STREET LIGHTING INSTALLATIONS
For Lighting on New Residential Roads and Industrial Estates

STREET LIGHTING SPECIFICATION

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## Specification for Street Lighting

### Section 38/278 Agreements

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Street Lighting Specification for Street Lighting

Residential and Industrial Estates

1. **General Requirements**

1.1 This specification is intended as a guide and it must be borne in mind by the developer that any and all proposals put forward are subject to approval by the Street Lighting Manager for Durham County Council, Neighbourhood Services, Strategic Highways Assets. All proposals must conform to this specification.

1.2 Prior to site works of any kind the developer must contact the Director of Neighbourhood Services, Strategic Highways Assets Street Lighting Section to determine if any works are required to maintain electrical supplies to existing street lighting or illuminated street furniture within or in the vicinity of the site.

1.3 The developer shall provide an approved form of street lighting as an integral part of the estate development. Proposals for street lighting must be included with the drawings and specifications and be submitted for approval to the Director of Regeneration and Economic Development. The proposals shall include the positions of lighting columns, type of columns, lanterns, cables, centrally managed systems, cable routes and proposed Electricity Company (NEDL) service connections; two copies of each drawing shall be provided. In addition an Auto-cad (DWG) drawing shall be e-mailed to the Director of Neighbourhood Services, Strategic Highways Assets Street Lighting Manager (ns.highwaysassetsadmin@durham.gov.uk) or appropriate officer together with a copy of the design data showing proposed illumination levels on the roads and footpaths/footways to be lit including the cable design calculations where appropriate.

1.4 The approved drawings will be used on any subsequent adoption inspections, therefore, any changes made to road or lighting layout should be re-submitted for approval.

1.5 The drawing indicating the proposed lighting and electrical layout should indicate a clear concise boundary line to identify the limit of adoption (footpaths/footway and roadway).

1.6 Where new accesses are formed onto existing highways/footways, or alterations to existing accesses, a conflict area is created. The developer shall be responsible for the provision of new lighting or alterations to existing lighting to the relevant standards.

1.7 Cabling and Servicing – Generally Electricity Company low voltage electrical service connections from their mains system (type Ref: TS/57 manufactured by Tofco/Lucy) double pole clear cut-outs but in the absence of such mains an underground loop in/out system of cabling.
1.8 Planning and Programming

The developer shall plan all lighting works in conjunction with Durham County Council’s Street Lighting Policies (available on DCC website, http://www.durham.gov.uk/Pages/Service.aspx?ServiceId=564), and standards relating to developments. The developer shall provide Durham County Council a copy of the working programme indicating installation works including any revisions thereto.

1.9 Prospective Residents Liaison

The developer shall show all lighting units and other illuminated equipment (signs and bollards) on all construction/layout plans (including sales and legal/conveyancing literature) in order that prospective residents are aware that there may be equipment placed adjacent to any given plot or property. Durham County Council will not involve itself in any dispute between the developer and prospective resident. Neither will Durham County Council entertain any request to move or alter any equipment arising from any such dispute arising from the developer not appraising the prospective resident of the proximity of any equipment in relation to a plot or property.

1.10 ‘Not Adopted’ Signs to be Erected

On all lighting units and lit signs erected as part of the development (whether On-site or Off-site), the developer shall attach, via non metallic cable ties, one ‘Not Adopted’ sign. These signs shall be attached to the lamp columns on erection and remain until such time that the County Council adopts the equipment. The signs shall generally face the carriageway. The pattern and legend of this sign shall be approved by Durham County Council but the purpose is to advise residents to whom they should refer any lighting defect or any other enquiry. On a large development (consisting of more than one new road) Durham County Council would advise the developer to erect an informative sign at the entrance to the site advising residents of contact details for all maintenance purposes. It is essential that the sign shall have accurate contact information for the developer or his agent.

2. Siting of Equipment

2.1 All street lighting and associated cable works and ancillary equipment shall only be installed within the area of the estate which it is proposed will be adopted as highway. In exceptional circumstances, and with the prior approval of the Director of Neighbourhood Services, the developer may be permitted to site apparatus outside the highway if appropriate easements are granted to the County Council at the developer’s expense.

3. Adoption of Lighting

3.1 Every lighting unit and underground cable, on completion and before being energised shall be inspected and tested to verify that the requirements of BS 7671 (Current Edition of the IEE Wiring Regulations) have been met. The inspection and the test results shall be submitted to the Director of Neighbourhood Services no later than the time of requesting a Part 2 adoption inspection.
3.2 It is the developer’s responsibility to obtain an **MPAN number from N.E.D.L.** when requesting underground services for the lighting installation from the electricity company. The developer will then be charged for the energy consumed by the street lighting installation from the date of connection up to and including the date of the final adoption certificate.

3.3 The developer shall be responsible for the maintenance (including replacement of damaged columns and the like) of the new equipment and any existing equipment affected by the works from the date of commencement of works up to and including the date of the final adoption certificate.

3.4 Upon completion of the installation ‘as constructed’ drawings shall be forwarded to the Director of Neighbourhood Services showing column positions, cable routes, depths, sizes and positions, and service positions and centrally managed systems.

3.5 On request from the developer for formal adoption of the development the lighting installation will be inspected and any remedial works shall be highlighted. The developer shall be responsible for any remedial repairs together with a bulk lamp change and clean prior to a final adoption certificate being issued. In addition, dependent upon the age of the installation, the developer may be required to re-test/ re-paint the installation at his own expense.

3.6 As soon as possible after the date of the final adoption certificate the developer shall remove ‘Not Adopted’ signs.

4. **Design Standards**


4.2 The actual level of public lighting to be provided shall be determined by the methods shown in the European Standard prEN 13201: 1998, Part 1, Selection of Lighting Classes.

4.3 Deviation from Standards shall only be allowed with prior approval by the Director of Neighbourhood Services.

4.4 In some areas of County Durham the provision of public lighting shall comply with Local Strategies that have been developed, for example Durham City Vision, Bishop Auckland Town Centre Lighting Strategy, and Barnard Castle Vision.

4.5 The Institution of Lighting Professionals ‘Guidance Notes for the Reduction of Obtrusive Light’ recommendation for zoning of areas shall be used when assessing lighting requirements.
4.6 Zone E1 – National Parks, Areas of Outstanding Natural Beauty, Sites of Special Scientific Importance and other Dark Area.

Villages and settlements within a Zone E1 area shall only be provided with lighting when requested by the Parish Council or residents and then limited to strategic locations such as telephone boxes, bus stops etc. Lighting shall be restricted to CEN Luminous Intensity Class G4/5 if possible otherwise Class G2/3, as specified in Table A1 of luminous intensity classes in EN 13201-2:2003 Annex A.

In Zone E1 areas outside villages and settlements shall only be provided with lighting where there is a known night time safety problem which cannot be controlled by other methods such as reflective studs, signing etc. New lighting installations shall be provided to the minimum level proposed by the Standard and be full cut off, CEN Luminous Intensity Class G6. Consideration shall be given to dimming or switching to reduce or vary lighting levels.

4.7 Zone E2 - Areas of Low District Brightness (Rural Location outside Zone E1)

Villages and settlements within a Zone E2 area shall generally be provided with lighting in accordance with the relevant standard applicable to the type and use of the highway. Consideration shall also be given to the lighting of footpaths and cycle tracks with high night time use. Further details on the lighting of cycle tracks are available in the Institution of Lighting Professionals Technical Report No 23, Lighting of Cycle Tracks, 1998. However, where a cycle track or footpath is remote from a highway or properties and an existing alternative lit route exists, regard should be given to whether it is safe to attract people on to isolated areas by the provision of lighting. Lighting shall be CEN Luminous Intensity Class G4/5 if possible otherwise Class G2/3.

