

**OCCUPATIONAL HEALTH AND SAFETY**  
 DURING THE CONSTRUCTION AND CABLE INSTALLATION WORKS ASSOCIATED WITH BELOW GROUND STRUCTURES, WORK SHALL COMPLY WITH THE REQUIREMENTS OF THE RELEVANT OH&S ACTS AND REGULATIONS, INCLUDING CONFINED SPACE AND FALLS REQUIREMENTS.

- GENERAL NOTES**
- STABILITY OF THE BUILDINGS, TRANSFORMERS & OTHER EQUIPMENT & FOUNDATIONS DURING CONSTRUCTION & THE CONSEQUENCES OF EXCAVATION IN THE VICINITY OF ADJACENT STRUCTURES ARE THE BUILDER'S RESPONSIBILITY.
  - ALL PROPRIETARY ITEMS ARE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
  - ALL WORKMANSHIP AND MATERIALS ARE TO BE IN ACCORDANCE WITH THE CURRENT STANDARDS AUSTRALIA CODES AND BUILDING CODE OF AUSTRALIA.
  - DO NOT SCALE DRAWING. ALL DIMENSIONS ARE IN MILLIMETRES.
  - ALL LEVELS ARE IN METRES ON AUSTRALIAN HEIGHT DATUM UNLESS NOTED OTHERWISE.
  - ELECTRICAL SAFETY SHALL BE IN ACCORDANCE WITH AUSGRID'S ELECTRICAL SAFETY RULES, NS 95 AND AS REQUIRED BY AUSGRID SUPERINTENDENT.
  - MAINTAIN EARTHING GRID AT ALL TIMES. MAKING & BREAKING OF EARTHING CONNECTIONS WILL BE BY AUSGRID.
  - HANDLE & DISPOSE OF ALL CONTAMINATED MATERIAL IN ACCORDANCE WITH RELEVANT OH&S ACTS & REGULATIONS AND DECCW REQUIREMENTS.
  - IN CASE OF DOUBT - ASK

- FOUNDATIONS**
- FOR SHALLOW FOOTING SYSTEMS FOUNDATION MATERIAL SHALL HAVE A UNIFORM STABLE SAFE BEARING CAPACITY OF 100 kPa. FOUNDATION MATERIAL SHALL BE APPROVED FOR THIS PRESSURE BEFORE PLACING CONCRETE IN FOOTINGS.
  - FOOTING EXCAVATIONS SHALL BE CLEANED TO REMOVE ALL LOOSE OR SOFTENED MATERIAL PRIOR TO PLACING OF CONCRETE.
  - CONCRETE SHOULD BE PLACED AS SOON AS POSSIBLE AFTER EXCAVATION. IF EXCAVATIONS ARE LIKELY TO REMAIN OPEN FOR MORE THAN 24 HOURS A BINDING LAYER OF CONCRETE SHALL BE PLACED TO PROTECT THE FOUNDATION BASE.
  - THE CONTRACTOR SHALL PROVIDE GEOTECHNICAL INSPECTION & CERTIFICATION SERVICES BY A PRACTISING GEOTECHNICAL ENGINEER DURING THE WORKS. THE GEOTECH SHALL CONFIRM THAT THE FOUNDATION MATERIAL HAS THE MINIMUM BEARING CAPACITY AND A CERTIFICATE IS TO BE PRODUCED TO AUSGRID SUPERINTENDENT PRIOR TO PLACING CONCRETE FOUNDATIONS. ALL FOUNDATIONS SHALL BE CERTIFIED THAT THEY HAVE BEEN FOUND IN ACCORDANCE WITH THE DRAWINGS.

