e. lift pits) and possibly to control groundwater during periods of prolonged and heavy rainfall. If wet sand conditions are encountered in the deeper areas then it will make it difficult to properly prepare the subgrade for construction of a slab-on-grade basement floor slab. Therefore, dewatering of the excavation will be required to allow construction in the 'dry'. The need for dewatering will need to be reassessed following geotechnical investigation and review of the proposed bulk excavation levels.

Detailed and longer term groundwater monitoring (refer to Section 4.1) should be carried prior to detailed structural design and construction in order to confirm the groundwater level and to establish likely variations in groundwater levels. The monitoring should also assist with the decision whether or not the basement needs to be tanked and designed for hydrostatic uplift associated with potential short term and long term rises in the groundwater table.

4.4 Retention and Excavation Induced Movements

The basement excavation will require both temporary and permanent support and the most suitable support system would be a closed, rigid system such as a secant pile wall. A contiguous pile wall might also be suitable, but not preferred by us, and will require close inspection and rapid progressive infilling of any voids exposed during excavation and between adjacent piles. This infilling can be completed with special chemical grout, mortar or shotcrete. The infilling between the piles is to prevent erosion and the flow of sand from outside the piles with consequent subsidence of the ground behind the piles. The contiguous pile wall would require more extensive offsite dewatering if higher levels of water than anticipated are encountered. Bored piers would not be suitable for this site due to the sandy soils and auger, grout injected (CFA) piles should be used. The use of conventional steel sheet piling is not recommended due to high risk of damage to adjoining structures due to ground vibrations.

Cantilevered pile walls may be adopted, but along critical boundaries where it is important to reduce excavation induced movements, we advise the use of the more rigid wall system of propped pile walls (assuming soil tie back anchors would not be feasible), which are designed for a higher lateral earth pressure. One propping solution would be to use top down construction whereby the ground floor slab is poured prior to excavation being undertaken. This allows the upper section of the piles to be fully propped and therefore, undergo reduced movements.

Given the limited depth of these walls and their offset from existing structures, they may be designed as cantilevered walls based on a triangular earth pressure distribution. However, we recommend that this be used within a higher lateral earth pressure coefficient, K, of 0.6 and a bulk unit weight of 20kN/m^3. This coefficient assumes a horizontal backfill surface and if inclined backfill is proposed the coefficient should be increased or the inclined backfill taken as a surcharge load. All surcharge loads should be allowed for in the design, plus full hydrostatic loads, unless measures are undertaken to provide complete and permanent drainage behind the walls.

The passive toe resistance of the cantilevered wall may be estimated using K_P equal to 3 for the loose sand, 3.5 for the medium dense sand and 4.0 for the dense sand (but with a Factor of Safety of at least 2). These resistance values assume excavation is not carried within the zone of influence of the wall toe. The upper 0.5m depth of the socket should not be taken into account to allow for disturbance effects during excavation.

It is inevitable that the excavation will induce movements of the adjacent ground that falls within the area of influence of the excavation. The objective with properly engineered shoring and retention systems is to keep the movements within tolerable limits. In the sandy subsoils, lateral movements even for a relative 'stiff' or rigid cantilever wall (constructed with good workmanship) could possibly be in the order of 1 % of the excavated depth. The actual wall movements are highly dependent on the construction sequence, detailing and quality of installation, and should be closely monitored in critical areas. The extent of significant influence can be defined as extending a horizontal distance from the excavation perimeter equal to at least twice the excavation depth. Hence, any existing adjoining structures, or buried services which fall within this area of influence of the excavations should be assessed for risks of damage due to excavation induced movements. These movements could still be of the order of 0.1% to 0.2% for a propped wall designed using a higher lateral pressure distribution (together with surcharge and hydrostatic pressures).

We recommend that only experienced contractors, with appropriate insurances, be considered for retaining/shoring wall construction. The design and/or construction specification should include direct references to the necessary safeguards and possibly prescribe the methodology of undertaking these works. Since there are a number of options in undertaking the works, the methodology of any alternative should be agreed and documented with the successful contractor prior to the signing of contracts to safeguard against misunderstandings or hidden costs.

4.5 Footings and Bearing Pressures

Given the likely moderate to high column loads, the building will need to be supported on deep piled footings. Suitable pile types will be limited and piling will not be without risks. Bored piers would not be suitable for this site due to the sandy soils and auger, grout injected (CFA) piles should be used. The proposed building may possibly be supported by a thick piled raft comprising a heavily reinforced, stiffened slab footing system with piles introduced into the raft to reduce raft settlements. However, detailed analysis and design, which considers soil-structure interaction using a layered soil model and elastic modulus values, must be undertaken to confirm the degree of stiffening required (i.e. spacing of integrated in-ground beams, etc.) for the raft. We can complete analysis of rafts using a computer based program if commissioned.

Assuming that the subsurface conditions within the entire site are similar to those encountered within the current boreholes, natural sand of loose relative density will be exposed within the basement excavation, but fill will be present below the areas outside of the basement. The portion of the structure outside of the basement will need to be supported on piles so that it is supported on footings founded below the zone of influence of the basement excavation and not on the existing fill. Therefore, to provide uniform support, we recommend that the entire structure be supported on piles founded within the natural sand of medium dense relative density. Such sand was encountered at depths of 4.4m-5.4m in DCPs 3 to 4. However, deep Electrical Friction Cone Penetration (EFCP) tests at the adjoining site to the rear (Nos. 41-42 East Esplanade) disclosed the natural sands to still contain loose density layers at 6.4m to 6.9m and then generally between depths of 13m and 15m.