On roads between villages and settlements in Zone E2 areas lighting shall only be provided where there is a known night time safety problem which cannot be controlled by other methods. New lighting installations shall be provided to the minimum level recommended by the Standard and be CEN Luminous Intensity Class G6.

Roundabouts are areas of high traffic conflict and are therefore generally provided with a system of lighting. Rural roundabouts in Zone E2 areas shall be provided with a system of lighting to the minimum level recommended by the Standard and be CEN Luminous Intensity Class G6.

It may be possible to provide adequate lighting for the safety of the motorist in such locations by means of a single centrally mounted lighting column instead of a proliferation of lighting columns around the perimeter of the roundabout. The height of the column shall be kept to the minimum but adequate to ensure that the whole of the carriageway around the island is correctly illuminated.

Complex junctions in Zone E2 areas shall only be lit when it can be shown that there is a significant night time traffic flow and no alternative remedial safety actions are effective. New lighting shall be provided to the minimum level recommended by the Standard and be limited to the minimum area necessary for road safety. Careful
consideration shall be given to the height and number of columns and to the wattage of the lamp used. New lighting shall be CEN Luminous Intensity Class G6.

Care shall be taken were there is a cycle track or footpath adjacent to a lit roundabout, lit complex junction or lit rural road to ensure that any conflict points where cyclists, pedestrians and motorists meet or cross are adequately illuminated.

Areas of special environmental interest in Zone E2 areas shall be subject to an individual assessment to determine the benefits or otherwise of providing a system of street lighting.

Consideration shall be given to dimming or switching to reduce or vary lighting levels

4.8 **Zone E3 - Areas of Medium District Brightness (Urban Location)**

Within an urban location all highways shall be lit in accordance with the relevant standard applicable to the type and category of the highway.

(a) Primary Routes
(b) District Distributors
(c) Local Distributors
(d) Access Roads
(e) Shared Access Roads
(f) Secondary Access Roads

Category a), b) and c) roads will mainly be classified as traffic routes and shall be lit accordingly. Glare shall be restricted to CEN Luminous Intensity Class G2/3 but Class G4 used if possible.

Category d), e) and f) roads will generally be considered as residential and lit accordingly. Glare shall be restricted to CEN Luminous Intensity Class G2/3.

Consideration will also be given to the lighting of footpaths and cycle tracks with high night time use. However, where a cycle track or footpath is remote from an adjacent highway or properties and an existing alternative lit route exists, regard shall be given to whether it is safe to attract people on to isolated areas by the provision of lighting. Glare shall be restricted to CEN Luminous Intensity Class G2/3.

Areas of special environmental interest in an urban area would normally be lit subject to an individual assessment to determine the benefits or otherwise of providing a system of street lighting at such locations and to assess any environmental restrictions on the type and level of lighting to be provided.
Energy Conservation

At the 1992 Earth Summit in Rio, the developed Countries agreed to voluntarily reduce emissions of greenhouse gases to 1990 levels by the year 2000.

At the Climate Change Convention in Kyoto in 1997, the developed Countries were legally committed to reduce greenhouse gases affecting the environment.

The UK Government set a target of reducing carbon dioxide emissions by 12.5% on 1990 levels by the year 2010, however, the corporate target is 40% by 2015.

Centrally managed systems are the preferred option of Durham County Council for all existing and proposed street lighting systems. This shall include all residential major and minor roads.

Lighting systems shall be capable of dimming and switching off to allow the Strategic Highways Authority to control such systems to reduce CO2 and energy and therefore, meet the corporate requirements as detailed above.

The County Council has an obligation to comply with the Carbon Management Act and reduction of the baseline of 18% for street lighting and the Carbon Reduction Commitment.

Energy efficient equipment shall be used at every opportunity and investigations and monitoring of technological developments undertaken.

The advent of electronic ballasts with reduced energy consumption, near unity power factor, and ability to be used in a lamp dimming mode shall be specified when appropriate.

The use of lower wattage white light sources such as CDM-T, PL compact fluorescent, CPO, and LED (Light Emitting Diodes) shall be considered as research is being conducted to show that lower levels of lighting can be provided using white light to achieve the same visual appearance and reduction of energy and maintenance.

Legislation Regulations, Codes and Specifications

6.2 All public lighting systems installed and maintained should fully comply with the following Legislation and Regulations:

- Highways Act 1980
- Goods and Services Act
- The Local Government Contract Act
- The Management of Health and Safety at Work Regulations 1982
- Electricity at Work Regulations 1989 (in force 1990)
- Traffic Signs Regulations and General Directions 1991
- Disabled Persons Act 1981
- Road Humps Regulations 1990
- New Roads and Street Works Act 1991
- BS 7671: Regulations for Electrical Installations 1992
- BS 5489: Parts 1 – 10 ‘Code of Practice for Road Lighting’
- BS EN 60529: ‘Specification for Clarification of Degrees of Protection provided by Enclosures’
- BS EN 60598 – 2-3: 1994, Luminaires for Road and Street Lighting
- BS5649: ‘Lighting Columns’
- BS EN 40-1:1992 Lighting Columns. Definitions and Terms
- BS EN.40-2: 2004 Lighting Columns. General Requirements
- BS 40-3-3:2003 Lighting Columns. Design by Verification. Verification by Calculation
- BS 40-5-2002 Lighting Columns. Requirements for Steel Columns
- BS 40-6:2002 Lighting Columns. Requirements for Aluminium lighting columns
- BS.6547:2004+A1:2009 Guidance for the use of BS 40-3-1 and BS EN 4-3-3
- BS EN 12767 Passively Safe Street Lighting and Sign Posts
- The Wildlife & Countryside Act (1981) (as amended)
- the Conservation (Natural Habitats, etc) Regulations 1994 (as amended)
- Department of Environment, Transport and the Regions Advice Note TA 49/07 – ‘Appraisal of New and Replacement Lighting on Trunk Roads and Trunk Road Motorways’
- Passively Safe Road BS EN12767 and Institution of Lighting Professionals Technical Report TR30, and Durham County Council Street Lighting Policy.
7 Siting of Columns

Columns must not obstruct footpaths or vehicular accesses. They shall be sited in accordance with BS5489-1:2003 + A2:2008, Code of Practice for the design of road lighting part 1: Lighting of roads and public amenity areas and generally be planted in the footpath at the rear or in the absence of a footpath, a minimum of 0.8 metres from the kerb edge to the face of the column and within the highway to be adopted. No obstruction or planting shall hinder access to the column base compartment or the light distribution from the lantern.

8 Obtrusive Lighting

8.1 Obtrusive light is lighting, which falls outside the area to be illuminated, which can cause discomfort, annoyance, distraction, or reduces the ability to see. Obtrusive light is referred to as light pollution which can be divided into three main categories:

a) Sky Glow
b) Glare
c) Light Trespass

8.2 The obtrusive light should be restricted by:

a) The control of the type of light source
b) Restricting the level of light emitted at high angles between 70 and 90 degrees
c) The use of full horizontal cut off (flat glass) luminaries where appropriate

8.3 Attention is drawn to the ILP Guidance Notes for the reduction of Light Pollution, which includes the recommendation that for road lighting installations, light near to and above the horizontal should be minimised. The use of full horizontal cut off luminaries at 0° uplift will minimise visual intrusion within the landscape as well as upward light. In urban situations luminaries fitted with shallow bowls provide good control of light near to and above the horizontal.

