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Additional information:

Appendix 2 attached. Report and Appendix 1 is published separately (ref 53/23)

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# Transport infrastructure in new developments

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## 4.1 Road construction

### Incorporating our Standard Details

It is imperative that our Standard Details are used on the construction drawings taken on site. \*.dwg formats are available for incorporating into your details sheets or alternatively, our Standard Details sheet can form part of the RCC package

[Download our standard details here](#)

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#### Revisions

01/07/2023 Document release

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## 4.2 Road drainage construction

### 4.2.1 Specification

The specification for the construction of road drainage is detailed in the Manual of Contract Documents for Highway Works Volume 1: Specification for Highway Works. Where discharging into an existing watercourse or public sewer, road drainage should additionally meet the requirements of Scottish Water (as the drainage authority) and Scottish Environment Protection Agency (SEPA).

The connection of road drainage systems to the public network should be undertaken only on the authority and to the requirements of Scottish Water.

[Download our Standard Drainage Details here](#)

### 4.2.2 Design

The developer is required to incorporate Sustainable Drainage Systems (SuDS) into their proposals. These must deal with excess water from a site, and return it to the water system in a controlled manner to alleviate flood risk and reduce discharge of diffuse pollutants. Refer to SuDS Supplementary Planning Guidance, noting in particular that while the use of permeable paving on carriageways is not supported, it may be acceptable in parking areas.

Road drainage design should be in accordance with the current Specification subject to the qualification that the minimum pipe diameter permitted will be 150mm. Land drainage or other appropriate measures must be taken to prevent water flowing onto the road from adjacent properties.

### 4.2.3 Sub-grade drainage

It is important to provide efficient permanent drainage of the sub-grade and any other permeable layer of the road. Ideally, the water table should be prevented from rising to within 0.6

metres of the formation level. This requirement is additional to those of the surface water drainage detailed below.

#### 4.2.4 Camber, crossfall and gradients

Carriageways should be cambered with a fall of 2.5% from the centreline to the channel except on curves where, to eliminate adverse camber, a crossfall of 2.5% between upper channel and centre line should be formed with increased crossfall between centre line and lower channel to allow for a 25mm centre line increase when boned channel to channel. For roads surfaced with block paving, 2.5% crossfall should be provided throughout. At a junction, the carriageway of the minor road should be graded into the channel of the major road. Footways and footpaths should be constructed with a crossfall towards the road channel. Channel gradients should not be flatter than 0.8%.

#### 4.2.5 Gullies, connections and chambers

Gullies should be trapped and constructed in accordance with Clause 508 of the Specification and as detailed here. Gully gratings and frames must be positioned with grating bars running at right angles to the kerb and be of the captive variety.

Connections should be constructed in accordance with Clause 508 of the Specification. They must be formed with junction pipes unless the Roads Authority has specifically approved the use of saddles.

Chambers should be constructed in accordance with Clause 507 of the Specification and as detailed in HCD drawings F3 to F12 as appropriate to that type.

Section 3.4.9 of the SCOTS National Roads Development Guide details the acceptable channel distance between gullies for a road comprising carriageway and two 2m-wide footways. The spacing may require to be altered according to the road layout (e.g. at junctions) and special measures will be required where the grade is necessarily flatter than 0.8 per cent (sags, crests, etc.). Irrespective of design spacings, a gully should be positioned:

- Just upstream of the tangent point at road junctions;
- short of the point where adverse camber is removed when applying super elevation; and
- at any local low point.

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# Transport infrastructure in new developments

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## 4.3 Construction Method Statements

### 4.3.2 Definitions

The terms Construction Method Statement and Traffic Management Plan are interchangeable when referring to the site construction phase. The term Traffic Management Plan is also used to control how traffic on a commercial development will be controlled in the long term.

The documents should be constantly monitored and reviewed taking into changing circumstances.

### 4.3.3 Topics to be included

Both documents should include

- Hours of construction work/business – care should be taken to avoid adding to congestion at peak times/school times
  - Secondary schools 8.30-15.25 Mon-Thurs, 8.30-12.15 Fri. Lunch 13.05-13.45.
  - Primary schools have local times
- Details of wheel-washing facilities including confirmation that these will be maintained in working order and will be used to prevent deleterious materials being carried onto the public road
- Details of how/when the surrounding roads and paths will be swept to keep clear of soil falling from loads
- Details of whether off-site parking for construction vehicles or contractors will be needed and where this will be accommodated
- Confirmation that pedestrian routes around the site will be remain accessible or suitable alternative arrangements made

Site map showing

- - Building construction order, taking into account different routes if there are multiple developers.
  - Any temporary haul roads required
  - Any temporary parking restrictions required
  - Location of site compound
  - Location of site car park – if the site is to be divided between developers, the CMS should confirm that all contractors will be able to use the car park, or alternative provision made
  - Location of material storage area
  - Construction vehicle turning area
  - Wheelwash area
  - Pedestrian routes within the site
- Area map showing routes along local roads as far as nearest A-road
- Details of how SuDS features (e.g. porous paving) and setted surfaces will be protected during the build
- Details of how surface water run-off will be controlled during the build
- Details of how contractors, visitors and suppliers will be informed of the existence of these policies, and how they will be enforced

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## 5.1 Lighting specification

### 5.1.1 General

This section sets out the performance requirements, equipment specification and control procedures that apply to the design of road lighting, associated cable networks and control systems for any street lighting system being constructed or installed that is intended to be adopted and to be maintained at public expense by East Lothian Council.

Unless otherwise specified, any reference to a British Standard shall mean the latest British Standard.

### 5.1.2 Design process

All lighting and electrical designs shall be carried out by designers who shall be asked to demonstrate their competency by means of detailing their experience, technical qualifications and responsibility, including the type of work and projects in which they have been involved indicating their own contribution and level of personal responsibility.

Designers shall as part of the design process undertake a site survey to ensure that:

- Designer risk assessments can be prepared
- any proposals are compatible with the existing equipment in adjoining areas
- the design takes account of all environmental constraints

### 5.1.3 Lighting levels

Lighting levels, materials to be utilised, and the general scope of the works are to be agreed with the Council's lighting engineer (email [stlighting@eastlothian.gov.uk](mailto:stlighting@eastlothian.gov.uk)) before any design works commence. Designs must be in accordance with the Code of Practice for Road Lighting BS 5489-1 2020 and BS EN 13201.

The Authority will define the appropriate road hierarchy and lighting class for all lighting designs on both the existing network and new developments.

East Lothian Council's policy is to minimise the energy consumption required by any new installation of lighting which is to be maintained at public expense. All proposed luminaires must be selected to be as energy efficient as possible.

UMSUG codes for lanterns specified will be provided along with the draft design.

Electrical design to be in accordance with BS7671:2018 and any revisions thereof.

Residential streets cul-de-sacs and remote footways shall be lit to lighting class P4 and dimmed by programmable driver from Midnight till 6am to lighting class P5.

Distributor roads, main traffic routes, bus routes etc. are to be lit to lighting class M4 and dimmed by programmable driver from Midnight till 6am to lighting class M5.

A maintenance factor of 0.76 shall be used for all lighting calculations.

## **5.1.4 Materials**

All proposed columns shall be manufactured in aluminium unless specific planning conditions specify otherwise.

All warranties for proposed equipment shall be declared at the design stage.

If period or decorative columns/luminaires are to be used, the developer shall provide the manufacturer's specification for approval. Where decorative columns are used our lighting engineer may impose additional conditions that may or may not be identified in this specification.

Where non-standard equipment is approved, the developer shall supply the Council, at no cost, spare equipment e.g. Lantern, bracket, column etc. The quantity to be supplied shall be 10% (rounded up) of that installed or 1 number if fewer than 10 are installed. A commuted sum for bespoke street lighting and electrical equipment may also be requested to be agreed with the Council.

All bollards, traffic signs etc. shall be of a suitable reflective material and will be non-illuminated. Details of the required specifications should be obtained from the Council.

The Council's lighting engineer must be notified before any works commence on site.

## **5.1.5 Lighting position**

Generally all lighting columns are to be installed at the back of the adopted footway. When it is not possible to install columns at the back of the footway the below setbacks must be achievable.

The developer/designer is to allow for adequate clearance from the carriageway with minimum setback of:

- 900mm from kerb edge when installing lighting columns on 30mph roads;
- 1200mm from kerb edge when installing lighting columns on 40mph roads;
- 1800mm from kerb edge when installing lighting columns on 50-70mph roads.