The allowable bearing pressure of piles founded within sands is dependent on the relative density of the sands, the embedment depth, and the pile diameter. All these factors would need to be taken into account during the design of the piles. As a guide, for piles of at least 0.45m diameter founded within sands of medium dense relative density, with a pile embedment depth of at least 3.5m below the bulk excavation level an allowable end bearing pressure of 700kPa-800kPa would be appropriate. Where piles of at least 0.6m diameter are used, with an embedment depth of at least 4m, an allowable end bearing pressure of 800kPa-900kPa would be appropriate. For grout injected piles, an allowable shaft adhesion value of 10kPa may also be adopted for sockets formed in the medium dense or dense sands under compressive vertical loading. The adhesion value may be increased to 20kPa for the medium dense or dense sands where sockets are greater 6m.

Pile settlements should be assessed once pile layouts and loadings have been confirmed. If relatively heavy column loads are expected, the use of pile groups would probably be required with minimum pile spacing adopted from AS2159.

4.6 Floor Slabs and Drainage

Variable subgrade conditions will be exposed within the site, with natural sand within the basement excavation and potentially existing fill outside of the excavation. If the fill outside of the excavation is only shallow it may be able to be compacted to allow placement of the new floor slab. However, if the fill is quite deep adequate compaction may not be able to be achieved. Excavation and replacement of the fill may not be possible as this may undermine the footings of the façade or the adjoining buildings. Therefore, the floor slab outside of the basement may need to be designed as a fully suspended slab supported on the piled footing system. The depth of the fill within the site should be assessed during the additional geotechnical investigation and final advice on subgrade preparation provided then.

Where the natural sands are exposed the subgrade should be inspected by a geotechnical engineer and the subgrade proof rolled. The purpose of the proof rolling is to compact the surface sands that would have been loosened during excavation and to detect any weak subgrade areas. A subbase layer of good quality granular material (e.g. fine crushed rock RTA Specification 3051 unbound base or equivalent) of say 100mm thickness should be placed over the sand subgrade and below the basement slab. The sub-base should be compacted with rollers to a minimum density of 100% of SMDD.

Although the groundwater levels are inferred to be below the base of the proposed excavations, allowance should be made for drainage below the basement slab to control any seepage or rise in groundwater level. In addition, hydrostatic relief valves should be provided within the slab in case groundwater levels rise above the basement level. Appropriate and effective waterproofing of the basement will be required. Alternatively, the slab could be designed to resist hydrostatic uplift pressures.

5 GENERAL COMMENTS

The recommendations presented in this report include specific issues to be addressed during the construction phase of the project. As an example, special treatment of soft spots may be required as a result of their discovery during proof-rolling, etc. In the event that any of the construction phase recommendations presented in this report are not implemented, the general recommendations may become inapplicable and JK Geotechnics accept no responsibility whatsoever for the performance of the structure where recommendations are not implemented in full and properly tested, inspected and documented.

Occasionally, the subsurface conditions between the completed boreholes may be found to be different (or may be interpreted to be different) from those expected. Variation can also occur with groundwater conditions, especially after climatic changes. If such differences appear to exist, we recommend that you immediately contact this office.

This report provides advice on geotechnical aspects for the proposed civil and structural design. As part of the documentation stage of this project, Contract Documents and Specifications may be prepared based on our report. However, there may be design features we are not aware of or have not commented on for a variety of reasons. The designers should satisfy themselves that all the necessary advice has been obtained. If required, we could be commissioned to review the geotechnical aspects of contract documents to confirm the intent of our recommendations has been correctly implemented.

This report has been prepared for the particular project described and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose. If there is any change in the proposed development described in this report then all recommendations should be reviewed. Copyright in this report is the property of JK Geotechnics. We have used a degree of care, skill and diligence normally exercised by consulting engineers in similar circumstances and locality. No other warranty expressed or implied is made or intended. Subject to payment of all fees due for the investigation, the client alone shall have a licence to use this report. The report shall not be reproduced except in full.

JK Geotechnics
GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

Borehole No.
1
1/1

Client: ICMS
Project: PROPOSED MIXED USE DEVEOPMENT
Location: 6 THE CORSO, MANLY, NSW

Job No. 29060V **Method:** HAND AUGER **R.L. Surface:** N/A
Date: 9-6-16 **Datum:**
Logged/Checked by: O.F./F.V.

Groundwater Record	SAMPLES ES	U50	DB	DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION					REFER TO DCP TEST RESULTS	0			CONCRETE: 165mm.t				5mm DIA. REINFORCEMENT, 115mm TOP COVER
	■					0.5		-	FILL: Silty sand, fine to medium grained, brown, trace of fine to medium grained sandstone gravel.	D			APPEARS POORLY COMPACTED
	■					1							
						1.5			END OF BOREHOLE AT 1.1m				BOREHOLE COLLAPSE
						2							
						2.5							
						3							
						3.5							

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BOREHOLE LOG

Borehole No.
2
1/1

Client: ICMS
Project: PROPOSED MIXED USE DEVEOPMENT
Location: 6 THE CORSO, MANLY, NSW

Job No. 29060V **Method:** HAND AUGER **R.L. Surface:** N/A
Date: 9-6-16 **Datum:**
Logged/Checked by: O.F./F.V.

