PRECAST CONCRETE

1. ALL PRECAST CONCRETE IS TO COMPLY WITH THE SPECIFICATION.

2. COMPLY WITH ANY NATIONAL, STATE OR TERRITORY CODES OF PRACTICE OF INDUSTRY STANDARD FOR PRECAST AND TILT-UP CONSTRUCTION FOR INCLUDING BUT NOT LIMITED TO THE WORKSAFE WA, CODE PRACTICE, TILT-UP AND PRECAST CONCRETE CONSTRUCTION, THE WORKSAFE VICTORIA, INDUSTRY STANDARD, PRECAST AND TILT-UP CONCRETE FOR BUILDINGS OR THE WORKPLACE HEALTH AND SAFETY QUEENSLAND, TILT-UP AND PRECAST CONSTRUCTION, INDUSTRY CODE OF PRACTICE, AS APPLICABLE.

3. THE PRECAST CONCRETE SHALL COMPLY WITH AS3600 CONCRETE STRUCTURES, AS3610 FORMWORK FOR CONCRETE AND PRECAST FLAT PANELS TO AS3850 TILT-UP CONCRETE CONSTRUCTION. PROVIDE A COPY OF AS3850 ON SITE FOR ANY PRECAST FLAT PANELS ERECTED IN A VERTICAL POSITION. FORMWORK SHALL BE CLASS 1 TO AS3610 UNLESS OTHERWISE NOTED. REFER ALSO TO CIA Z48-2002, THE CIA PRECAST CONCRETE HANDBOOK. ALL STEEL ITEMS CAST INTO THE CONCRETE SHALL COMPLY WITH AS4100, ALL WELDING SHALL COMPLY WITH AS1554 AND ALL GRADE 4.6 BOLTS AND GRADE 8.8 SHALL COMPLY WITH AS1111 AND AS1252 RESPECTIVELY.

4. FOR LOCATIONS AND DIMENSIONS OF PRECAST UNITS REFER TO THE ARCHITECTURAL DRAWINGS.

5. THE PRECAST HAS TO BE DESIGNED FOR THE IN PLACE CONDITION AND THE CONTRACTOR MUST MAKE AN ASSESSMENT AS TO ANY EXTRA REINFORCEMENT ETC., THAT MAY BE REQUIRED TO SUIT THE PROPOSED TRANSPORTATION, HANDLING AND ERECTION METHODS. ANY SUCH EXTRA MATERIALS OR OTHER HANDLING REQUIREMENTS MUST BE ALLOWED FOR IN THE TENDER.

6. WHERE REQUIRED BY LEGISLATION TO SUIT STATUTORY REQUIREMENTS, USE AN EXPERIENCED ENGINEER, DESIGNATED AS THE ERECTION DESIGN ENGINEER WHO IS RESPONSIBLE FOR DESIGNING THE PRECAST FOR HANDLING AND ERECTION INCLUDING BRACING. TILT-UP TO BUILDINGS, OR PORTIONS OF BUILDINGS THAT ARE GREATER THAN ONE PANEL IN HEIGHT, OR INCORPORATE WALL PANELS GREATER THAN 8m IN HEIGHT OR INCORPORATE WALL PANELS WEIGHING MORE THAN 8 TONNE OR INCORPORATE WALL PANELS WHICH ARE NOT NOMINALLY FLAT OR RECTANGULAR OR WHERE WALL PANELS ARE NOT DIRECTLY FIXED AND SUPPORTED BY A FREE STANDING STRUCTURAL FRAME SHALL REQUIRE AN ERECTION DESIGN ENGINEER ENGAGED BY THE CONTRACTOR.