8.4 Within urban locations in areas of medium district brightness glare should be rectified by the use of lanterns with a CEN luminous intensity class of 2 or 3

9. Equipment (General)

9.1 Urban Traffic Routes, Main Distributor Roads – Generally 10 metre mounting height column supporting 140 watt Cosmopolis or 150 watt High Pressure Sodium (Sont+) lanterns as appropriate to meet the requirements for the appropriate ME lighting class.

9.2 Industrial Estate, Local Distributor and Access Roads – Generally 8-10 metre mounting height column supporting SONT+/ Cosmopolis lanterns to meet the requirements for the appropriate lighting class.

9.3 Residential Roads Access Roads and Footpaths – Generally 6 metre mounting height column supporting SONT+/ PL-L/ PL-S/ Cosmopolis/ LED/ CDM-T/ CDO-TT) as appropriate to meet the requirements for the appropriate S lighting class.
Appendix 9 details the standard range of street lighting lanterns to which all persons providing new lighting will be expected to adhere wherever possible. Any departures from these standards are to be agreed in writing with the Street Lighting Engineer prior to work commencing. Where no such prior agreement has been made the County Council reserves the right not to adopt the equipment.

Consideration shall generally be given to non standard columns/ lanterns in conservation areas only based upon individual assessment and future revenue implications.

Where non standard equipment is approved the developer shall supply to Durham County Council, at no cost, spare equipment eg lantern, bracket, column etc. The quantity to be supplied shall be 10% (rounded up) of that installed or 1no if fewer than 10 are installed.

Ballasts, Lamps, Controls etc shall be approved for use under the Balancing and Settlement Code (BSC) Unmetered Supplies Arrangements and shall have all necessary UMSUG codes.

Columns and Brackets

Columns shall be manufactured from galvanised tubular/ sheet steel, or aluminium and shall conform to the following:

The column and bracket manufacturer shall be registered with and accredited under the Quality Assurance Scheme ISO9002 for the manufacture, supply and verification of lighting columns. A copy of the accreditation document shall be supplied to the Engineer on request.

All columns and brackets shall be manufactured, supplied and installed in accordance with the requirements of BS5649 or revision of such. Columns shall be manufactured in accordance with the requirements of BSEN40 and amendments by BD 26/04. The design of all columns shall include for the mounting of a sign plate 5kg x 0.3m x 1.8 shape co-efficient mounted 2.5 metres above ground and with 300mm eccentricity.

Unless agreed otherwise columns and brackets shall be designed to be capable of accepting lanterns with the following weights and windage of lanterns:

<table>
<thead>
<tr>
<th>MOUNTING HEIGHT</th>
<th>LANTERN WEIGHT (kg)</th>
<th>Windage Area (sqm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5m post top/ side entry</td>
<td>10</td>
<td>0.15</td>
</tr>
<tr>
<td>6m post top/ side entry</td>
<td>10</td>
<td>0.15</td>
</tr>
<tr>
<td>8m post top/ side entry</td>
<td>10</td>
<td>0.19</td>
</tr>
<tr>
<td>10m post top/ side entry</td>
<td>15</td>
<td>0.19</td>
</tr>
<tr>
<td>12m post top/ side/entry</td>
<td>15</td>
<td>0.27</td>
</tr>
</tbody>
</table>
10.4 All columns shall have a root for planting to a depth shown by the middle range listed in Clause 5 of Part 2 of BS 5649 as follows:

<table>
<thead>
<tr>
<th>Column Length</th>
<th>Planting Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 metre columns</td>
<td>800mm planting depth</td>
</tr>
<tr>
<td>6 metre columns</td>
<td>1000mm planting depth</td>
</tr>
<tr>
<td>8 metre columns</td>
<td>1200mm planting depth</td>
</tr>
<tr>
<td>10 metre columns</td>
<td>1500mm planting depth</td>
</tr>
<tr>
<td>12 metre columns</td>
<td>1700mm planting depth</td>
</tr>
</tbody>
</table>

10.5 All columns shall have a cable entry slot 75mm x 150mm with the top of the slot 350mm below ground level.

10.6 Columns manufactured in galvanised tubular steel shall have shaft and base sections manufactured from continuous lengths of new steel tube and shall not contain any welded or stepped sections.

10.7 The base section of columns shall have a minimum wall thickness of 3.2mm and have base compartment openings of a minimum

- 500 x 100mm for 5 and 6 metre columns
- 600 x 115mm for 8, 10 and 12 metre columns

10.8 The shaft sections shall have minimum diameters of 76mm and 114mm for 5/6 and 8/10 metre columns respectively.

10.9 The height above ground of the base sections shall be 1250mm.

10.10 Column roots shall be treated with dense bitumen

10.11 Unless agreed otherwise all columns shall be designed for the following conditions:-

- (a) Mean hourly wind speed Vref of 24m/s.
- (b) Site altitude of 250 metres.
- (c) Terrain category III for 5 and 6 metre columns.
- (d) Terrain category II for 8, 10, and 12 metre columns.
- (d) Topography factor f, shall be 1.0.
- (e) The Partial Safety Factor on loads shall be Class B, wind load 1.2 and dead load 1.2.
- (f) The maximum horizontal deflection of the lantern connection shall be Class 3, 0.1 (h+w).

10.12 Tubular steel columns shall, where specified, be provided with detachable web type steel brackets and shall have a welded web gusset between the spigot and pipe arm and shall have a welded steel spigot cap. For 8 metre columns, and above, the fixing of the bracket to the column shall be over a reduced diameter spigot to maintain the smooth parallel line between the column and bracket arm. The bracket arm shall be held in position by stainless steel screws allowing fixing in any one of four 90° positions relative to the door opening.

10.13 A means of preventing undesired rotational movement of the bracket, once fixed in position, to the column shaft shall be incorporated in the column design.
10.14 Bracket arms shall, provide an incline of lantern of 5°, or 0° in Environmental Zone E1 or specified otherwise, when fitted to spigots of:

(a) 42mm OD x 110mm long for 5 and 6 metre columns
(b) 42mm OD x 127mm long for 8, 10 and 12 metre columns.

10.15 The method of joining the base section and the shaft shall be by a swage joint with an internal centralising washer. All welding procedures shall be in accordance with the requirements of BS EN288 and all welders approved to the requirements of BS EN287 with welding carried out in accordance with BS 5135.

10.16 The same pattern of door lock shall be used throughout all columns. Keys shall be supplied for 10% of all columns supplied. The door fixing bolt shall have a tapered end to facilitate self centering when closing.

10.17 An internal full length base board, equivalent to the door size, substantially non-hygrosopic, shall be fitted in each compartment for mounting control gear. Base board fixing studs or bolts shall not protrude beyond the front face of the base board. The base board shall be firmly bolted in position. On delivery, the column door shall come assembled on the column.

10.18 All columns shall be fitted with M8 x 30mm brass earth studs, threaded the whole length, with two plain washers and two nuts within the base compartment and that are easily accessible. Column doors shall be provided with an internal lug to enable earthing of the column door with an M8 brass earth stud.

10.19 There shall be no sharp edges within columns or bracket arms to damage electrical cables during installation or service. An anti-chafe ring shall be fitted where cable routes change direction from horizontal to vertical within the bracket.

