

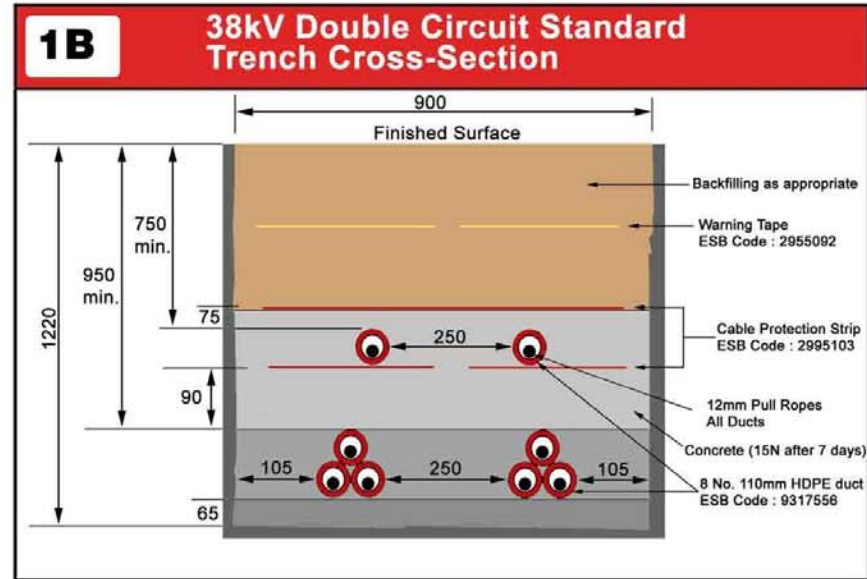
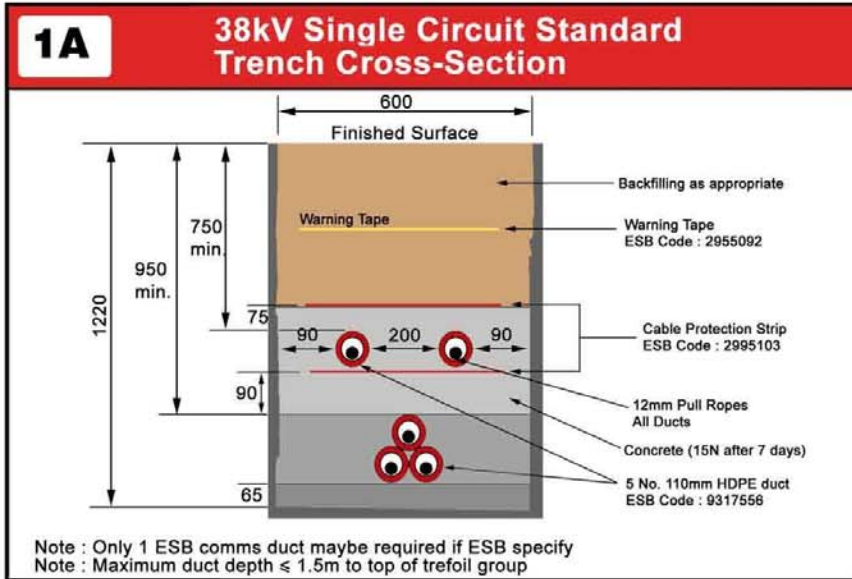
Appendix P