7. THE CONTRACTOR SHALL SUBMIT FOR REVIEW IF REQUIRED BY THE SUPERINTENDENT, FULL DETAILS IN WRITING OF THE PROPOSED HANDLING AND ERECTION OF PRECAST PANELS INCLUDING A WORK METHOD STATEMENT. WHEN A DESIGN ERECTION ENGINEER IS REQUIRED, SUBMIT THE COMPUTATIONS FOR ERECTION ON REQUEST. THIS REVIEW SHALL COVER THE HANDLING PROCEDURE OF THE UNITS THROUGHOUT ALL STAGES INCLUDING STRIPPING, LIFTING, STACKING, TRANSPORTING AND ERECTION. CONCRETE STRESSES THROUGHOUT HANDLING SHALL NOT CAUSE CRACKING. THE REVIEW SHALL INCLUDE THE LOCATION AND SIZE OF LIFTING AND BRACING INSERTS, TESTS OR MANUFACTURER'S WRITTEN DATA PROVING THE CAPACITY OF LIFTING INSERTS, BRACING INSERT, THE BRACING AND THE BRACE ANCHORS. ALL OF THIS WILL BE DONE IN ACCORDANCE WITH AS3850 IF APPLICABLE.

8. REFER TO THE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS, SETOUT, JOINT LAYOUTS, REQUIRED REBATES, FERRULES, DRIPS, SEALS AND BAFFLES, WATERPROOFING ETC. AND EDGE DETAILS FOR GLAZING AND WINDOWS, DOOR OPENINGS, PANEL LOCATIONS AND DIMENSIONS AND THE LIKE. ARCHITECTURAL FIXINGS FERRULES ARE TO BE LOCATED WHERE NECESSARY TO SUIT ARCHITECTURAL DETAILS.

9. ALL FLASHINGS SHALL BE FIXED TO CAST IN REGLETS. SAW CUTTING REGLETS WITHOUT WRITTEN INSTRUCTIONS IS NOT PERMITTED.

10. THE CONTRACTOR SHALL REFER TO ALL OTHER TRADES TO ENSURE THAT OPENINGS ARE LEFT WHERE NECESSARY AND THAT FIXINGS, FITTINGS AND ASSOCIATED COMPONENTS REQUIRED BE INSTALLING ARE PROVIDED AND BUILT IN AS THE WORK PROCEEDS.

11. SHOP DRAWINGS OF ALL PRECAST UNITS ARE TO BE DRAWN AND SUBMITTED TO THE SUPERINTENDENT TO ENABLE REVIEW AND ALTERATIONS IF NECESSARY TO BE MADE, PRIOR TO MANUFACTURE. REFER ALSO TO THE SPECIFICATIONS.

12. REFER TO THE SPECIFICATIONS FOR THE SUPPLY OF SAMPLES AND PROTOTYPES.

13. REINFORCING FABRIC IN PANELS SHALL BE OF ONE SHEET AND LAPPING IS NOT PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER. ALL REINFORCING SHOWN IS FOR THE PRECAST UNITS IN THEIR IN PLACE POSITION.

14. USE ONLY PLASTIC BAR CHAIRS TO SUPPORT REINFORCING AND HANG REINFORCING FROM THE BACK OF THE PRECAST UNIT SO THAT THERE ARE NO EXPOSED BAR CHAIRS ON THE EXPOSED FACES TO VIEW. THE USE OF PLASTIC COATED METAL BAR CHAIRS IS NOT PERMITTED.

15. PROVIDE 1N12 TRIMMER BAR PER LAYER OF REINFORCING ALL ROUND, ALL EDGES OF THE PRECAST UNITS. PROVIDE N12 CORNER BARS BY 1000 LONG FOR EACH LAYER OF REINFORCING AT 45 DEGREES AT CORNERS OF DOORS AND WINDOW OPENINGS AND THE LIKE.

    LAPS IN BARS = N12-300mm, N16-400mm, N20-500mm UNO.

16. BARS AND FABRIC TO HAVE A CRANK OF 1:6 MAX. U.N.O. ALL COGGED BARS AND FITMENTS. TO HAVE 5db BENDS. PROVIDE AS ALTERNATIVE TO BARS PROTRUDING FROM PRECAST UNITS FOR LAPPING WITH SLAB REINFORCEMENT, EITHER A CAST IN FERRULE WITH SCREW IN BARS (SCREW IN BARS TO BE THREADED FROM A BAR LARGER THAN THE FERRULE E.G. USE N16 BAR FOR A M12 FERRULE) OR REID BAR COUPLERS WITH ANCHOR BAR AND REID BAR DOWEL BAR, WHERE SUCH BARS WOULD INTERFERE WITH THE FIXING OF FORMWORK OR REINFORCEMENT. SEEK APPROVAL FOR THESE ALTERNATIVES.

