Birmingham City Council
Development Standard Specification for Street Lighting Works

Version 1

Rev	Date	Amendments	Systems Approved	Authorised by
A	August 2010	First Issue		

Contents

Introduction

1 General

This specification is based on the latest requirements of the Department of Transport Specification for Highway Works, (MCDHW) hereafter referred to as the Department of Transport Specification.

The Clause numbers are references to the Department of Transport Specification Clauses as amended or superseded by this document. It should be noted that Clause numbers in this document do not always run consecutively.

The amended specification clauses contained in this section have been compiled so as to be sufficient for most normal development purposes but reference may have to be made to British Standards and the Department of Transport Specification for supplementary information.

2 Application

This document sets out the performance requirements, equipment specification and control procedures that shall apply to the design of road lighting, illuminated traffic signs, associated cable networks and control systems for any street lighting system or illuminated traffic signs being constructed or installed that is intended:

- to be maintained at public expense by the Authority and;
- to be included in the scope of the Birmingham Highways Management and Maintenance PFI contract through the “Standard Specification for Street Lighting Works” route.

The Authority may specify alternative equipment / materials to those identified in this Specification.

Other ‘development particular specifications’ may be acceptable to the Authority but the Authority is likely to require the payment of a commuted sum to cover the additional cost of maintaining Non Standard Lighting Units.

Sections A + B are extracts from the general specification and indicate the information supplied to the Designer (Section A) and information required by the Authority / Service Provider from the Designer / Developer (Section B).

3 British Standards and other publications – Materials, Workmanship and Testing

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

4 Definitions

The definitions referred to in this Specification are listed in Appendix 0/1.

Preamble

The Specification referred to in the tender shall be the latest "Specification for Highway Works" published by HMSO as Volume 1 of the Manual of Contract Documents for Highways Works as modified and extended in the following Appendices: -

Appendix Number	Title
0/1	List of Additional Definitions
1/17	Traffic Safety and Management
5/1	Service Duct Requirements
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13/2	Design of Lighting Columns and Brackets
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19/1	Protection of Steelwork Against Corrosion

APPENDIX 0/1 Definitions

Phrase / Abbreviation	Definition
Authority	Birmingham City Council
Additional Works	means any New Build and/or any Third Party Works
Anti-Climbing Measures"	means measures taken to protect the security of premises from persons who may wish to gain illegal access to those premises by climbing on adjacent Lighting Columns and including anti-climbing spikes and anti-climbing paint.
Apparatus	means Powered Apparatus and Network Components.
Balancing and Settlement Code Procedure 520 or "BSCP520"	means the Balancing and Settlement Code Procedure 520 for unmetered supplies of electricity set out in the Balancing and Settlement Code as published by Elexon Limited and amended from time to time.
BCC Cable Network	All electricity cable networks not the responsibility of the DNO, used to distribute electricity to any Apparatus and capable of electrical isolation from the DNO network at an exit point. Such cable networks include all feeder pillars, switchgear, cables, overhead conductors, joints, ducts and cut-outs, (including cable networks from Apparatus to bus shelters and advertising signs);
Belisha Beacon	means the Posts, galleries, orange flexi globes, lighting units, Lamps, electrical circuits and components, control devices, wiring brackets, cut out and electricity connection and numbering found on either side of a pedestrian crossing in or on a Project Road, and the term **"Belisha Beacons"** shall be construed Accordingly.
British Standards or "BS"	means those standards published by the British Standards Institution as updated or amended from time to time.
CDM Regulations	means the Construction (Design and Management) Regulations 2007 together with any Approved Code of Practice issued in connection therewith as amended from time to time (and **"CDM Regulation"** shall be construed accordingly).
Central Management System	means the Telensa CMS system
"CONFIRM"	means the proprietary software produced by Pitney Bowes for the maintenance and management of public infrastructure and assets;
Conflict Areas	means any or all of the following: (a) road junctions where any of the Project Roads that are in Categories 2, 3a or 3b of Table 1 in Appendix B of part 1 of schedule 2 (Output Specification) meet; (b) complex road junctions; (c) pedestrian crossings and pedestrian refuge islands; (d) locations of vertical traffic calming features, which shall include, without limitation, speed tables, build-outs and chicanes; (e) roundabouts and mini roundabouts;

Phrase / Abbreviation	Definition
	(f) frontages and entrances of schools and hospitals, to a maximum of one hundred (100) metres; and (g) road junctions to public car park entrances, having a capacity for more than twenty (20) vehicles; and shall include the area covering any Footway or Cycle Lane adjoining the relevant Carriageway;
Connection(s)	means direct connection, disconnection and transfer of electricity service cables and ancillary equipment between Apparatus and the DNO's low voltage distribution system and **"Connected"** shall be construed accordingly;
Control Device	means the equipment that starts a Lamp, maintains the correct current flow through the Lamp, switches the Lamp on or off at appropriate times or at ambient light levels or modulates lamp output;
Designed Light Level	means the light level that a Lighting System shall, as a minimum, achieve at any time in order to deliver the appropriate lighting class as defined in the Relevant Standards. In calculating the light level, the light output of each luminaire shall be calculated by multiplying the initial luminous flux for the specific Lamp being used, by the lamp lumen maintenance factor for that Lamp, in accordance with the Group Lamp Replacement Period being used by the Service Provider, and by the luminaire maintenance factor in accordance with the maintenance regime being adopted by the Service Provider;
"Dimming Requirements"	means the dimming of Street Lighting by one (1) Lighting Class for four (4) hours a day in particular in respect of: Add ref to tables
Dimming unit	means the device that is fitted in the Apparatus to facilitate the control of the Control Device
"Disability Glare"	shall have the meaning given to it in BS EN 13201:2003;
DNO	means a distribution network operator within the meaning of part 1 of the Electricity Act 1989 as amended by the Utilities Act 2000;
Electrical Test and Inspection	As described in BS7671 and all tests required to comply with Electricity at Work Regulations.
Full Spectrum Light Source	means an electric light source where the colour rendering index (Ra) is greater than or equal to sixty (60);
HAUC	Highway Authorities and Utilities Committee;
High Mast Lighting	means lighting which illuminates by means of Luminaires mounted on masts that are 15m or more in height and "**High Mast Light"** shall be construed accordingly.
Highway	means all Carriageways and Footways subject to a Section 38 Agreement which have received a Part 2 Certificate as defined under the relevant Section 38 Agreement.