10.20 Raise and Lower columns:

shall be installed at such locations where vehicular access is severely limited, for example, remote footpaths or where the presence of a maintenance vehicle may impede the free flow of traffic. Refuge Island beacon posts may fall within this latter category.

shall generally comply with the Clauses above and shall be erected in accordance with manufacturer’s instructions and recommendations. The oiling point, provided for the lubrication of the hinged cam, shall be attended to during Routine Maintenance visits.

shall be supplied with:

No door - access to electrical equipment only in lowered position, or,

Columns shall be either mid or base hinged

10.21 All new roads above 50mph shall be designed to include passively safe street lighting columns and sign posts in accordance with the British/CEN standards EN12767 and reference shall be made to the County Surveyors, Transport for London research document SL04/07, the Institution of Lighting Professionals Technical Report TR30, and the passive revolution shall be considered and DCC Street Lighting Policy.
11 Corrosion Protection for Steel Columns and Brackets

11.1 All columns and bracket arms shall be galvanised unpainted. Additional protection shall be used for columns and bracket arms within a conservation area or as agreed with the Director of Neighbourhood Services. Additional protection, as per the treatment below, shall be applied before leaving the factory.

   i) Hot dipped galvanised in accordance with BS EN 1501461 1999.

   ii) The galvanised surface shall then be degreased and left with a smooth finish to prepare for painting.

The paint system shall comprise:

1st Coat - On the internal root section, to 250mm above ground level and on the overall external surfaces, one coat of Mordant Solution, T wash.

2nd Coat - On the internal root section, to 250mm above ground level, one coat of modified vinyl micaceous iron oxide with high solids to give a high build coating colour grey to provide a minimum dry film thickness of 60 microns.

3rd Coat - On the external surface overall, one coat of two pack high build epoxy zinc phosphate primer, light grey to provide a minimum dry film thickness of 75 microns.

4th Coat - On the external root section to 250mm above ground level, one coat of modified vinyl micaceous iron oxide with high solids to give a high build coating, coloured grey to provide a minimum dry film thickness of 75 microns.

5th Coat - On the external surface overall, one coat of modified vinyl with high solids to give a sheen finish to the dried film colour grey from BS 4800 shade 18B25 to provide a minimum dry film thickness of 60 microns.

A line on the circumference of the base section shall denote ground level.

The minimum dry film thickness shall be:

Root - 60µm (internal) 210µm (external to 250mm)

External - 135µm (from 250mm)

12 Lanterns

12.1 Lanterns used for road lighting shall be integral and fitted with electronic control equipment and Centrally Managed Control Systems currently utilised by DCC.

12.2 The lanterns should be manufactured to BS EN 60598-2-3 1994 (BS4533) and incorporate an efficient optical system to direct the light onto the highway. To ensure minimum environmental pollution of the night sky the upward light emitted shall be kept to a minimum. Lanterns will be specified with due consideration of the Institution of Lighting Engineers Guidance Notes for the Reduction of Obtrusive Light and shall be of the side entry type unless otherwise agreed by the Director of Neighbourhood Services.
12.3 Lanterns shall allow for side entry and post top mounting and shall, when post top mounted, be capable of adjustable inclination between zero (0) and five (5) degrees without the need for special and additional adaptors.

12.4 Lanterns shall be environmentally friendly and all component parts shall be easily recyclable.

12.5 The body/frame and canopy of lanterns shall be made of high-quality die-cast aluminium, painted grey, silver or black. An alternative to an aluminium canopy shall be allowed if manufactured from high quality, recyclable materials.

12.6 Lanterns shall be available with polycarbonate bowls, low profile bowls, flat glass or curved tempered glass protectors.

12.7 The impact rating for glass protectors shall be IK08 minimum in accordance with BS EN 62262:2002.

12.8 All lanterns shall be fitted with bowls of sound and robust construction capable of being easily dismantled for maintenance or repair purposes. All lanterns shall be fitted with bowls manufactured from vandal resistant material and stabilised to minimise loss of transparency due to weathering and exposure to ultra violet light.

12.9 The bowl or other component giving access to the interior of the lantern shall, when in a closed position, be firmly attached to the body of the lantern; in the open position it shall be attached in such a way that there is no likelihood of it becoming accidentally detached.

12.10 All hinges, toggle catches, captive screws and nuts shall be made of non-corrosive material.

12.11 Lanterns shall be reasonably weather and dust-proof and shall be fitted with a suitable gasket between the body of the lantern and the bowl. The IP Rating of the lantern shall not be less than IP 65.

12.12 The means of supporting the lamp shall be so designed that the position of the lamp in the lantern relative to any optical equipment remains substantially the same under all conditions of service and throughout the life of the lantern.

12.13 The optical equipment controlling distribution should include high purity aluminium reflectors and/or prismatic refractors and these shall have a smooth exterior surface or be protected by hermetically sealed cover plates to prevent an accumulation of dirt and to facilitate cleaning. Refractors wholly within a totally enclosed lantern need not be sealed.

12.14 All lanterns shall be fitted with a porcelain terminal block, earth terminal, cable clamp and lampholder ready wired to connector block with heat resisting type cable. Lanterns for use with SON lamps shall be suitable for the operation of both the standard and higher lumen output lamps e.g. SON and SONP.

12.15 All lanterns shall be fitted with integral control gear and have a heat barrier between the lamp enclosure and gear compartment. The control gear shall be fitted to a tool-
less, quick release gear tray, equipped with a plug and socket connector for ease of maintenance or replacement purposes.

12.16 Electrical equipment shall be installed so that levels of radio interference given in BS EN 55014-1 are not exceeded.

12.17 The downward light output ratio shall be a minimum of 70%.

12.18 Lanterns shall be securely fitted to bracket arms or columns and the lamp and all parts affecting the photometric performance shall be in a clean condition and correctly orientated.

12.19 Lanterns shall incorporate a Central Management System compatible with the Harvard Leafnut system currently used by Durham County Council.

12.20 Lanterns shall have electronic, dimmable ballasts enabled for connection to the central management system (CMS) components but able to be connected to standard electronic photocell controls.

12.21 Ballasts shall be approved for use under the Balancing and Settlement Code (BSC) Unmetered Supplies Arrangements and shall have all necessary UMSUG codes.

12.22 Ballasts shall comply with EN61000-3-2:2000, EN61347-2-12-2005, EN61000-3-3:2001, BS EN 61347-1, BS EN 61347-2-1, BS EN 61347-2-8, BS EN 61347-2-9 and BS EN 60921 or BS EN 60923 as appropriate and be tap selected to the specified operating voltage of the network.

13 Light Sources

13.1 The type of light source, its colour and colour appearance can have a significant effect on the night scene. The attributes of the various light sources that shall be considered for public lighting are:-

SOX – low pressure sodium
- Monochrome yellow orange colour
- Poor colour rendering
- Average lamp life
- Highest energy efficiency
- No further development from manufacturers
- Limited optical control

SON – high pressure sodium
- Golden yellow colour
- Average colour rendering
- Long lamp life
- High energy efficacy

CDM-T – ceramic high intensity discharge metal halide
- Crisp white colour
- Excellent colour rendering
- Average energy efficacy
- Average lamp life
CDO – ceramic metal halide
- Attractive white light
- Excellent colour rendering
- Good energy efficacy
- Average lamp life

Cosmopolis – ceramic metal halide
- Attractive white light
- Good colour rendering
- Best optical efficacy
- High energy efficacy
- Average lamp life

PL – compact fluorescent
- Full spectrum white light
- Good colour rendering
- Average lamp life
- High energy efficiency
- Limited optical control

LED.-Light Emitting Diode
- Low maintenance implications
- Low energy usage
- Extensive Lamp Life
- White light source
- Luminaires still under development

Low pressure sodium (SOX) lamps produce the most lumens per watt of energy consumed but the superior optical light control which can be applied to other physically smaller lamps make such lamps more cost effective.