Lighting column base compartment doors are to face away from the direction of traffic travelling in the adjacent carriageway. Column orientation on site must allow the electrician carrying out any maintenance works to see oncoming traffic.

Columns which are located within soft landscaped areas shall be provided with a hard standing area of at least 600mm x 600mm x 60mm to allow sufficient workspace access for maintenance operatives.

Placement of columns in locations that may make the unit vulnerable to being struck by roads vehicles should be avoided. Where this cannot be designed out then the column must be protected by a kerbed surround or suitable bollards or tubular column guards. Use of such apparatus must be agreed with our lighting engineer.

## 5.1.6 Ducting

All ducts shall be fitted with a single draw rope and shall be laid in a trench depth to invert 750mm in roadway construction and 450mm in footway construction.

Where duct trenches are excavated in existing carriageways the existing road construction shall be saw-cut full-depth at each side of the trench.

Duct excavations shall be backfilled in accordance with the New Roads and Street Works Act 1991 – Specification for the Reinstatement of Openings in Highways as updated.

## 5.1.7 Drawpits

Drawpits for Street Lighting purposes, when required, shall be constructed in sectional units.

Unless otherwise stated all drawpits shall have 450mm x 450mm outer wall dimensions with galvanised steel full frame in accordance with BS729 and anti-slip composite polyester cover in accordance with BS497 Grade B (5 tonne loading) (non-metallic) marked “STREET LIGHTING”.

Draw ropes shall be tied off within the draw box to ensure that they cannot inadvertently be withdrawn from other locations.

The draw box cover and frame shall be laid to suit the finished footway surface level and gradient.

## 5.1.8 Vegetation

The developer is responsible for ensuring that any surrounding high/low level trees and or vegetation, private or otherwise near proposed/installed lighting columns is sufficiently cut back to allow for suitable illumination of the road in accordance with the approved lighting design.

The developer is responsible for resolving and agreeing any cutting back/removal or modification of trees subject to TPO within design extents prior to the installation of lighting columns to ensure lighting provided is fit for purpose prior to hand over.

## 5.1.9 Column numbering

Column numbering will be provided by the developer on receipt of a schedule from our lighting engineer.

All column numbers shall be installed at 1800mm height from ground level and be stencil painted on or printed on a reflectorized 3M or similar self-adhesive label with black coloured character on a white background. The column numbering will be specified by the lighting engineer prior to formal adoption.

Numbers on columns located on residential subsidiary roads/cul-de-sacs/footpath shall have a character height of 50mm.

## 5.1.10 AS BUILT drawings

AS BUILT drawings are to be provided by the developer on completion of the works and prior to formal adoption.

The AS BUILT drawings provided shall clearly show the position of all the street lighting equipment, cabinets, cables, draw pits, ducts and the like as actually installed.

The developer must provide electrical test certificates prior to formal adoption of the roads and street lighting and electrical equipment. The certification will be as per BS7671:2018

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## 5.2 Lighting materials supplied by contractors

### 5.2.1 Column material, construction and finish

Lighting columns and projections shall be manufactured from Series 6000 aluminium alloy to EN 573-3.

The column shall form a parallel tube over the base section with a continuously tapered conical shape from above the door area to the lantern mounting spigot.

All columns shall be equipped with dual locking flush fitting doors.

A heavy duty plastic “trimmer guard” shall be fitted at ground level.

There shall be no sharp edges within the columns or bracket arms which could damage electrical cables or cause injury to operatives, either during installation or during service life.

All columns shall be supplied with a brushed aluminium finish.

### 5.2.2 Lantern mounting

Post-top mounted lanterns, (spigot mounted) shall have a column top diameter of 76mm, constant over the topmost 130mm of the column.

### 5.2.3 Base compartment and doors

The lighting column base compartment shall comply with the requirements of BS EN 40-2:2004

The base compartment of all columns shall allow a test block of dimensions 400mm high x 100mm wide x 100mm deep, representing the electrical gear, to be installed without fouling on any part of the column, earth stud or door, including door locking latches and door earth stud.

Door openings shall be free from irregularities and burrs or sharp edges.

Base compartments shall be fitted with an M8 x 30mm, grade A2 stainless steel earth stud on their internal face, at the bottom of the door opening. The earth stud will be complete with two

hexagon nuts, three plain washers, and one lock-washer all in stainless steel. Effective means, such as serrated washers or other measures shall be provided to ensure that low electrical impedance, between the stud and the body of the column, is permanently maintained.

These fastenings shall be fitted to the earth stud along with a durable label stating “*Safety Electrical Connection – Do Not Remove*”

The label and lettering shall conform to BS 951 and BS7671 Section 514-13-01 and if attached to the earth stud, it shall be of an incompressible material to prevent loosening of the earth stud.

Columns shall be supplied with dual locking doors operated by a standard triangular key. The same pattern of door lock shall be used throughout on all columns supplied. Door locks shall be suitable for outside use and be corrosion resistant for a minimum period of 50 years and shall be tamperproof. Anti-vandal door studs shall be made available on request.

## 5.2.4 Raising and lowering columns

Columns shall be 5m in height, mid-hinged conical tapered aluminium with brushed alloy finish fitted with ground level grey strimmer guard

Columns shall be the mid-hinged counter balanced type designed such that the fitted lantern provides the counter balance.

Dimensions: 145mm diameter base, 76mm post-top spigot

Hinge mechanism hidden within column shaft with discreet access to hinge mechanism using anti-vandal tool

Access to operate the hinge mechanism to be no lower than 1300mm from ground level to allow safe manual operation

The raising and lowering mechanism must be suitable for operation by one operative.

There shall be no obvious protrusions to access the hinge from the exterior surface of the column.

Column should be supplied pre-wired with suitable flexible conduit provided

Certification EN 40-6 for Public Lighting.

## 5.2.5 Luminaires

Luminaires shall:

- have a light source of light emitting diodes
- be constant light output enabled

- have zero light output above the horizontal (0% ULOR)
- have factory-set pre-programmed dimming profiles
- comply with BS EN 60598-2&3
- have bodies (chassis and canopy) constructed entirely from aluminium to a grade no less than LM6 or equivalent. The body including finishes and fittings shall be suitable for a marine environment
- have lenses manufactured from suitable optical grade material
- operate within the stated temperature parameters throughout its defined life
- not have external surfaces where dust or particles can deposit and compromise the defined life
- have a colour temperature of 3000K. Colour temperature must be stable over the Guarantee Period of the lantern
- have mechanical fixing of the LEDs which will ensure light output patterns be maintained throughout the defined life
- have a degree of protection to BS EN 60529 not less than IP66. The integrity specified must be capable of being maintained for the design life of the lantern
- have canopies which open sufficiently to allow easy access for maintenance
- be capable of being recycled at end of life
- be capable of both side-entry and/or post-top mounting without additional attachments or brackets
- have the following spigot dimensions:
  - Post-top mount 60-76mm,
  - Side-entry mount 32-42 or 48-60mm
- be capable of being tilted to:
  - Post-top mount + 5 deg.
  - Side-entry mount – 15 deg, + 5 deg
- have a minimum of 2 no. stainless steel Allen type fixing grub screws in order to fix the lantern securely to the spigot/column/bracket
- be installed so that levels of radio interference as stated in BS EN 55014-1 or equivalent are not exceeded
- have light shields available which can be retro-fitted after installation

## 5.2.6 Underground cable

The cable shall be PVC/XPLE insulated and sheathed 600/1000V grade to BS5467 with wire armouring to BS 7671 and all conductors shall be stranded copper and of equal cross-sectional area.

Single phase 3-core wire armoured cable must have its cores continuously coloured blue, brown and green/yellow unless specified otherwise in the bill of quantities.

3-phase 5-core wire armoured cable shall have its cores continuously coloured blue, brown, grey, black, green / yellow unless specified otherwise.

Sleeving cable ends to indicate cable core colours is not acceptable. The outer sheath shall be continuously coloured violet unless otherwise stated

The cable shall be marked ELECTRIC CABLE 600/1000V BS5467 and have a manufacturer identification on the sheath. The cable shall be marked with BASEC or other approval organisation. Any other approval organisation must be accepted in writing by the Council prior to acceptance of any order.

Where required, cable sheaths shall have meterage marked at 1 metre intervals along their total length.

Cables shall not be bent to an internal radius of less than 12 times the external diameter of the cable or less than the radius recommended by the manufacturer whichever is greater.

