Network Standard

Document No.
NS135

Title:
Construction of 33kV, 66kV and 132kV Overhead Mains

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Revision

No	Date	Description	Technical Approver	Authorised By
4	29/08/2025	Conversion to the new Network Standard template	Duminda Thenuwara	Jacob Bayley
5	16/10/2026	Removed four drawings (203726, 203727, 203728 and 203729) and added three drawings (275282, 275283 and 275284)	Duminda Thenuwara	Stephen Poropat

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Scope

This Network Standard is Ausgrid's specification for the construction of overhead sub-transmission (33kV, 66kV and 132kV) lines that form part of the Ausgrid network. This standard and the standard construction drawings listed in Annexure B, describes Ausgrid's requirements for new construction and replacement or refurbishment of existing overhead sub-transmission lines.

Reference Documents

All work covered in this document shall conform to all relevant Legislation, Standards, Codes of Practice and Network Standards.

Ausgrid Documents

Electrical Safety Rules

NS001 Glossary of Terms

NS125 Construction of Low Voltage Overhead Conductors

NS126 Construction of High Voltage Overhead Mains

NS128 Pole Installation and Removal

NS156 Working Near or Around Underground Cables

NS167 Positioning of Poles and Lighting Columns

NS179 Vegetation Management

NS203 Telecommunications Network: Master Policy Document

NS215 Telecommunications Allocation and Recording of Fibre Use Design Work Instruction

NS220 Overhead Design Manual

NS260 Sub-transmission Feeder Earthing Design

NS264 Major Substation Lightning Protection and Insulation Coordination

NS268 Design and Construction of Waterway Crossings

Other Standards and Documents

AS/NZS 3835 Earth potential rise – Protection of telecommunications network users, personnel and plant – Code of practice

AS/NZS 4853 Electrical hazards on metallic pipelines

AS/NZS 7000 Overhead Line Design – Detailed Procedures (previously ENA C(b)1 Guidelines for Design and Maintenance of Overhead Distribution and Transmission Lines)

HB 87 Joint use of poles: The placement on poles of power lines and paired cable telecommunications lines

HB 88 Unbalanced high voltage power lines: Code of practice for the mitigation of noise induced into paired cable telecommunications lines from unbalanced high voltage power lines

HB 101 Coordination of power and telecommunications - Low Frequency Induction (LFI): Code of practice for the mitigation of hazardous voltages induced into telecommunications lines

HB 102 Coordination of power and telecommunications - Low Frequency Induction (LFI): application guide to the LFI code

HB 103 Coordination of power and telecommunications - crossing code: the arrangement of overhead power and telecommunications lines, pole stay wires and suspension wires

HB 331 Handbook – Overhead Line Design

ISSC 20 Guideline for the Management of Activities within Electricity Easements and Close to Electricity Infrastructure

Clause	Standard Requirements

1 Selection

1.1 The designer shall follow the general design approach and conductor selection in NS220.

1.2 Ausgrid reserves the right to nominate which conductor to use in any given situation.

1.3 Construction type selection

1.3.1 Flat pin construction (e.g. for 33kV; Construction 4-1) shall be used only if there is no reasonable alternative e.g. when under-building the circuit or for under-crossing structures.

1.3.2 Where flat constructions are used, the centre phase must be alternated from one side of the pole to other on each successive pole.

1.3.3 Where it is impractical to alternate the side of the pole on which the centre phase is located, the sag/tension/span length must be adjusted appropriately to maintain the specified *k* factor as discussed in NS220.

1.4 Conductor selection

1.4.1 For sub-transmission lines, in addition to the requirements in NS220, the designer shall:

- Include assessment of voltage support and line regulation.
- Select conductor sizes to ensure regulation is kept within defined limits.
- Use transposition structures where necessary.
- Ensure line losses are kept within the specified limits
- Where appropriate to the proposed line, information on limits to losses or regulation shall be nominated in the Design Brief.

1.4.2 The Design Brief shall specify either the loading and voltage drop requirements for the circuit to be constructed or the conductor to be used.

1.5 Crossarm selection

1.5.1 Composite crossarms shall be used where they are included as an option on the standard construction drawing.

1.5.2 Some standard construction drawings do not include a composite crossarm in the length and drilling pattern required. In these cases, a timber or steel crossarm shall be used as shown on the standard construction drawing.

1.6 Pole selection

1.6.1 Pole selection shall be according to the pole selection requirements outlined in NS128.

1.6.2 Pole positioning shall be according to the pole position requirements in NS167.

1.7 Insulator selection

1.7.1 For post insulator and long rod insulators, polymeric insulators shall be used where possible.

1.7.2 Damaged insulators/surge arresters shall not be installed.

1.8 Line switch selection

1.8.1 Line switches shall only be used with 33kV and 66kV lines.

1.8.2 Line switches shall be erected in locations accessible to vehicles in all weather conditions, wherever possible.

2 Installation of mains within zone and transmission substations

2.1 Where overhead mains are installed within the boundaries of Ausgrid's Zone or Transmission substations, some of the requirements of this Network standards may be varied provided a risk assessment is undertaken.

2.2 Minimum clearances and approach distances shall be according to the requirements in AS 2067 - Substations and High Voltage Installations Exceeding 1 kV A.C.