ESB Requirements

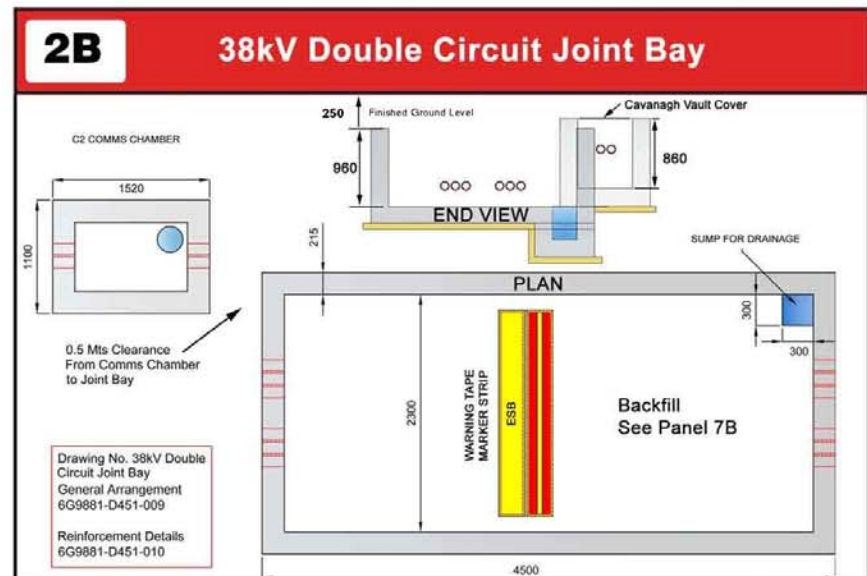
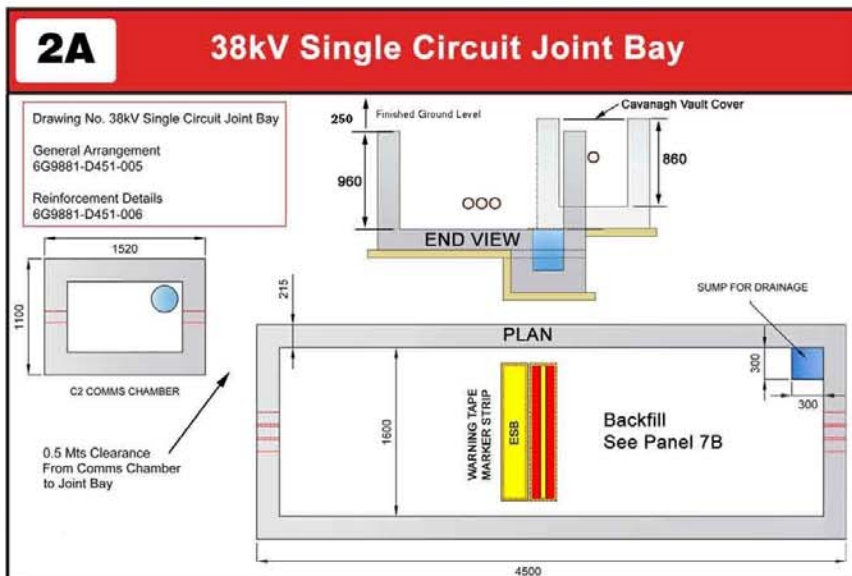
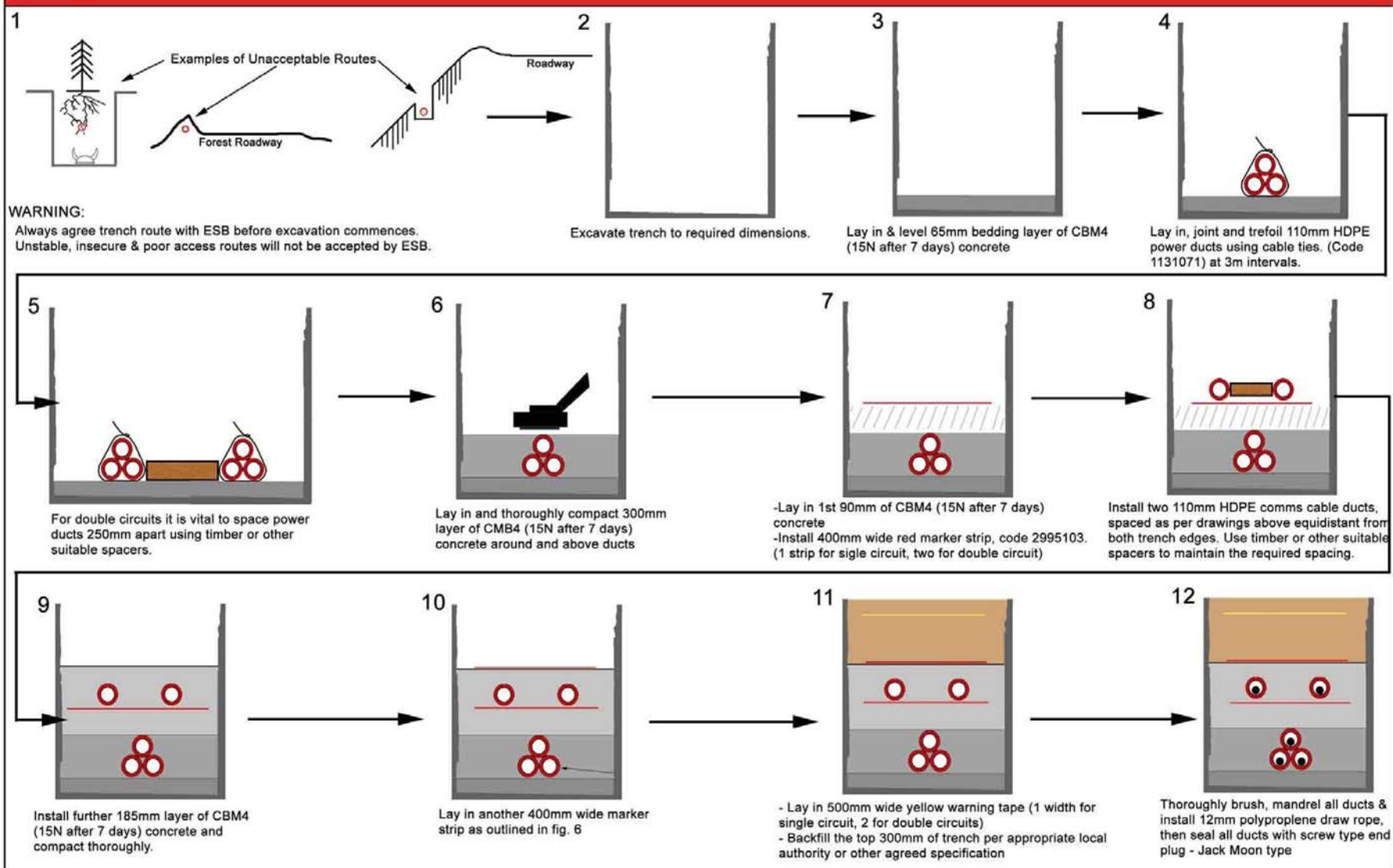