Phrase / Abbreviation	Definition
Highway Tree	means any tree planted in a Project Road or Street scene Land (to the extent set out in the Authority's Data Room document 0370c) and **"Highway Trees"** shall be construed accordingly.
Highways Lighting Code	means the Well-Lit Highways Code of Practice for Highways Lighting Management.
Illuminated Bollards	means bollards in or on a Project Road or Street scene Land (to the extent set out in the Authority's Data Room document 0370c) lit by base mounted lighting units, carrying one or more diagrams from the Traffic Signs Regulations & General Directions (2002), or occasionally the same type of unit with all plain aspect including base, flexible body shell, lighting units, Luminaires, Lamps, electrical circuits and component, control devices, wiring and components, cut-out electricity connection and numbering;
Illuminated Traffic Signs	means illuminated signs in or on a Project Road or Street scene Land (to the extent set out in the Authority's Data Room document 0370c) including direction signs and any sign required by the Traffic Signs Regulations & General Directions 2002 (whether externally or internally illuminated) including plates, faces, Posts/mounting, brackets, Luminaires, Lamps, electrical circuits, control devices, wiring, components, cut out and electricity connection and numbering;
Lamp	means the light emitting component of a Luminaire and **"Lamps"** shall be construed accordingly;
Lighting Columns	means all columns comprised in the Powered Apparatus including Luminaires, Lamps, electrical circuits and components, control devices, wiring and components, bracket, cut out and electricity connection and numbering and the term **"Lighting Column"** shall be construed accordingly.
LED	means a light emitting diode and **"LEDs"** shall be construed accordingly;
LED Array	means a Lamp comprising of two (2) or more LED's;
Lighting Activation Levels	means those levels set out in the tables in paragraphs 2.6, 2.7.4.1, 2.7.13.1 of part 2 of schedule 2 (Output Specification);
Lighting Authority	means a council or other body authorised to provide lighting under section 161 of the Public Health Act 1875 or section 3 of the Parish Councils Act 1957;
Lighting Class	has the same meaning given to it in BS EN ISO 13201:2003;
Lighting Points	means those items of Powered Apparatus incorporating all internal and external Luminaires and the term **"Lighting Point"** shall be construed accordingly;
Luminaire	means that part of Street Lighting or Illuminated Traffic Signs which is a complete lighting unit consisting of a Lamp or Lamps together with the housing designed to distribute the light, position and protect the Lamps and connect the Lamps to the power supply and **"Luminaires"** shall be

Phrase / Abbreviation	Definition
	construed accordingly;
Telecell	means the device which is fitted to the apparatus to provide interface between the apparatus and the CMS
PFI Contractor	means a person that has contracted with the Government, a local authority or other public or statutory body to provide services under the PFI (AMEY);
Relevant Standards	Means (a) Highways Standards to the extent that they relate to Powered Apparatus; (b) all relevant European and British Standards for road lighting described in Appendix 13/71:
Section 38 Agreement	means a contract between a developer and the Authority under which the Authority agrees, pursuant to Section 38 of the 1980 Act, to adopt highways which are maintainable at public expense;
Section 106 Agreement	means a contract between a developer and the Authority which, pursuant to Section 106 of the TC 1990, restricts or regulates the development of land;
Section 278 Agreement	means a contract between a developer and the Authority under which the Authority agrees, pursuant to Section 278 of the 1980 Act, to the execution of highways works;
Specific Lighting Design Standards	means the Street Lighting standards set out in appendix B of part 1 of schedule 2 (Output Specification);
Standard Street Lighting	means Street Lighting which is not Non-Standard Street Lighting or Deemed to Comply Street Lighting;
Street Lighting	means all Lighting Columns comprised in the Powered Apparatus including Luminaires, electrical circuits and components, control devices, wiring and components, brackets, cut out and electricity connection and numbering, Lighting Points and Tunnel Lighting Points, Subway Lighting and Underpass Lighting in each case installed solely for the purpose of illuminating Project Roads or Streetscene Land
Street Lighting Management System	means an electronic database designed to record and store information relating to the street lighting infrastructure including to inventory, records of inspections, records of works undertaken and so forth;
Traffic Sign	shall have the meaning given to it in Section 64 of the Road Traffic Regulations Act 1984 and, for the avoidance of doubt, shall include street name plates and **"Traffic Signs"** shall be construed accordingly;
Tree	means any tree within falling distance of the Project Network that is not a Highway Tree;
TSR&GD	means the Traffic Signs Regulations and General Directions 2002;
ULOR	means upward light output ratio as defined in EN 12665:2002;

Phrase / Abbreviation	Definition
Underground Apparatus	means the Authority's electrical distribution network;
Underground Apparatus Inventory	means an electronic records system which records information in respect of all Underground Apparatus as required by the Highways Authorities and Utilities Committee “Code of Practice for Recording of Underground Apparatus in Streets”;
Well Lit Highways: Code of Practice for Highway Lighting Management	means the Code of Practice entitled Well Lit Highways: Code of Practice for Highway Lighting Management issued November 2004 by the Department of Transport, Local Government and the Regions;

APPENDIX 1/17 – Traffic Safety and Management

1.1.1 Where work has to be carried out on or adjacent to existing public highways or a highway to which the public have access the work shall be carried out in accordance with Chapter 8 of the Traffic Signs Manual (Traffic Safety Measures and Signs for Road Works and Temporary Situations, 2006). This clause is applicable to all such works.

APPENDIX 5/1 – Service Duct Requirements

5.1.1 Unless otherwise stated, all service ducts supplied by the Developer shall be Low density polyethylene (PE) and shall comply with Clause 501 and Table 5/2 of the Dept. of Transport Specification and shall be compatible with any drawpits proposed by the Developer. All lengths shall be fixed socketed at one end and shall have a smooth bore across the push fitted socket joint.