17. FOR PANELS WITH A SINGLE LAYER OF REINFORCING AND VERTICAL GROUT TUBE (DUCTS) PARALLEL TO THE PLANE OF THE REINFORCING, CUT THE HORIZONTAL REINFORCEMENT LOCALLY FOR THE GROUT TUBE AND PROVIDE ADDITIONAL 2N12 BY 400mm LONG EACH SIDE OF GROUT TUBE HORIZONTALLY (I.E. 800 LONG) AT 100 CENTRES.

18. CONCRETE COVER ON EXPOSED FACE IS TO BE 40mm UNO. REBATES OF 15mm OR LESS ON EXPOSED FACE REDUCE COVER TO 25mm OTHERWISE INCREASE COVER FOR DEEPER REBATES. COVER ON INTERNAL FACE 30mm. TOLERANCE ON COVER IS +5mm, -0mm UNO.

19. THE CONTRACTOR SHALL SUPPLY AND FIT LIFTERS AS REQUIRED TO HANDLE AND ERECT THE PRECAST UNITS. THESE SHALL BE CAST IN PROPRIETARY LIFTERS. THEY SHALL NOT BE LOCATED IN THE FACE WHICH IS EXPOSED TO THE VIEW IN THE FINAL CONDITION.

20. ALL CAST-IN FERRULES AND ALL BRACING INSERTS (FERRULES) ARE TO BE M20x95 UNO AND ARE TO BE REID ELEPHANT'S FEET FERRULES AND TO HAVE N12x400 LONG CROSS BAR SECURELY ANCHORED BEHIND THE REINFORCING UOS. ALL FERRULES ARE TO BE SUPPLIED BY REID OR AN APPROVED SUPPLIER AND ALL FERRULES SHALL HAVE TEST DATA CONFIRMING THEIR LOAD CAPACITIES IN ULTIMATE LIMIT AND WORKING LOAD LIMIT (WLL) TO AS3850.

    PROVIDE DOWEL BARS EITHER AS A LOOSE BAR, OR A CAST IN BAR OR A BAR SCREWED INTO A FERRULE OR COUPLER. PROJECTING FROM A PRECAST UNIT OR FROM INSITU CONCRETE WHICH FITS INTO A GROUT TUBE IN THE MATING SECTION. PROVIDE THREADED REINFORCING BAR (GRADE N500) WHERE SHOWN AND SCREWED INTO A CAST IN FERRULE IN THE PRECAST UNIT. PROVIDE REID BAR SCREWED INTO A REID COUPLER OR JOINER WHERE SHOWN ON THE DRAWINGS.

    PROVIDE GROUT TUBES AS SHOWN MADE FROM THIN WALL GALVANISED METAL DUCT (VSL ROUND DUCT) CAST INTO EITHER INSITU CONCRETE OR THE PRECAST ELEMENT INTO WHICH A REINFORCING BAR, EITHER DOWEL BAR OR A BAR FROM THE PRECAST UNIT WILL FIT AND IS THEN GROUTED IN PLACE. DO NOT USE PLASTIC TUBE TO ENCAPSULATE THE DOWEL BAR.

    PROVIDE THE PURPOSE MADE STEEL BRACKETS WITH BARS, BOLTS OR STUDS WELDED TO THEM CAST INTO THE CONCRETE AND TO WHICH STRUCTURES IS ATTACHED TO OR WHICH ARE USED TO BE SUPPORT FOR THE PRECAST UNIT ON THE STRUCTURE. BOLTS AND STUDS TO PLATES AND BOLTS CAST INTO THE PRECAST TO BE GRADE 4.6 UNO.

    ALL PROPRIETARY CAST IN CONNECTOR PLATES SHALL CONFORM TO AS4100 WITH APPROVED TEST DATA TO CONFIRM THE LOAD CAPACITIES USED ON REQUEST. BOLTS AND STUDS TO PLATES AND BOLTS CAST INTO THE PRECAST ARE TO BE GRADE 4.6 UNO.