Standard Specification for ESB 38kV Networks Ducting/Cabling (Minimum Standards)

Note 1 : ESB Networks reserves the right not to accept ducting which does not conform to these standards and dimensions
 Note 2 : Refer to ESB Networks for Specific job Specification. These instructions do not apply to LV/MV/110kV/220kV cable
 Note 3 : All materials (ducts, marker tapes/strips, duct surrounds, mandrels and brushes) must be ESB approved materials



1C Trench Installation Sequence



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3A End Mast Termination

For existing 9m masts increase steel work height by 1.3m at mast top

12m Mast (For all new works)

Anti-Climbing Guard

Cable Assembly Drawing Number : D205778

EARTH GRID

3B Triple Pole Structure

Cable Steel Work Code: 1286697

Made up anti-climbing guard

7m Min Dimension to Bare Metal Use 12m Pole

3C Station Termination

To Cubicle

If Cable run <50m install lightning arrestors.

Assess need for mesh screen guard (Code: 3175003)

Drg. No A3205856

Clearances : Phase to:
 - Phase 500mm outdoor
 - Earth 500mm outdoor

3D Earth Grids

10m PLAN

10m

3m approx.

1.5m

1.5m

12 Rod Earth Grid For 3-Pole Structure

Warning Tape

500

300

12 Rod Earth Grid For Mast Structure

Earth Grid resistances <10 Ohms. If ground is known to be high resistance, plan ahead and put additional earthwire into cable trench.

Drg. No. A4D 205343
 PE424-D901-911-001-000

4A Obligation of Duct Installer to minimise the number and severity of duct bends

The duct installer must minimise the number and severity of preformed bends in ground with obstructions and other utility service crossings by opening ground 15m ahead of backfilled duct, wherever practical to do so. This safety obligation, which may require use of steel plating, allows the duct installer to pick the least bendy duct route through utility crossings and obstructions. Otherwise, numerous sharp unrecorded duct route deviations will be present making cable installation considerably more difficult and less safe for the cable installer.