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION					REFER TO DCP TEST RESULTS	0			CONCRETE: 190mm.t				5mm DIA. REINFORCEMENT, 150mm TOP COVER
	■							-	FILL: Silty sand, fine to medium grained, brown and dark brown.	D			APPEARS POORLY COMPACTED
						0.5			END OF BOREHOLE AT 0.45m				HAND AUGER REFUSAL ON OBSTRUCTION IN FILL (APPEARED TO BE CONCRETE)
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

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BOREHOLE LOG

Borehole No.
3
1/1

Client: ICMS
Project: PROPOSED MIXED USE DEVEOPMENT
Location: 6 THE CORSO, MANLY, NSW

Job No. 29060V **Method:** HAND AUGER **R.L. Surface:** N/A
Date: 9-6-16 **Datum:**
Logged/Checked by: O.F./F.V.

Groundwater Record	SAMPLES ES	U50	DB	DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION					REFER TO DCP TEST RESULTS	0			CONCRETE: 150mm.t				5mm DIA. REINFORCEMENT, 120mm TOP COVER
								-	FILL: Silty sand, fine to medium grained, brown, trace of fine to medium grained sandstone gravel and brick fragments.	D			APPEARS POORLY COMPACTED
						0.5							
						1			END OF BOREHOLE AT 1.0m				BOREHOLE COLLAPSE
						1.5							
						2							
						2.5							
						3							
						3.5							

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BOREHOLE LOG

Borehole No.
4
1/1

Client: ICMS
Project: PROPOSED MIXED USE DEVEOPMENT
Location: 6 THE CORSO, MANLY, NSW

Job No. 29060V **Method:** HAND AUGER **R.L. Surface:** N/A
Date: 9-6-16 **Datum:**
Logged/Checked by: O.F./F.V.

Groundwater Record	SAMPLES ES	U50	DB	DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLET-ION					REFER TO DCP TEST RESULTS	0			CONCRETE: 140mm.t				NO OBSERVED REINFORCEMENT
	■							-	FILL: Gravelly sand, fine to coarse grained, fine to coarse grained sandstone gravel, with brick and steel fragments.	M			APPEARS POORLY COMPACTED
						0.5			END OF BOREHOLE AT 0.4m				HAND AUGER REFUSAL ON OBSTRUCTION IN FILL
						1							
						1.5							
						2							
						2.5							
						3							
						3.5							

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GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

DYNAMIC CONE PENETRATION TEST RESULTS

Client:	ICMS		
Project:	PROPOSED MIXED USE DEVELOPMENT		
Location:	6 THE CORSO, MANLY, NSW		
Job No.	29060V	Hammer Weight & Drop: 9kg/510mm	
Date:	9-2-16	Rod Diameter: 16mm	
Tested By:	O.F.	Point Diameter: 20mm	

Number of Blows per 100mm Penetration

Test Location				Test Location			
Depth (mm)	1	2	3	Depth (mm)	1	2	3
0 - 100	EXCAVATED	EXCAVATED	EXCAVATED	3000-3100	2		2
100 - 200				3100-3200	2		2
200 - 300			3	3200-3300	2		2
300 - 400		1	2	3300-3400	2		2
400 - 500	1	2/50mm	2	3400-3500	2		3
500 - 600	1	REFUSAL	4	3500-3600	2		3
600 - 700	2	ON	2	3600-3700	2		3
700 - 800	1	OBSTRUCTION	2	3700-3800	2		4
800 - 900	1		3	3800-3900	2		4
900 - 1000	2		2	3900-4000	2		3
1000 - 1100	2		2	4000-4100	2		2
1100 - 1200	2		3	4100-4200	2		2
1200 - 1300	2		7	4200-4300	2		2
1300 - 1400	2		8	4300-4400	2		3
1400 - 1500	2		5	4400-4500	2		6
1500 - 1600	2		6	4500-4600	4		10
1600 - 1700	2		5	4600-4700	9		10
1700 - 1800	2		5	4700-4800	15		8
1800 - 1900	2		5	4800-4900	16		7
1900 - 2000	2		3	4900-5000	14		6
2000 - 2100	1		3	5000-5100	21		6
2100 - 2200	2		3	5100-5200	26/80mm		7
2200 - 2300	1		2	5200-5300	REFUSAL		6
2300 - 2400	2		3	5300-5400			6
2400 - 2500	2		3	5400-5500			7
2500 - 2600	2		3	5500-5600			6
2600 - 2700	2		2	5600-5700			12
2700 - 2800	2		2	5700-5800			15
2800 - 2900	1		3	5800-5900			15
2900 - 3000	2		2	5900-6000			END

Remarks:
1. The procedure used for this test is similar to that described in AS1289.6.3.2-1997, Method 6.3.2.
2. Usually 8 blows per 20mm is taken as refusal.
3. DCP1 No water marks on rods.
4. DCP3 Water mark on rods from 5m depth.