13.2 New low pressure SOX lighting is to be restricted to existing SOX lit areas and to short extensions of existing installations.

13.3 The installation of new lighting shall generally use high pressure sodium lamps (SON) of the tubular lamp version with high lumen output designated as SON-T plus.

13.4 Where British Standards allow the lowering of lighting classes for light sources with good colour rendering, in compliance with local strategies, or where dictated by environmental/ safety factors, CDM-T, CDO, Cosmopolis, compact fluorescent lamps and LED’s shall be used.

13.5 Lamps must comply with the latest revision of all ruling legislation at the time of supply including:
- EC Declaration of Conformity (CE Mark)
- Full compliance RoHS Directive 2002/95/EC and all related UK legislation
- Full compliance WEEE Directive 2002/96/EC and all related UK legislation
- EuP Directive 2005/32/EC and all related UK legislation
13.6 All lamps supplied shall carry markings in conformity with the above legislation and any other mandatory markings ruling at the time of supply.

13.7 **Low Pressure Sodium Lamps (SOX & SOX-E)**

a) Low-pressure sodium lamps shall comply with EN 60235: “Discharge Lamps (excluding fluorescent lamps) safety specifications,” version 1.1 date of issue 2003-08.

b) EC Declaration of conformity certificate shall be provided.


d) Low-pressure sodium lamps shall have sodium reservoirs (dimples) along the length of the discharge tube for enhanced run-up time and lifetime characteristics.

e) The electrodes shall be resistant to sodium corrosion.

f) The discharge tube bend shall be insulated.

g) The lamp shall have a graduated IR coating.

h) Mica lamp supports shall be incorporated.

i) *35W, 55W & 36W ratings shall have internal vacuum purification via Zirconium-Aluminium solid-state getter technology and lamps with traditional barium getter technology (noted by typical blackening around the cap-end of the glass envelope) shall not be accepted.

**Low Pressure Sodium Lamps (BY 22d caps) – Minimum Performance Criteria:**

<table>
<thead>
<tr>
<th>Nom W / Lamp Type</th>
<th>Rated Luminous Efficacy lm/W (100hrs)</th>
<th>LSF @ 12,000hrs</th>
<th>LLMF @ 12,000hrs</th>
<th>Correlated Colour Temp. Tc (K)</th>
<th>Colour Rendering (Ra)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*35W SOX</td>
<td>129</td>
<td>0.94</td>
<td>0.95</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>*55W SOX</td>
<td>140</td>
<td>0.94</td>
<td>0.95</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>90W SOX</td>
<td>152</td>
<td>0.87</td>
<td>0.95</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>135W SOX</td>
<td>167</td>
<td>0.87</td>
<td>0.95</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>18W SOX-E</td>
<td>100</td>
<td>0.90</td>
<td>0.95</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>26W SOX-E</td>
<td>141</td>
<td>0.90</td>
<td>0.95</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>*36W SOX-E</td>
<td>163</td>
<td>0.94</td>
<td>0.95</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>66W SOX-E</td>
<td>172</td>
<td>0.90</td>
<td>0.95</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>91W SOX-E</td>
<td>194</td>
<td>0.90</td>
<td>0.95</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>131W SOX-E</td>
<td>206</td>
<td>0.90</td>
<td>0.95</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>
13.8 High Pressure Sodium Lamps

a) High pressure sodium lamps shall comply with EN 60235: “Discharge Lamps (excluding fluorescent lamps) safety specifications,” version 1.1 date of issue 2003-08.

b) EC Declaration of conformity certificate shall be provided.

c) High pressure sodium lamps shall comply with IEC60662: “High Pressure Sodium Vapour Lamps,” version 1.10 date of issue 2001-11

d) High pressure sodium lamps shall be of the “Plus” type with higher xenon pressure for increased lm/W

e) High pressure sodium lamps shall incorporate a solid state getter with clear lamp bases (getter -blackened lamp bases shall not be accepted)

f) High pressure sodium lamps shall incorporate an integrated antennae starting aid, which shall be sintered to the ceramic arc tube

g) High Pressure Sodium Lamps shall be of the single arc-tube type to ensure the light source is always at the centre of the luminaire optic for consistent photometric performance. Elements within the lamp construction shall not give rise to shadows cast.

h) The construction shall be sturdy and robust with as few as welds as possible in order to reduce the risk of early failures due to external shock and vibration.

High Pressure Sodium Lamps - Minimum Performance Criteria:

<table>
<thead>
<tr>
<th>Nom W / Lamp Type</th>
<th>Rated Luminous Efficacy lm/W @ 100hrs</th>
<th>LSF 16,000hrs</th>
<th>LLMF 16,000hrs</th>
<th>Correlated Colour Temp. Tc (K)</th>
<th>Colour Rendering (Ra)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50W SON-T Plus (E27)</td>
<td>88</td>
<td>0.92</td>
<td>0.87</td>
<td>2000</td>
<td>25</td>
</tr>
<tr>
<td>70W SON-T Plus (E27)</td>
<td>91</td>
<td>0.92</td>
<td>0.87</td>
<td>2000</td>
<td>25</td>
</tr>
<tr>
<td>100W SON-T Plus (E40)</td>
<td>107</td>
<td>0.96</td>
<td>0.94</td>
<td>2000</td>
<td>25</td>
</tr>
<tr>
<td>150W SON-T Plus(E40)</td>
<td>110</td>
<td>0.96</td>
<td>0.94</td>
<td>2000</td>
<td>25</td>
</tr>
<tr>
<td>250W SON-T Plus(E40)</td>
<td>128</td>
<td>0.96</td>
<td>0.94</td>
<td>2000</td>
<td>25</td>
</tr>
</tbody>
</table>
13.9 Ceramic Metal Halide Lamps (suitable for HPS control gear) CDM, CDO

a) Ceramic Metal Halide lamps shall comply with EN 60235: “Discharge Lamps (excluding fluorescent lamps) safety specifications,” version 1.1 date of issue 2003-08.

b) EC Declaration of conformity certificate shall be provided.

Ceramic Metal Halide Lamps (suitable for HPS control gear) - Minimum Performance Criteria:

<table>
<thead>
<tr>
<th>Nom W / Lamp Type</th>
<th>Rated Luminous Efficacy lm/W (100hrs)</th>
<th>LSF @ 12,000hrs</th>
<th>LLMF @ 12,000hrs</th>
<th>Correlated Colour Temp. Tc (K)</th>
<th>Colour Rendering Ra</th>
</tr>
</thead>
<tbody>
<tr>
<td>70W CDM-TD (RX7s)</td>
<td>86</td>
<td>0.90</td>
<td>0.70</td>
<td>3000</td>
<td>82</td>
</tr>
<tr>
<td>35W CDM-T (G12)</td>
<td>87</td>
<td>n/a</td>
<td>n/a</td>
<td>3000</td>
<td>81</td>
</tr>
<tr>
<td>70W CDM-T (G12)</td>
<td>93</td>
<td>n/a</td>
<td>n/a</td>
<td>3000</td>
<td>84</td>
</tr>
<tr>
<td>50W CDO-TT (E27)</td>
<td>83</td>
<td>0.90</td>
<td>0.65</td>
<td>2800</td>
<td>83</td>
</tr>
<tr>
<td>70W CDO-TT (E27)</td>
<td>88</td>
<td>0.90</td>
<td>0.80</td>
<td>2800</td>
<td>83</td>
</tr>
<tr>
<td>100W CDO-TT (E40)</td>
<td>91</td>
<td>0.90</td>
<td>0.80</td>
<td>2800</td>
<td>83</td>
</tr>
<tr>
<td>150W CDO-TT (E40)</td>
<td>92</td>
<td>0.90</td>
<td>0.80</td>
<td>2800</td>
<td>85</td>
</tr>
<tr>
<td>250W CDO-TT (E40)</td>
<td>92</td>
<td>n/a</td>
<td>n/a</td>
<td>2800</td>
<td>85</td>
</tr>
</tbody>
</table>