Obstructions

Backfilled Duct

Digger

Dig 15m Ahead of duct to uncover obstructions

4B Standard for Brushing, Mandrelling, Roping and End-Capping of 38kV ducts

All Ducts must be:

- Thoroughly brushed and mandrelled to prove ducts against debris /excessive deflection
- Roped using 12mm polypropylene rope with certified safe breaking load of 1.5 tons – all rope joints to be properly spliced and PVC taped over. Approved Supplier Silver Strand Bunclana Donegal, ph (074) 9382503 - 500m drum lengths available to minimise splicing/coil handling
- Sealed using endcaps against grit and water getting into them

NB: Replace mandrels once mandrel wear indicators or grooves are worn down
 Replace brushes once brush diameter falls 5mm below dimensions in table below

- Approved endcaps, both disposable and reusable types, are available from suppliers of approved ESB ducting
- Approved ESB Mandrel and brush suppliers :

Brandon Agencies, Rathnew, Co Wicklow: Phone 0404 20500 (Brushes & Mandrels)
 IS Varian, Greenhills Industrial Estate, Walkinstown, Dublin 12 Phone: 01-4501150 (Brushes Only)
 Clydesdale UK Phone 086 172 6665 (Brushes & Mandrels)
 Tynagh Network Systems, Loughrea, Co Galway. Phone: 091 842206 (Brushes & Mandrels)

110mm HDPE Duct Size	
Mandrel Code: 9317546	Brush Code: 8783255
Sponge Code: 8783252	

4C Approved ESB Ducting for 38kV Cables

- Use only solid wall high impact resistance ESB approved HDPE red ducting to IS 370 colour standard and ESB specification 16113 (6.3mm minimum wall thickness) Discoloured or unidentified ducting not acceptable. All duct material must be approved by ESB Networks.
- Lightweight flexible corrugated twinwall ducting is not acceptable to ESB irrespective of manufacturer
- Current approved HDPE Duct and duct bend manufacturers are: Lynplast (bend fittings only), Uponor-Radius Systems, Wavin, Quality Plastics

4D Specification for Duct Jointing for 38kV Cables

Mallet or Hammer

Timber block to protect end of duct from damage

Long Coupler

Fully jointed Duct Marks

All ducts to be securely jointed by tapping against timber board on each duct until the black depth insertion mark is reached

Always smear duct lubricant on coupler rubber ring

4E Repair of Existing Ducts

Use only approved slip couplers from approved manufacturers in section 4C

Damaged Duct Section

Slip Coupler

Slip Coupler

Repair length

- Cut out damaged section of duct and ensure all cut surfaces are square and free from sharp edges
- Slide, position and centre the repair couplers on the centering marks