Ref: JK Geotechnics DCP 0-6m July 2012

JK Geotechnics

GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

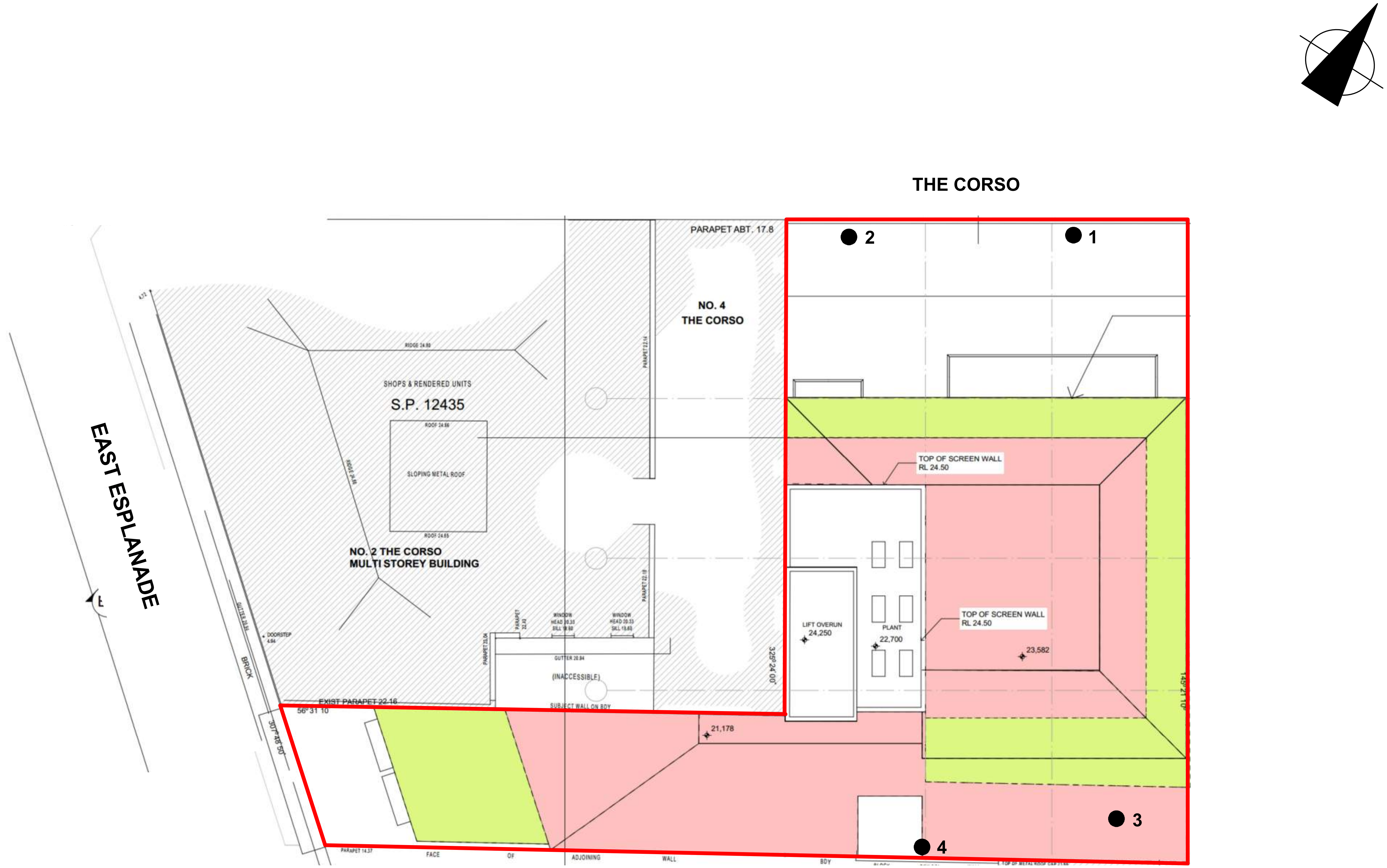
DYNAMIC CONE PENETRATION TEST RESULTS

Client:	ICMS		
Project:	PROPOSED MIXED USE DEVELOPMENT		
Location:	6 THE CORSO, MANLY, NSW		
Job No.	29060V	Hammer Weight & Drop: 9kg/510mm	
Date:	9-2-16	Rod Diameter: 16mm	
Tested By:	O.F.	Point Diameter: 20mm	

Number of Blows per 100mm Penetration

Test Location				Test Location			
Depth (mm)	4			Depth (mm)	4		
0 - 100	EXCAVATED			3000-3100	1		
100 - 200	↓			3100-3200	2		
200 - 300	↓			3200-3300	1		
300 - 400	↓			3300-3400	2		
400 - 500	↓			3400-3500	2		
500 - 600	1			3500-3600	4		
600 - 700	1			3600-3700	2		
700 - 800	1			3700-3800	1		
800 - 900	1			3800-3900	2		
900 - 1000	1			3900-4000	2		
1000 - 1100	1			4000-4100	1		
1100 - 1200	1			4100-4200	1		
1200 - 1300	↓			4200-4300	1		
1300 - 1400	1			4300-4400	1		
1400 - 1500	↓			4400-4500	2		
1500 - 1600	1			4500-4600	2		
1600 - 1700	2			4600-4700	2		
1700 - 1800	2			4700-4800	2		
1800 - 1900	2			4800-4900	5		
1900 - 2000	2			4900-5000	6		
2000 - 2100	3			5000-5100	4		
2100 - 2200	3			5100-5200	3		
2200 - 2300	2			5200-5300	3		
2300 - 2400	2			5300-5400	3		
2400 - 2500	2			5400-5500	6		
2500 - 2600	2			5500-5600	5		
2600 - 2700	3			5600-5700	5		
2700 - 2800	3			5700-5800	5		
2800 - 2900	2			5800-5900	6		
2900 - 3000	2			5900-6000	6 END		