13.10 Optimised Ceramic Metal Halide (dedicated Electronic Control Gear)

a) Ceramic Metal Halide lamps shall comply with EN 60235: “Discharge Lamps (excluding fluorescent lamps) safety specifications,” version 1.1 date of issue 2003-08.

b) EC Declaration of conformity certificate shall be provided

Optimised Ceramic Metal Halide - Minimum Performance Criteria:

<table>
<thead>
<tr>
<th>Nom W / Lamp Type</th>
<th>Rated Luminous Efficacy lm/W (100hrs)</th>
<th>LSF @ 16,000hrs</th>
<th>LLMF @ 16,000hrs</th>
<th>Correlated Colour Temp. Tc (K)</th>
<th>Colour Rendering Ra</th>
</tr>
</thead>
<tbody>
<tr>
<td>45W CPO-TW (PGZ12)</td>
<td>96</td>
<td>0.9</td>
<td>0.78</td>
<td>2720</td>
<td>60</td>
</tr>
<tr>
<td>60W CPO-TW (PGZ12)</td>
<td>113</td>
<td>0.9</td>
<td>0.83</td>
<td>2730</td>
<td>66</td>
</tr>
<tr>
<td>90W CPO-TW (PGZ12)</td>
<td>116</td>
<td>0.9</td>
<td>0.87</td>
<td>2880</td>
<td>66</td>
</tr>
<tr>
<td>140W CPO-TW (PGZ12)</td>
<td>118</td>
<td>0.9</td>
<td>0.87</td>
<td>2860</td>
<td>66</td>
</tr>
</tbody>
</table>
13.11 Single Capped Compact Fluorescent Lamps


b) EC Declaration of conformity certificate shall be provided.

c) The ambient temperature shall be stated at which the lamp was designed to maximise its luminous flux.

Compact Fluorescent Lamps - Minimum Performance Criteria:

<table>
<thead>
<tr>
<th>Nom W / Lamp Type</th>
<th>Rated Luminous Efficacy Im/W (100hrs)</th>
<th>LSF @ hrs stated (Pre-heat ECG / 12hrs cycle)</th>
<th>LLMF @ hrs stated (ECG)</th>
<th>Correlated Colour Temp. Tc (K)</th>
<th>Colour Rendering Ra</th>
</tr>
</thead>
<tbody>
<tr>
<td>11W PL-S 2pin 840</td>
<td>n/a</td>
<td>0.89 @ 8000hrs</td>
<td>4000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>11W PL-S 4pin 830</td>
<td>82</td>
<td>0.9 @ 8,000hrs</td>
<td>0.89 @ 8000hrs</td>
<td>4000</td>
<td>82</td>
</tr>
<tr>
<td>11W PL-S 4pin 840</td>
<td>82</td>
<td>0.9 @ 8,000hrs</td>
<td>0.89 @ 8000hrs</td>
<td>4000</td>
<td>82</td>
</tr>
<tr>
<td>42W PL-T 4pin 830/ TOP</td>
<td>74</td>
<td>0.9 @ 8,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>42W PL-T 4pin 840/ TOP</td>
<td>74</td>
<td>0.9 @ 8,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>57W PL-T 4pin 830 / TOP</td>
<td>77</td>
<td>0.9 @ 8,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>57W PL-T 4pin 840 / TOP</td>
<td>77</td>
<td>0.9 @ 8,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>24W PL-L 4pin 830/ Polar</td>
<td>82</td>
<td>0.9 @ 14,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>24W PL-L 4pin 840/ Polar</td>
<td>82</td>
<td>0.9 @ 14,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>36W PL-L 4pin 830/ Polar</td>
<td>80</td>
<td>0.9 @ 14,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>36W PL-L 4pin 840/ Polar</td>
<td>80</td>
<td>0.9 @ 14,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>55W PL-L 4pin 830/ Polar</td>
<td>87</td>
<td>0.9 @ 14,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>55W PL-L 4pin 840/ Polar</td>
<td>87</td>
<td>0.9 @ 14,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>80W PL-L 4pin 840</td>
<td>75</td>
<td>0.9 @ 14,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
<tr>
<td>36W PL-L 4pin 830/ Polar Xtra</td>
<td>80</td>
<td>0.9 @ 32,000hrs</td>
<td>3000</td>
<td>82</td>
<td></td>
</tr>
</tbody>
</table>
14  **Cut Outs and Isolators**

14.1 All cut-outs shall incorporate a double pole isolation switch complying with BS5419 having a rating of 32 amps and of adequate short circuit withstand for the position in the circuit in which it is installed. The isolation switch shall be capable of being positively and visibly locked off by means of a padlock or locking bar and it shall not be possible to remove the outgoing fuse(s) unless the isolation switch is in the off position.

14.2 The cut-outs shall be of the all insulated type with drip proof enclosure affording a minimum degree of protection to IP22 and have a high mechanical and dielectric strength. The terminals shall be capable of accepting conductors with crimped lug connectors.

14.3 The incoming phase terminals shall be shrouded when all connections have been made, the shroud shall be capable of removal for inspection or disconnection of cable ends, but shall not be capable of accidental detachment or be of a push fit type. Movement of cables shall be prevented by the use of bushes or inserts. Fuse carriers shall utilise HRC fuse links to BS 88.

14.4 The units shall be provided with separate terminals for phase and neutral conductors manufactured from solid brass and electro-tinned and be entirely suitable for connecting the requisite cables.

14.5 Where connection is made into any cut-out for supplying a sub-circuit the cut-out shall incorporate a second fuse link to protect the sub-circuit.

14.6 Electricity Service Connections cut-outs shall be manufactured by Tofco or and be double pole or similar approved by DCC.

The cut-outs shall be securely fitted to the baseboard with non-corrodible screw fixings.

15  **Fuses**

15.1 No rewirable fuses shall be used. All fuses to be HRC to BS88 Part 2 operating on 240 volts 50Hz supply. Fuse ratings shall be 6 amps for lamps up to and including 100watt and 10 amps for lamps greater than 100 watts.

16  **Cables**

16.1 Underground cables shall be laid in duct except where they leave the duct to enter the cable slot of the apparatus, and consist of stranded copper conductors, XLPE insulated, PVC extruded bedding, a concentric layer of steel wire armour, overall PVC sheathing suitable for operation in an earthed system and of rated voltage 600/1000 volts at 50HZ, all in accordance with BS 6346 for metric cable, have BASEC approval under the product certification scheme and produced by a manufacturer who has been awarded a Certificate of Assessed Quality Management, to BS 5750, by BASEC.
16.2 All cores shall be of equal cross sectional area of 6sq mm minimum and be of such a size that the requirements of the current IEE Wiring Regulation, BS 7671, are met and allow for a disconnection time not exceeding 5 seconds.