4F Sealing of Ducts

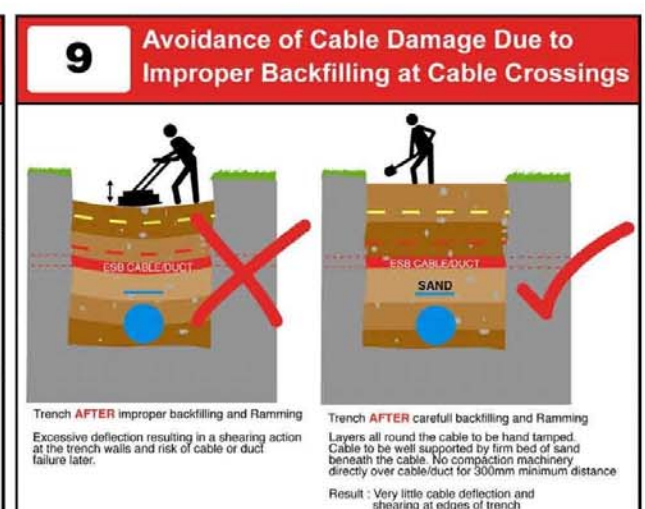
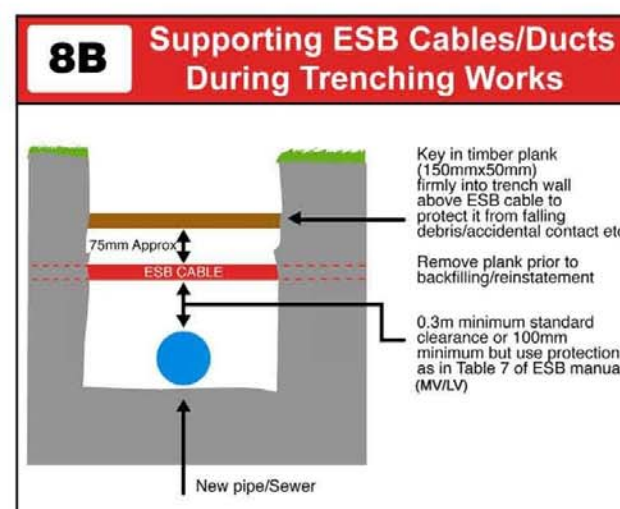
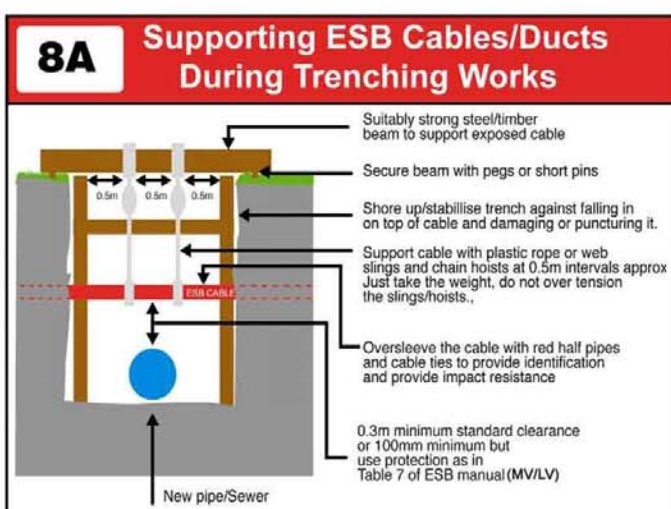
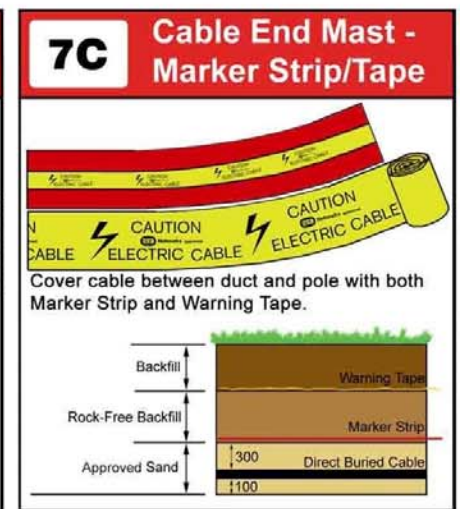