5.1.2 The 100mm / 50mm diameter ducts intended to contain street lighting sub circuits which will, upon completion of the works, become the responsibility of the Authority shall have a minimum wall thickness of 4mm, be orange in colour and have the words “Street Lighting” printed 9mm high, along the length at intervals of not more than one metre. All ducts shall be fitted with a single draw rope.

5.1.3 The 100mm / 50mm diameter ducts intended to contain Distribution Network Operator cables which will, upon completion of the works, become the responsibility of the District Network Operator, shall be Black in colour and comply with Electricity Supply Industry Specification 12-24.

When laid the wording shall be uppermost.

All lengths shall be properly jointed and sleeved to give a smooth bore.

All ducts shall be fitted with a single draw rope.

5.1.4 All ducts shall be laid in a trench depth to invert 750mm in roadway construction and 450mm in footway construction.

5.1.5 90 degree bends of 250mm radius, fixed socketed at one end, the colour shall be compatible for use with the duct on offer.

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

5.1.7 Duct excavations shall be backfilled in accordance with the New Roads and Street Works Act 1991 – Specification for the reinstatement of openings in highways.

APPENDIX 5/2 – Manholes, Catchpits, Inspection Chambers and Draw Pits

DRAWPITS

5.2.1 Drawpits for Street Lighting purposes, when required, shall be constructed of recycled Polyolefin material in sectional units.

5.2.2 Unless otherwise stated all drawpits shall have 450mm x 300mm outer wall dimensions with galvanised steel full frame in accordance with BS 729 and anti-slip composite polyester cover in accordance with BS 497 Grade B (5 tonne loading) (non-metallic) marked “STREET LIGHTING”.

To be installed to a depth not exceeding 1 metre, nominal depth 950mm.

5.2.3 The diameter of pre-trepanned openings shall be 64mm and 109mm shall easily accommodate the ducting specified.

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

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

APPENDIX 12/1 – Traffic Signs

12.1.1 The developer shall ensure that the electrical service and associated electrical infrastructure to any existing illuminated traffic signs and bollards affected by the works shall be maintained as electrically live for the duration of the works and shall not be disconnected or isolated without the authorisation of the Authority and / or the Service Provider.

12.1.2 The developer shall ensure that the optical performance or visibility of Illuminated traffic signs or bollards is not adversely affected by trees and other vegetation.

12.1.3 All sign lanterns and bollards shall be lit using energy efficient, low maintenance LED light sources.

12.1.4 All illuminated sign lanterns and bollard bases shall have an Elexon 'Unmetered Supplies Operational Charge Code' and have approved total circuit wattage equal to or less than 7w.

12.1.5 All illuminated traffic signs and bollards shall be fitted with a control device (infra red for illuminated bollards) to switch the light source on or off at the appropriate times in accordance with Table G – Lighting periods.

12.1.6 The names and manufacturers, together with details of equipment or materials proposed for illuminated traffic signs and bollards are detailed in Table 12/1 below. Other manufacturer's equipment of equivalent standard and performance would be considered.

12.1.7 All traffic sign posts shall be painted black. The surface treatment shall be as specified in Appendix 19/1 over their entire length.

Table 12/1 – Current Proposal for Standard Equipment / Manufacturer*

Description	Manufacture	Description	Product code
Sign Lantern (single)	Signature Ltd	Exlite Delta LED, black, with SS12A 70/35 lux pecu & 76mm post top arm	ELD-LED-21-76SS-PB
Sign Lantern (double)	Signature Ltd	Exlite Delta LED, twin lantern black, with SS12A 70/35 lux pecu & 76mm post top double arm	ELD-LED4-21-76DS-PB
Non –illuminated Bollard Shell	Signature Ltd	Trueflex bollard shell single aspect (any aspect) fluorescent material	SP-TF-1-XX-FLU
Illuminated Bollard Shell	Signature Ltd	Central bollard shell single aspect (Any aspect)	SP-TF-1-XX-FLU
Bollard Base	Signature Ltd	Superior LED baselight, c/w infra red pecu	BL-S-LED-D-07-H
Sign Plates	Morelock	Permanent Glass Reinforced Plastic (MP GRP) with black back and Class 2 reflective face.	N/A
School Patrol Warning equipment	Signature Ltd	Twin Amber LED flashing unit	LED TAFLU
Belisha Beacons	Signature Ltd	LED beacon globe assembly, includes globe , gallery, LED, Flasher, anti vandal collar (excludes post)	PDA-STAYFAST-B+14059
Marker Beacon Post	Signature Ltd	Standard 76x140mm diameter LBP 5800mm o/all 600pd post only, with grey PVC coated c/w two white reflective bands	CI-58-POST
Centre Island Beacon	Signature Ltd	24V stayfast assembly, LED c/w non flashing LED beacon, gallery, anti vandal collar, opal globe and transformer	CIA-STAYFAST-G

Description	Manufacture	Description	Product code
Sign posts	SignPost solutions Ltd	Galvanised steel posts both wide base and straight with PVC protection (colour black)	n/a

**Other manufacturer's equipment of equivalent standard and performance may be considered.*

Appendix 13/1 – Road Lighting Columns and Brackets

13.1.1 Road Lighting columns and brackets shall be designed, constructed, assembled, located and erected in compliance with Series 1300 of the Specification.

13.1.2 Lighting columns shall be designed to carry the attachment loads in Table A13/1/1, in addition to the public lighting equipment.

Table A13/1/1 Table 5: Design Requirements of Columns and Posts in relation to Signs (additional or otherwise) to be attached

Column / Post Height (m)	Sign Size	Sign Position in accordance with BD26199
Up to and including 6m	0.5m sq	Symmetrical or Offset
Over 6m and up to and including 9m	1.0m sq	Symmetrical or Offset
Over 9m	2.0m sq	Symmetrical or Offset

13.1.3 In the City Centre and District Centres the use of Strengthened Columns may be required as directed by the Authority. Paint systems appropriate for these columns shall be in accordance with Appendix 19/1 or as directed by the Authority and / or the Service Provider.