## 5.2.7 Control Pillars

Enclosures shall be manufactured from 3mm mild steel, with external dimensions pillar 994mm x 300mm x 653mm, and a bitumen-coated roof, fully-detachable roof measuring 300mm x 300mm x 653mm.

The finish will be hot dipped galvanised to BS EN ISO1461 and power coated grey to RAL7043.

The backboard dimensions will be 900mm x 525mm x 12mm and treated with a clear water repellent.

The door must be fitted with 2 x tri head locks, and an M8 earthing point. Door hinges shall be stainless steel, the door aperture fully gasketed.

## 5.2.8 Panels

Panel shall be single phase and consist of:

- Enclosure: 500mm high x 400mm wide x 150mm deep

- Locks: 2 no. 8mm Triangle Locks
- Paint: RAL7035 Textured
- Gland-plate: Brass Plate 244mm x 89.5mm x 2mm 5x25mm + 1x20mm holes
- Ventilation: N/A
- Voltage: 230Volt 50/60Hz Single Phase and Neutral
- Current: 63Amps
- Isolation: Internal 63Amps rotary isolator
- Main Protection: 63Amp fuse link
- Switching: 63A 4P AC1 contactor 240Volt coil
- Control: 1 Part 20Lux/20Lux switching regime, Cell Wired to Terminals (3Wire) or appropriate digital time clock
- Override:SFH125 override
- Test: None
- Number of ways: 1 x 24HR BS88 fuse carrier + 7 switched fuse carriers or type C MCBs
- Heater: None
- Earth Bar: Brass earth bar 12-way single pole 12+2
- Neutral Bar: Brass neutral bar 12-way single pole 12+2
- Incoming tails: Live and Neutral 25mm<sup>2</sup> Dual Insulated + 16mm<sup>2</sup> Earth

## 5.2.9 Underground Duct System

### General requirements

For use as part of a road \ footpath lighting installation. The system shall be designed and constructed so as ensure reliable mechanical protection of cables contained therein. The system shall be formed from several component parts to allow cable distribution between all roads lighting furniture to be wholly contained within it.

### Performance requirements

The ducting and accessories shall be designed and constructed to BS EN 61386-24:2010 Specification for CONDUIT SYSTEMS FOR ELECTRICAL INSTALLATIONS Part 2 Section 2.4 Conduit systems buried underground. The interior of the duct shall be smooth walled.

### Material

The duct shall be manufactured from one of the following Polyolefin made from 100% virgin material base:

- High density polyethylene (HDPE)
- Copolymer polypropylene (PP)

Duct shall be coilable and in 40m lengths.

### **Marking**

- Shall be per BS EN 61386-24:2010.

### **Dimensions**

Nominal sizes shall be:

- 35mm external diameter
- 60mm external diameter
- 100mm external diameter

### **Colour**

The ducting colour shall be violet.

### **Accessories**

As follows:

- Straight coupling
- Underground junction box
- End shroud
- End plug
- Reducer coupling

Duct access chamber shall be of modular stacked construction to accept 60mm or 100mm duct by preformed knockouts on all sides at 450mm below ground level.

Duct access chambers shall be crush resistant, with flush fitting cover to BS EN 124-1:2015 loading requirements. Cover shall also be non-slip, corrosion resistant. Lifting by two half-turn key actions into prepared slots.

## **5.2.10 Cable Marker Tape**

Cable marker tape For use in underground cable installations shall:

- be 150mm wide and not less than 0.1mm thick,
- be violet in colour and marked “**CAUTION STREET LIGHTING CABLE BELOW**” at 2 metre intervals.
- The letter height shall be not less than 75mm.
- The tape shall be PVC or Polythene Plastic
- Tape colour shall be permanent and resistant to ground acids and alkalis.

## 5.2.11 Earth Electrodes and mats

### General requirements

- Used to bond to earth, road lighting systems and plant.
- Earth electrodes shall be fitted at each control pillar and at the end of every circuit of three or more units.

### Earth electrode mats

- Of the lattice earth plate type of minimum surface area 0.3sqm. To BS EN 13601:2013.

### Earth electrodes

- Of the rod type shall consist of low-carbon steel rod clad with 99.9% pure electrolytic copper bonded to the steel core.
- The cladding shall have a radial thickness of not less than 250 microns over the whole rod.
- The rods shall be threaded to accept couplings. To BS EN 62561-2:2012, and BS 7430:2011+A1:2015

### Conenction

Connections to earth electrodes, shall be made with non-ferrous nuts, bolts and washers, interconnecting with 16sq mm PVC or XLPE insulated copper conductors.

All connections shall be of the compression type.

### Couplings

Couplings shall be made from high copper content alloy to BS EN 62561-1:2017

### Driving head

The driving head shall be a threaded socket head bolt of high strength steel for repeated use of driving hammer. To BS EN 62561-1:2017

## Earth inspection pit

The earth inspection kit shall be of concrete construction with removable cover which shall fit flush with the top and be marked "EARTH". It shall be suitable for vehicle loading.

An alternative plastic EARTH INSPECTION PIT, complying with the requirements of BS 5834-2:2011 can be offered. It shall be heavy-duty type with a lockable lid

## 5.2.12 Termination Units

Termination units and fuse holders shall be not less than IP42. All line, earth and neutral terminals will be provided with suitable separators.

Column base termination units shall comply with BS 7654:2010 and be of double-pole fused switch disconnecter type with locking off facility and comply with BS EN 60947-1:2007 and BS EN 60947-3:2009

Fuse options shall be for MCB type C, BS EN 60898-1:2003, 10kA, or alternatively Cartridge fuse links on DIN rail mount to BS 88-2:2013.

The termination unit shall have a removable brass gland plate to facilitate glanding of incoming and outgoing cables.

The plate shall have three 20mm or 25mm diameter holes and shall be provided with 2 no. brass glands and suitable shrouds capable of securing armoured cables of rating and type as specified in Table 1.

The third hole on the plate shall be supplied with a suitable blanking plug which, when fitted, maintains the IP integrity of the unit.

The gland plate shall have a brass M6 earth stud complete with double brass washers and nuts for crimp terminals to allow connection of protective conductors and extraneous bonding conductors, both internal and external.

*Table 1*

<b>Cable type</b>	<b>No. of conductors</b>	<b>Conductor size</b>	<b>Gland type</b>
PVC / SWA / PVC	3-core	16mm <sup>2</sup> /6mm <sup>2</sup>	BW25/BW20

Terminals shall be suitable for LST type fuses and sufficient for the conductors as described in Table 1 and shall be clearly labelled to differentiate circuits and phases. Main terminals will be



suitable for use with crimped cable connectors for armoured underground cables as set out in Table 1 and shall be M6 slotted hex head nuts and lock washers. They shall also be provided with spacer elements to allow the unit to be used with one, two or three cables.

The termination units shall be fitted with a removable 10mm<sup>2</sup> tri-rated (flexible) link green/yellow bonding conductor between the brass gland plate and the earth terminal of the conductor termination block.

The termination unit shall have a fixed label on the front face capable of being indelibly marked with the outgoing / incoming cable destinations.

Cable sizes will be as per Table 2.

*Table 2*

Lantern supply cables	2.5mm <sup>2</sup> 3-core flex (3183Y)
Lighting radial circuit cable	6, 10 or 16mm <sup>2</sup> 3-Core PVC / SWA / PVC
Photocell control cable	2.5mm <sup>2</sup> 5-core PVC / SWA / PVC

Each luminaire on a column shall be supplied from a separate fuse in the termination unit and cable entry to the unit shall be angled to prevent moisture intake.

Termination units shall be described by fuseway, and spur, where fuseways indicate load upwards, and spur indicates load downwards (through the gland plate).

A 5-core flexible cable will be accommodated within the termination unit when this is utilised as photocell control.

The termination unit shall be designed to accommodate sufficient countersunk no 8 woodscrews for secure fixing to the column wooden backboard.

Termination units shall have an overall size not exceeding 95mm wide x 95mm high x 340mm long.

The body of the termination unit shall be moulded from tough thermoplastic material.

Covers are only to be removable by tools, screws are to be held captive on release, and are to be non-corrodible.

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# Transport infrastructure in new developments

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## 5.3 Our role as Technical Approval Authority

### 5.3.1 Scope

East Lothian Council as Roads Authority is responsible as Technical Approval Authority (TAA) for the approval of structures on its own roads or affecting its roads. This applies whether the Designer is the Council's own, a firm of consulting engineers, an individual or any other organisation. We are also responsible as TAA, where a developer is to hand over a structure for adoption on completion.