3 Earthing

3.1 An earth fault assessment is required for earthing systems associated with new sub-transmission lines.

3.2 Earthing systems shall show safety compliance with the applicable standards AS/NZS 7000, NS260 and HB 331.

3.3 Earthing associated with sub-transmission assets within 20m of distribution earthing or metallic infrastructure shall only be considered where no suitable alternative exists. An earth fault assessment must be completed to demonstrate safety compliance with applicable standards ISSC 20 and NS260.

4 Overhead earth wires and telecommunication cables

4.1 Overhead earth wires

4.1.1 All new Overhead earth wires (OHEW) installations that run the entire length of the line shall be Optical ground wire (OPGW).

4.1.2 On new or refurbished 132kV lines, the OHEW shall be erected for the entire length of the line, with at least one OHEW per circuit.

4.1.3 On new 33kV and 66kV lines the OHEW shall be erected for the whole length of the line.

4.1.4 On existing/refurbished 33kV and 66kV lines, the minimum OHEW length requirements are given below.

Table 1

	33kV	66kV
Minimum OHEW length* requirements from substations connected to sub-transmission overhead lines	1600m	800m

*Minimum OHEW length can be reduced if approved by Engineering.

4.1.5 For horizontal multi-pole construction at any voltage, at least two OHEWs shall be used - one erected at the top of each pole. Where three-pole structures are erected on a predominantly two-pole structure line, the two OHEWs shall be attached as per standard construction drawings.

4.1.6 An earth connection shall be made at every structure supporting an OHEW, in accordance with the appropriate earthing arrangement drawings specified in the standard construction drawings.

4.2 Buried earth electrodes

4.2.1 Buried earth electrode and conductor systems shall be in accordance with the requirements of NS260 Sub-transmission Feeder Earthing.

4.3 Optical ground wire (OPGW)

4.3.1 Where OPGW is installed, coils shall be provided at known fibre connection points in urban areas.

4.3.2 In rural areas coils shall be provided as specified on a case-by-case basis by Ausgrid.

4.3.3 The coils are required to reach the ground plus 20 metres to permit connections to be made at ground level.

4.3.4 For all new OPGW installations, a Fibre Optic Cable Name/number shall be allocated to it (refer to NS215). These details shall be obtained from the Optic Fibre Cable Registries maintained by Ausgrid's Control and Protection Engineering.

4.3.5 If an additional communications circuit is required for control and protection engineering compliance under the NER, this shall be specified in a separate Telecommunications Brief – Physical Infrastructure.

4.3.6 For feeders originating from a substation OHEW shall be used for the first span from landing structure to "first pole" outside yard. OPGW shall then be continued from the first pole. New telecommunications UGOH to be installed on first pole as per NS235, with conduits and underground fibre optic cable from UGOH pit to switchyard / control room. 40m cable coil of UGFO to be provisioned in pit + OPGW cable coil on first pole.

4.4 Above ground and underground telecommunication systems

4.4.1 All lines must comply with the requirements of the following Standards Australia publications and NS260:

- AS/NZS 3835
- HB 87, HB 88, HB 101, HB 102 and HB 103

4.4.2 Where lines are to be constructed close to or crossing rail corridors, existing railway communications circuits must be considered.

5 Clearance Criteria

5.1 All clearances shall be met at the time the network is built or altered in any way, including construction of new lines, pole replacements or relocations, conductor replacements and crossarm replacements.

5.2 Clearances specified in NS220 and NS179 shall be met.

6 Construction

6.1 Lines shall be constructed in accordance with the standard construction drawings listed in Annexure B.

6.2 Polymeric Insulators

6.2.1 Polymeric insulators shall be handled with care in accordance with NSA 1494 Polymeric Insulator Handling Guide.

6.2.2 Construction methods which subject a polymeric insulator to a force or load which is greater than its design limit shall not be used.

6.3 Conductor erection

6.3.1 Conductors shall normally be erected using the pulling-in method.

6.3.2 Stringing using helicopters or large-scale drones is permitted where appropriate, and with sufficient processes/approvals in place.

6.3.3 Use of the paying-out method may be permitted where other methods are not practicable after approval has been obtained from Ausgrid's Engineering.

6.3.4 Where the paying-out method is used, adequate measures shall be taken to prevent conductors suffering mechanical damage such as scratching or deformation.

6.4 Use of hurdles

6.4.1 Where new conductors are to be strung crossing existing circuits that remain in service for part or all of the stringing operations, a risk assessment shall be completed to determine if temporary hurdles are required to be installed to protect the in-service mains from falling conductors.

6.4.2 The hurdle shall be capable of catching and supporting any conductor of the new or re-conductored span and keep it at least the minimum safe approach distance away from the in-service conductors.

6.4.3 If the upper conductor of the in-service circuits is an overhead earthwire, a minimum clearance of one metre shall be maintained between the hurdle and the earth wire in the event of a fallen conductor.

6.4.4 The hurdle shall be strong enough to support the maximum number of conductors likely to be pulled at one time under the worst conditions likely to be encountered (i.e. position in conductor pull that maximises the weight of the conductor the hurdle must support).

6.4.5 Strength calculations shall allow for the maximum permissible wind speed under which conductor stringing is permitted to be undertaken.