13.1.4 Each column shall be fitted with an identification badge and numbered in accordance with a numbering schedule to be provided by the Service Provider. The identification label shall include the following detail:-

- the unique reference number for that lighting column;
- the joint Authority and Service Provider logo for the Project; and
- the telephone number for the Help Desk

Labels shall be positioned at a height of 2 metres above the ground.

Labels on Non Standard Equipment shall be agreed in consultation with the Service Provider.

13.1.5 Columns shall be constructed from galvanised steel and be of the planted root type unless otherwise agreed in writing by the Authority. The shaft shall consist of one continuous length of tube without transverse weld.

Columns shall be of straight circular shaft type with a single step at the top of the base compartment.

Refer to the requirements detailed in Table A13/1/2 - Table of Columns.

13.1.6 Surface treatment of traffic signposts shall be as specified in Appendix 19/1 over their entire length.

13.1.7 The internal and external surfaces to lighting column roots shall be additionally protected as specified in Appendix 19/1.

Column Index

Table A13/1/2 – Table of Columns

Column Type	Loading	Post Top	Single Arm Bracket	Twin Arm Bracket	Column Drawing No
6m raise and lowering column	In accordance with table A13/1/1	Y	N	N	CC5594
6m Column post top	In accordance with table A13/1/1	Y	N	As per CB0136	CC5426
7m Column post top	In accordance with table A13/1/1	Y	N	As per CB0136	CC5428
8m Column post top	In accordance with table A13/1/1	Y	N	N	CC5428
10m Column post top	In accordance with table A13/1/1	Y	N	N	CC5429
10m Column single arm	In accordance with table A13/1/1	N	Up to 1.5m	N	CC5430
12m Column single arm	In accordance with table A13/1/1	Y*	Up to 1.5m	N	CC5430
10m Column double arm	In accordance with table A13/1/1	N	N	Up to 1.5m	CC5432
12m Column double arm	In accordance with table A13/1/1	N	N	Up to 1.5m	CC5432
10m Column single arm – Heavy Duty	In accordance with table A13/1/1	Y*	Up to 1.5m	N	CC5431
12m Column single arm – Heavy Duty	In accordance with table A13/1/1	Y*	Up to 1.5m	N	CC5431

* Spigot adaptor required

13.1.7 No brackets shall be used on new lighting columns in residential areas except for column heights of 8m and above unless agreed in writing in advance by the Authority

13.1.8 Columns shall be provided with non-hygroscopic baseboards, minimum thickness 15mm, secured in the base compartment. Baseboard fixings shall be recessed below the surface of the board so as not to impede the fixing of electrical equipment to the baseboard

13.1.9 The bottom of the door opening shall not be less than 400mm above ground level. The door opening shall be free from sharp edges and burrs.

13.1.10 Foundations for planted columns shall be in accordance with PD6547:2004 plus A1:2009 and manufacturer's instructions.

13.1.11 Columns to be mounted on bridge parapets shall be fitted with a door-retaining device to ensure that the door cannot be dropped over the parapet. Any steel wire or chain used shall be cadmium plated or galvanised.

13.1.12 6mm diameter brass (or stainless steel) earthling terminal complete with two brass washers and a brass nut and locknut shall be located both in the base compartment (so positioned as to be readily accessible through the door opening) and on the door, (to be supplied fitted).

13.1.13 Raising and lowering lighting columns shall be provided where access considerations demand. Such columns shall be mid-hinged.

13.1.14 All door locking mechanisms shall be lubricated and doors secured in position.

13.1.15 The use of passively safe lighting columns shall be agreed with the Service Provider at the preliminary design stage.

13.1.16 Passively safe lighting columns shall comply with BS EN 12767:2007.

Appendix 13/2 – Column and Bracket Details

The contractor shall complete column and bracket details in Table 13/2 below.

Description	Details		
Type of column base:	Planted root	Base Plate	Flange Plate
Bracket Protection: (m)	Single	Double	Post top fitting
Size, Length and Angle of lantern fixing:	Spigot	(mm)	
Design Life	(y)		
10 min Mean Wind Velocity	(m/s)		
Terrain Category:			
Max Altitude:	(m)		
Size of door opening: (m)	Length	Width	
Number of door openings	(nr)		
Backboard size: (mm)	Length	Width	
Planting Depth (mm)			
Size of cable entry slot (mm)	Length	Width	
Identification and Location marking			
Type of corrosion treatment for planted root			
Lantern type (kg)	Manufacture	Model	
Lantern windage area (m2)	Weight (kg)	Windage (m sq)	
Lantern size (mm)	Length	Width	Depth
Number of door keys (nr)			
Embellishments	Yes	No	

All columns shall, unless otherwise agreed in writing by the Authority, be manufactured by Valmont Stainton.

Appendix 13/70 – Design and Installation Considerations

REQUIREMENT OF DESIGNERS

1. All lighting and electrical designs shall be carried out by competent designers who meet the requirements of the Institution of Lighting Engineers Competency Requirements for Lighting Design Staff Highway Design Implementation (Designed to meet the requirements of HA GD02/08 and CDM2007 Regulations)

2. Designers shall as part of the design 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

REQUIREMENT OF CONTRACTORS

1. All installation works shall be undertaken by specialist lighting contractors that are registered with ASLEC and meet the requirements of the relevant Highways Sector Schemes.

GENERAL REQUIREMENTS

All Apparatus shall be installed by the Developer in accordance with the following requirements (where applicable):

- Highways Standards;
- Relevant Lighting Standards;
- all new and replacement Apparatus shall be sited so as to minimise, insofar as is reasonable and practicable, nuisance, danger and obstruction to all residents, businesses and users of the Project Network;
- all Lighting Columns shall have a uniform appearance and be appropriate to and in keeping with the relevant location;
- the Developer shall obtain the Authority's prior written approval (not to be unreasonably withheld or delayed) in respect of the aesthetics and appearance of all Apparatus to be replaced or installed in any Conservation Area (as designated by the Authority), Prestige Walking Zone or in, on, or about any listed building, civic building, monument, place of worship or other place or location requiring special lighting treatment
- the Service Provider shall reconnect any Existing Apparatus that has its supply looped from Powered Apparatus that is being replaced; and
- where any Private Cable Installations need to be altered the cables shall be replaced rather than jointed and extended.
- The Developer shall ensure that the lighting performance of Street Lights and the optical performance or visibility of Illuminated Traffic Signs and Illuminated Traffic Bollards is not adversely affected by trees and other vegetation. If the obstruction is due to Highway trees and vegetation, the Developer shall take necessary action to remove the obstruction by pruning back branches up to a maximum of 25mm diameter

flush to a main branch or limb. Where heavier pruning is required the Developer, following consultation and agreement with the Authority, shall employ a qualified arborist to prune back the tree or vegetation.