**CONCRETE NOTES:**

C1A. ALL CONCRETE MUST BE IN ACCORDANCE WITH THE CURRENT AS CODE 3600. ALL CONCRETE TO BE MANUFACTURED AND SUPPLIED IN QUALITY CONTROLLED CERTIFIED PLANT, IN ACCORDANCE WITH AS 1379. NO SITE MIXING PERMITTED. CONCRETE TESTS AS REQUIRED BY AS 1379 - CERTIFICATES TO BE PROVIDED AS FOLLOWS:

ITEM	REQUIREMENT
- SLUMP	- AS PER CODE
- 7 DAY STRENGTH	- IF REQUIRED
- 28 DAY CHARACTERISTIC STRENGTH	- FIRST TRUCK, 3rd TRUCK AND EVERY 5th TRUCK FOLLOWING BUT NOT LESS THAN CODE
- FLEXURAL STRENGTH	- FOR PAVING SLABS WHERE FLEXURAL STRENGTH IS SPECIFIED
- CHLORINE & SULPHATE CONTENT	- AS PER CODE
- DRYING SHRINKAGE	- AS PER CODE
- AIR CONTENT	- NOT REQUIRED

C2. CONCRETE QUALITY WATER/CEMENT RATIO SHALL NOT BE GREATER THAN 0.45. NO WATER TO BE ADDED ON SITE.

ELEMENT	MAX. AGG. SIZE	SLUMP	CHARACTERISTIC STRENGTH F' <sub>c</sub> (AS 3600) AT 28 DAYS	MAXIMUM SHRINKAGE STRAIN
SLABS	20 mm	80 mm	32 MPa	650
WALLS	20 mm	80 mm	32 MPa	650

C3. CLEAR CONCRETE COVER IN mm TO REINFORCEMENT UNLESS NOTED OTHERWISE.

ELEMENT	FORMED & SHELTERED	FORMED & EXPOSED	AGAINST EARTH
SLABS	40 mm	45 mm	65 mm
WALLS	40 mm	45 mm	65 mm

- NO ADMIXTURES ARE TO BE ADDED TO CONCRETE WITHOUT THE PRIOR WRITTEN APPROVAL OF THE AUSGRID STRUCTURAL ENGINEER.
- CONCRETE SHALL NOT BE POURED ON HOT WINDY DAYS WITH EVAPORATION RATES GREATER THAN 15 l/m<sup>2</sup>/h WHERE THE EVAPORATION RATE IS ABOVE 0.6 l/m<sup>2</sup>/h IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS TO PREVENT PLASTIC SHRINKAGE CRACKING.
- ALL CONCRETE SHALL BE CURED IMMEDIATELY AFTER FINISHING CONCRETE TO ENSURE THE PREVENTION OF CRACKING AND TO SATISFY THE REQUIREMENTS OF STRENGTH, SERVICEABILITY AND DURABILITY. ALL CONCRETE SURFACES TO BE KEPT CONTINUOUSLY WET FOR 7 DAYS AND THEN ALLOWED TO GRADUALLY DRY OUT. THE USE OF SPRAYED MEMBRANE-FORMING CURING COMPOUNDS COMPLYING WITH AS 3799 SHALL BE PERMITTED, SUBJECT TO PRIOR APPROVAL BY THE AUSGRID STRUCTURAL ENGINEER.
- SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITIONS SHOWN & SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCEMENT.
- ALL REINFORCEMENT TO BE ACCURATELY PLACED IN POSITION SHOWN & TIED & ADEQUATELY SUPPORTED TO GIVE SPECIFIED COVER.
- CONCRETE SIZES SHOWN DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
- CONDUITS PIPES ETC. MUST NOT BE PLACED IN CONCRETE COVER OR HOLES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE ALLOWED UNLESS APPROVED IN WRITING BY THE AUSGRID STRUCTURAL ENGINEER.
- ALL TIE RODS WHEN NOT SHOWN ON THE DRAWING SHALL BE M12-200 PROVIDE M12 TIES AS REQUIRED TO SUPPORT REINFORCEMENT BARS IF STANDARD BAR CHAIRS ARE OF INADEQUATE HEIGHT.
- ALL BAR CHAIRS TO BE PLASTIC OR CONCRETE TYPE UNLESS NOTED OTHERWISE. STEEL BAR CHAIRS PERMITTED IN SWITCHYARD FOOTINGS ONLY.
- CONCRETE ELEMENTS SHALL BE FINISHED IN ACCORDANCE WITH AS 3610 AS FOLLOWS (OTHERWISE AS ON DWG).