6.4.6 The hurdle shall be structurally stable so that in the event of a fallen conductor, it is not prone to lean dangerously towards the in-service mains or fall onto roads or adjacent land.

6.4.7 The hurdle supports shall be located no closer to the in-service conductors than the minimum safe approach distances specified in Ausgrid's Electrical Safety Rules for the highest voltage of the in-service mains.

6.4.8 The webbing or supporting mesh shall be nonconductive.

6.4.9 Hurdles are to be designed by suitably qualified person. Approval for the use of the hurdle shall be obtained from Ausgrid's Engineering, in consultation with Ausgrid's Design.

6.4.10 Hurdles or other forms of conductor support may also be required for crossings of major roads, depending on the requirements of the relevant road's authority.

6.5 Construction records

6.5.1 The following information shall be recorded and submitted to Ausgrid's Mains Engineering:

- The Conductor Tensioning Report, as shown in Annexure A.
- The serial number and calibration date of all instruments used for recording the above measurements.

6.6 Commissioning tests

6.6.1 After completion of construction of a new section of overhead sub-transmission line, the following tests shall be completed:

- Both calculated and measured Line impedance (zero and positive sequence) measurements.
- Insulation resistance check, to ensure no inadvertent short circuits.

6.6.2 For lines with an OHEW, earth current injection tests and the following measurements at each earthed support structure shall be completed to confirm compliance with AS 4853, AS 3835 and AS/NZS 7000. These tests and measurements shall only be done after the substation earth mats at all ends of the line are fully installed and connected to the feeder earthing system:

- structure earth impedance,
- step and touch potentials, and
- earth potential rise and associated soil voltage contour.

6.6.3 All values measured shall be recorded in a commissioning report and submitted to the Ausgrid Earthing Engineer assigned to the project.

6.7 Railway crossings

Where poles are positioned near a rail corridor, it must meet the requirements of NS167 and clearances in NS220.

6.8 Navigable waterway crossings

Where a section of line crosses a navigable waterway, it must meet the requirements of NS268 and clearances in NS220.

6.9 Pole installation and removal

Pole installation and removal must meet the requirements set out in NS128, NS167 and NS220.

6.10 Painting of poles

Painting of poles must meet the requirements in NS220.

6.11 Stay of poles

Where poles are required to be stayed, it must meet the requirements of NS220.

6.12 Conductor fittings

Conductor fittings shall meet the standard construction drawings listed in Annexure B.

6.13 Redundant mains and hardware

6.13.1 Where overhead mains are redundant, the designer must make provision in the design to remove redundant assets when work is identified on the pole structure.

6.13.2 All redundant hardware, including connectors, shall be removed at the time it is made redundant.

6.13.3 Any other redundant hardware already present shall also be removed.

Annexure A: Overhead Mains Tensioning Report

Overhead Mains Tensioning Report

Ausgrid or Contractor / ASP: ..... Contract Name/Description: .....

Contract No.: ..... Report No.: .....

Week Ending: .....Project No.:.....

1. Tensioning Section

This tension section is from Structure No. ..... to Structure No. .....

2. Contract Reference Data

Contract Reference Data for Tension Section	Drawing No.	Sheet No.	Revision No.
Route Plan			
Line structure			
OHEW / OPGW Stringing Chart			
HV Phase Stringing Chart			
Other Conductor Stringing Chart			

3. Sagging Checks

a.	Selected spans for tension checks: (1) Structure No. ..... to Structure No. ..... (2) Structure No. ..... to Structure No. .....
b.	Control span is: Structure No. .... to Structure No. ....., Span length ..... metres

4. Record of Sagging Actually Carried Out

	Ambient Conductor Temp °C	Date/Time of Reading	Temp Curve Used on Chart (From Stringing Chart)	Equiv Span (m) (From Line Schedule)	Date and Time	Sag in Control Span		% Sag	Sag in Span (1)		% Sag	Sag in Span (2)		% Sag
						Req'd	Actual		Req'd	Actual		Req'd	Actual	
OHEW OPGW Stringing Chart														
HV Phase Stringing Chart														
Other Conductors stringing Chart														
						Span length (m)			Span length (m)			Span length (m)		

5. Declaration

I declare that I am competent to sag conductors.

The above is submitted as a true and correct record of work

I submit and declare the sagging has been completed in accordance with correct design and sag tolerances specified.

..... Date: ..... / ..... / ..... Time: .....am/pm.

For Ausgrid or Contractor (Supervisor)