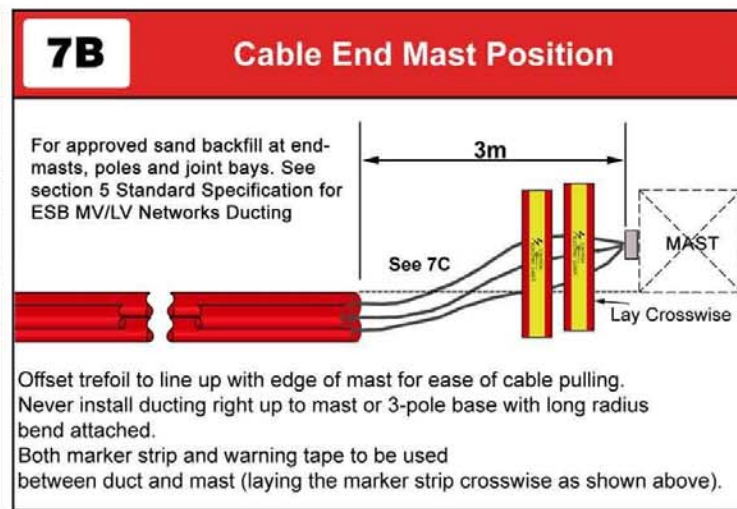
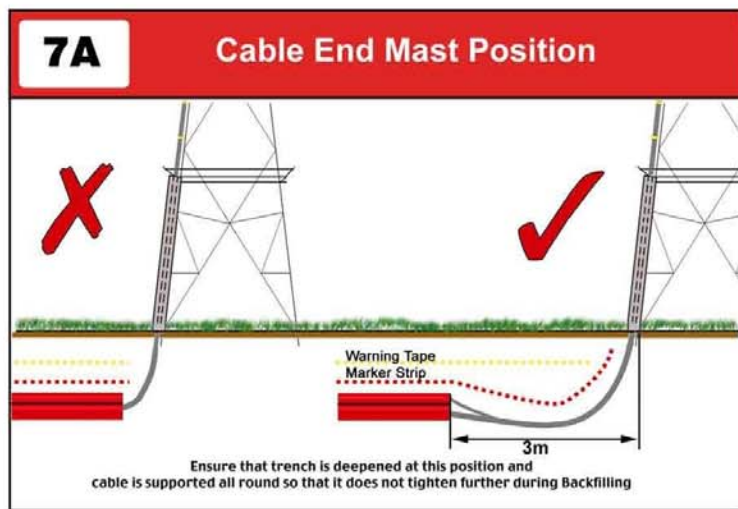
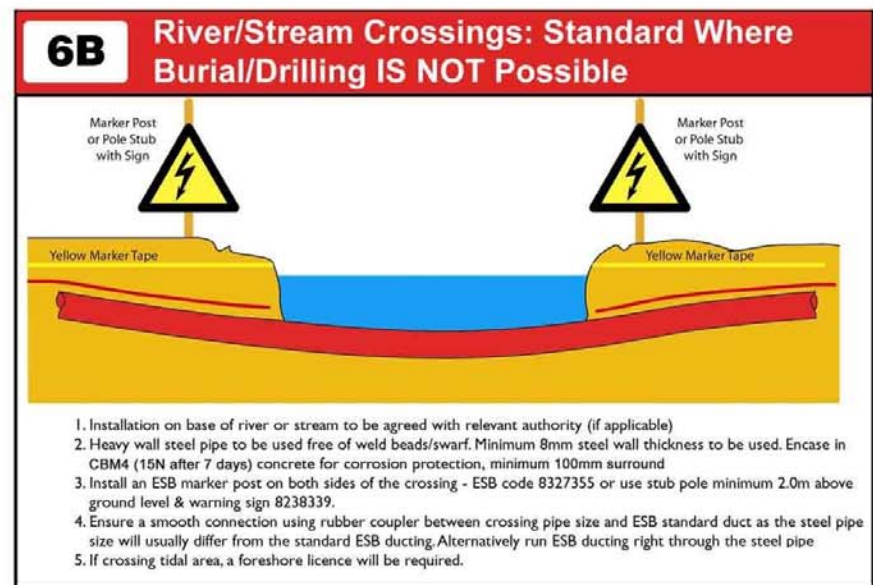
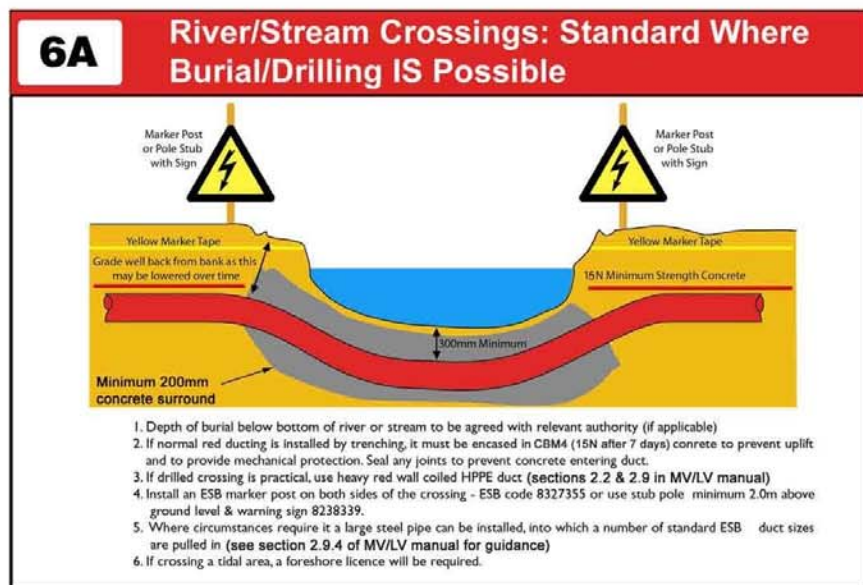
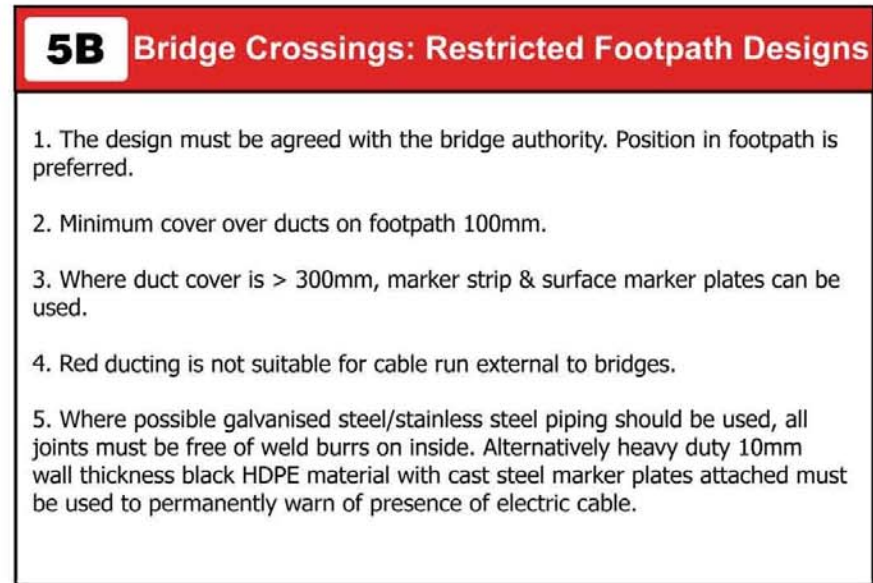