ITEM	FORMED SURFACE FINISH (AS3610)	UNFORMED SURFACE FLATNESS (TOLERANCE CLASS)	UNFORMED SURFACE FINISH METHOD
BUNDS	CLASS 3	C	STEEL TROWEL

C14. UNFORMED SURFACE FLATNESS TOLERANCE SCHEDULE

TOLERANCE CLASS	MEASUREMENT	MAXIMUM DEVIATION
A	3 m STRAIGHT EDGE	3
B	3 m STRAIGHT EDGE	6
C	600 mm STRAIGHT EDGE	6

- UNFORMED ELEMENTS IN CONTACT WITH THE GROUND (EXCEPT FOR FOOTINGS) SHALL BE SEPARATED WITH A POLYMERIC FILM UNDERLAY TO AS2870 MINIMUM THICKNESS 200 MICRONS.
- EXTERNAL EMBEDDED ITEMS SHALL BE PLACED SO THAT THEY ARE NOT WITHIN THE ZONE OF CONCRETE COVER REQUIRED TO PROTECT THE REINFORCEMENT.
- THE EXPOSED EDGE OF THE CONCRETE SHALL BE FINISHED WITH A 10mm RADIUS CORNER UNO.

- REINFORCEMENT SYMBOLS**
- RL DENOTES RECTANGULAR LOW DUCTILITY REINFORCING FABRIC TO AS/NZS 4671
  - SL DENOTES SQUARE LOW DUCTILITY REINFORCING FABRIC TO AS/NZS 4671
  - R DENOTES STRUCTURAL GRADE ROUND BAR TO AS/NZS 4671
  - N DENOTES 500 GRADE DEFORMED BAR NORMAL DUCTILITY TO AS/NZS 4671
  - C DENOTES COLD WORKED DEFORMED BAR TO AS/NZS 4671
- THE NUMBER FOLLOWING THE SYMBOLS R, N AND C IS THE BAR DIAMETER IN MILLIMETRES