Annexure B: Standard Construction Drawings

Drawing Number	Construction Code	Drawing Description
		33kV Constructions
166244(1/2)	4-120	UGOH ON CONCRETE POLE 630MM^2 TO 1200MM^2 GENERAL ARRANGEMENT
166244(2/2)	4-120	UGOH ON CONCRETE POLE TO SUIT 630MM^2 TO 1200MM^2 GENERAL ARRANGEMENT DETAILS AND MATERIAL LIST
232985(1/3)	-	UGOH ON CONCRETE POLE 300MM^2 TO 1200MM^2 FLEXIBLE NON SELF SUPPORTING TERMINATIION GENERAL ARRANGEMENT
232985(2/3)	-	UGOH ON CONCRETE POLE 300MM^2 TO 1200MM^2 FLEXIBLE NON SELF SUPPORTING TERMINATIION DETAILS & MATERIAL LIST
232985(3/3)	-	UGOH ON CONCRETE POLE 300MM^2 TO 1200MM^2 FLEXIBLE NON SELF SUPPORTING TERMINATIION POLE HEAD TYPES
127143	4-11C	THROUGH TERMINATION CONSTRUCTION ON CONCRETE POLE
127144	4-33C/E	VERTICAL TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
166707(1)	4-455	AK POWER MID POLE OPERATED AIR BREAK SWITCH FOR TIMBER, CONCRETE AND STEEL POLES GENERAL ARRANGEMENT
166707(2)	4-455	NGK STANGER MID POLE OPERATED AIR BREAK SWITCH FOR TIMBER, CONCRETE AND STEEL POLES GENERAL ARRANGEMENT
166707(3)	4-455	1250A NON LOAD BREAK INSULECT MID POLE OPERATED AIR BREAK SWITCH FOR TIMBER, CONCRETE, & STEEL POLES GENERAL ARRANGEMENT
174122	4-34C/E	VERTICAL ANGLE POLE CONSTRUCTION WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
174126	4-1C/E	HORIZONTAL PIN CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
174127	4-8C/E	DELTA CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
174128	4-9C/E	DELTA CONSTRUCTION WITH OVERHEAD EARTHWIRE TERMINATION ON CONCRETE POLE
174181	4-10E	TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE
174184	4-10C/E	TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
174243	4-25C/E	DELTA TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
174244	4-17C/E	THROUGH TERMINATION TEE-OFF CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
174245	4-25E	DELTA TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE
174380	4-27C/E	DELTA CORNER POLE TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
174424	4-30E	LARGE DELTA THROUGH TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE
174425	4-30C/E	LARGE DELTA THROUGH TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
174426	4-31C/E	LARGE DELTA CORNER POLE TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
174427	4-35E	DELTA CONSTRUCTION WITH SUSPENDED OVERHEAD EARTH WIRE
174443	4-170C/E	SUSPENSION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
174444	4-171	SUSPENSION CONSTRUCTION
185415	4-200	VERTICAL DELTA CONSTRUCTION

Drawing Number	Construction Code	Drawing Description
		33kV Constructions
185416	4-200E	VERTICAL DELTA CONSTRUCTION WITH OVERHEAD EARTH WIRE
185417	4-200C/E	VERTICAL DELTA CONSTRUCTION WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
185418	4-240	VERTICAL CONSTRUCTION
185419	4-240E	VERTICAL CONSTRUCTION WITH OVERHEAD EARTH WIRE
185420	4-240C/E	VERTICAL CONSTRUCTION WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
185511	4-208E	VERTICAL DELTA CONSTRUCTION WITH OVERHEAD EARTH WIRE ON BRACKET
185512	4-208C/E	VERTICAL DELTA CONSTRUCTION WITH OVERHEAD EARTH WIRE ON BRACKET ON CONCRETE POLE
185513	4-248E	VERTICAL CONSTRUCTION WITH OVERHEAD EARTH WIRE ON BRACKET
185514	4-248C/E	VERTICAL CONSTRUCTION WITH OVERHEAD EARTH WIRE ON BRACKET ON CONCRETE POLE
248460(1/2)	-	UGOH CONSTRUCTION ON TIMBER POLE DOUBLE POINT BONDED EARTHING SYSTEM OPTIONAL LV & STREETLIGHT ATTACHMENTS GENERAL ARRANGEMENT
248460(2/2)	-	UGOH CONSTRUCTION ON TIMBER POLE DOUBLE POINT BONDED EARTHING SYSTEM OPTIONAL LV & STREETLIGHT ATTACHMENTS DETAILS AND MATERIAL LIST
248461(1/2)	-	UGOH CONSTRUCTION ON TIMBER POLE SINGLE POINT BONDED EARTHING SYSTEM OPTIONAL LV & STREETLIGHT ATTACHMENTS GENERAL ARRANGEMENT
248461(2/2)	-	UGOH CONSTRUCTION ON TIMBER POLE SINGLE POINT BONDED EARTHING SYSTEM OPTIONAL LV & STREETLIGHT ATTACHMENTS DETAILS AND MATERIAL LIST
513923	4-1	HORIZONTAL PIN CONSTRUCTION
513924	4-3	ANGLE SUSPENSION CONSTRUCTION
204109	4-4	¾ OFFSET ARM CONSTRUCTION
513925	4-5	SMALL DELTA CONSTRUCTION
513926	4-6	DELTA CONSTRUCTION
513927	4-7	LARGE DELTA CONSTRUCTION
513928	4-8E	DELTA CONSTRUCTION WITH OVERHEAD EARTHWIRE
513929	4-10	TERMINATION CONSTRUCTION
513930	4-11	THROUGH TERMINATION CONSTRUCTION
513931	4-12	CORNER POLE TERMINATION CONSTRUCTION
513932	4-14	TEE-OFF CONSTRUCTION
513933	4-25	DELTA TERMINATION CONSTRUCTION
513934	4-26	DELTA THROUGH TERMINATION CONSTRUCTION
513935	4-28	RAILWAY DELTA TERMINATION CONSTRUCTION WITH RHS GALVANISED CROSSARM
513936	4-30	LARGE DELTA THROUGH TERMINATION CONSTRUCTION
513937	4-31	LARGE DELTA CORNER POLE TERMINATION CONSTRUCTION
513938	4-33	TERMINATION CONSTRUCTION
513944	4-27	DELTA TERMINATION CORNER POLE CONSTRUCTION
513957	4-60	THROUGH TERMINATION WITH GREATER THAN 4kA DROPOUT FUSES