- Where pruning of Private trees or foliage is required, the Developer shall take appropriate steps to ensure the lighting system is able to function correctly.
- Where lighting already exists, the designer / developer shall maintain the existing lighting levels at all times during the project. Temporary lighting shall be provided where columns have to be temporarily removed or re-sited.
- The Developer shall ensure that each item of Apparatus and each electrical installation is inspected and tested in accordance with the Electricity at Work Regulations and BS 7671. Sample test sheets are shown in Appendix 14/71.
- Paint systems above ground protecting Apparatus against corrosion and enhancing the aesthetics of Apparatus shall be as specified in Appendix 19/1.
- All lighting columns shall have an individual the Distribution Network Operator (DNO) 24 hour live supply.
- All equipment provided by the Developer shall be brand new.
- The Developer shall effectively manage, for its own works, the Connection, disconnection, or transfer of the Apparatus to the electricity distribution network operated by the DNO including all necessary service diversions and reinstatements. Responsibility for payment of energy consumption will, in accordance with the Council's Section 38 agreement, remain with the developer until formal adoption is completed. It is the duty of the developer to notify the PFI Contractor of actual connection dates.
- All waste material arising form the execution of the Services shall be disposed of in a manor that complies with all applicable Law, byelaws and codes of practice relating to the particular category of material concerned.
- All current relevant and applicable Good Industry Practices shall be adopted for the execution of the Services.
- The Developer shall ensure that the performance of the completed installation is compliant with the design standard.

Appendix 13/71 – Relevant Standards

The contractor shall comply in all respects with the following Statutory Requirements, Codes of Practice and Specifications together with any subsequent revisions, amendments and other Standards or Documents referred to therein.

All design, equipment specification and installation work shall comply with the standards indicated below:

a) Highway Standards to the extent that they relate to Powered Apparatus

b) European and British Standards for road lighting, using the classes set out in this Appendix:

- BS EN 13201-2: 2003 Road Lighting – Part 2: Performance requirements
- BS EN 13201-3: 2003 Road Lighting – Part 3: Calculation of performance
- BS 5489-1:2003 Code of practice for the design of road lighting - Part 1: Lighting of roads and public amenity areas

c) BS 7671 for the requirements of electrical installations

d) BS EN 14001 for Environmental Management

e) BS EN 40 for lighting columns as follows:

- BS EN 40-1: 1992 – Part 1: Definitions and terms
- BS EN 40-2: 2004 – Part 2: General requirements and dimensions
- BS EN 40-3-1: 2000 – Part 3-1: Design and verification – Specification for characteristic loads, including the particular requirements set out below:
    - All 6m and 7m Lighting Columns shall be designed to meet the requirements of a Terrain Category III. 8m, 10m and 12m Lighting Columns shall be designed to meet the requirements of a Terrain Category II.
    - All Lighting Columns shall be designed to have a 10-minute mean wind velocity of 22m/s adjusted for an altitude above sea level of 132m.
    - Design of Lighting Columns to facilitate Attachments shall be as specified in Appendix 13/72 clause 3.2
- BS EN 40-3-2: 2000 – Part 3-2: Design and verification – Verification by testing.
- BS EN 40-3-3: 2000 – Part 3-3: Design and verification – Verification by calculation, except that:
    - Fatigue calculations shall be in accordance with BD 94/07 and the design life shall be taken as 30 years for the purposes of this calculation.
- BS EN 40-5: 2002 – Part 5: Requirements for steel lighting columns-

f) For luminaires:

- BS EN 60598-1: 2008 – Part 1 – Luminaires - General requirements and tests
- BS EN 60598-2-3: 2003 – Part 2-3 – Luminaires - Particular requirements for luminaires for road and street lighting

g) For Illuminated Traffic Signs and Illuminated Traffic Bollards:

- BS EN 12899-1: 2007 – Fixed, vertical road traffic signs: Part 1: Fixed signs
- BS EN 12899-2: 2007 - Fixed, vertical road traffic signs: Part 2: Transilluminated traffic bollards
- BS EN 12899-1:2007, BS EN 12899-2:2007 and BS EN 8442:2006 Miscellaneous road traffic signs and devices. Requirements and test methods, insofar as relevant to belisha beacons, centre island beacons, flashing school warning signs and the external illumination of traffic signs
- BS 873-6:1983 - Road traffic signs and internally illuminated bollards. Specification for retroreflective and non-retroreflective signs.

h) For ingress protection, BS EN 60529: 1992 – Specification for degrees of protection provided by enclosures (IP code)

- Class IP 6x for the optical compartment of Street Lighting luminaires and floodlights and the base unit of Illuminated Traffic Bollards.
- Class IP 5x for the optical compartment of luminaires for Illuminated Traffic Signs including transilluminated signs

i) Institution of Lighting Professionals Technical Reports and Guidance notes

j) Institution of Lighting Professionals Codes of Practice

k) Institution of Lighting Professionals Guidance for the Reduction of Lighting Pollution

l) ADEPT (Formally known as the County Surveyors Society) Road Lighting Maintenance Code of Good Practice

m) Well lit Highways – Code of Practice for Highway Lighting Management

And all other relevant standards, codes of practice, government and national policies, industry guidelines and good industry practice relating to any Powered Apparatus and all successor standards, publications of or to the above mentioned Relevant Lighting Standards

Appendix 13/72 – Lighting and other Design Considerations

1. General

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

b) Lighting designs shall be designed in accordance with the general principles, relevant performance requirements and design procedures of BS EN 13201:2003 and BS 5489-1:2003 and incorporate the 'Specific Lighting Design Standards" for the Birmingham Highways Management and Maintenance PFI (BHMM PFI).