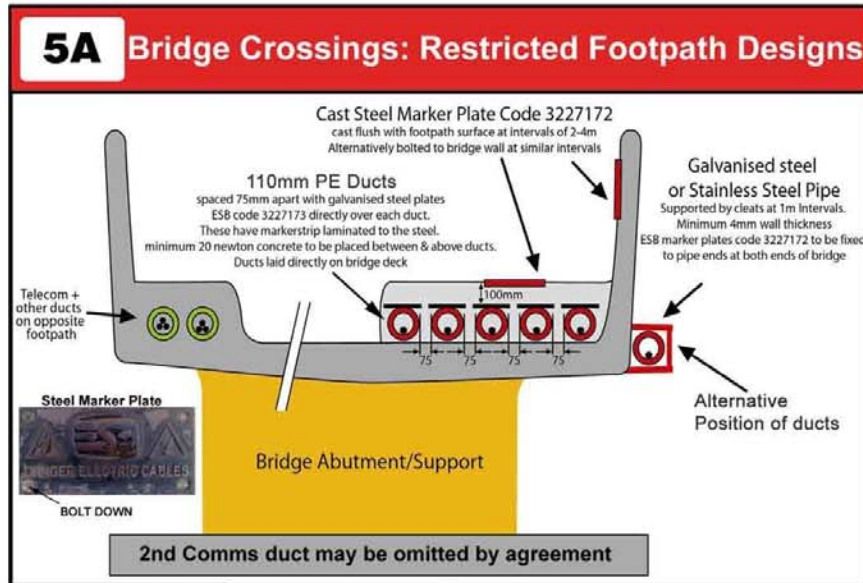
All ducts to be permanently sealed at both ends of duct run
 Ducts to be temporarily sealed during installation using endcaps provided with each bale

