

GARAGE & DRIVEWAY SLABS

49 TRISTRAM ROAD, BEACON HILL N.S.W. 2100

STRUCTURAL DETAILS

STRUCTURAL DRAWING LIST

CO14070.00 - S01 STRUCTURAL DRAWING LIST & GENERAL STRUCTURAL NOTES
CO14070.00 - S02 GARAGE & DRIVEWAY SLABS PLANS AND DETAILS

GENERAL STRUCTURAL NOTES

GENERAL

- G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANT'S DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
- G2 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.
- G3 ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE. ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS. ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT. REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.
- G4 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.
- G5 UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES (m) AND ALL DIMENSIONS ARE IN MILLIMETRES (mm).
- G6 THE STRUCTURAL COMPONENTS DETAILED ON THESE DRAWINGS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE RELEVANT STANDARDS AUSTRALIA CODES AND LOCAL GOVERNMENT ORDINANCES FOR THE FOLLOWING LOADINGS. REFER TO ARCHITECTURAL DRAWINGS FOR PROPOSED FLOOR USAGE.

| | | |
|-------------|-----------------|------------------------------|
| FLOOR USAGE | LIVE LOAD (kPa) | SUPERIMPOSED DEAD LOAD (kPa) |
| GARAGE | 3.0 | NIL |

- G7 WIND LOADS ARE IN ACCORDANCE WITH AS1170.2 AS FOLLOWS: REGIONAL ULTIMATE LIMIT STATE WIND SPEED VELOCITY, $V_R = 45\text{m/s}$ TERRAIN CATEGORY: TC3 SHIELDING MULTIPLIER & TOPOGRAPHIC MULTIPLIER: 1.0 REGION: A2 EARTHQUAKE ACTIONS TO AS1170.4 EARTHQUAKE DESIGN CATEGORY II

FOUNDATIONS

- F1 FOOTINGS HAVE BEEN DESIGNED FOR AN ALLOWABLE BEARING CAPACITY OF 1000 kPa ON ROCK. THE FOUNDATION MATERIAL SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER FOR THIS BEARING CAPACITY BEFORE PLACING MEMBRANE, REINFORCEMENT OR CONCRETE.
- F2 REFER TO GEOTECHNICAL INVESTIGATIONS REPORT No: 10044-GR-1-1 PREPARED BY: ALLIANCE GEOTECHNICAL DATED: 22 NOVEMBER 2019
- F3 FOOTINGS SHALL BE LOCATED CENTRALLY UNDER WALL AND COLUMNS UNLESS NOTED OTHERWISE.
- F4 DO NOT EXCEED A RISE OF: 1 IN A RUN OF: 2 FOR THE LINE OF SLOPE BETWEEN ADJACENT FOOTINGS OR EXCAVATIONS.
- F5 RESIDENTIAL SLABS AND FOOTINGS HAVE BEEN DESIGNED FOR A REACTIVITY CLASS A TO AS2870-2011.
- F6 FOOTINGS TO BE CONSTRUCTED AND BACKFILLED AS SOON AS POSSIBLE FOLLOWING EXCAVATION TO AVOID SOFTENING OR DRYING OUT BY EXPOSURE.
- F7 BEFORE PLACEMENT OF FRAMEWORK, REINFORCEMENT & POURING CONCRETE, THE EXCAVATIONS FOR THE INSTALLATION OF FOOTINGS SHOULD BE INSPECTED BY A GEOTECHNICAL ENGINEER TO CONFIRM THAT THE FOUNDING MATERIAL AND THE BASE OF THE FOOTINGS ARE CLEAN, DRY AND FREE OF SOFT, LOOSE SOIL/DEBRIS AS RECOMMENDED IN CLAUSE 4.2 OF THE GEOTECHNICAL REPORT.