c) Lighting class requirements for both new and proposed Project Roads shall be determined by the Network Hierarchy as detailed in Table 1 – Carriageway Hierarchy of the Well-maintained Highways – Code of Practice for Highway Maintenance.

d) All Lighting Points shall be fitted with control devices to enable individual luminaires to be remotely controlled and managed by the PFI Contractors Central Management System (Telensa). For avoidance of doubt this shall include dimmable fully electronic ballast and a Telensa Telecell with dimming control.

e) All light sources for road lighting on the Link Road and Local Access Road Network shall be fitted with LED light sources. The luminaire shall be the WRTL STELA Square or Wide (350mA) shall be fitted to all for other areas more specific requirements apply and these are indicated below.

f) All Lighting Columns shall be sited at the rear of a Verge or Footway and provide compliance with the minimum column setbacks as detailed in BS 5489-1:2003

g) Non-Standard equipment shall replaced on a like for like basis

h) Where the dimming of street lighting is used or approved in accordance with Appendix C, the amended lighting requirements shall take cognisance of Technical Report 27 (Code of Practice for Variable Light Levels for Highways), issued by the Institution of Lighting Engineers.

2. Lighting Design Requirements

a) Strategic Route and Main Distributor Network and Secondary Distributor Network

- The lighting class requirements for Strategic Routes, Main Distributor Network and the Secondary Distributor Network are detailed in Table 13/72/1;
- Light sources shall be high output High Pressure Sodium lamps with a minimum colour rendering equal to or greater than Ra 20
- All luminaires shall be WRTL Airtrace 2
- BS EN 13201 and BS 5489 make recommendations regarding the scale of lighting in relation to the surroundings. The choice of mounting height shall take account of these recommendations. In particular, the mounting height shall not exceed the corresponding maximum height of a Lighting Column identified in column 5 of Table 13/72/1;

- Where a Conflict Area exists on the relevant type of Project Road, Lighting Points of the corresponding Lighting Class identified in column 4 of Table 13/72/1 shall apply;
- All Luminaires used on Project Roads that are classed as category 2, 3a and 3b shall have a luminous intensity class of G3 or greater; and
- All Luminaires used on roundabouts shall have a luminous intensity class of G5 or greater.

Table 13/72/1: Strategic Route and Main Distribution Network and Secondary Distributor Network

Category	Type of Project Road	Lighting Class	Conflict Area	Max. Height of a Lighting Column (m)
2	Strategic Routes on the Strategic Route and Main Distributor Network	ME2	CE1	12
3a	Main Distributor Routes on the Strategic Route and Main Distributor Network	ME3a	CE2	12
3b	Secondary Distributor Routes on the Secondary Distributor Network	ME3c	CE2	10

Note: This table also applies to parts of PFI District 11 (City Centre).

b) Link Road Network and Local Access Road Network

- The lighting class requirements for the Link Road Network and local Access Road Network are detailed in Table 13/72/2;
- Light sources shall be LED with a minimum colour rendering equal to or in excess of Ra 60
- All luminaires shall be WRTL STELA Square or Wide (350mA)
- BS EN 13201 and BS 5489 make recommendations regarding the scale of lighting in relation to the surroundings. The choice of mounting height shall take account these recommendations. In particular, the mounting height shall not exceed the corresponding maximum height of a Lighting Column identified in column 4 of Table 13/72/2; and
- Luminaires shall have adequate optical control to minimise light pollution and obtrusive light to properties and shall conform to the E3 environmental zone obtrusive light limitations, defined in the Lighting Engineers Guidance Notes for the Reduction of Lighting Pollution.

Table 13/72/2 - Link Road and Local Access Road Network

Category	Type of Project Road	Lighting Class	Max. Height of a Lighting Column (m)
		Lamp Ra >60	
4a	Link Routes on the Link Road Network	S3	8
4b	Local Access Routes on the Local Access Road Network	S4	6

Note: This table also applies to parts of PFI District 11 (City Centre).

c) City Centre and District Centres

- Special requirements apply to lighting installed in the City Centre and District Centres. Drawings detailing the extents of the City Centre and District Centres are available to view at the Service Providers premises on request.
- The lighting class requirements for City Centre and District Centres are detailed in Table 13/72/3;
- Light sources shall have a colour-rendering index equal to or in excess of Ra60;
- The style of lighting column and luminaire shall be agreed with the Authority / Service Provider prior to any design work commencing:
- The mounting heights of Lighting Points shall not exceed the corresponding maximum height of a Lighting Column identified in column 5 of Table 13/72/1;and
- All Luminaires shall have a luminous intensity class of G4 or greater except where such Luminaires are affixed to Non-Standard (heritage) street lighting.

Table 13/72/3 – City Centre and District Centres

Areas of the Project Network	Lighting Class
City Centre and District Centres which are mixed vehicular and pedestrian areas	CE1
City Centre and District Centres which are wholly pedestrian areas	CE2
City Centre and District Centres which are pedestrian subway areas	CE0
All other pedestrian subway areas on the Project Network	CE2

d) Footpaths and Cycle Tracks

- BS EN 13201 and BS 5489 make recommendations regarding the scale of lighting in relation to the surroundings. The choice of mounting height shall take account of these recommendations. In particular, the mounting heights of Lighting Points shall not exceed the corresponding maximum height of a Lighting Column identified in column 5 of Table 13/72/4; and
- The lighting class requirements for Footpaths and Cycle Tracks are detailed in Table 13/72/4;

- Light sources shall be LED with a minimum colour rendering equal to or in excess of Ra 60
- All luminaires shall be WRTL STELA Square or Wide (350mA)
- Luminaires shall have adequate optical control to minimise light pollution and obtrusive light to properties and shall conform to the E3 environmental zone obtrusive light limitations, defined in the Lighting Engineers Guidance Notes for the Reduction of Lighting Pollution.