Remarks:
1. The procedure used for this test is similar to that described in AS1289.6.3.2-1997, Method 6.3.2.
2. Usually 8 blows per 20mm is taken as refusal.
3. DCP4 Water mark on rods from 5m depth.



LEGEND

● BOREHOLE AND DCP TEST

Scale (m): 0 — 10	JK Geotechnics GEOTECHNICAL & ENVIRONMENTAL ENGINEERS	
Title: INVESTIGATION LOCATION PLAN	Report Number: 29060V	Figure Number: 1

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REPORT EXPLANATION NOTES

INTRODUCTION

These notes have been provided to amplify the geotechnical report in regard to classification methods, field procedures and certain matters relating to the Comments and Recommendations section. Not all notes are necessarily relevant to all reports.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Geotechnical engineering involves gathering and assimilating limited facts about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such facts obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, the SAA Site Investigation Code. In general, descriptions cover the following properties – soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the predominating particle size and behaviour as set out in the attached Unified Soil Classification Table qualified by the grading of other particles present (e.g. sandy clay) as set out below:

Soil Classification	Particle Size
Clay	less than 0.002mm
Silt	0.002 to 0.075mm
Sand	0.075 to 2mm
Gravel	2 to 60mm

Non-cohesive soils are classified on the basis of relative density, generally from the results of Standard Penetration Test (SPT) as below:

Relative Density	SPT 'N' Value (blows/300mm)
Very loose	less than 4
Loose	4 – 10
Medium dense	10 – 30
Dense	30 – 50
Very Dense	greater than 50

Cohesive soils are classified on the basis of strength (consistency) either by use of hand penetrometer, laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Unconfined Compressive Strength kPa
Very Soft	less than 25
Soft	25 – 50
Firm	50 – 100
Stiff	100 – 200
Very Stiff	200 – 400
Hard	Greater than 400
Friable	Strength not attainable – soil crumbles

Rock types are classified by their geological names, together with descriptive terms regarding weathering, strength, defects, etc. Where relevant, further information regarding rock classification is given in the text of the report. In the Sydney Basin, 'Shale' is used to describe thinly bedded to laminated siltstone.

SAMPLING

Sampling is carried out during drilling or from other excavations to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content, minor constituents and, depending upon the degree of disturbance, some information on strength and structure. Bulk samples are similar but of greater volume required for some test procedures.

Undisturbed samples are taken by pushing a thin-walled sample tube, usually 50mm diameter (known as a U50), into the soil and withdrawing it with a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application. All except test pits, hand auger drilling and portable dynamic cone penetrometers require the use of a mechanical drilling rig which is commonly mounted on a truck chassis.

Test Pits: These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for an excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling: A borehole of 50mm to 100mm diameter is advanced by manually operated equipment. Premature refusal of the hand augers can occur on a variety of materials such as hard clay, gravel or ironstone, and does not necessarily indicate rock level.

Continuous Spiral Flight Augers: The borehole is advanced using 75mm to 115mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling and insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the auger flights, but they can be very disturbed and layers may become mixed. Information from the auger sampling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability due to mixing or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table is of even lesser reliability than augering above the water table.

Rock Augering: Use can be made of a Tungsten Carbide (TC) bit for auger drilling into rock to indicate rock quality and continuity by variation in drilling resistance and from examination of recovered rock fragments. This method of investigation is quick and relatively inexpensive but provides only an indication of the likely rock strength and predicted values may be in error by a strength order. Where rock strengths may have a significant impact on construction feasibility or costs, then further investigation by means of cored boreholes may be warranted.

Wash Boring: The borehole is usually advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from “feel” and rate of penetration.

Mud Stabilised Drilling: Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilise the borehole. The term ‘mud’ encompasses a range of products ranging from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is only possible from intermittent intact sampling (eg from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling: A continuous core sample is obtained using a diamond tipped core barrel. Provided full core recovery is achieved (which is not always possible in very low strength rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation. In rocks, an NMLC triple tube core barrel, which gives a core of about 50mm diameter, is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as CORE LOSS. The location of losses are determined on site by the supervising engineer; where the location is uncertain, the loss is placed at the top end of the drill run.

Standard Penetration Tests: Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils as a means of indicating density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, “Methods of Testing Soils for Engineering Purposes” – Test F3.1.