21. THE METAL FIXINGS, CONNECTOR PLATES, FERRULES, BOLTS, NUTS, WASHERS, LIFTERS, CAST IN ITEMS ETC. ARE TO BE HOT DIP GALVANISED IN ACCORDANCE WITH AS4680 UOS. USE ONLY GRADE 4.6 OR 8.8 BOLTS AS SPECIFIED. DO NOT WELD, INCLUDING TACK WELD, 8.8 BOLTS OR NUTS UNDER ANY CIRCUMSTANCES.

22. ALL PANELS ARE TO BE CONSTRUCTED FROM NORMAL WEIGHT CONCRETE. THE CONCRETE IN THE PRECAST UNITS SHALL BE AS SHOWN ON THE DRAWINGS BUT NOT LESS THAN f'c = 40MPa. THE MINIMUM CEMENT CONTENT FOR THE PRECAST UNITS IS TO BE 420kg/m AND A WATER CEMENT RATIO NOT EXCEEDING 0.5 UOS. THE CONTRACTOR SHALL SUBMIT HIS PROPOSED CONCRETE MIX DESIGN FOR APPROVAL PRIOR TO CASTING OF UNITS.

23. COMPACT THE CONCRETE USING VIBRATING TABLE., VIBRATING FORM AND VIBRATORS TO ACHIEVE DENSE WELL COMPACTED CONCRETE.

24. THE CONCRETE STRENGTH AT REMOVAL FROM MOULDS IS TO BE A MINIMUM OF 15MPa

25. ALL CONCRETE CORBELS TO THE PRECAST PANELS TO BE POURED MONOLITHICALLY WITH THE PANEL.

26. THE PRECAST UNITS MUST BE STACKED IN SUCH A WAY THAT CRACKING WILL NOT OCCUR AND WARPING IN EXCESS OF THAT GIVEN IN THE RELEVANT CODES WILL NOT OCCUR.

27. ACCEPTANCE OF THE COMPLETED PRECAST UNITS BY THE SUPERINTENDENT WILL BE UPON DELIVERY AND ERECTION ON THE SITE. PRECAST UNITS WHICH ARE CRACKED OR DAMAGED ON DELIVERY IN ANY MANNER SHALL BE REJECTED PRIOR TO ERECTION. LIKEWISE ANY PRECAST UNITS DAMAGED DURING OR FOLLOWING ERECTION, SHALL BE REMOVED AND REPLACED BY THE CONTRACTOR OR WHERE APPROVED, SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIFICATION.

28. DO NOT ERECT TILT-UP ON STRUCTURE SUCH AS SLABS ON GROUND UNTIL THEY ARE AT LEAST 3 DAYS OLD AND HAVE REACHED THEIR DESIGN STRENGTH OR ON SUSPENDED STRUCTURE UNTIL THEY ARE AT LEAST 28 DAYS OLD AND HAVE REACHED THEIR DESIGN STRENGTH. SEEK APPROVAL IN WRITING TO REDUCE THESE TIMES AND ALLOW FOR ALL COSTS OF INCREASED CONCRETE STRENGTHS, SHORING ETC. IF APPROVAL IS GIVEN.

29. ERECT THE PRECAST UNITS IN A SAFE AND CORRECT MANNER IN ACCORDANCE WITH RELEVANT CODES OR PRACTICE, LEGISLATION OR TO SUIT STATUTORY REQUIREMENTS. THE ERECTION DESIGN WILL INCLUDE BUT NOT LIMITED TO THE FOLLOWING, LIFTING INSERTS, RIGGING SYSTEM, BRACES, BRACE FIXINGS AND THE BRACE FOOTINGS. THE ERECTION DESIGN ENGINEER IS TO CARRY OUT PERIODIC INSPECTIONS (2 MINIMUM FOR EACH TYPE OF UNIT) OF THE BRACING ON SITE TO ENSURE THE INTENT OF THE BRACING DESIGN IS BEING CARRIED.