Table 13/72/4: Footpaths and Cycle Tracks

Group	Types of Footpaths and Cycle Tracks	Lighting Class		Max. Height of a Lighting Column (m)
		Lamp Ra <60	Lamp Ra ≥60	
1	Footpaths and Cycle Tracks that are on the Prestige, Primary and Secondary Walking and Cycling Route Network.	S2	S3	6
2	Footpaths and Cycle Tracks that are on Link Walking and Cycling Routes on the Link and Local Access Walking and Cycling Route Network.	S2	S3	6
3	Footpaths and Cycle Tracks that are on [Local Access Walking and Cycling Routes on the Link and Local Access Walking and Cycling Route Network.]	S4	S5	6

e) CCTV

- The designer shall identify during the site survey all Project Network parts covered by CCTV and confirm with the Authority that the area is a designated CCTV area and the extents
- all lighting in designated CCTV areas shall be lit to Lighting Class CE1;
- all Luminaires shall have a luminous intensity class of G4 or greater;
- light sources shall have a colour rendering index equal to or in excess of Ra60; and
- light output shall be reduced by one lighting class between the hours of 12.00am and 4.00am.

f) Conservation Areas

Where any proposals affect lighting in Conservation Areas then the designer shall agree with the Authority prior to any design work commencing :-

- the type of equipment required;
- the luminous intensity class for the luminaires;

- where standard luminaires are required the designer shall use the equipment specified in these standards based on the hierarchy of the road and associated lighting class:
- all light sources shall have a colour rendering index equal to or in excess of Ra60;
- light output shall be reduced by one lighting class between the hours of 12.00am and 4.00am.

g) Trees

Where and to the extent the Designer is either proposing or replacing Lighting Points that are affected by the presence of trees the Service Provider shall, when designing such Lighting follow requirements detailed below:-

- in accordance with clause 5.2 – Siting in BS 5489-1.2003 in new streets where trees are to be planted, the lighting should be designed first and the planting sites fixed afterwards. Careful siting of trees can help to minimize interference with the performance of the lighting by the foliage and eliminate any future requirements for unnecessary pruning;
- minimise the need for unnecessary pruning and damage to any trees throughout the expected life of the replacement Lighting Point;
- take into account the inevitable growth in height and spread of any relevant trees;
- and consult an arboriculturist (where appropriate) in relation to the above issues.

h) Other Lighting Standards

- When dimmed, Full Spectrum Light Sources shall be deemed to have a colour rendering index (Ra) of ≥60.

i) Conflict Areas

- Conflict areas shall have the same meaning as that in Appendix 0/1 – Definitions. Where a Conflict Area exists on the relevant type of Project Road, Lighting Points of the corresponding Lighting Class identified in column 4 of Table 13/72/1 shall apply;
- Where routes meet to which different lighting classes have been applied, the higher class shall determine the class at the Conflict Area.
- The extent of each Conflict Area shall be carefully considered to ensure that conflicting traffic and pedestrian movements are catered for and shall be the total area of the highway between highway boundaries, including carriageway, verge, cycle track and footway and shall include any splitter islands or pedestrian refuges or marked pedestrian routes or pedestrian crossings adjacent to the junction.
- The longitudinal extent of the Conflict Area shall be determined by ‘Safe stopping distances’ based on the enforceable speed limit for the highest hierarchy of road. Table 13/72/5 below shows the safe stopping distances and extents

Table 13/72/5: Extent of Conflict Area

Type	Extent of Conflict Area	
	Without crossing facilities	With crossing facilities
T Junction	Safe stopping distance	Stopping distance plus 5 metres beyond crossing
Staggered Junction	Safe stopping distance	Stopping distance plus 5 metres beyond crossing
Cross Roads	Safe stopping distance	Stopping distance 5 metres beyond crossing
Roundabouts	Safe stopping distance	Stopping distance plus 5 metres beyond crossing

For a roundabout, the area of a Conflict Area shall be the total area of the highway between highway boundaries, including carriageway, verge, cycle track and footway. Where vehicles are permitted to travel over the central island, the area of the island shall be included in the calculation, but where vehicles are not so permitted, the island may be excluded. The longitudinal extent of the Conflict Area shall extend from the roundabout along each approach road for a distance of not less then the safe stopping distance from a line continuing the outer circumference of the roundabout carriageway across the mouth of each road.

j) Pedestrian Crossings

Zebra crossings and signal controlled crossings shall be in accordance with Institution of Lighting Engineers Technical Report TR 12 – Lighting of Pedestrian Crossings.

Pedestrian crossings include both signalled controlled crossings and uncontrolled crossings (Zebra's). Pedestrian crossings shall be lit in accordance with the Institution of Lighting Engineers Technical Report TR12. In summary:-

- Signal controlled crossings on traffic routes shall be lit to the appropriate ME lighting class using 'negative contrast' lighting
- Zebra crossings shall by lit using 'positive contrast' lighting using a light source with a colour rendering of Ra60

Where 'positive contrast' lighting is provided on Zebra crossings supplementary luminaires shall be mounted on an extended beacon pole with the beacon mounted on an offset pole.

k) Attachments to Lighting Columns and Illuminated Traffic Signs

Attachments made to Apparatus at the time of installation or in the future shall follow the Authorities attachment procedure. A copy of this procedure can be obtained from the Birmingham City Council. To facilitate such attachments to new lighting columns provided under this Specification, such Lighting columns shall be designed to carry the attachment loads in Table A13/1/1 Table 5: Design Requirements of Columns and Posts in relation to Signs (additional or otherwise) to be attached. All Attachment loads shall be taken at the most onerous position in relation to door opening and bracket or luminaire orientation.

i) Lighting periods

The periods within which the lighting of Apparatus is switched on shall be as required in Table 13/72/6.

Table 13/72/6 – Lighting periods

Type of Lighting Points	Lighting activation level
On street lighting points	On at 70 lux and off at 35 lux
Subway and under bridge lighting points	Continuous
Tunnel or underpass points	Continuous, in accordance with BS5489 part 2

m) Design Maintenance Factors

The design Maintenance Factors to be used is detailed in the table 13/72/7 below:-

Table 13/72/7 – Design Maintenance Factors

Initial Design Maintenance Factors		
Lamp Type and Wattage	Mounting Height	Design Maintenance Factor
For all LED lamps	6m or less	0.79
For all LED lamps	7m and above	0.79
60w CPO-TW	7m and above	0.71
90w – 140w CPO-TW	7m and above	0.78
For lamps from 100w – 400w SON-TP	7m and above	0.85
For lamps from 210w – 310w CDM-Elite	7m and above	0.83
For all PL-L	6m or less	0.80

3 Design Sheets

The developer / designer shall produce an outline design sheet at the preliminary design stage complete with all information detailed in Table 13/72/5a below. This shall be submitted to the Authority for approval prior to the commencement of the scheme design.