These procedures are to be applied to the design, checking and construction of all new structures (whether to be adopted or not), partial renewals and maintenance works affecting the integrity or load carrying capacity of existing structures on the local road network. They are intended to ensure that structures are safe and serviceable, economic to build and maintain, and sustainable with minimal impact on the environment.

### 5.3.2 Definitions

Structures include

- bridges, tunnels, subways, culverts, of clear span greater than 0.9m
- retaining walls, reinforced earth structures and soil strengthening with more than 1.5m retained height
- sign-gantries, portal/cantilever signs, highway signs on posts more than 4m high
- environmental barriers and temporary structures provided for public use
- high masts more than 20m in height for lighting/cameras
- cellar roofs and basements which support the road.

The above list is not intended to be exhaustive and in cases of doubt, we will advise on the necessity and requirements for Technical Approval.

## 5.3.3 Process and forms

Technical Approval can consist of several stages including outline agreement to form of structure within overall scheme concept, development of the Approval in Principle document and certification. It is a continuing process and can involve many discussions between the Designer and the TAA. In order to avoid delays, it is advised that preliminary discussions take place early in the process. Any special criteria and departures from standards should be identified as soon as possible.

The Technical Approval Schedule (TAS) is the schedule of standards and technical documents, relating to road structures, to be used in the design, as confirmed by the Designer. The documents must comprise *relevant* current British Standards and Codes of Practice, appropriate current technical memoranda from the Design Manual for Roads and Bridges (DMRB), and other relevant documents and publications including the Manual of Contract Documents for Highway Works (MCHW).

Model Forms and other pro-forma are contained in DMRB standard CG 300 Technical Approval of Highway Structures.

Standard TAS Schedules are listed in DMRB standard CG 300 TAS.

The procedures described and model pro-forma are intended to be contract-neutral and may be amended as necessary to suit specific contract requirements, for example design-and-construct contracts.

## 5.3.4 Our role as the Technical Approval Authority (TAA)

As TAA, East Lothian Council is required to

- Examine all proposals at the preliminary design stage and, when satisfied, to endorse the Approval in Principle Form. We will agree the application of selected documents to particular structures and, exceptionally, give directives on principles to be followed in the Approval in Principle document.
- Determine, and agree the category of structures and hence the need for Approval in Principle.
- Be available for consultation by the Designer or Checker and to give advice on interpretations of Codes and Standards.
- Consider at any stage any proposals for additional criteria or for departures from the documents listed in the Technical Approval Schedule, national codes or standards.
- Resolve any points of difference which occur between the Designer and Checker.

- Receive from the Designer, certificates of compliance with the Approval in Principle (i.e. Design Certificates and Check Certificates), which will also record:-
  - Departures from, and aspects not covered by, Codes and Standards.
  - Directives issued by the TAA

We will not check the calculations nor their translation into design other than to such limited extent as may be required to consider aspects of economic suitability.

Additionally, we have a policy role in the context of applying special parameters such as:-

- Any extra criteria suggested for a particular problem and/or any proposed departures from the documents listed in the Technical Approval Schedule, National Codes and Standards, or DMRB.
- Resolving points of difference between the Designer and the Checker or the interpretation of items in a Code, DMRB or Standard, on which a directive is required.

It is our responsibility to ensure that these decisions are recorded in the Approval in Principle document and on Design Certificates as appropriate. Rulings given for a particular scheme are not to be applied to another scheme without our agreement.

Exceptionally, where the TAA and the Designer cannot resolve a difference, the Roads Authority will issue a directive on a particular subject.

The agreement of the Approval in Principle or acceptance of the Design and Check Certificates does not relieve the Designer or Checker of the responsibility for the validity and arithmetic correctness of the calculations nor their translations into design details, drawings and specification clauses.

**Note:** *These webpages are for reference by developers of housing and employment sites in East*

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# Transport infrastructure in new developments

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## 5.4 Structures Approval in Principle

### 5.4.1 Approval in Principle

Any proposed structure providing support to or crossing above an adopted road is required to follow the Approval in Principle (AIP) process, as outlined and detailed in DMRB standard CG 300.

Templates for relevant AIP Forms and certificates are contained within CG 300.

The purpose of the Approval in Principle is, before detailed design proceeds, to allow us to be satisfied as to:

- The economy of the type and form of structure proposed, with particular reference to the evaluation of maintenance costs.
- Its suitability for the environment and sub-soil conditions.
- Its appearance, including the standards of finish to be adopted.
- The adequacy of soil and other investigations.
- The loading and other design criteria proposed.
- The suitability of the design methods proposed.
- The application of selected documents listed in the TAS, and the suitability of any methods or criteria outside existing Codes or Standards proposed for adoption in a particular structure.
- The need for consultation with interested authorities and compliance with statutory requirements.
- The provision made for the inspection and maintenance of the structure.
- The adequacy, in the case of repair, maintenance or partial renewal works, of those parts of the existing structure, which will remain to carry the temporary and new permanent loading.



Approval in Principle shall not be given until we are satisfied that all foreseeable aspects have been covered and any differences resolved.

Applications for Approval in Principle should be accompanied by

- a location plan
- a preliminary General Arrangement drawing
- relevant parts of the site investigation report and interpretation (if available)
- the Approval in Principle document, with original signatures

## 5.4.2 Category of Design Proposals:

The design proposals shall be classified in one of four Structure Categories: 0, 1, 2 or 3, depending on form, scale and complexity. The Category shall be proposed by the Designer for our agreement.

Criteria for selecting a Structure Category is detailed in DMRB standard CG 300.

The Approval in Principle is valid for 3 years after acceptance. If construction of the structure has not commenced within that time, it must be re-submitted in order that we can review it. Our decision as to whether it is still acceptable must be recorded and dated at the end of the document.

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## 5.5 Structures certification and inspection

### 5.5.1 Design

Detailed design should not normally be undertaken until we have given our Approval in Principle. The design must comply with the Approval in Principle and, should any variations prove necessary, we must agree to them before they are implemented. Such variations must be recorded on an addendum to the Approval in Principle, signed by both the Designer and the TAA.

Any modifications or additions to the Approval in Principle during the design stage will be subject to the same procedures as the original submission.

The Designer shall be responsible for the applicability and accuracy of all computer programs used and shall also ensure the validity of the programs for each application.

### 5.5.2 Checking

Designs and Contract Drawings (including bar bending schedules) under the parameters given in CG 300.

The Checker shall carry out a comprehensive examination of all aspects of the design and any proposed departures, and shall ensure that it complies with our requirements. The Checker shall ensure that the calculations are translated accurately into design details, drawings and specification clauses.

The Checker shall be responsible for checking, with due professional skill and care, in accordance with the Approval in Principle, and shall draw the attention of the Designer and TAA to any aspect of the agreed Approval in Principle where changes are considered necessary.

The Checker's analytical work shall be independent of that of the Designer and carried out without reference to, or exchange of, calculation sheets or similar information between the Designer and Checker.

The Checker shall be responsible for the application and accuracy of all computer programs used and shall ensure the validity of the program for each application. Provided that the Checker agrees with the input, the Checker may use computer output generated by the Designer for the design.

It is not intended that the start of the check should await the completion of the design. Both may proceed together as far as possible to ensure that agreement or resolution of differences is obtained progressively through the design period. Although independence between the Designer and the Checker must be maintained, and the methods they employ need not be the same, consultation can take place between the teams to ensure that the results they are obtaining are directly comparable.

The TAA may call a pre-certification meeting, for selected structures with the Designer and Checker, to discuss their findings prior to accepting Certificates.

### **5.5.3 Certification**

When the design and check of each structure has been completed, the appropriate certificates should be sent to the TAA with original signatures, for, if appropriate, endorsement. All departures from, and aspects not covered by, standards agreed at the Approval in Principal stage, must be recorded on the certificates for our endorsement.

A copy of the General Arrangement drawing of the structure must accompany the Certificate for a Category O structure.

The two signatories submitting the Certificate must clearly indicate their name and office. One, a chartered Engineer, must be the team leader responsible for the design or independent check and the other Partner, (Consulting Engineer) who may delegate this authority for Category O and 1 structures.

Any proposed substitute or additional bridge works specification clauses required, and Bar Bending Schedules, should be identified and are to be included on the certificates together with a list of drawings, with appropriate revision markings.