30. DESIGN THE BRACING TO WALL PANELS TO AS3850. ENSURE ALL WALL PANELS ARE SECURELY FIXED AT THEIR BASE WITH AT LEAST TWO FIXING. ONE AT EACH END. DO NOT USE FRICTION FOR RESTRAIN OF THE BASE OF THE PANELS UNLESS IT IS POSITIVELY RESTRAINED. BRACING TO BE AT 45-60 DEGREES TO THE HORIZONTAL AND TO CONNECT AT ABOUT 2/3 HEIGHT OF PANEL UNLESS OTHERWISE DESIGNED BY THE ERECTION DESIGN ENGINEER. BRACING (PROPS) TO CONNECT TO M20 FERRULES (BRACE INSERTS), CAST INTO THE BACK OF THE PRECAST PANEL WITH AN M20 BOLT GRADE 8.8/S. ALL BRACING PROPS SHALL BE SUPPLIED BY RJB, SHISHAM DURAGAL OR AN APPROVED SUPPLIER WITH TEST DATA FOR THEIR LOAD CAPACITY TO BE SUPPLIED ON REQUEST.

    PROVIDE 300mm MIN. BETWEEN BRACING INSERTS AND EDGE OF CONCRETE. USE. PROPRIETARY BRACES (PROPS) WITH KNOWN WORKING LOAD CAPACITY WITH A MIN. OF 2 BRACES PER PANEL. THE BRACE FOOTING IS TO BE DESIGNED FOR THE TEMPORARY ERECTION LOADS AND IF IT IS A SEPARATE FOOTING IT MUST BE FOUNDED IN UNDISTURBED NATURAL GROUND. IF THE BRACE FOOTING IS THE FLOOR SLAB IT MUST BE A MIN. OF 125mm THICK WHERE THE BRACING INSERTS ARE TO BE FIXED. THE FLOOR SLAB MUST ALSO BE CAST FOR AT LEAST 3 DAYS WITH A MIN. STRENGTH OF 20MPa BEFORE ANY DRILLED FIXING CAN BE FIXED. FOR DRILLED FIXINGS USED FOR BRACING INSERTS, USE THICK SHIELD, HIGH PERFORMANCE, LOAD CONTROLLED ANCHORS WHICH HAVE BEEN TESTED IN ACCORDANCE WITH APPENDIX A OF AS3850. LOAD CONTROLLED ANCHORS ARE TO BE TORQUED UP TO THE REQUIRED TORQUE AS SPECIFIED BY THE MANUFACTURER USING A CALIBRATED TORQUE WRENCH.

    COILS BOLTS, DEFORMATION CONTROL ANCHORS OR CHEMICAL ANCHORS MUST NOT BE USED.

31. ADVISE IN WRITING WHEN THE BRACING TO THE WALL PANEL IS TO BE REMOVED IN ACCORDANCE WITH SECTION 7 OF AS3850. IF IT IS PROPOSED TO REMOVE THE BRACES BEFORE THE STRUCTURE IS COMPLETE ENSURE THE STRUCTURE IS STABLE AND IS ADEQUATELY BRACED TO ALLOW THE BRACING TO BE REMOVED AND SEEK APPROVAL FOR THIS REMOVAL. THE ERECTION DESIGN ENGINEER ENGAGED BY THE CONTRACTOR, MUST PROVIDE WRITTEN APPROVAL PRIOR TO REMOVAL OF ANY PROPPING.

32. PROVIDE PROPPING AND BRACING OF PRECAST FLOOR UNITS AND PRECAST BEAMS ALLOWING FOR OUT OF BALANCE FORCES DUE TO ERECTION OR CONSTRUCTION ON ONE SIDE REQUIRED. ALLOW TO SUPPORT ALL CONSTRUCTION LOADS INCLUDING THE FULL SELF WEIGHT OF THE COMPLETED FLOOR SYSTEM AND POSSIBLE LOCAL CONCENTRATIONS OF LOAD DURING CONSTRUCTION.

    ENSURE PROPS ARE VERTICAL AND BRACE TO PREVENT SIDE-SWAY AND LATERAL MOVEMENT OF THE WHOLE ASSEMBLY AND THE BUCKLING OF INDIVIDUAL PROPS. PLACE PROPS AND FORMWORK SUPPORTING PRECAST BEAM OVER COMPLETED PRECAST CONCRETE BEAMS UNDER. DO NOT SUPPORT PROPS AND FORMWORK ON PRECAST FLOOR PANELS.