SLAB MAINTENANCE

- SM1 DURING THE LIFE OF A BUILDING, DAMAGE IN VARIOUS FORMS IS LIKELY TO OCCUR TO THE CONCRETE SLAB. GOOD HOUSEKEEPING WILL KEEP PROBLEMS TO A MINIMUM AND EXTEND THE LIFE OF THE FLOOR AND ROAD SLABS. THE FOLLOWING LIKELY AREAS OF DAMAGE MAY OR MAY NOT OCCUR DURING THE LIFE OF THE BUILDING.
- SM2 DAMAGE TO JOINTS SUCH AS FRETTING OR BREAKING AWAY AT FLOOR SHOULD BE REPAIRED USING EPOXY CONCRETE REPAIR PRODUCTS AND THE JOINTING MATERIAL MADE GOOD.
- SM3 CRACKING OF SLABS WHICH MAY OCCUR OVER THE LIFE OF THE SLAB SHOULD BE REPAIRED BY EPOXY GROUTING AS SOON AS POSSIBLE TO PREVENT LOCAL FRETTING AND BREAKING AWAY. THE DEFINITION OF A CRACK WHICH MAY BECOME DETRIMENTAL IS ONE WHICH IS GREATER THAN 0.3mm IN WIDTH.
- SM4 LOCAL MOVEMENT OF SLABS CAUSED BY EXTERNAL SOURCES SUCH AS EGRESS OF WATER SHOULD BE REFERRED TO THE STRUCTURAL ENGINEER TO DETERMINE THE BEST METHOD OF REPAIR.

SITE PREPARATION

- SP1 STRIP EXISTING AREA OF TOPSOIL AND OTHER DELETERIOUS MATERIAL AS REQUIRED TO CONSTRUCT NEW WORKS.
- SP2 PRIOR TO PLACING THE SLAB THE CONTRACTOR SHALL CONFIRM THAT THE SUBGRADE HAS BEEN PROPERLY PREPARED, IS SOUND, AND IS AT THE CORRECT MOISTURE CONTENT.
- SP3 REMOVE ANY ORGANIC OR SOFT MATERIAL FROM SITE.
- SP4 REFER TO GEOTECHNICAL REPORT 10044-GR-1-1 PREPARED BY ALLIANCE GEOTECHNICAL DATED 22 NOVEMBER 2019 FOR INFORMATION PERTAINING TO EXISTING GROUND CONDITIONS & SPECIFIC FILL PLACEMENT & COMPACTION REQUIREMENTS.
- SP5 WHERE SOFT, YIELDING OR UNSTABLE MATERIAL IS IDENTIFIED, DEEPEN EXCAVATION AS REQUIRED TO REMOVE ANY SOFT SPOTS AND EXPOSE SUITABLE FOUNDATION STRATA. THIS MATERIAL MUST BE APPROVED BY THE GEOTECHNICAL ENGINEER.
- SP6 SITE REGRADED OR ENGINEERED FILL SHALL BE CLEAN MATERIAL COMPACTED TO 100% SMDD WITHIN $\pm 2\%$ OF OPTIMUM MOISTURE CONTENT IN LAYERS OF 250mm LOOSE THICKNESS.
- SP7 MAXIMUM PARTICLE SIZE OF FILL TO BE HALF THE LOOSE LAYER THICKNESS OR TWO-THIRDS THE COMPACTED LAYER THICKNESS.
- SP8 SERVICE TRENCH BACK FILL AND FILL OVER UNDERGROUND SERVICES SHALL BE COMPACTED WITH HAND OPERATED PLATE COMPACTOR IN LAYERS OF 100mm LOOSE THICKNESS.
- SP9 FILLING TO EXTEND 1 METRE BEYOND THE EDGE OF THE SLAB.

CONCRETE

- C1 ALL WORKMANSHIP AND MATERIAL SHALL BE IN ACCORDANCE WITH AS3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.
- C2 READYMIX CONCRETE SUPPLY SHALL COMPLY WITH AS1379.
- C3 CONCRETE QUALITY ALL THE REQUIREMENTS OF THE ACSE SPECIFICATION DOCUMENT 1 (EDITION 6) SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.
- | ELEMENT | STRENGTH GRADE (MPa) | SLUMP | MAX AGG SIZE | CEMENT TYPE |
|---------|----------------------|-------|--------------|-------------|
| SLABS | 32 | 80 | 20 | GP |
| PIERS | 25 | 80 | 20 | GP |

- C4 NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING.
- C5 CLEAR CONCRETE COVER TO ALL REINFORCEMENT FOR DURABILITY SHALL BE AS FOLLOWS UNLESS SHOWN OTHERWISE.