Drawing Number	Construction Code	Drawing Description
		33kV Constructions
514039	4-2	OFFSET ARM CONSTRUCTION
514169	4-11E	THROUGH TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE
514170	4-12E	CORNER POLE TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE
514171	4-27E	DELTA CORNER POLE TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE
514172	4-31E	LARGE DELTA CORNER POLE TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE
514173	4-26E	DELTA THROUGH TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE
519448	4-33E	VERTICAL TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE
519449	4-34E	VERTICAL ANGLE POLE CONSTRUCTION WITH OVERHEAD EARTH WIRE
520242	4-11C/E	THROUGH TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
520270	4-9E	DELTA CONSTRUCTION WITH OVERHEAD EARTHWIRE
520271	4-17E	THROUGH TERMINATION TEE-OFF CONSTRUCTION WITH OVERHEAD EARTHWIRE
520315	4-1 E	HORIZONTAL PIN CONSTRUCTION WITH OVERHEAD EARTHWIRE
520388	4-131	POLE HEATSHRINK TERMINATION FOR 3 SINGLE CORE CABLES EARTH BONDED SCREEN SYSTEM
520407	4-170	SUSPENSION CONSTRUCTION ON TIMBER POLE
520408	4-170E	SUSPENSION CONSTRUCTION ON TIMBER POLE WITH OVERHEAD EARTHWIRE
520409	4-34	VERTICAL ANGLE POLE CONSTRUCTION
520791		AIR BREAK SWITCH – ABB TYPE D746 MID POLE MOUNTED GENERAL ASSEMBLY
527025	4-130	POLE HEATSHRINK TERMINATION FOR 3 SINGLE CORE CABLES SINGLE POINT BONDED SYSTEM
565712	4-35C/E	DELTA CONSTRUCTION WITH SUSPENDED OVERHEAD EARTH WIRE ON CONCRETE POLE
565739	4-12C/E	CORNER POLE TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
565787	4-26C/E	DELTA THROUGH TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
567078	4-171E	SUSPENSION CONSTRUCTION WITH OVERHEAD EARTH WIRE
567079	4-171C/E	SUSPENSION CONSTRUCTION WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
250184	4-250E	VERTICAL HORIZONTAL LINE POST SUSPENSION CONSTRUCTION WITH OVERHEAD EARTHWIRE
250185	4-250C/E	VERTICAL HORIZONTAL LINE POST SUSPENSION CONSTRUCTION WITH OVERHEAD EARTHWIRE ON CONCRETE POLE
250187	4-250	VERTICAL HORIZONTAL LINE POST SUSPENSION CONSTRUCTION
250193	4-230E	VERTICAL DELTA HORIZONTAL LINE POST SUSPENSION CONSTRUCTION WITH OVERHEAD EARTH WIRE
251886	4-230C/E	VERTICAL DELTA HORIZONTAL LINE POST SUSPENSION CONSTRUCTION WITH OVERHEAD EARTH WIRE ON CONCRETE POLE

Drawing Number	Construction Code	Drawing Description
		33kV Constructions
238364	4-230	VERTICAL DELTA HORIZONTAL LINE POST SUSPENSION CONSTRUCTION
238362	4-230c	VERTICAL DELTA SUSPENSION ON CONCRETE POLE
238370(1)	-	UGOH WITH OHEW ON TIMBER POLE GENERAL ARRANGEMENT
238370(2)	-	UGOH WITH OHEW ON TIMBER POLE DETAILS & MATERIAL LIST
250116(1)	-	UGOH CONSTRUCTION WITH OHEW ON TIMBER POLE SOLIDLY BONDED EARTHING SYSTEM OPTIONAL LV & STREETLIGHT ATTACHMENT GENERAL ARRANGEMENT
250116(2)	-	UGOH CONSTRUCTION WITH OHEW ON TIMBER POLE SOLIDLY BONDED EARTHING SYSTEM OPTIONAL LV & STREETLIGHT ATTACHMENT DETAILS & MATERIAL LIST
229262(1)	-	UGOH ON CONCRETE POLE 300mm2 TO 1600mm2 TWIN CABLES PER PHASE SCREEN EARTHED ASSEMBLY GENERAL ARRANGEMENT
229262(2)	-	UGOH ON CONCRETE POLE 300mm2 TO 1600mm2 TWIN CABLES PER PHASE SCREEN EARTHED ASSEMBLY DETAILS & MATERIAL LIST
229262(3)	-	UGOH ON CONCRETE POLE 300mm2 TO 1600mm2 TWIN CABLES PER PHASE SCREEN EARTHED ASSEMBLY POLE HEAD TYPES
227403(1)	-	UGOH FOR 3 CORE CABLE FLEXIBLE TERMINATIONS GENERAL ARRANGEMENT
227403(2)	-	UGOH FOR 3 CORE CABLE FLEXIBLE TERMINATIONS DETAILS & MATERIAL LIST
227403(3)	-	UGOH FOR 3 CORE CABLE FLEXIBLE TERMINATIONS POLE HEAD TYPES
254313	4-146E	VERTICAL TEE OFF TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE

Drawing Number	Construction Code	Drawing Description
		66kV Constructions
181516	5-111C/E	DUAL CIRCUIT TERMINATION
181531	5-140E TRANS	VERTICAL TERMINATION TRANSPOSITION WITH OHEW ON TIMBER POLE – HIGH STAY
181530	5-140C/E TRANS	VERTICAL THROUGH TERMINATION TRANSPOSITION WITH OHEW ON CONCRETE POLE – HIGH STAY
166653	5-240S/E	VERTICAL HORIZONTAL LINE POST CONSTRUCTION WITH OVERHEAD EARTHWIRES
166782	5-140S/E	VERTICAL THROUGH TERMINATION WITH OVERHEAD EARTH WIRE ON STEEL POLE - HIGH STAY
178000	5-200S/E	VERTICAL DELTA HORIZONTAL LINE POST CONSTRUCTION WITH OVERHEAD EARTHWIRES
511786	5-21	'H' POLE SPECIAL TERMINATION STRUCTURE ON TIMBER POLES
514074	5-145C/E	VERTICAL TERMINATION CONSTRUCTION WITH SINGLE ENDED OVERHEAD EARTH WIRE TERMINATION
514075	5-140C/E	VERTICAL THROUGH TERMINATION WITH OVERHEAD EARTH WIRE ON CONCRETE POLE - HIGH STAY
514076	5-160C/E	FLYING ANGLE SUSPENSION WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
514077	5-140	VERTICAL THROUGH TERMINATION ON TIMBER POLE
514079	5-160	FLYING ANGLE CONSTRUCTION

Drawing Number	Construction Code	Drawing Description
		66kV Constructions
514080	5-146	VERTICAL TEE OFF TERMINATION CONSTRUCTION
514139	5-148C/E	DELTA THROUGH TERMINATION WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
514141	5-146C/E	VERTICAL TEE-OFF TERMINATION CONSTRUCTION WITH OVERHEAD EARTH WIRE
514144	5-146E	VERTICAL TEE-OFF TERMINATION CONSTRUCTION WITH OVERHEAD EARTH WIRES
514150	5-140E	VERTICAL TERMINATION WITH OVERHEAD EARTH WIRE ON TIMBER POLE - HIGH STAY
514153	5-160E	FLYING ANGLE SUSPENSION WITH OVERHEAD EARTH WIRE ON TIMBER POLE
514159	5-200C/E	STAGGERED HORIZONTAL LINE POST WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
514162	5-200E	STAGGERED HORIZONTAL LINE POST WITH OVERHEAD EARTH WIRE ON TIMBER POLE
514164	5-148	DELTA THROUGH TERMINATION ON TIMBER POLE
514182	5-250C/E	HORIZONTAL LINE POST SUSPENSION CLAMPS ON CONCRETE POLE WITH OVERHEAD EARTH WIRE
518775	5-400C/E	UNDERGROUND TO AERIAL TERMINATION ON CONCRETE POLE
520202	5-148E	DELTA THROUGH TERMINATION WITH OVERHEAD EARTH WIRE ON TIMBER POLE
184115	5-180E	TWIN CIRCUIT HORIZONTAL LINE POST SUSPENSION BRACKET OVERHEAD EARTH WIRE ON TIMBER POLE
520205	5-180C/E	DUAL VERTICAL HORIZONTAL LINE POST CONSTRUCTION WITH OVERHEAD EARTH WIRE ON RAISER BRACKET
209631	5-190C/E	DUAL VERTICAL HORIZONTAL LINE POST WITH DUAL OHEW ON CONCRETE POLE
520230	5-240C/E	HORIZONTAL LINE POST ON ONE SIDE WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
520253	5-200	VERTICAL DELTA HORIZONTAL LINE POST CONSTRUCTION
520310	5-21E	'H' POLE SPECIAL OVERHEAD EARTH WIRE TERMINATION STRUCTURE ON TIMBER POLES
520412	5-21C/E	'H' POLE SPECIAL OVERHEAD EARTH WIRE TERMINATION STRUCTURE ON CONCRETE POLES
275282	-	STANDARD CONSTRUCTION SINGLE 66KV NGK VERTICAL AIR BREAK SWITCH GENERAL ARRANGEMENT
275283	-	STANDARD CONSTRUCTION SINGLE 66KV NGK VERTICAL AIR BREAK SWITCH WITH TEE OFF GENERAL ARRANGEMENT
275284	-	STANDARD CONSTRUCTION TWIN 66KV NGK VERTICAL AIR BREAK SWITCH WITH TEE OFF GENERAL ARRANGEMENT
250177	5-240E	STANDARD CONSTRUCTION 66KV VERTICAL HORIZONTAL LINE POST CONSTRUCTION WITH OVERHEAD EARTH WIRE ON TIMBER POLE
192882	5-205E	VERTICAL DELTA HORIZONTAL LINE POST WITH OHEW ON RAISER BRACKET ON TIMBER POLE
251973	5-230	VERTICAL DELTA HORIZONTAL LINE POST CONSTRUCTION
184271	5-230E	VERTICAL DELTA HORIZONTAL LINE POST WITH OHEW ON TIMBER POLE
163728	5-230C/E	VERTICAL DELTA HORIZONTAL LINE POST SUSPENSION WITH OHEW ON CONCRETE POLE
209624	5-230S/E	VERTICAL DELTA HORIZONTAL LINE POST SUSPENSION WITH OHEW ON STEEL POLE