### **5.5.4 Subsequent procedure**

Tenders for a scheme must not be invited until Technical Approval procedures have been completed for all structures in it except where temporary and/or proprietary structures are specified in the contract and the choice is to be made after return of tenders.

Temporary and/or proprietary structures proposed by a contractor for public use on or over a Public Road will be subject to the normal Technical Approval procedures and subsequent certification by a chartered civil or structural engineer.

A set of drawings for each certified structure shall be submitted to us at the time of tender for reference during the period of contract.

An alternative design by a contractor, which appears to be viable to the Engineer for the Works, will be subject to Approval in Principle by the TAA. An Approval in Principle document must be submitted with the alternative tender and final approval will not be given until Certificates for the design and independent check have been accepted. The Engineer for the Works will be the Independent Checker unless we agree otherwise.

It is the responsibility of the Designer to inform us of any amendments to the design, during construction, which have structural implications and such amendments should be included in an addendum to the Approval in Principle. Certificates revised to take account of such amendments shall be submitted to us for acceptance. Only where the value of the associated Variation Order is within that for which the Engineer for the Works has delegated powers and the structural input is negligible may the amendment be implemented before we have accepted the Certificates. Additionally, where the proposed erection procedure induces different stresses in the completed structure from those anticipated in the design, the changes will need to be covered by additional certificates from the Designer and Checker, and we must issue our acceptance before erection commences.

The Designer will assume the responsibility for the design of the permanent works.

Works should not commence on site until we have endorsed all relevant Certificates.

### **5.5.5 Testing**

The Designer must complete a testing schedule in the format outlined in Series 100 of the “Manual of Contract Documents for Highway Works”, for approval. This testing schedule must describe the absolute minimum testing to be undertaken by the Contractor.

### **5.5.6 Loading and headroom**

All structures supporting the road must be designed using DMRB standard CD 350 The Design of Highway Structures.

Traffic Loading is in accordance with BS EN 1991-2, Eurocode 1: Actions on structures – Part 2: Traffic loads on bridges, as implemented by the UK National Annex (NA) to BS EN 1991-2.

Combinations of actions shall be in accordance with CD 350 and NA BS EN 1990 and as outlined in PD 6694-1:2011.

Selection of Special Vehicles (SV), Load Model 3 (LM3) shall be determined through consultation with the TAA.

Road geometry and cross sections for all road structures and minimum headroom for structures over roads shall be in accordance with DMRB standard CD 127 Cross-sections and Headrooms.

## 5.5.7 Notice of Operations

When a new or modified structure is to be adopted, two weeks' notice must be given of works commencing on site.

The developer or their contractor must give us a minimum of 2 working days' notice of the following operations: -

- Commencement of each pavement layer to the carriageways, footways, footpaths and verges.
- Each concrete pour (including blinding) and commencement of steel fixing where reinforced concrete is used.
- Backfilling to abutments and retaining walls.
- Application of waterproof membrane.
- Prior to application of primer to steelwork and each following coating.
- Prior to erection of structural steelwork.
- Prior to pouring sealant/placing expansion joints.
- Prior to taking down any scaffold, after completion of that part of the works.

## 5.5.8 Construction Compliance Certificate

The Construction Compliance Certificate shall be submitted to us for acceptance and should refer to, if available, the relevant Approval in Principle, Design and Check Certificates, Specification and As-Constructed drawings.

## 5.5.9 Health and safety file for adopted structures

On completion of the works a separate Health and Safety File for each structure is to be prepared and submitted prior to adoption.

The Health and Safety File is to be completed in accordance with **Construction (Design and Management) Regulations 1994**. Details of all testing undertaken, (including manufacturer's literature) must be included in the Health and Safety File. A statement setting out problems encountered during construction of the works and what corrective action undertaken must also be included in the Health and Safety File.

With respect to structures not proposed for adoption, including basement walls and cellar roofs, reference must be made in the Health and Safety File for the structure/building that approval

must be sought from the Council prior to any alterations being undertaken.

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## 6.1 Shrub planting

This section relates to the planting and replacement of all horticultural plants, except trees.

### 6.1.1 Site Preparation

Where planting is to take place on existing soil, the contractor shall cultivate to a minimum depth of 300mm, removing all weeds, rubbish and stones greater than 25mm diameter, and dispose of at a licensed tip. A pre-planting spray of approved herbicide shall be applied in suitable weather conditions where required by the Roads Authority.

### 6.1.2 Amelioration

The Contractor, prior to planting any material, shall incorporate and evenly distribute into the soil surface an appropriate shrub fertiliser such as Fisons Tree and Shrub Planting Compost or SAI Enmag, or other approved fertiliser or compost.

### 6.1.3 Plant Quality

All plants shall be of the species, size and quality as approved by the Roads Authority. Substitution of species shall only be permitted upon submission by the Contractor of evidence that a particular species is not available. Any substitution shall be of similar species and variety to the original and shall be subject to the approval of the Roads Authority.

Plants shall be well formed and healthy with vigorous roots, have several stems originating from, or near, ground level and shall be of reasonable bushiness, well-grown, established and shall have been transplanted or pot-grown in Britain for a minimum period of 12 months prior to uplifting. All shrubs shall comply with British Standard 3936 – 1: 1992.

Where the Contractor supplies the plant material the Roads Authority reserves the right to approve and inspect the material at source. Any material rejected by the Roads Authority will be required to be replaced at the full expense of the Contractor.

The Contractor will be required to provide material, which is acclimatised to the local conditions. Species groups shall all have securely fixed to them identification labels.

## **6.1.4 Planting**

Planting shall take place during the period October - March. Planting outwith this period shall only be undertaken with the authorisation of the Roads Authority. When this occurs only pot-grown material, which has been in the pot for a minimum period of one season shall be accepted.

The Contractor shall ensure that the time between lifting and collection of plant material at the nursery and the planting on site shall be kept to a minimum and whilst lying on site awaiting planting, all plants shall be covered with damp sacking to prevent dehydration of foliage and roots, kept in shade and protected from wind and frost.

Planting shall not be permitted during periods of drought, frost, or cold drying winds or when the ground is waterlogged.

The Contractor shall prepare an adequate hole to accept all plants. In the case of bare root materials, roots shall be inspected prior to placing into the planting hole. Any damaged roots shall be pruned as necessary. The plant shall then be carefully placed in the planting hole, separating and spreading roots as necessary to finish at ground level at the base of stem and back-filling around roots with soil compacting evenly in 100mm consolidated layers leaving no voids.

All containerised plants shall be thoroughly soaked prior to planting. Solid containers shall be removed and mesh or net-type containers shall be cut open on one side if not fabricated of a biodegradable material.

Following planting the Contractor shall ensure that the bed is finally raked over leaving a reasonable level finish with no footprints. The Contractor shall leave the entire site in a tidy state leaving no pots, bags or any other extraneous material.

The contractor shall be required to undertake the watering of all horticultural features being planted or replanted within this section, this being undertaken immediately after planting in, in such a manner that the whole surface of the ground receives adequate water to penetrate to a depth of 75mm and paid for at rates included in the schedule of rates.

## **6.1.5 Mulch**

All Shrub beds shall be treated with pulverised bark mulch following re-planting. The Contractor shall evenly spread a bark mulch to the approval of the Roads Authority over the available area at a minimum settled depth of 75mm.

## **6.1.6 Establishment maintenance**

Maintenance of newly planted areas shall be the responsibility of the contractor for a period of twelve months from the date of practical completion of the landscape works.

During the first growing season following planting, herbicide application shall be restricted to spot treatment only. Any damage resulting from this treatment in the first year shall be held as a responsibility of the Contractor who shall then undertake to replace damaged material with identical species. The following maintenance programme shall be adopted on a frequency of a monthly visit:-

All areas shall be hoed, or hand-weeded as appropriate and all rubbish, litter and weeds removed from site

Plants loosened by maintenance operations, vandalism, frost or wind, shall be firmed up.

Suckers and dead or broken twigs shall be carefully removed back to source with a sharp knife and all pruning works carried out in accordance with the species.

All areas shall be watered ensuring that the area is saturated to a depth of 75mm, as and when necessary.

During the first year establishment period of the newly planted material, the Contractor shall inspect all material and undertake to replace all material which has been damaged, diseased, vandalised, or does not meet the specification, with fresh material. This work shall be undertaken at the Contractor's expense prior to the new planting being accepted into the routine maintenance regime.