Endcap Plain End

ESB Code 110mm: 9317569

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10A 38kV Railway Crossing Details

ESB Signpost

3m

ESB Signpost

Drilling pits outside CIE property line

Formal licence for crossing and approval required from CIE. Accurately record crossing location & erect marker posts.

10B Directional Drill/Thrust Bore Duct Bore Details

DESIGN 1

Minimum internal bore size = 325mm for 5 ducts

=290mm for 4 ducts where approved by ESB

Spacer

5 no. 110mm diameter HDPE ducts

Alternatively use 2 x 37mm HDPE ducts for comms cables with C2 chamber on each side of the crossing to permit pulling along entire route. (See 10C)

Completed interstitial space to be bentonited thoroughly to maintain cable rating. Accurately record crossing location & erect marker posts.

10C Directional Drill/Thrust Bore Duct Bore Details

ALTERNATIVE DESIGN

ESB Signpost

ESB Signpost

Cable joint pit

Cable joint pit

Install 1 no. 200mm SDR 17.6 duct with 6 no. short length cables pulled into this pipe along with 2 x 37mm comms ducts. Full cable joint bays are required on either side of crossing along with C2 chambers for this design. This method is used where it is not practical to install large diameter pipe -eg. risk of ground upheaval or presence of obstructions. Completed interstitial space to be thoroughly bentonited to maintain cable rating. Accurately record crossing location & erect marker posts.

10D Double Circuit Bore Crossing

Standard Design

3m min

-Both Bentonited

Separate drilling for each circuit crossing

Alternative

HDPE or steel thrust bore pipe Diameter ID= 400mm

Bentonite

6 no. 110mm Power ducts + 2 no. 110mm comms ducts

2 no. sets of 110mm HDPE ducts - 8 ducts in total. All crossings to be accurately recorded and signposts erected given impracticality of marker tape. If both circuits = 40MVA then use 630 Cu cable

12 Minimum Standard Clearances to Other Services

Normal Services 300

Large Pipelines High Pressure Pipes 600

Clearances less than the above at pinch points and crossings requires placement of additional mechanical protection (concrete slab/brick) and agreement of ESB

ESB ducts must never be laid over other services on parallel runs, except with the written prior agreement of the other utilities and ESB

Other services must never be laid directly over ESB ducts on parallel runs

13 Combined MV & 38kV Cable Runs

38kV Trench

1.1m to 1.25m Depending on Location

Yellow Marker Tape

Pilot Cables

Concrete Surround

MV/LV Cables

Yellow Marker Tape

Red Marker Strip

150mm

150mm

Additional MV/LV Ducts as Required

300mm Strict Minimum Separation

Where it is impractical to avoid such trench runs, the separation of 300mm should be strictly controlled and monitored to minimise derating (See MV/LV manual page 180)

14 Sealing and Protection of 38kV Cables Once They Exit Ducts

Duct

Ducts to be thoroughly using ESB approved water sealant and 4hr fire rating approved for firestop. NB - All joint bay duct entries to be thoroughly sealed to prevent sand washout and subsidence.

Sandbags or other durable support for cable as it exits ducts to prevent damage to cable sheath

15 Duct Crossovers Are Not Allowed

1 2

2 1

Be especially careful when going from flat to trefoil formation in vicinity of services

16 Crossing Dumps/Contaminated Ground

Thoroughly seal all joints with adhesive water-tight duct jointing compound and pressure test for airtightness. Gasketed couplers alone are inadequate. Fusion welded couplers are also acceptable but require red over-taping.

NB. Avoid whenever possible due to: Subsidence, methane gas & severe thermal derating risks. Seek advice from ug networks section to ensure rating of cable is adequate (derating of 50% can occur) NB. Waste oils and chemicals can also seriously damage cables

Seal all duct joints with duct adhesive compound or use continuous duct lengths & seal all duct ends in joint bays. Alternatively weld pipes.

Concrete is continued up to 300mm of final surface to offset derating (CBM4 - 15N after 7 days)