Drawing Number	Construction Code	Drawing Description
		66kV Constructions
214414	5-245E	VERTICAL HORIZONTAL LINE POST WITH OHEW ON RAISER BRACKET ON TIMBER POLE
214416	5-245C/E	VERTICAL HORIZONTAL LINE POST WITH OHEW ON RAISER BRACKET ON CONCRETE POLE
192881(1)	-	UGOH ON CONCRETE POLE SINGLE CABLE PER PHASE GENERAL ARRANGEMENT
192881(2)	-	UGOH ON CONCRETE POLE SINGLE CABLE PER PHASE DETAILS & MATERIAL LIST
192881(3)	-	UGOH ON CONCRETE POLE SINGLE CABLE PER PHASE POLE HEAD TYPES
221569(1)	-	UGOH ON CONCRETE POLE 300mm2 TO 800mm2 TWIN CABLES PER PHASE GENERAL ARRANGEMENT
221569(2)	-	UGOH ON CONCRETE POLE 300mm2 TO 800mm2 TWIN CABLES PER PHASE DETAILS & MATERIAL LIST
182531	5-140E TRANS	VERTICAL TRANSPOSITION TERMINATION CONSTRUCTION WITH OVERHEAD EARTHWIRE

Drawing Number	Construction Code	Drawing Description
		132kV Constructions
181517	6-111C/E	DUAL CIRCUIT TERMINATION
507773	WP-AA	'H' POLE SUSPENSION WITH CROSSARM ON TIMBER POLES 4.4 AND 5.4m CENTRES
507776	WP-BA	'H' POLE ANGLE SUSPENSION WITH CROSSARM ON TIMBER POLES
507777	WP-BB	'3' POLE ANGLE SUSPENSION WITH CROSSARM ON TIMBER POLES
507778	WP-BC	'3' POLE FLYING ANGLE ON TIMBER POLES
507780	WP-CA	'H' POLE TERMINATION WITH CROSSARM ON TIMBER POLES
507781	WP-CB	'H' POLE TERMINATION WITH CROSSARM ON TIMBER POLES
513049	RCP-AA	'H' POLE SUSPENSION WITH CROSSARM ON CONCRETE POLES
513051	RCP-BA	'H' POLE ANGLE SUSPENSION WITH CROSSARM ON CONCRETE POLES
513052	RCP-BB	'3' POLE ANGLE SUSPENSION WITH CROSSARM ON CONCRETE POLES
514121	6-220C/E	THROUGH TERMINATION WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
514126	6-201C/E	HORIZONTAL LINE POSTS WITH TWIN OVERHEAD EARTH WIRE TERMINATED ON CONCRETE POLE
514143	6-202C/E	HORIZONTAL OVERLOAD RELEASE LINE POST WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
514166	6-231C/E	HORIZONTAL LINE POSTS SUSPENSION CLAMPS WITH OVERHEAD EARTH WIRE TERMINATED ON CONCRETE POLE
514186	6-230C/TE	HORIZONTAL LINE POSTS SUSPENSION CLAMPS WITH TWIN OVERHEAD EARTH WIRE ON CONCRETE POLE
514192	6-190C/E	TWIN CIRCUIT HORIZONTAL WITH OVERHEAD EARTH WIRE ON CONCRETE POLES
514195	6-200E	HORIZONTAL LINE POSTS WITH OVERHEAD EARTH WIRE ON TIMBER AND CONCRETE POLES
514196	6-201E	HORIZONTAL LINE POSTS WITH TWIN OVERHEAD EARTH WIRE TERMINATED ON TIMBER POLE