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*These pages supersede all previous versions of our Standards for Development Roads document.*

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# Transport infrastructure in new developments

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## 6.2 Grassed areas

### 6.2.1 Seeding

This section provides the specification for all operations relating to the edging of Turfed and New Areas.

### 6.2.2 Seed quality

The Contractor shall only use grass seed mixture as approved by the Roads Authority who shall only accept proprietary amenity and sports fine turf grass seed mixtures which contain varieties as approved and featuring in the U.K. seeds list.

Seed mixtures as approved by the Supervisory Officer shall have a germination capacity for each constituent of not less than 85% and a purity of not less than 95%.

### 6.2.3 Soil quality

The soil is to be approved by the Roads Authority and conforming to British Standard 3882: 1994.

### 6.2.4 Seeding preparation and seeding

The following procedure shall be undertaken on each occasion:-

All areas shall have all vegetation and extraneous material removed prior to cultivation.

Where replacement soil is required due to chemical contamination or fungal/viral disease of turf/soil, it may be necessary to excavate and replace the topsoil to a depth of 300mm, with topsoil as approved by the Roads Authority. The excavated contaminated soil shall be removed from site and disposed of at a licensed tip. A pre-seeding spray of an approved herbicide shall be applied in suitable weather conditions. Allow a suitable fallow period before carrying out cultivation works.

All areas shall be cultivated to a minimum depth of 50mm to produce an acceptable tilth (any stones over 25mm shall be removed).

Where additional topsoil is needed it shall be deposited and spread in layers not exceeding 100mm. Topsoil shall conform to the above Specification Clause and shall be graded to the true specified levels, all depressions shall be eliminated, any undue compaction must be loosened and graded, all to evenly running falls and levels.

Topsoil level shall, after consolidation, be 25mm above adjoining kerbs, manhole covers and similar hard surfaces, and a minimum of 150mm below damp proof course of buildings and walls.

All areas shall be graded at minimum falls of 1 in 60 and a maximum of 1 in 2 to the contours and spot levels.

Unduly compacted areas shall be well ripped to a depth of 100mm and be loosened prior to levelling, raking and seeding.

Where necessary, provision shall be made to take surface water from damp patches and ponding areas by means of land drains, e.g. using 100mm diameter 'Wavincoil' type piping, or others as approved by the Roads Authority.

Prior to sowing the surface shall be reduced to a fine tilth as is necessary to a depth of 25mm by raking or harrowing with a chain harrow. All large stones exceeding 25mm diameter shall be removed from the surface, together with all extraneous material.

The Contractor, prior to seeding taking place, shall incorporate and work into the top 50mm of topsoil a pre-seeding fertiliser as approved by the Roads Authority.

Grass seed shall be applied at a rate of 28g per square metre.

When the grass has established and reached a height of 50mm - 70mm it shall be lightly 'topped' with a rotary action mower gradually reducing the height, the Roads Authority may then instruct the Contractor to roll the area with a light roller, not exceeding 45kg per 300mm width.

During dry weather conditions the contractor shall make arrangements to ensure that the area is adequately watered to a depth of 75mm.

Any failure whatsoever of seed germination shall be the responsibility of the Contractor, and shall be reinstated, where the Contractor shall bear all costs incurred as a result of this operation

During early establishment periods it may be necessary to protect the seeded area by means of either post and wire sheep net or chespale fencing. At the end of the establishment period the Contractor shall dismantle and remove from site any protective fencing which was required, and fill in the holes with soil to the surface level and re-seed.

## 6.2.5 Turfing

Turf edges and margins should be laid with whole turves of a minimum 1m length



Immediately following laying the turf, watering shall be undertaken ensuring that the area has adequate water to penetrate to a depth of 75mm. Further watering may be required, to be undertaken dependent upon weather conditions.

Watering is particularly important when turf is laid, and shall be required to be undertaken on a frequency of twice per week until turf is established, especially if dry weather is experienced.

When turf has established and reached a height of 50mm - 70mm it shall be lightly 'topped' with a rotary action mower gradually reducing the height,

Any failure whatsoever, including shrinkage, settlement, dying, scorching, of the turf establishment shall be the responsibility of the Contractor, and shall be reinstated.

During early establishment periods it may be necessary to protect the turfed area by means of either post and sheep net or chespale fencing. At the end of the establishment period the Contractor shall dismantle and remove from site any protective fencing which was required, and fill in the holes with soil to the surface level and seed or turf as specified.

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## 6.3 Tree planting

### 6.3.1 Planting Stock

All Trees are to comply with BS. 3936 'Nursery Stock' Part 1 'Trees & Shrubs' and shall be to the approval of the Roads Authority who may request to inspect and approve the material at the suppliers nursery or prior to delivery, and reserves the right to reject any material which fails to meet the specification before or after delivery or planting.

### 6.3.2 Seedlings and cuttings

Seedlings and cuttings will be identified as follows:

1+0	1-year-old seedling
1+1	1-year-old seedling lined out for 1 year
1+2	1-year-old seedling lined out for 2 years
1+1+1	1-year-old seedling lined out for 1 year lifted and lined out for one further year
0/1	1-year-old hardwood cutting
0/2	2-year-old hardwood cutting
0/1+1	1-year-old hardwood cutting lined out for 1 year
2x	Twice transplanted tree
3x	Three times transplanted tree
4x	Four times transplanted tree

4x	Four times transplanted tree
ZRB	Root balled hessian

### 6.3.3 Forest transplants/whips

Transplants and whips will be identified as follows:

Transplants	Height up to 0.8m	(TP)
Whips	Height 0.8m - 1.2m	(W)

### 6.3.4 Immature trees & mature trees

Immature trees shall be as identified as follows;

Type	Girth	Height	Stem Clearance
Standard	8cm - 10cm	2.75m - 3.0m	1.8m
Selected Standard	10cm - 12cm	3.0m - 3.5m	1.8m - 2.15m
Heavy Standard	12cm - 14cm	3.5m - 4.2m	1.8m - 2.15m
Extra Heavy Standard	14cm - 20cm	4.2m - 6.0m	1.8m - 2.15m

Mature trees are those that have exceeded 5.0 m in height and are greater in girth than 20cm.

The Contractor shall be required to remove any branches which, as a result of new growth and or leaf foliage weight overhangs any part of a road as defined in Section 151 of the Roads (Scotland) Act 1984.

The Contractor should ensure that:-

1. The branch or branches are cut back at least 30cms from the edge of the road; and
2. Any tree not listed in the Schedule which has grown to the point where they may now become a potential hazard are added to the listed Schedule on an annual basis.
3. All tree work that is undertaken shall be carried out to the satisfaction of the Roads Authority and to specification decided by him.

4. Planting should be carried out as follows, all trees being supplied by the Contractor, shall be of the species, size and a quality as approved by the Roads Authority

### 6.3.5 Site preparation

The Contractor shall remove from site all perennial weeds, large stones, rubbish, litter and other debris, with special attention to the removal of broken glass and similar items hazardous to the public and dispose of at a licensed tip.

A pre-planting spray of an approved herbicide shall be applied in suitable weather conditions where required by the Roads Authority.

The herbicide spot treatment method is to be the normal method used before planting transplants or whips over extended areas such as road embankments or as instructed. Such planting schemes may or may not involve the use of tree-shelters.

The Contractor must ensure that with this method of herbicide application, each individual circle of treated ground is at least 1m in diameter, and since this circle defines the exact tree planting position, the Contractor must also ensure that the numbers and spacing of these circles are consistent with planting requirements as approved by the Roads Authority. Care should be taken to avoid straight lines unless otherwise stated by the Roads Authority

In conditions of high exposure, poor drainage, or where ground compaction has occurred, the Roads Authority may require the Contractor to plough. Where this is the case, the depth of furrow would be a minimum of 250mm. Distances between furrows, and the direction of furrows should be to the approval of the Roads Authority before the start of any given ground preparation/tree planting operation.

### 6.3.6 Time of planting

Planting broadleaves should be undertaken between November and March, with preferences being given to the period before Christmas. No planting should be undertaken when the soil is frozen or snow-covered.

Planting of Conifers is to be confined to the period after Christmas, before April - excepting frozen/snow covered ground conditions.

Only in exceptional cases will the Roads Authority accept Planting implemented outwith the biological dormant season, and when this does occur only containerised or root balled trees will be considered. Watering of each tree will be required immediately after planting.