    ALSO PROVIDE PROPPING TO SUSPENDED INSITU CONCRETE STRUCTURE TO SUPPORT ALL PRECAST ACTION (LOADS) WERE THE PRECAST IS TO BE ERECTED BEFORE THE INSITU STRUCTURE HAS ACHIEVED ITS 28 DAY STRENGTH.

    WHERE PRECAST IS TO BE ERECTED ON STEEL BEAM ENSURE THE BEAMS CANNOT ROTATE AND ALLOW FOR LING AND LEVELLING.

33. ALL GAPS SHALL BE PROPERLY SEALED WHEN GROUTING UP THE PRECAST CONNECTIONS TO AVOID THE GROUT FILLING THE GAP BETWEEN THE PANEL AND THE STRUCTURE AND TO AVOID GROUT SPOILING THE FACE OF THE PANELS.

34. GROUT TO BE USED SHALL BE NON-SHRINK AND HAVE A 28 DAY CHARACTERISTIC STRENGTH OF 60MPa. DETAILS OF THE PROPOSED GROUT USED TO BE SUBMITTED TO THE SUPERINTENDENT FOR APPROVAL.

35. WHERE REQUIRED, SITE WELDING OF METAL FIXINGS MAY BE DONE WITHOUT REMOVING THE GALVANISING PROVIDED THE CORRECT TYPE OF CELLULOSE ELECTRODE TO AS1553 IS USED AFTER WELDING. COLD GALVANISE AFFECTED AREA. REFER ALSO TO THE SPECIFICATION.

36. HIGH STRENGTH PLASTIC PACKERS TO BE USED FOR LEVELLING UNDER SUPPORT POINTS OF LOAD BEARING PRECAST MAY BE LEFT PERMANENT PROVIDED THEY ARE CENTRALLY LOCATED WITHIN THE EDGES OF THE PANELS, HAVE A MINIMUM OF 50mm GROUT COVER AND ENSURE BEARING PRESSURE LESS THAN 7MPa. REMOVE PACKERS TO ALL COLUMNS.

37. PACKERS USED BETWEEN NON-LOADBEARING PANELS SHALL BE REMOVED IMMEDIATELY FOLLOWING THE INSTALLATION OF THE UNITS UOS. WHERE PACKERS ARE USED TO TAKE UP TOLERANCES, THE THICKNESS SHALL BE SUCH THAT NO MORE THAN 3 PACKERS REQUIRED PRIOR TO ADDITIONAL FLOOR AND WALL LOAD BEING APPLIED TO THE PANEL. THE BED OF GROUT AT THE BASE MUST HAVE ACHIEVED FULL STRENGTH.

38. ALL LOAD BEARING PRECAST UNITS SHALL BE FULL GROUTED FOR THE FULL EXTENT OF THEIR BEARING AREA UNLESS OTHERWISE NOTED OR APPROVED BY THE ENGINEER.

39. FIREPROOF CONNECTIONS AND JOINTS AS REQUIRED AND AS SET OUT ON THE ARCHITECTURAL DRAWINGS TO GIVE THE REQUIRED FIRE RATINGS.

GENERAL NOTES: CONTRACTOR TO CHECK ALL DIMENSIONS ON SITE. REFER ANY DISCREPANCIES TO ARCHITECT FOR A DECISION, PRIOR TO COMMENCING ANY WORK OR PREPARING ANY SHOP DRAWING.

REV	DATE	DESCRIPTION	DRN	CHD
A	29.04.19	ISSUED FOR BUILDING PERMIT	JAG	MD

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DRAWING TITLE:
STRUCTURAL
GENERAL NOTES
SHEET 2

BUILDING PERMIT

DRAWN:	JAG	APPROVED:	
DESIGN:	MD	DATE:	15.04.19
CHECKED:		SCALE:	NTS
PROJECT NUMBER:	19-080		REV
DRAWING NUMBER:	S002		A