The test is carried out in a borehole by driving a 50mm diameter split sample tube with a tapered shoe, under the impact of a 63kg hammer with a free fall of 760mm. It is normal for the tube to be driven in three successive 150mm increments and the ‘N’ value is taken as the number of blows for the last 300mm. In dense sands, very hard clays or weak rock, the full 450mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form:

- In the case where full penetration is obtained with successive blow counts for each 150mm of, say, 4, 6 and 7 blows, as

  N = 13
  4, 6, 7

- In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150mm and 30 blows for the next 40mm, as

  N>30
  15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

Occasionally, the drop hammer is used to drive 50mm diameter thin walled sample tubes (U50) in clays. In such circumstances, the test results are shown on the borehole logs in brackets.

A modification to the SPT test is where the same driving system is used with a solid 60° tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid Cone Penetration Test (SCPT) are shown as "N_c" on the borehole logs, together with the number of blows per 150mm penetration.

Static Cone Penetrometer Testing and Interpretation: Cone penetrometer testing (sometimes referred to as a Dutch Cone) described in this report has been carried out using an Electronic Friction Cone Penetrometer (EFCP). The test is described in Australian Standard 1289, Test F5.1.

In the tests, a 35mm diameter rod with a conical tip is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the frictional resistance on a separate 134mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are electrically connected by wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20mm per second) the information is output as incremental digital records every 10mm. The results given in this report have been plotted from the digital data.

The information provided on the charts comprise:

- Cone resistance – the actual end bearing force divided by the cross sectional area of the cone – expressed in MPa.
- Sleeve friction – the frictional force on the sleeve divided by the surface area – expressed in kPa.
- Friction ratio – the ratio of sleeve friction to cone resistance, expressed as a percentage.

  The ratios of the sleeve resistance to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1% to 2% are commonly encountered in sands and occasionally very soft clays, rising to 4% to 10% in stiff clays and peats. Soil descriptions based on cone resistance and friction ratios are only inferred and must not be considered as exact.

Correlations between EFCP and SPT values can be developed for both sands and clays but may be site specific.

Interpretation of EFCP values can be made to empirically derive modulus or compressibility values to allow calculation of foundation settlements.

Stratification can be inferred from the cone and friction traces and from experience and information from nearby boreholes etc. Where shown, this information is presented for general guidance, but must be regarded as interpretive. The test method provides a continuous profile of engineering properties but, where precise information on soil classification is required, direct drilling and sampling may be preferable.

Portable Dynamic Cone Penetrometers: Portable Dynamic Cone Penetrometer (DCP) tests are carried out by driving a rod into the ground with a sliding hammer and counting the blows for successive 100mm increments of penetration.

Two relatively similar tests are used:

- Cone penetrometer (commonly known as the Scala Penetrometer) – a 16mm rod with a 20mm diameter cone end is driven with a 9kg hammer dropping 510mm (AS1289, Test F3.2). The test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various Road Authorities.
- Perth sand penetrometer – a 16mm diameter flat ended rod is driven with a 9kg hammer, dropping 600mm (AS1289, Test F3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.

LOGS

The borehole or test pit logs presented herein are an engineering and/or geological interpretation of the sub-surface conditions, and their reliability will depend to some extent on the frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will enable the most reliable assessment, but is not always practicable or possible to justify on economic grounds. In any case, the boreholes or test pits represent only a very small sample of the total subsurface conditions.

The attached explanatory notes define the terms and symbols used in preparation of the logs.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than "straight line" variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

Where groundwater levels are measured in boreholes, there are several potential problems:

- Although groundwater may be present, in low permeability soils it may enter the hole slowly or perhaps not at all during the time it is left open.
- A localised perched water table may lead to an erroneous indication of the true water table.
- Water table levels will vary from time to time with seasons or recent weather changes and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must be washed out of the hole or 'reverted' chemically if water observations are to be made.

More reliable measurements can be made by installing standpipes which are read after stabilising at intervals ranging from several days to perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg bricks, steel etc) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably determine the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse engineering characteristics or behaviour. If the volume and quality of fill is of importance to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing is normally carried out in accordance with Australian Standard 1289 *'Methods of Testing Soil for Engineering Purposes'*. Details of the test procedure used are given on the individual report forms.

ENGINEERING REPORTS

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building) the information and interpretation may not be relevant if the design proposal is changed (eg to a twenty storey building). If this happens, the company will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions – the potential for this will be partially dependent on borehole spacing and sampling frequency as well as investigation technique.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of persons or contractors responding to commercial pressures.

If these occur, the company will be pleased to assist with investigation or advice to resolve any problems occurring.

SITE ANOMALIES

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, the company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed that at some later stage, well after the event.

REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

Attention is drawn to the document *'Guidelines for the Provision of Geotechnical Information in Tender Documents'* , published by the Institution of Engineers, Australia. Where information obtained from this investigation is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. The company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Copyright in all documents (such as drawings, borehole or test pit logs, reports and specifications) provided by the Company shall remain the property of Jeffery and Katauskas Pty Ltd. Subject to the payment of all fees due, the Client alone shall have a licence to use the documents provided for the sole purpose of completing the project to which they relate. License to use the documents may be revoked without notice if the Client is in breach of any objection to make a payment to us.

REVIEW OF DESIGN

Where major civil or structural developments are proposed or where only a limited investigation has been completed or where the geotechnical conditions/ constraints are quite complex, it is prudent to have a joint design review which involves a senior geotechnical engineer.

SITE INSPECTION

The company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related.