16.3 Internal wiring between the terminal block in the lantern and the components in the base of the column shall be PVC insulated and sheathed cable of 300/500 volt grade, have a copper conductor size of not less than 2.5 sq mm.

16.4 Where approved, cable to a two part photo electric cell detector unit shall be 1.5 sq mm two core flat with white sheath.

16.5 All cores shall be correctly colour coded and cables for continuous earth bonding shall be green/yellow PVC insulated single core copper cable of minimum cross section 6 sq mm 600 volt grade conforming to BS 6004.

16.6 All underground cables (except Regional Electricity Company cables) shall be identified as to their origin and destination by permanent markers located over the sheath at the cable ends. An example is shown in Appendix 5.

17 Cable Ducts

17.1 Cable ducts across roadways shall have internal diameters of 100 mm and average wall thickness of 5.0 mm. Cable ducts in footpaths and verges shall have internal diameters of 50 mm and average wall thickness of 3.5 mm.

17.2 Ducts shall be manufactured from low, medium or high density polyethylene and coloured orange with white, 9 mm high lettering “STREET LIGHTING” at intervals of not more than 1m along its length.

17.3 Ducts for street lighting cables under carriageways shall be laid with 750 mm minimum cover and laid on 100 mm bed of Acceptable Material Class 8 (Specification of Highway Works) and covered with Acceptable Material Class 8 but containing no material greater than 20 mm within 100 mm of the duct.

18 Cable Laying

18.1 Joints in underground cables are not permitted and continuous lengths of cable shall be laid and looped in and out of the terminations.

18.2 Cables shall not be laid in a frozen state or when the ambient temperature is below 0°C.

18.3 The internal radius of a cable bend shall be such as not to cause damage to the cable.

18.4 For cables not accommodated in 50 mm duct, the trench shall be excavated to 525 mm minimum depth and the cable laid on and surrounded by a 75 mm thickness of sand or equivalent material. The trench to be back filled with acceptable material to within 150 mm of finished level before laying the cable marker tape and completing the backfill and finished surface.
Erection of Columns and Brackets

19.1 The columns shall be erected in the locations shown on the approved drawings. Columns shall be set on a 450 x 450 x 50 mm paving slab at the level necessary to obtain the required planting depth. The column shall be correctly aligned in the vertical position with the door opening facing away from oncoming traffic.

19.2 The columns shall be placed in a hole allowing a minimum of 150 mm clearance all round the base of the column for the full excavation depth. The column foundation shall be formed as shown in Appendix 6 or as otherwise directed by the Director of Neighbourhood Services.

19.3 Concrete used in the backfill shall be grade ST5 as specified in the Specification for Highway Works.

19.4 Bracket arms shall be fixed to the columns at the site of installation. The method of securing the bracket arm must be positive such that the arm cannot rotate. The arm and lantern shall be at right angles to the highway to be illuminated.

Internal Wiring and Distribution Cables

20.1 Columns not directly supplied from Electricity Company supplies shall be supplied on a sub-circuit from the serviced column by means of the public lighting underground cable and looped from column to column. All looped connections shall be made in the bottom terminals of the fused isolator cut-out. The armouring of the underground cables shall be secured onto the gland plate of the cut-out or have a non ferrous sleeve fitted below the armouring and earthing clamps fitted to make a positive grip on the armour wires. The earthing clamps and gland plate shall be bonded to the main column earthing terminal with 10 sq mm single core PVC cable.

20.2 Typical wiring diagrams are shown in Appendices 1 to 4.

Illuminated Road Traffic Signs

21.1 Where it is necessary, all illuminated road traffic signs shall be provided by the developer and shall be as prescribed in the Traffic Signs Regulations and General Directions 1994, the Traffic Signs (Speed Limits) Regulations and any amendments.

They shall be provided where directed by the Director of Environment and Technical Services to whom details of any proposals must be submitted for approval.

21.2 Posts for Illuminated Traffic Signs

A post with base housing shall be provided for each overhead sign lighting unit and cut out and service connections made in the base housing. All metal posts shall be tubular steel section and supplied in accordance with BS 873 and BSEN 10210.

The corrosion protection for sign posts shall be as that specified for street lighting columns in Clause 11 of this specification.
21.3 Sign Plates

All plates shall be of a size, colour and type prescribed by the Secretary of State as indicated in the Traffic Sign Regulations. All parts of the sign assemblies shall be designed and manufactured to withstand a minimum wind pressure of 1.5 KN/square metre.

Plates shall be manufactured from aluminium or plastic coated steel which shall have a ten year guarantee applicable to the reflective material and substrate. All signs shall have class one reflective material (encapsulated lens) fully reflectorised.

21.4 Sign Lanterns

Sign lanterns shall comply in all respects with the requirement of Section 4, BS873 and BS1788 where applicable.

The lantern for overhead illumination of plates up to 750mm diameter shall house one PL11 watt compact fluorescent lamp. The unit shall be manufactured from LM6-M cast aluminium and incorporate a fully detachable gear try and alloy frame supported polycarbonate lens that pivots or hinges downwards leaving the signlight canopy in tact and providing weatherproof protection to the electrics and lighting unit during maintenance operations. The sign lantern and bracket shall be as manufactured by Simmonsigns type LUA or similar approved.

21.5 Illuminated Signs on Pedestrian Refuge Islands

Unless otherwise agreed the signs used at such locations shall be of the demountable type with the installation incorporating cable chambers and post sheaths as depicted on standard detail drawing, Appendix 7.

22. Electricity Supply Services

22.1 The developer shall liaise with the Regional Electricity Company (Northern Electric) with regard to provision of electricity supply services to the lighting installation.

22.2 Northern Electric advise that where a significant number of services are required, the developer should contact the appropriate Northern Electric office eight weeks prior to the supply being required, and provide the following:

(a) A schedule of lamps requiring a new supply or transfer of supply.
(b) Two plans of the approved lighting scheme.
(c) An indication of when the work will be required.

Northern Electric will return one of the plans, a written quotation and a schedule of the columns that are to receive a new or transferred supply. The developer will be required to confirm acceptance of terms and to give at least four weeks notice of a “site ready date” when work on site can commence. Northern Electric will require payment in advance of work commencing and also require the developer to install all service and cross road ducts to their specification.
22.3 Where public lighting underground supplies are to be drawn from the Electricity Company fuse unit, the developer shall provide and fix a public lighting cut-out at that service position.

UNDER NO CIRCUMSTANCES SHALL CONNECTIONS BE MADE TO THE LIVE SIDE OF THE ELECTRICITY COMPANY CUT-OUT.

23. **Earthing**

23.1 The whole of the installation shall be earthed in accordance with the requirements of the current BS 7671, IEE Wiring Regulations, and with the recommendations contained in BS 7430, Earthing. Earthing shall be carried out in PVC insulated copper cable green/yellow in colour. All metallic parts of the ancillary equipment, column, lantern and gear shall be bonded together to form a continuous earth path to the earth stud of the column.

24. **Painting**

24.1 After erection, any areas of damage to the paint protection system shall be made good by abrading the edges of the damaged areas and coating the damaged areas with M.I.O. modified vinyl, applied by spray, to give a sheen finish coloured grey 18B25.

24.2 No further site painting of new columns shall be required unless a finish in a colour other than grey is required. Any further finish paint shall be applied to the overall column and bracket in one continuous flow free coat. All painting shall be carried out in accordance with the paint manufacturer's instructions and no painting shall be carried out during extremes of temperature or when the surface is damp or wet.