| EXPOSURE CLASSIFICATION TO AS3600: | CONCRETE GRADE: | CAST AGAINST GROUND: | CAST IN FORMS AND EXPOSED: | CAST IN FORMS NOT EXPOSED: |
|------------------------------------|-----------------|----------------------|----------------------------|----------------------------|
| A1&A2 | 25 | 50mm | 30mm | 20mm(A1) |
| B1 | 32 | 60mm | 40mm | - |
| B2 | 40 | 65mm | 45mm | - |

COVER REQUIREMENTS MAY NEED TO BE INCREASED TO SUIT FIRE RATING. EXPOSURE CLASSIFICATION SHALL BE AS INDICATED ON THE DRAWING.

DURABILITY REQUIREMENTS FOR CONCRETE.

| EXPOSURE CLASSIFICATION TO AS3600: | MINIMUM CEMENT CONTENT: | MAXIMUM W/C RATIO: |
|------------------------------------|-------------------------|--------------------|
| A1&A2 | 280 | 0.56 |
| B1 | 320 | 0.56 |
| B2 | 390 | 0.46 |
| C | 450 | 0.40 |

- C6 ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS, PLASTIC CHAIRS OR CONCRETE CHAIRS AT 1 METRE CENTRES MAXIMUM BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS. USE PLASTIC CHAIRS IN EXPOSURE CONDITION GREATER THAN B1.
- C7 CONCRETE SIZES DO NOT INCLUDE THICKNESSES OF APPLIED FINISHES.
- C8 DEPTHS OF BEAMS ARE GIVEN FIRST AND INCLUDE SLAB THICKNESS.
- C9 REFER TO ARCHITECT'S DETAILS, FOR CHAMFERS, DRIP GROOVES, REGLETS, ETC., MAINTAIN COVER TO REINFORCEMENT AT THESE DETAILS.
- C10 NO HOLES, CHASES OR EMBEDMENT OF PIPES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.

CONCRETE (CONTINUED)

- C11 CONSTRUCTION JOINTS WHERE NOT SHOWN SHALL BE LOCATED TO THE APPROVAL OF THE ENGINEER.
- C12 ALL CONCRETE INCLUDING SLABS ON GROUND AND FOOTINGS SHALL BE COMPACTED WITH MECHANICAL VIBRATORS.
- C13 USE ALIPHATIC ALCOHOLS SPRAYED OVER THE SURFACE PRIOR TO AND AFTER FINISHING TO REDUCE RATE OF EVAPORATION FROM THE SURFACE AND HELP CONTROL PLASTIC SHRINKAGE CRACKING. NOTE THAT THE USE OF ALIPHATIC ALCOHOLS IS NOT A SUBSTITUTE FOR CURING.
- C14 COMMENCE CURING OPERATIONS PROMPTLY AFTER SURFACE FINISHING IS COMPLETE. CURING COMPOUNDS ARE TO BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND ARE TO BE CHECKED FOR COMPATIBILITY WITH PROPOSED FLOOR FINISHES. SOME COMPOUNDS MAY REQUIRE REMOVAL FOR GLUED DOWN FLOOR COVERINGS OR WET CURING AS DESCRIBED BELOW.

CONCRETE IS TO BE CURED BY KEEPING THE SURFACES CONTINUOUSLY WET FOR A PERIOD OF 3 DAYS, AND PREVENTING THE LOSS OF MOISTURE FOR A FURTHER 7 DAYS FOLLOWED BY A GRADUAL DRYING OUT.

- C15 THE ENGINEER SHALL BE GIVEN 48 HOURS NOTICE FOR REINFORCEMENT INSPECTIONS AND CONCRETE SHALL NOT BE DELIVERED UNTIL ENGINEERS APPROVAL IS OBTAINED.

- C16 CONDUITS, PIPES ETC. SHALL ONLY BE LOCATED IN THE MIDDLE ONE THIRD OF SLAB DEPTH AND SPACED AT NOT LESS THAN 3 DIAMETERS OF THE CONDUIT, PIPES ETC. PIPES OR CONDUITS SHALL NOT BE PLACED WITHIN THE COVER TO REINFORCEMENT.