Requirements could range from:

i) a site visit to confirm that conditions exposed are no worse than those interpreted, to

ii) a visit to assist the contractor or other site personnel in identifying various soil/rock types such as appropriate footing or pier founding depths, or

iii) full time engineering presence on site.

GRAPHIC LOG SYMBOLS FOR SOILS AND ROCKS

SOIL

- FILL
- TOPSOIL
- CLAY (CL, CH)
- SILT (ML, MH)
- SAND (SP, SW)
- GRAVEL (GP, GW)
- SANDY CLAY (CL, CH)
- SILTY CLAY (CL, CH)
- CLAYEY SAND (SC)
- SILTY SAND (SM)
- GRAVELLY CLAY (CL, CH)
- CLAYEY GRAVEL (GC)
- SANDY SILT (ML)
- PEAT AND ORGANIC SOILS

ROCK

- CONGLOMERATE
- SANDSTONE
- SHALE
- SILTSTONE, MUDSTONE, CLAYSTONE
- LIMESTONE
- PHYLLITE, SCHIST
- TUFF
- GRANITE, GABBRO
- DOLERITE, DIORITE
- BASALT, ANDESITE
- QUARTZITE

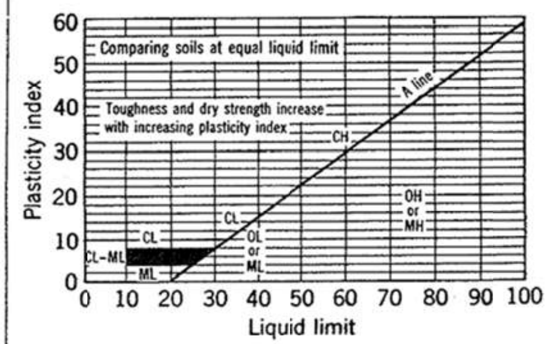
DEFECTS AND INCLUSIONS

- CLAY SEAM
- SHEARED OR CRUSHED SEAM
- BRECCIATED OR SHATTERED SEAM/ZONE
- IRONSTONE GRAVEL
- ORGANIC MATERIAL

OTHER MATERIALS

- CONCRETE
- BITUMINOUS CONCRETE, COAL
- COLLUVIUM

Major divisions			Field Identification Procedures (Excluding particles larger than 75 µm and basing fractions on estimated weights)			Group Symbols[a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria			
Coarse-grained soils More than half of material is *larger* than 75 µm sieve size[b] (The 75 µm sieve size is about the smallest particle visible to naked eye)	Gravels More than half of coarse fraction is larger than 4 mm sieve size	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes			*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses. For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics. Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles 12 mm maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	Use grain size curve in identifying the fractions as given under field identification	Determine percentages of gravel and sand from grain size curve. Depending on percentage of fines (fraction smaller than 75 µm sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP*; More than 12% *GM, GC, SM, SC*; 5% to 12% *Borderline* cases requiring use of dual symbols	$C_U = \frac{D_{60}}{D_{10}}$ Greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			Predominantly one size or a range of sizes with some intermediate sizes missing			*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines				Not meeting all gradation requirements for *GW*	
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)			*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures				Atterberg limits below "A" line, or *PI* less than 4	Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols
			Plastic fines (for identification procedures, see *CL* below)			*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures				Atterberg limits above "A" line, with *PI* greater than 7	
	Sands More than half of coarse fraction is smaller than 4 mm sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes			*SW*	Well graded sands, gravelly sands, little or no fines				$C_U = \frac{D_{60}}{D_{10}}$ Greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			Predominantly one size or a range of sizes with some intermediate sizes missing			*SP*	Poorly graded sands, gravelly sands, little or no fines				Not meeting all gradation requirements for *SW*	
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)			*SM*	Silty sands, poorly graded sand-silt mixtures				Atterberg limits below "A" line or *PI* less than 5	Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols
			Plastic fines (for identification procedures, see *CL* below)			*SC*	Clayey sands, poorly graded sand-clay mixtures				Atterberg limits below "A" line with *PI* greater than 7	
Fine-grained soils More than half of material is *smaller* than 75 µm sieve size	Identification Procedures on Fraction Smaller than 380 µm Sieve Size											
			Dry Strength (crushing character-istics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)							
	Silts and clays liquid limit less than 50		None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses. For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions. Example: *Clayey silt*, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)				
			Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays					
			Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity					
	Silts and clays liquid limit greater than 50		Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts					
			High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays					
			Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity					
Highly Organic Soils			Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils					



Plasticity chart
for laboratory classification of fine grained soils

Note: 1 Soils possessing characteristics of two groups are designated by combinations of group symbols (eg. GW-GC, well graded gravel-sand mixture with clay fines).
2 Soils with liquid limits of the order of 35 to 50 may be visually classified as being of medium plasticity.