25. **Electrical Testing of Equipment and Commissioning**

25.1 Prior to being energised, all equipment wiring and cabling of every completed installation shall be tested in accordance with Part 7 of BS7671.

25.2 Testing shall be carried out in compliance with the Electricity at Work Regulations 1989 and such that no danger to persons or property or damage to equipment can occur even if the tested circuit is defective.

25.3 The columns and underground cables should be tested in the following sequence.

1. Visual Inspection – to verify that the electrical equipment has been correctly installed in accordance with the design with correctly rated protection devices and bonding and that no visible damage exists.

2. Continuity – every protective conductor, including bonding, shall be tested to verify that it is electrically sound.

3. Insulation Resistance – the insulation resistance should be measured between all the conductors and the conductors to earth with a test voltage of 500 volts. The insulation resistance should not be less than 0.5 megohm.
4. Polarity – a polarity test should be made and a check to verify that protective devices are connected correctly and fuses in the phase conductor only.

5. Earth Fault Loop Impedance – measurements should be taken at the point of supply and, where underground cables have been installed, at the most distant point of each circuit. The values should accord with those shown in BS 7671 to ensure the circuit protective device will function within five seconds.

6. Earth Electrode Resistance – tested in accordance with BS 7430 and BS 7671.

7. Operation of Residual Current Device – verify by a test simulating an appropriate fault condition independent of any test facility incorporated in the device. The device shall be tested at 50% and 100% of its rated trip current.

8. Voltage Drop – measured at the most remote point from the supply under full load conditions.

25.4 All results shall be recorded and submitted to the Director of Neighbourhood Services prior to a Part 2 adoption inspection. The results, for each unit, shall be recorded on the forms shown in appendix 10 or such similar in accordance with BS 7671 subject to approval.
Typical Wiring Arrangement for Lighting Unit with (One Part) PEC, Integral gear lantern and incoming Electric Company Supply

Provisional Item PEC now Superseded By CMS
Typical Wiring Arrangement for Lighting Unit with Composite (One Part) PEC, Integral gear lantern and incoming Public Lighting Supply—Provisional Item PEC now Superseded By CMS
Typical Wiring Arrangement for Lighting Unit with Composite (One Part) PEC, Integral gear lantern and Electric Company Service Position and Public Lighting Supply Outgoing Live Loop

Provisional Item PEC now Superseded By CMS
Typical Wiring Arrangement for Lighting Unit with Composite (One Part) PEC, Integral gear lantern and Public Lighting Looped Supply with Fuse Spur

Provisional Item PEC now Superseded By CMS
Typical Layout and Cable schematic Diagram

Key:
- ☑ 6 Meter Tubular Steel Lighting Column Fitted with 55 Watt PLL Lantern as Type .....................
- □ Illuminated Traffic Sign
- ▶ REC Direct Service Position
- └ 2 Core XPLE/SWA/XPLE 6mm² Cable Installed in 50mm orange duct marked with Street Lighting

Date: 28/06/2011
Appendix 5
Standard Detail
Lighting Column Foundation

NOTES
1. Columns to be erected vertically
2. Where surfacing material is used round the column, in footways, the top concrete collar to be lowered by the thickness of the surfacing material.
3. Cable to be covered by 75mm thickness of sand or equivalent material passing a 2mm BS sieve, then Class B material to Clause 601 table 6/1 of the Specification For Highways Works to be deposited to within 200mm of finished ground level.
4. Planting depths to be middle range of BS 5649 Part 2 Clause 5

<table>
<thead>
<tr>
<th>Mounting Height</th>
<th>Planting Depth</th>
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</thead>
<tbody>
<tr>
<td>5m</td>
<td>800mm</td>
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<tr>
<td>6m</td>
<td>1000mm</td>
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<td>10m</td>
<td>1500mm</td>
</tr>
<tr>
<td>12m</td>
<td>1700mm</td>
</tr>
</tbody>
</table>
5. Over excavation of the column hole shall be backfilled with concrete Grade ST5.
6. All dimensions are in millimetres unless otherwise shown.

Appendix 6
Lighting Column Standard Foundation Arrangements
Standard Detail

Date: 28/06/2011

Durham County Council
Making a difference where you live
NOTES

1. Incoming cable from supply point to underground junction box is to be 6mm² - 2 core XLPESWA. Cable gland is to be BICC EIW brass (or similar). Earth tag to be installed to the inside of the junction box. 6mm² earth cable connected to armour and earth stud on pole.

2. Cable from underground junction box to sign lanterns is to be 0.75mm² - 3 core - outer sheath black. General purpose TRS to BS6500 - rated 300/500v reference 3183VR. Gland to be IP67 rated.

3. Underground junction box is to be GRP moulded 255 x 250 x 120mm deep and rated to IP67. This box is to be fitted with fusing facilities for individual sign units.

4. Kerbs to be laid on existing planed carriageway construction.

5. This detail is only applicable to roads with speed limits not greater than 30mph.
Central Management System Schematic Wiring
Diagram-Replacing PEC Control
Note: All cut-out details remain as per PEC appendices above
## Appendix 9: Standard Range of Street Lighting Lanterns

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model</th>
<th>Lamp Wattage</th>
<th>Source</th>
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<tr>
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<td>Oracle S shallow glass</td>
<td>45W</td>
<td>Cosmo</td>
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<tr>
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<tr>
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Appendix 10: ELECTRICAL TEST SHEET (page 1 of 2)

SITE NAME: ___________________ DEVELOPER: ________________________

DISTRICT: __________________ PARISH: __________________ UNIT No: ________

TOWN: ______________________ STREET: ________________________________

LOCATION: ______________________________________________________________________________

TYPE (eg Ltg Col, Illuminated Sign etc): ________________________________________________________

POST HEIGHT: ________ MATERIAL: ____________________________

POSITION: ON A BRIDGE/ CENTRAL RESERVE/ FRONT OF PATH/ REAR OF PATH/ IN GARDEN/ ON ROUNDBOUT/ ON SIDE OF ROAD/ ON SLIP ROAD/ ON SPLITTER ISLAND/ IN VERGE

MANUFACTURER: ____________________________ COATING: ______________________________

FLANGED: YES/ NO RAISE & LOWER: YES/ NO CONDITION: GOOD/ AVERAGE/ POOR

BRACKET TYPE: ____________________________________ PROJECTION: __________

No OF BKTS: _______ BRACKET CONDITION: GOOD/ AVERAGE/ POOR

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VISUAL INSPECTION SATISFACTORY | YES/ NO | COMMENTS INCLUDING REPAIRS MADE

SYSTEM & EARTHING TYPE: ________________ SUPPLY VOLTAGE: __________

TRIP LAMP/ FEEDER PILLAR No.: __________ P.S.C.C.: _________________ kA

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### Appendix 10: ELECTRICAL TEST SHEET (page 2 of 2)

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<th>CABLE TYPE, MATERIAL, CSA, No of CORES</th>
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R.C.D. INSTALLED: YES/ NO  LOAD RATING (A) ________  TRIP RATING (Ma): __________

MANUFACTURER: _____________________________  MODEL REF: ___________________________

OPERATION: $\frac{1}{2}$ = _______________ ms  1 = _______________ ms

EARTH ELECTRODE RESISTANCE (IF INSTALLED): ____________ OHMS

COMMENTS

---

I CERTIFY THAT THE ABOVE INSTALLATION HAS BEEN INSPECTED IN ACCORDANCE WITH THE CURRENT IEE REGULATIONS

SIGNED: _________________________________________  DATE: _____________________

PRINT NAME: _______________________________________

---

FINAL 14-07-2011