Where bare root material is to be planted towards the end of the biological dormant season, It may be necessary to treat root systems with an approved root dip medium. Manufacturer's

instructions for the preparation and use of root dip, are to be followed. Any root dip operation must be undertaken immediately following exposure of roots when removed from the storage medium.

Throughout any pre-planting preparation or any planting operation, the Contractor is to minimise the amount of time bare roots are left exposed to the atmosphere.

### **6.3.7 Planting techniques**

Pruning at planting is required for any tree, which has broken roots or branches. The cut is to be made close to the point of damage (either on the roots or the branches). When planting standard trees and advanced nursery stock, the Contractor is to seek the advice of, and adhere to the recommendations made by, the Roads Authority with respect to pruning at planting.

All transplants and whips (including those in tree shelters) are to be inspected one year after planting. Failures must be replaced at the Contractor's expense. Any transplants and whips (including those in tree shelters) suffering from frost-lift are to be re-firmed.

### **6.3.8 Notch planting**

This is to be used for bare root transplants up to 80cm high. Unless ploughing has been undertaken, the exact planting positions will already be evident as circles of dead vegetation at least 1m in diameter resulting from a spot application of a herbicide spray

The notch planting technique is as follows:- using a straight-backed planting spade, an L-shaped notch is to be cut deep enough to take the root system. The soil is then to be levered up and a single fertiliser tablet - content and manufacturer to be approved by the Roads Authority - forced by hand deep into the cut. With the soil still levered up the tree roots are to be inserted taking care not to distort them. The spade withdrawn, the tree is then to be eased upwards until the root collar is at ground level - this should coincide with the nursery soil mark on the stem, then firm in with the heel.

Care is required to ensure that the resting position of the fertiliser tablet is at least 12cm from the vertical axis of the tree stem. Fertiliser tablets shall be Sommerford Grohi tablets or similar equal approved.

### **6.3.9 Planting with tree-shelters**

Tree-shelters shall be of Tubex or similar, equal approved.

Tree-shelters are to be 1.2m high and brown in colour. Tubes with a diameter of 80mm should be used for deciduous trees and 120mm tubes for coniferous trees. Each tree shelter should have two weather resistant ties for securing to the stake. Stakes are to be 1.5m long, 35cm square, and

pointed at one end. Softwoods other than larch or cedar are to be pressure treated with an approved timber preservative. All planting stock to be used in tree-shelters should be between 45cm and 90cm in height.

Before embarking on a programme of planting using tree-shelters, the Contractor is to establish the direction of the prevailing wind. On level ground it is on the windward side of the tree shelter that the stake is to be situated, while on a slope the stake is to be situated on the uphill side of the tree shelter. On sites with a high degree of shelter from wind, stakes should be positioned on the north side of the tree shelter to avoid shading.

Either ploughing or a herbicide spot application is to be completed prior to the commencement of any planting using tree-shelters, and any deviation from this approach must first receive authorisation from the Roads Authority. Unless ploughing is involved, exact planting positions will therefore be evident as circles of dead ground vegetation due to the spot herbicide application.

The following procedure for planting with tree-shelters is to be used:-

- a. **1.** First the stake is to be positioned vertically and hammered down so that no less than 108cm and no more than 118cm remains above ground. No portion of the stake is to be left at a height likely to protrude above the top lip of the tree shelter.
- b. **2.** When planting, the Contractor is to ensure that the position of the planting hole in relation to the stake is consistent with the environmental factors (exposure/slope of ground) detailed earlier, and that the vertical axis of the tree's main stem is no less than 4cm and no more than 7cm from the base of the stake. Other requirements, such as the use of fertiliser tables, are detailed under Notch Planting.
- c. **3.** Remove tree-shelters when trees reach a diameter of 50mm at 1m above ground.

## 6.3.10 Pit planting

### General

The pit planting method is to be used for all root balled trees, container grown trees, and any bare root tree over 90cm tall. Using a spade a hole is to be excavated large enough to take the full spread of the roots with at least 10cm clearance all round. The required minimum dimensions of the hole will depend on the size of the planting stock involved.

Broken or damaged branches should be removed back to the main branch or stem, and broken or damaged roots should be pruned back to the point of attachment to a more major root. The final soil level should coincide with the root collar, i.e., the mark of the nursery soil on the stem. For pit planting in the spring when the weather is dry, trees are to be watered generously immediately after planting.

Where trees of half-standard size and upwards are to be planted on grass, sheets or boards are to be placed around the area of the pit to protect the grass, and any excess subsoil remaining after planting is completed is to be removed to a licensed tip.

### **Pit planting of bare-root transplants taller than 90cm and small bare root whips**

The pit planting of this size of material is simpler than for larger trees. Once the hole has been excavated, a fertiliser tablet, Grohi or equal similar approved should be placed so that it will be at least 12cm from the vertical axis of the tree stem. Soil should be backfilled in stages and well heeled-in at each stage, while shaking the tree gently to minimise air pockets.

### **Pit planting of large bare-root whips (up to 2.2 metres)**

Once the pit has been excavated, the base is to be broken up using a fork or spade. In some cases the use of stakes, perhaps short stakes, may be necessary.

Fertiliser tablets should be used and planting compost is to be mixed with the topsoil for backfilling. Topsoil and subsoil are to be kept separate, and the planting compost well mixed with the topsoil in equal proportions. The method of backfilling is as described earlier.

### **Pit planting of bare-root feathered trees, half standards, and standard trees**

Here planting compost must be used. Topsoil and subsoil are to be kept separate and the planting compost mixed with the topsoil in equal proportions. If soil water content approximates the field capacity level and the sides of the pit appear glazed, they should be scored with a spade to increase permeability.

The base of the pit should be broken up with a spade or a fork, and a stake placed slightly upwind of the centre of the hole and driven in. Before positioning the tree in the pit, a small amount of the topsoil/compost mixture should be placed in the centre of the base of the pit and firmed gently by foot, this will assist in properly spreading the roots. Once the roots are in place, the topsoil/compost mixture should be backfilled in 15cm layers, heeling-in each layer from the outside of the pit and working in towards the tree, while gently shaking the tree to minimise air pockets and ensure that the soil get right between the roots.

### **Pit planting of containerised stock**

Plant as for bare root material, but remove the container and tease out the roots, especially if they are grown around the root ball. Ensure all compost of the root ball is moist before planting, except in the case of rootrainer grown stock.

### **Pit planting and underground guying of prepared nursery stock**

Prepared nursery stock shall have roots enclosed in a root ball to minimise the stress of being moved, and to enable the underground guying technique to be used. These trees should have



received some form of root pruning while in the nursery to encourage a compact, fibrous root system.

The root ball diameter should be at least twelve times the stem diameter one metre above ground level, and the root ball depth should be at least seventy-five percent of its diameter. The root ball should be enclosed in biodegradable sheeting, held in place by 25mm mesh 20 - gauge steel wire netting.

When planting trees of this size on any grassed area, it is particularly important to adhere to the requirements for grass protection and the removal of excess soil to a licensed tip.

The pit depth should be the same as the depth of the root ball. The pit diameter should be one and a half times the diameter of the root ball, with vertical sides. The base of the pit should be broken up with a spade or fork to a minimum depth of 12cm. Excavated topsoil (excluding turf if present) should be kept separate from excavated subsoil in the proportions of 20% topsoil and 80% subsoil. The subsoil and any turf should be set aside and later removed to a licensed tip. Special care should also be taken to ensure that the planting pit is not sited close to underground services. A quantity of planting compost equal to the quantity of topsoil should be thoroughly mixed with it.

Where soil water content is high the pit should be dug an extra 120mm deep. A 120mm thick layer of gravel should then be placed at the base of the pit to improve drainage, and where the sides of the pit appear glazed these should be scored with a spade.

Once the root ball is in place, three pointed lengths of angle iron are to be positioned equidistantly around the root ball pointed end downwards, in the gap between the root ball and the pit sides. Each angle iron pin should be 1m long; the width of each face should be 50mm, and the thickness of each face 5mm. The two faces should form a right angle. Two holes of diameter between 8mm and 10mm are required and these should be positioned 7mm from the blunt end of the pin, halfway across each face.

Using a sledge hammer each pin should be driven into the ground so that there is a 15 degree angle of lean, the lower pointed end of the pin going towards the vertical axis of the tree's stem, and the upper end of the pin away from it. At this stage, the pins are not to be driven home completely - they are to be left with the holes still between 4cm and 8cm above ground level.