- C17 REINFORCEMENT SYMBOLS:
N DENOTES DEFORMED GRADE 500 NORMAL DUCTILITY CLASS BARS TO AS4671
R DENOTES PLAIN ROUND GRADE 250 NORMAL DUCTILITY CLASS BARS TO AS4671
SL DENOTES SQUARE MESH GRADE 500 LOW DUCTILITY CLASS TO AS4671
TM DENOTES TRENCH MESH GRADE 500 LOW DUCTILITY CLASS TO AS4671
THE MEMBER IMMEDIATELY FOLLOWING THE BAR GRADE SYMBOL REPRESENTS THE NOMINAL BAR DIAMETER IN MILLIMETERS. THE FIGURES FOLLOWING THE MESH SYMBOL SL & RL IS THE REFERENCE NUMBER FOR MESH TO AS4671.

- C18 REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY IN TRUE PROJECTION.

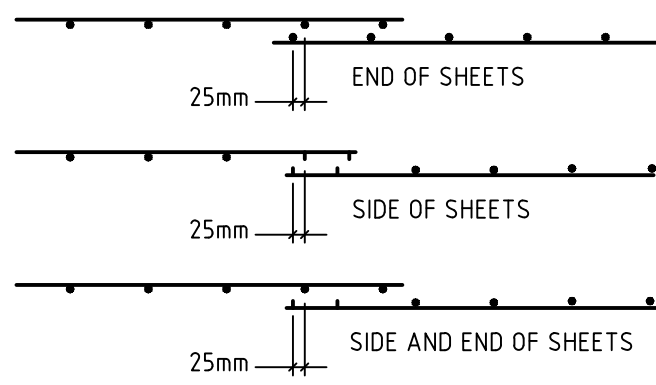
- C19 SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN POSITIONS SHOWN OR OTHERWISE APPROVED IN WRITING BY THE ENGINEER. LAPS SHALL BE IN ACCORDANCE WITH AS3600 AND NOT LESS THAN THE DEVELOPMENT LENGTH FOR EACH BAR.

- C20 STANDARD LAP AND COG LENGTHS UNLESS NOTED OTHERWISE ON DRAWINGS.

| BAR DIAMETER | MIN LAP LENGTH (mm) | MIN COG LENGTH (mm) |
|--------------|---------------------|---------------------|
| N12 | 500 | 180 |
| N16 | 750 | 210 |
| N20 | 1000 | 260 |
| N24 | 1375 | 310 |
| N28 | 1560 | 360 |

CONCRETE (CONTINUED)

- C28 MINIMUM MESH LAPS



REINFORCEMENT

- R1 ALL REINFORCEMENT BARS ARE TO BE D500N U.N.O.
- R2 ALL REINFORCEMENT WELDED MESHES TO BE GRADE 500L U.N.O.
- R3 WELDING OF REINFORCEMENT SHALL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.

CHEMICAL INJECTION ANCHORING (BOLTS/ANCHOR STUDS & REINFORCING BARS)

- A1 CHEMICAL INJECTION ANCHORING IS ONLY TO BE USED WHERE SPECIFIED ON THE DRAWINGS
- A2 UNLESS NOTED OTHERWISE ALL CHEMICAL ANCHORING IS TO BE COMPLETED WITH THE FOLLOWING:
- FOR CONCRETE SUBSTRATES USE RAMSET CHEMSET REO 502 EPOXY ADHESIVE
- FOR UNREINFORCED MASONRY USE RAMSET CHEMSET 101 PLUS
- A3 UNLESS NOTED OTHERWISE ALL ANCHOR STUDS SHALL BE GRADE 8.8 STEEL, ALL REINFORCING BARS SHALL BE D500N.
- A4 FOR BOLTS & ANCHOR STUDS ALL CONNECTIONS SHALL HAVE A MINIMUM OF TWO (2) BOLTS.
- A5 UNLESS NOTED OTHERWISE THE EMBEDMENT DEPTH, EDGE DISTANCE & SPACING SHALL BE IN ACCORDANCE WITH THE INSTALLATION DETAILS & OPTIMUM DIMENSIONS PROVIDED BY THE MANUFACTURER.
- A6 INSTALLATION IS TO BE STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS INCLUDING DRILLING, HOLE PREPARATION, CLEANING METHODOLOGY & TIGHTENING TORQUE ETC.
- A7 INSTALLATION MUST BE COMPLETED IN DRY HOLES UNLESS OTHERWISE APPROVED BY THE ENGINEER.