**INSPECTION & CERTIFICATION**

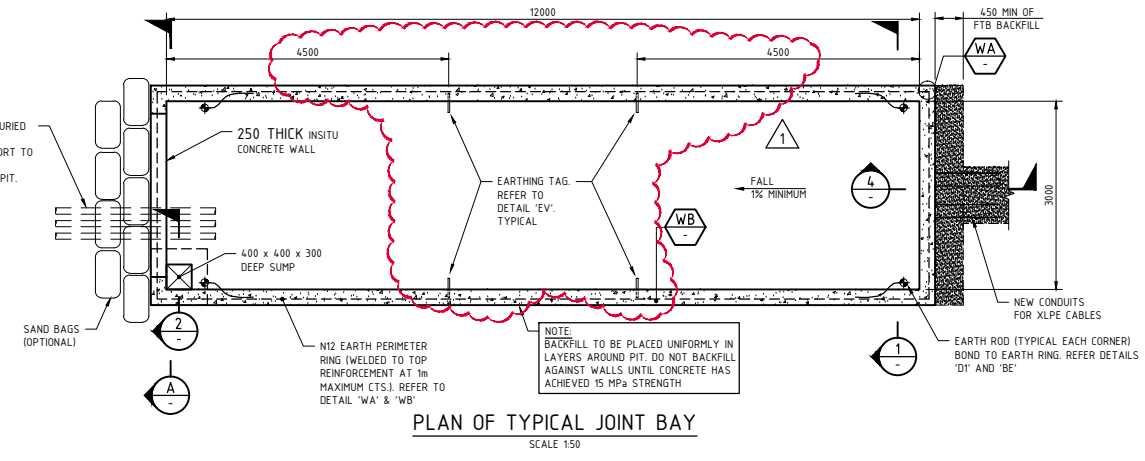
- UNLESS NOTED OTHERWISE IN THE SPECIFICATION THE FOLLOWING INSPECTION HOLD POINTS AND CERTIFICATES ARE REQUIRED:
- HOLD POINTS TO ALLOW FOR INSPECTION SHALL BE:
    - FOUNDATION MATERIAL
    - FORMWORK
    - REINFORCING & EMBEDDED EARTHING
  - THE BUILDER SHALL PROVIDE THE FOLLOWING TEST RESULTS AND OTHER CERTIFICATES:
    - GEOTECHNICAL ENGINEER'S CERTIFICATE ON THE SAFE BEARING CAPACITY OF THE FOUNDATION MATERIAL
    - CONCRETE TEST RESULTS AS DETAILED IN CONCRETE NOTE C1
    - FORMWORK DESIGN AND CONSTRUCTION ENGINEERS CERTIFICATE
    - WELD TEST CERTIFICATES
    - BUILDERS CERTIFICATION OF FINISHED BUILDING WORKS
  - WORKS 'AS BUILT' DRAWINGS SHALL BE SUBMITTED BY THE BUILDER AT THE COMPLETION OF THE PROJECT.
  - THE EMBEDDED EARTHING SHALL BE INSPECTED BY AUSGRID EARTHING ENGINEER PRIOR TO POURING CONCRETE. THIS SHALL CONSTITUTE A HOLD POINT.