Wire rope, 6mm diameter, is to be threaded through all six holes so that it forms a triangular loop around the top of the root ball, and it should be long enough to give an overlap of at least 20cm. Tightening the loop by hand so that the three sections of wire rope between the pins run over the upper surface of the root ball, two U-bolts, of a size suited to the fastening together of two lengths of 6mm gauge wire rope, are to be positioned 10cm apart over the two overlapping ends, and tightened securely.

Wooden battens, approximately 3cm x 10cm x 25cm are then to be positioned between the upper surface of the root ball and the wire rope, so that when the pins are driven home the pressure points of the wire rope are not directly against the root ball, and the rope is prevented from cutting into it.

The battens in place, the angle iron pins can then be driven home. No part of the pins or the wire rope/batten assembly should remain above ground level, but care should be taken not to drive the pins down too far or the wire rope may break. Care is also required to ensure the tree is vertical. It will often be necessary to drive in one pin further than the others to achieve this. Once the tree is firmly secured in a vertical position, all accessible wire mesh on the root ball's upper surface immediately surrounding the trunk should be removed with wire cutters.

**Normal wire or bolt cutters should not be used to cut wire rope. Wire rope must be cut to length either by burning with a blow-torch, or by cutting with a special wire rope cutting tool.**

The topsoil/compost mixture should then be used to fill in the gap between the root ball sides and the sides of the planting pit. This backfilling should be in stages, each stage being well heeled-in. Finally, a shallow layer of the mixture should be spread and firmed down on top of the root ball so that no part of the wire mesh, guy rope, U-bolts, battens, or angle iron pins remains visible. However, care should be taken to avoid, or at least minimise the amount of mixture above the nursery soil mark on the stem.

All root ball trees are to be inspected one year after planting and any failures replaced prior to handover for maintenance purposes.

## 6.3.11 Staking

### General

Tree stakes are to be peeled softwood poles without projections, pointed at the base, and pressure treated to BS 1282 to 8.5 kg/m<sup>3</sup> minimum net dry salt retention.

Tree categories requiring staked support at planting include all bare root feathered trees, half-standards, and standard trees. Special staking techniques may be relevant to large whips or root balled/containerised trees. Generally speaking root balled trees in the Advanced Nursery Stock category (BS 5236) should be planted using the underground guying technique detailed earlier.

Where the required above ground height of the stake is less than 40cm, the stake should be driven into firm ground at the base of the planting pit to a depth of at least 40cm. Where between 40cm and 80cm of stake is required above ground, and then more than 80cm is required above ground.

## **Planting with a single stake**

When planting a tree to have staked support, the pit planting method is to be used.

Where the tree is bare root requiring the support of a single stake, the stake is to be placed slightly upwind of the centre of the pit then driven into the ground to the required depth, the tree should then be positioned and backfilling completed as described under 'Pit Planting'. Finally the tree should be fixed to the stake using either a single tie, or two ties, and galvanised flat-head nails.

The minimum depth to which the stake is to be driven into the ground, and the question of whether a single tie or two ties should be used, are variables dependent on the required above ground height of the stake. The objective is to minimise this above ground stake height, and also to minimise the length of time the tree remains dependent on any form of artificial support, while providing an adequate protection from the elements until roots are firmly established. To this end, and taking the vandalism factor into account, the following procedures should be adopted.

When planting bare root half-standards or standard trees, stakes will be required to provide support up to a point just below the lowest branch. Two ties and spacers are needed. The upper tie should be placed around the tree just below the lowest branch and fixed securely to the stake, leaving a gap between the tie and the top of the stake of not more than 25mm. The lower tie should be positioned one fifth of the way up from the ground to the upper tie.

## **Maintenance of staked trees**

All staked trees should be inspected by the Contractor at the end of the first year's growing season and all dead or diseased trees replaced prior to handover. All stakes and ties should be checked and replaced or adjusted as required.

Bare root half standards and standard trees i.e. all staked trees, are to have the above ground height of staked support reduced three years after planting. After severing the upper tie the stake should be cut not more than 25mm above the lower tie. Protective material should be placed around the bark while the cut is being made, and the lower tie replaced if damaged, weathered, or if increased stem girth is causing excessive pressure.

## **Stakes on bare-root feathered trees / large whips**

When planting bare root standard selected trees, and in certain circumstances large bare root whips, staked support may be required with these sizes of trees, a short stake for a single year may be adequate, or alternatively for feathered trees requiring support further up the stem a double stake may be required

## **Double stakes / angled Stakes**

The requirement for double stakes or angled stakes may be required where the location the trees are in would be an unusual one. However, where the Contractor is intending to plant selected standard trees, containerised trees, or root balled trees below Advanced Nursery Stock size (trees in the Advanced Nursery Stock Category will normally be planted using the underground guying technique). He is required first to inform the Supervisory Officer who will assess the particular planting stock and planting site involved, then specify the particular staking technique to be adopted.

For a double stake, the two stakes are to be driven firmly into the ground on each side of the tree, far enough away from roots to avoid damaging them. A crossbar is then to be nailed or wired to within 50mm of the tops of the stakes, and should be horizontal. The height of the crossbar would be one third of the height of the tree. When the tree stem is attached to the crossbar with an approved tie and spacer the crown of the tree should not be displaced from its unattached position.

Where an angled stake is specified, its angle with the tree should be approximately 45 degrees, the stake should be positioned on the leeward side of the tree, and it should be attached to the tree at approximately one third of its height using an approved tie and spacer

The Roads Authority may require the Contractor to use double or angled stakes for the following reasons:

Firstly, if the material to be planted has roots containerised or root balled, then staking through the roots is avoided. Secondly, where feathered trees require above ground support above the level of the lowest lateral branches, damage to these lower branches is avoided. Thirdly, on exposed sites, angled stakes may greatly increase root stability; and finally, on hillsides or steep slopes, angled stakes may have a much firmer anchorage on the uphill side of the trees.

Trees supported by double or angled stakes are to be inspected, and have ties replaced or stakes removed with the same regularity as for all staked trees.

### **Above ground guy wire supports**

In exposed situations, and perhaps after a storm, it may be necessary to support trees between 3.0m and 4.5m in height with above ground triple guy wires. This method is not suitable where members of the public may trip over the wire ropes, and it should be noted that staking the guy wires in grass may make cutting of the grass around the tree more awkward.

Each of the three guys should form a 45-degree angle with the stem and the ground. The guy itself should be seven strands 3mm galvanised steel cable with the loop around the stake and the loop around the tree securely fixed with U-bolts. The loop around the tree should be sheathed in protective rubber hose piping. Each guy should have a compression spring to provide limited flexibility and reduce the strain on the anchor stakes. Each guy should also have a raddiseur for

periodic adjustment to remove excess slack or tension. The point of attachment on the tree should be a branch crotch approximately one third up the trunk.

Trees supported in this way should be inspected and have raddisseurs adjusted each spring, and also after any storm. This form of support is likely to be long-term.

Stakes should be pointed and pressure treated, measuring 5cm x 5cm x 70cm with a small notch cut 3cm from the end to take the guy. These should be driven into the ground at a 45 degree angle, the lower pointed end towards the vertical axis of the trunk. Only the top 5cm or 6cm of stake with the notch away from the tree should be left above ground. Guy wires should be marked with streamers to alert the public to their presence.

### 6.3.12 Protection

The Contractor may be required by the Roads Authority to provide any of the following protective measures - normally at the time of planting -

Treeshelters	See under 'Planting with Treeshelters'
Spiral Guards	For whips, feathered trees, half standards, and standards.
Split Tubes	For whips, feathered trees, half standards and standards. Especially vole protection.
Plastic Mesh Guards	Cut from a roll and secured by a cane through the mesh.
Field Guards/Stockades	Protection from sheep, horses, cattle.
Mammal Repellent Spray	To comply with The Control of Pesticides Regulations 1986.
Fencing Around	See section entitled 'Fencing'. Any plantation fence protecting a newly planted area of trees is to be inspected each autumn for the first three years following planting and all repairs as necessary executed by the Contractor.

**Note:** *These webpages are for reference by developers of housing and employment sites in East Lothian. They provide guidance on transport infrastructure against which Planning Applications will be considered and evaluated, and set out East Lothian Council's procedures regarding the construction and approval of new roads in accordance with current Legislation. These pages supersede all previous versions of our Standards for Development Roads document.*

## Revisions

01/07/2023 Document release

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East Lothian Council, John Muir House, Brewery Park, Haddington, East Lothian EH41 3HA.

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