Drawing Number	Construction Code	Drawing Description
		132kV Constructions
514198	6-210E	FLYING ANGLE WITH OVERHEAD EARTH WIRE ON TIMBER OR CONCRETE POLE
514199	6-220E	THROUGH TERMINATION ON TIMBER POLE WITH OVERHEAD EARTH WIRE
520227	6-203E	HORIZONTAL LINE POSTS WITH TERMINATED OVERHEAD EARTH WIRE ON TIMBER POLE
520228	6-200C/TE	HORIZONTAL LINE POSTS SUSPENSION WITH TWIN OVERHEAD EARTH WIRE ON CONCRETE POLE
520229	6-240C/E	HORIZONTAL LINE POSTS ON ONE SIDE WITH SUSPENSION OVERHEAD EARTH WIRE ON CONCRETE POLE
520254	6-262C/E	HORIZONTAL OVERLOAD RELEASE LINE POST ON ONE SIDE AND INTERPOLE STAY WITH OVERHEAD EARTH WIRE ON CONCRETE POLE
520300	6-270C/E	HORIZONTAL LINE POST TWO SIDE SUSPENSION CLAMPS CONCRETE POLE WITH SUSPENSION OVERHEAD EARTH WIRE ON CONCRETE POLE
520308	6-283C/E	HORIZONTAL LINE POST AND FLYING ANGLE WITH 2 OVERHEAD EARTH WIRES ON CONCRETE POLE
236260	SP-AA	'H' POLE SUSPENSION WITH CROSSARM ON STEEL POLES 4.4 & 5.4m CENTRES
236261	SP-BA	'H' POLE ANGLE SUSPENSION WITH CROSSARM ON STEEL POLES
236259	SP-CA	'H' POLE TERMINATION WITH CROSSARM ON STEEL POLES
236258	SP-CB	'H' POLE TERMINATION WITH CROSSARM ON STEEL POLES
513053	RCP-BC	'3' POLE FLYING ANGLE ON CONCRETE POLES
520306	RCP-CA	'H' POLE TERMINATION WITH CROSSARM ON CONCRETE POLES
513055	RCP-CB	'3' POLE THROUGH TERMINATION WITH OHEW ON CONCRETE POLES
236262	6-111S/E	DUAL VERTICAL CROSSARM TERMINATION WITH OHEW ON STEEL POLE
514124	6-200C/E	VERTICAL DELTA HORIZONTAL LINE POST WITH OHEW ON CONCRETE POLE
236244	6-200S/E	VERTICAL DELTA HORIZONTAL LINE POST WITH OHEW ON STEEL POLE
236245	6-200S/TE	VERTICAL DELTA HORIZONTAL LINE POST WITH TWIN OHEW ON STEEL POLE
186739	6-205E	VERTICAL DELTA WITH OHEW ON RAISER BRACKET ON TIMBER POLE
209632	6-205C/E	VERTICAL DELTA WITH OHEW ON RAISER BRACKET ON CONCRETE POLE
514123	6-210C/E	FLYING ANGLE WITH OHEW ON CONCRETE POLE
165268	6-220C/E TRANS	VERTICAL THROUGH TERMINATION TRANSPOSITION WITH OHEW ON CONCRETE POLE
236254	6-220S/E	VERTICAL THROUGH TERMINATION WITH OHEW ON STEEL POLE
520226	6-221E	VERTICAL TERMINATION WITH DUAL TO SINGLE OHEW ON TIMBER POLE
514131	6-221C/E	VERTICAL TERMINATION WITH DUAL TO SINGLE OHEW ON CONCRETE POLE
520250	6-230E	VERTICAL DELTA HORIZONTAL LINE POST SUSPENSION WITH OHEW ON TIMBER POLE
520251	6-230C/E	VERTICAL DELTA HORIZONTAL LINE POST SUSPENSION WITH OHEW ON CONCRETE POLE
236246	6-230S/E	VERTICAL DELTA HORIZONTAL LINE POST SUSPENSION WITH OHEW ON STEEL POLE

Drawing Number	Construction Code	Drawing Description
		132kV Constructions
236247	6-230S/TE	VERTICAL DELTA HORIZONTAL LINE POST SUSPENSION WITH TWIN OHEW ON STEEL POLE
212803	6-234C/E	VERTICAL DELTA BRACED LINE POST WITH OHEW ON CONCRETE POLE
212804	6-234C/E	VERTICAL DELTA BRACED LINE POST WITH TWIN OHEW ON CONCRETE POLE
244711	6-240E	VERTICAL HORIZONTAL LINE POST WITH OHEW ON TIMBER POLE
236249	6-240C/TE	VERTICAL HORIZONTAL LINE POST WITH TWIN OHEW ON TIMBER POLE
236248	6-240S/E	VERTICAL HORIZONTAL LINE POST WITH OHEW ON STEEL POLE
236250	6-240S/TE	VERTICAL HORIZONTAL LINE POST WITH TWIN OHEW ON STEEL POLE
244674	6-245E	VERTICAL HORIZONTAL LINE POST WITH OHEW ON RAISER BRACKET ON TIMBER POLE
209633	6-245C/E	VERTICAL HORIZONTAL LINE POST WITH OHEW ON RAISER BRACKET ON CONCRETE POLE
244712	6-250E	VERTICAL HORIZONTAL LINE POST SUSPENSION WITH OHEW ON TIMBER POLE
514181	6-250C/E	VERTICAL HORIZONTAL LINE POST SUSPENSION WITH OHEW ON CONCRETE POLE
236252	6-250C/TE	VERTICAL HORIZONTAL LINE POST SUSPENSION WITH TWIN OHEW ON CONCRETE POLE
236251	6-250S/E	VERTICAL HORIZONTAL LINE POST SUSPENSION WITH OHEW ON STEEL POLE
236253	6-250S/TE	VERTICAL HORIZONTAL LINE POST SUSPENSION WITH TWIN OHEW ON STEEL POLE
212805	6-256C/E	DUAL VERTICAL BRACED HORIZONTAL LINE POST SUSPENSION WITH OHEW ON CONCRETE POLE
202351	6-258C/E	VERTICAL BRACED HORIZONTAL LINE POST SUSPENSION OHEW ON CONCRETE POLE
158400	6-290C/E	DUAL VERTICAL TERMINATION WITHY OHEW AT 45deg ON CONCRETE POLE
221816(1)	-	UGOH TERMINATION ARRANGEMENT
221816(2)	-	UGOH TERMINATION DETAILS
221816(3)	-	UGOH TERMINATION POLE HEAD TYPES