**EARTHING NOTES**

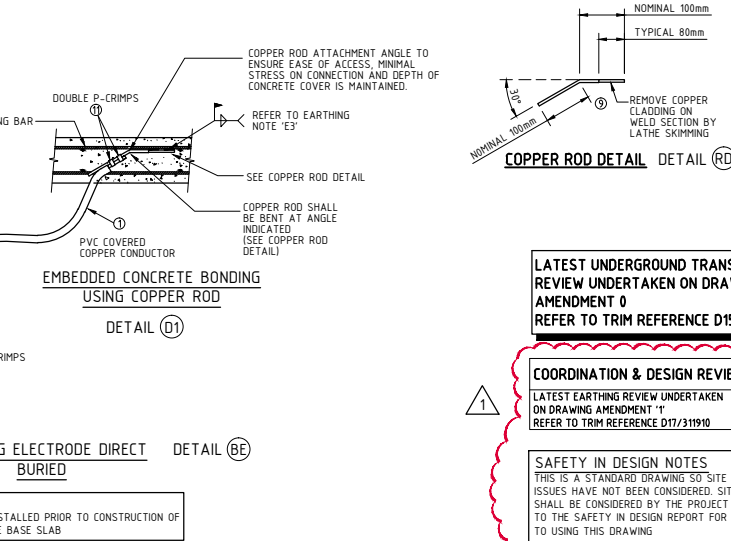
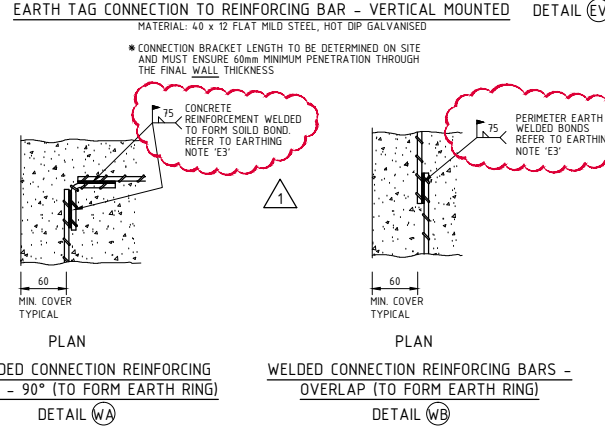
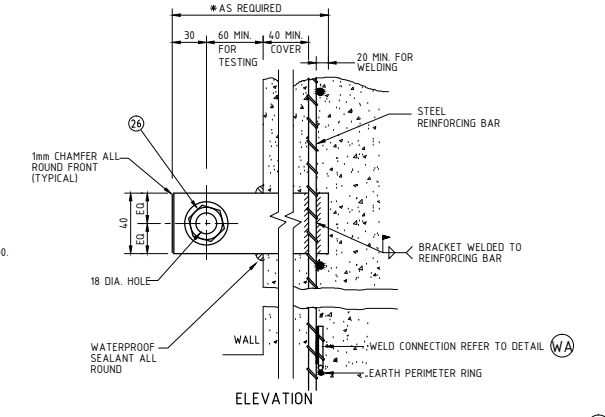
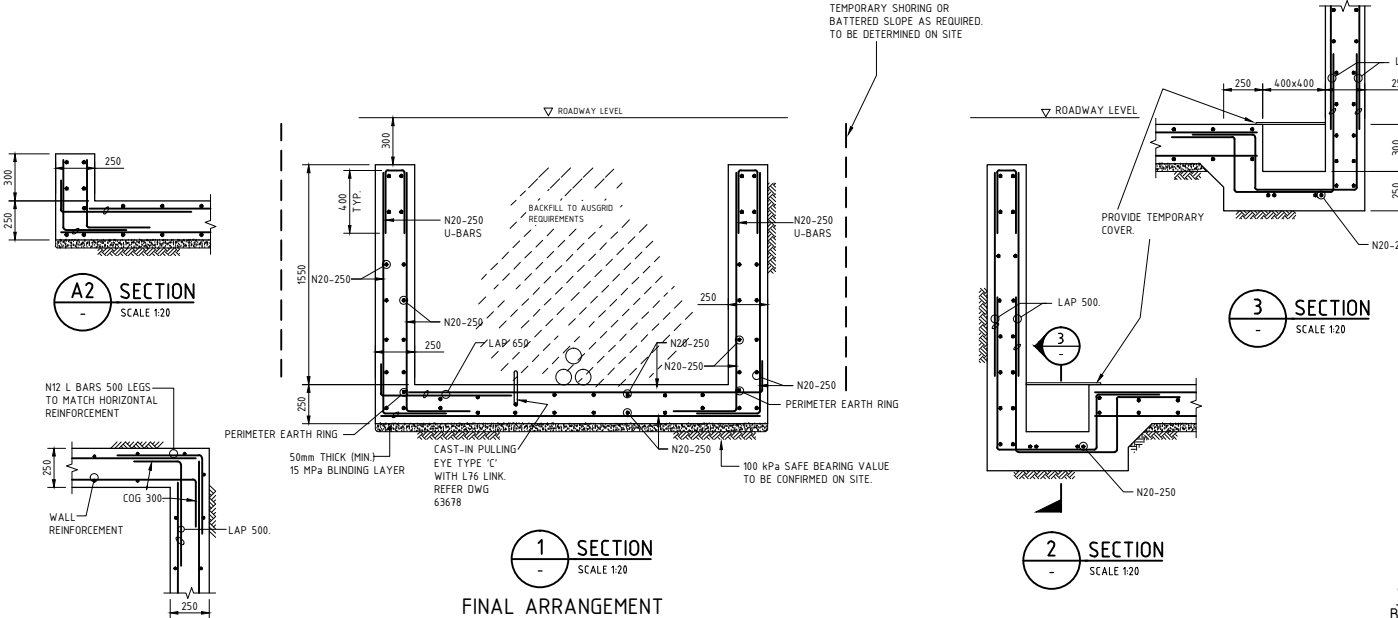
- THE STEEL REINFORCEMENT IS TO BE WELDED TO FORM A CONTINUOUS ELECTRICAL PATH DESIGNATED AS A PERIMETER EARTH RING. A MINIMUM OF ONE (1) EARTH BOND IS TO BE CONNECTED TO THE PERIMETER EARTH RING IN ACCORDANCE TO THE SPECIFIED METHOD. REFER TO SITE SPECIFIC EARTHING DRAWINGS FOR DETAILS OR CONTACT 'EARTHING AND INSULATION CO-ORDINATION'.
- AUSGRID TO SUPPLY EMBEDDED EARTH BOND.
- ALL WELDS TO BE IN ACCORDANCE TO AUSGRID'S EARTHING SPECIFICATION AND TO BE MINIMUM OF 75mm IN LENGTH.
- THE EMBEDDED EARTHING SHALL BE INSPECTED BY AUSGRID EARTHING ENGINEER PRIOR TO POURING CONCRETE. THIS SHALL CONSTITUTE A HOLD POINT.
- FOR JOINT BAY ELECTRICAL EARTHING LAYOUT AND DETAILS SEE DRAWING No. 217795. IF REQUIRED.