WATERPROOFING RESPONSIBILITIES :

THE WATERPROOFING SPECIFICATION, DETAILING AND INSTALLATION FOR THE ENTIRE PROJECT REMAINS THE RESPONSIBILITY OF THE BUILDER AND/OR THE ARCHITECT, AND THE ASSOCIATED WATERPROOFING CONTRACTORS. THIS INCLUDES BUT IS NOT LIMITED TO INTERNAL & EXPOSED SLABS, WALLS, EXPANSION JOINTS, CONSTRUCTION JOINTS AND WALL JOINTS. THE STRUCTURAL ENGINEER IS RESPONSIBLE FOR THE STRUCTURAL ELEMENTS ONLY. THE STRUCTURAL ENGINEER IS TO BE CONTACTED IF ADVICE IS REQUIRED REGARDING EXPECTED BUILDING MOVEMENTS.

NOTE :

THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS ON SITE. REFER ANY DISCREPANCIES TO COSTIN ROE CONSULTING PTY LTD BEFORE PROCEEDING WITH THE WORK.

SLAB CRACKING NOTE :

ATTENTION IS DRAWN TO THE FACT THAT DUE TO THE NATURE OF CONCRETE, CRACKING OF A NON-STRUCTURAL NATURE MAY OCCUR. REINFORCEMENT HAS BEEN ADDED TO THE SLABS TO MITIGATE THE EXTENT OF THE CRACKING HOWEVER IT IS NOT POSSIBLE TO GUARANTEE COMPLETE ELIMINATION OF SLAB CRACKING.

STRUCTURAL STABILITY NOTE :

THE BUILDER IS TO ENSURE THAT THE STABILITY OF THE STRUCTURE IS MAINTAINED THROUGHOUT THE PERIOD OF CONSTRUCTION.

GENERAL FRAMING NOTE :

ALL MATERIALS & WORKMANSHIP TO BE IN ACCORDANCE WITH AS 1270. TIMBER SIZES, TIE DOWNS & BRACING WHERE NOT INDICATED SHALL BE IN ACCORDANCE WITH AS 1684 OR NSW TIMBER FRAMING MANUAL. ROOF FRAMING TO BE PRE-FABRICATED TRUSSES DESIGNED BY ROOF TRUSS MANUFACTURER U.N.O. ON PLANS. LINTELS TO OPENINGS BY BUILDER U.N.O. ON THESE DRAWINGS. BUILDER TO MAKE ANY MODIFICATIONS TO THE FRAMING AS REQUIRED TO ENSURE ITS STRUCTURAL STABILITY. REFER TO COSTIN ROE CONSULTING PTY. LTD. ANY AREAS OF CONCERN.

NOTE :

THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL & OTHER CONSULTANTS DRAWINGS & SPECIFICATIONS & WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

FOR DEVELOPMENT APPLICATION

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | CLIENT PATRICK HILL 49 TRISTRAM ROAD BEACON HILL N.S.W. 2100 | | | PROJECT GARAGE & DRIVEWAY SLABS 49 TRISTRAM ROAD BEACON HILL N.S.W 2100 | | |  | | | Costin Roe Consulting Pty Ltd. Consulting Engineers 925 003 696 446 Level 1, 8 Windmill Street Walsh Bay, Sydney NSW 2000 Tel: (02) 9261-7699 Fax: (02) 9241-3731 email: mail@costinroe.com.au © | | | <div>Costin Roe Consulting</div> | | | DRAWING TITLE STRUCTURAL DRAWING LIST & GENERAL STRUCTURAL NOTES | | | | | | | | | | | | | | | | | | | | |
| ISSUED FOR DEVELOPMENT APPLICATION | | | 29.11.19 | | | A | | | DESIGNED D.N. | | | DRAWN B.C. | | | DATE NOV. 2019 | | | CHECKED | | | SIZE A1 | | | SCALE AS SHOWN | | | CAD REF: C014070.00 - S01 | | | <div>PRECISION COMMUNICATION ACCOUNTABILITY</div> | | | DRAWING No C014070.00 - S01 | | | ISSUE A | | |
| AMENDMENTS | | | DATE | | | ISSUE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