LOG SYMBOLS

LOG COLUMN	SYMBOL	DEFINITION
Groundwater Record	▼	Standing water level. Time delay following completion of drilling may be shown.
	—C—	Extent of borehole collapse shortly after drilling.
	▶—	Groundwater seepage into borehole or excavation noted during drilling or excavation.
Samples	ES	Soil sample taken over depth indicated, for environmental analysis.
	U50	Undisturbed 50mm diameter tube sample taken over depth indicated.
	DB	Bulk disturbed sample taken over depth indicated.
	DS	Small disturbed bag sample taken over depth indicated.
	ASB	Soil sample taken over depth indicated, for asbestos screening.
	ASS	Soil sample taken over depth indicated, for acid sulfate soil analysis.
	SAL	Soil sample taken over depth indicated, for salinity analysis.
Field Tests	N = 17 4, 7, 10	Standard Penetration Test (SPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration. 'R' as noted below.
	N_c = 5 7 3R	Solid Cone Penetration Test (SCPT) performed between depths indicated by lines. Individual figures show blows per 150mm penetration for 60 degree solid cone driven by SPT hammer. 'R' refers to apparent hammer refusal within the corresponding 150mm depth increment.
	VNS = 25	Vane shear reading in kPa of Undrained Shear Strength.
	PID = 100	Photoionisation detector reading in ppm (Soil sample headspace test).
Moisture Condition (Cohesive Soils)	MC>PL	Moisture content estimated to be greater than plastic limit.
	MC≈PL	Moisture content estimated to be approximately equal to plastic limit.
	MC<PL	Moisture content estimated to be less than plastic limit.
(Cohesionless Soils)	D	DRY – Runs freely through fingers.
	M	MOIST – Does not run freely but no free water visible on soil surface.
	W	WET – Free water visible on soil surface.
Strength (Consistency) Cohesive Soils	VS	VERY SOFT – Unconfined compressive strength less than 25kPa
	S	SOFT – Unconfined compressive strength 25-50kPa
	F	FIRM – Unconfined compressive strength 50-100kPa
	St	STIFF – Unconfined compressive strength 100-200kPa
	VSt	VERY STIFF – Unconfined compressive strength 200-400kPa
	H	HARD – Unconfined compressive strength greater than 400kPa
	( )	Bracketed symbol indicates estimated consistency based on tactile examination or other tests.
Density Index/ Relative Density (Cohesionless Soils)		**Density Index (I_D) Range (%)** — **SPT 'N' Value Range (Blows/300mm)**
	VL	Very Loose <15 — 0-4
	L	Loose 15-35 — 4-10
	MD	Medium Dense 35-65 — 10-30
	D	Dense 65-85 — 30-50
	VD	Very Dense >85 — >50
	( )	Bracketed symbol indicates estimated density based on ease of drilling or other tests.
Hand Penetrometer Readings	300 250	Numbers indicate individual test results in kPa on representative undisturbed material unless noted otherwise.
Remarks	'V' bit	Hardened steel 'V' shaped bit.
	'TC' bit	Tungsten carbide wing bit.
	T_{60}	Penetration of auger string in mm under static load of rig applied by drill head hydraulics without rotation of augers.

LOG SYMBOLS continued

ROCK MATERIAL WEATHERING CLASSIFICATION

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported.
Extremely weathered rock	XW	Rock is weathered to such an extent that it has "soil" properties, ie it either disintegrates or can be remoulded, in water.
Distinctly weathered rock	DW	Rock strength usually changed by weathering. The rock may be highly discoloured, usually by ironstaining. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
Slightly weathered rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh rock	FR	Rock shows no sign of decomposition or staining.

ROCK STRENGTH

Rock strength is defined by the Point Load Strength Index (Is 50) and refers to the strength of the rock substance in the direction normal to the bedding. The test procedure is described by the International Journal of Rock Mechanics, Mining, Science and Geomechanics. Abstract Volume 22, No 2, 1985.

TERM	SYMBOL	Is (50) MPa	FIELD GUIDE
Extremely Low:	EL		Easily remoulded by hand to a material with soil properties.
-----------------------	--------------	0.03	
Very Low:	VL		May be crumbled in the hand. Sandstone is "sugary" and friable.
-----------------------	--------------	0.1	
Low:	L		A piece of core 150mm long x 50mm dia. may be broken by hand and easily scored with a knife. Sharp edges of core may be friable and break during handling.
-----------------------	--------------	0.3	
Medium Strength:	M		A piece of core 150mm long x 50mm dia. can be broken by hand with difficulty. Readily scored with knife.
-----------------------	--------------	1	
High:	H		A piece of core 150mm long x 50mm dia. core cannot be broken by hand, can be slightly scratched or scored with knife; rock rings under hammer.
-----------------------	---------------	3	
Very High:	VH		A piece of core 150mm long x 50mm dia. may be broken with hand-held pick after more than one blow. Cannot be scratched with pen knife; rock rings under hammer.
-----------------------	---------------	10	
Extremely High:	EH		A piece of core 150mm long x 50mm dia. is very difficult to break with hand-held hammer. Rings when struck with a hammer.

ABBREVIATIONS USED IN DEFECT DESCRIPTION

ABBREVIATION	DESCRIPTION	NOTES
Be	Bedding Plane Parting	Defect orientations measured relative to the normal to the long core axis (ie relative to horizontal for vertical holes)
CS	Clay Seam	
J	Joint	
P	Planar	
Un	Undulating	
S	Smooth	
R	Rough	
IS	Ironstained	
XWS	Extremely Weathered Seam	
Cr	Crushed Seam	
60t	Thickness of defect in millimetres	