ITEM No.	ITEM	DESCRIPTION	STOCK CODE	PRODUCT CODE	QTY.
26	EARTH STUBB	EARTH STUBB - MCKEOWN REFERENCE DRAWING A3-530088	H108415		4
12	EARTHING COMPOUND	EARTHING COMPOUND - "GOOD EARTH" 15kg BAG USE AROUND ELECTRODE IN PIT	99861	JB5 02342012	AS RECD
11	CONNECTOR COMPRESSION	CONNECTOR - 70mm <sup>2</sup> BURNDY STYLE YGHP CRMP	H31699	BURNDY YGHP29C26	16
9	ELECTRODE DRIVEN EARTH	#15mm - 1800 LONG COPPER CLAD EARTH ELECTRODES	H31631	ERICO 615860EA	AS RECD
1	CONDUCTOR	BLACK PVC COVERED STRANDED CU CONDUCTOR - 70mm <sup>2</sup>	60111		AS RECD

EARTHING - MATERIALS LIST



NOTE:  
NOT TO BE USED IN ACID SULPHATE SOILS



**LATEST UNDERGROUND TRANSMISSION REVIEW UNDERTAKEN ON DRAWING AMENDMENT 0 REFER TO TRIM REFERENCE D15/355090**

**COORDINATION & DESIGN REVIEW**  
 LATEST EARTHING REVIEW UNDERTAKEN ON DRAWING AMENDMENT 1 REFER TO TRIM REFERENCE D17/31910

**SAFETY IN DESIGN NOTES**  
 THIS IS A STANDARD DRAWING SO SITE SPECIFIC SAFETY ISSUES HAVE NOT BEEN CONSIDERED. SITE SPECIFIC ISSUES SHALL BE CONSIDERED BY THE PROJECT DESIGN TEAM. REFER TO THE SAFETY IN DESIGN REPORT FOR THE PROJECT PRIOR TO USING THIS DRAWING

**AMENDMENTS**

NO.	ISSUED FOR	DATE	BY
0	ISSUED FOR CONSTRUCTION PLAN AND DETAILS 'WA', 'WB' & 'WB'	19/05/2015	PAUL LOVARINI
1	REVISED EARTHING NOTE 'E5'	19/05/2015	PAUL LOVARINI

CHKD: J. ABDULLA  
 DATE: 29/03/17  
 APPD BY: K. GALLEN



SCALE	AS SHOWN
DESIGNED	PAUL LOVARINI
DRAWN	ALEX SPITERI
CHECKED	JOHN MESSIH
APPROVED	KATINA GALLEN
DATE	19/05/2015
TRIM REF	2010/21560
PROJECT NUMBER	SJ-06136

**132kV UNDERGROUND CABLE STANDARD CONSTRUCTION 12m XLPE/OIL TRANSITION JOINT BAY STRUCTURAL DETAILS**

DRAWING No	236374	SHEET	1	AMD	1	SIZE	B1
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ASSOCIATED DRAWINGS