The developer / designer shall produce a design summary sheet following the completion of the scheme design. The sheet shall include all the information detailed in Table 13/72/5b below and be submitted to the Authority for final approval prior to the commencement of works on site.

3.1 Outline Design Sheet -Table 13/72/8a Typical Outline Design Sheet

Project: Title: By: Date:

Street Lighting Proposals								
Road Name	Area	Design class	Mounting height	Luminaire	Light source	Wattage	Maintenance factor	G Class

Illuminated Sign Proposals					
Road Name	Area	Sign Diagram Number	Luminaire	Light source	Wattage

Illuminated Sign Proposals						
Road Name	Area	Sign Diagram Number	Bollard base	Bollard shell	Light source	Wattage

Comments / supporting information:-

3.2 Design sheet - Table 13/72/8b Typical Design Summary Sheet

PROJECT:						
TITLE:						
BY: ********	DATE: **/**/**					
CHECKED: *******	DATE: **/**/**					

Road Name	Area	Lighting Category	Maintenance Factor	Calculation Width (M)	Existing Quantity	Proposed Quantity	Column Height	Bracket	Column Location	Lantern/Bowl/Optic/Position/Lamp	Min Spacing Stag	Max Spacing Stag	Min Spacing SSL	Max Spacing SSL	Calculation Grid Ref.	Contd on Sheet	Installed Date	Comments
Green End Road	Hall Green	S4	.79	13	9	7	6	N	R	WRTL STELA WIDE 36 LED (Standard lens)	41	44	41	46	1			
Jockey Road	Sutton	ME 3a	.85	13	32	36	12	N	R	WRTL Airtrace 2/FG/IReflec 300/3A	-	48	-	29	2			

Note: Column Location column will have either 1) a symbol ‘R’ to denote the rear of footpath, or 2) a measurement in metres of the set-back from the kerb edge

Appendix 14/1 – Site Records

The Contractor shall supply two number hard copies of as-built drawings to the Service Provider. The drawings shall also be provided electronically on CD ROM in a format to be agreed with the Service Provider prior to submission.

In accordance with the Construction (Design and Management) Regulations 2007, the Contractor shall co-operate with the CDM Coordinator and shall provide information for inclusion in the Health and Safety File. The information shall include but is not limited to:

- As-built drawings
- Electrical test certificates – Appendix 14/71
- Design certificates
- Operation and maintenance manuals
- COSHH data
- Design summary sheet– Table 13/72/8b
- Column data sheets – Appendix 13/2
- Lantern photometric data
- Installation Certificate of Compliance with this Specification
- Details of As-built column foundations
- Ordnance Survey Positional Data
- Unit types
- Dates lamps are lit
- Individual point data sheets as detailed in Table 14/1/1

Table 14/1/1 – Individual Point Data sheets

1	Plot Number	Auto generated
2	Contract Status	DtC
3	Unit Type Code	SL
4	Unit Type	Street Light
5	Unit Owner	BCC
6	District	Edgbaston
7	Ward	Quinton
8	Scout Route	N/A
9	Maintenance Area	N/A
10	Within Conservation Area	No
11	Within Prestige walk zone	No
12	Design Variation Notice	No
	NSG ID	N/A
	NSG Name	N/A
	Ground Conditions	N/A
	Salting of Road	N/A
	Road Environment	N/A
	Wind Exposure	N/A
	Traffic Flow	N/A
	Traffic Speed	N/A
	Pedestrian Density	N/A
13	Unit Location	Outside no 58.
14	Commission Date	01/01/2011
15	Lighting Standard	S4
16	Easting	400000.21
17	Northing	300000.45
18	On Bridge	No
19	Service Owner	DNO
20	Supply Point	Main
21	Approved Attachments	2
22	Lantern Fixing	post top
23	Gear Location	Integral
24	Control Location	Luminaire
25	Painted	Yes
26	Paint Colour	Grey (BS18B25)
27	Structural Test Certificate	N/A
28	Date of last Structural Inspection	N/A
29	TR22 Condition Level	Good
30	Electrical Test Certificate	Yes
31	Date of last Electrical Test	01/01/2011

32	Date of last Bulk Lamp Clean	01/01/2011
33	Date of last Bulk Lamp Change	01/01/2011
34	Photometric Test Result	Yes
35	Date of Photometric Test	01/01/2011
36	Photometric Test Certificate	Yes
37	Picture of Asset	Yes
38	Illuminated	Yes/No
39	Number of phases	Single
40	Isolator Rating	16A
41	Number of Outing Circuits	1
42	Outgoing Protection Device	6A
43	Destination	Sign S2 high street
44	Feeder Pillar Drawing Number	N/A
45	Column/Post Type	Street Light
46	Column/Post Manufacturer	Stainton
47	Column/Post Batch No.	S/0001
48	Column/Post Cross-Section Shape	Tubular
49	Column/Post Height	6m
50	Column Material	Steel
51	Column/Post Protective Finish	Galvanised
52	Column/Post Fixing	Planted
53	Column Post Root Protection	Yes
54	Number of Column Post	4
55	Bracket Type	N/A
56	Bracket Arms	Number
57	Bracket Arm Projection	N/A
58	Bracket Manufacturer	N/A
59	Bracket Material	N/A
60	Bracket Protective Coating	N/A
61	Lantern Manufacturer	WRTL
62	Lantern Model	STELA
63	Lantern Bowl Type	Standard Lens
64	Lantern IP Rating	IP 67
65	Lamps per Lantern	36
66	Control Gear Type	Driver
67	Control Gear Manufacturer	Philips
68	Control Gear Model	LED
69	Control Protocol	0 to 10v, DALI
70	Life Expectancy	80,000 hours
71	Warranty Period	8 years
72	Control Type	LMMS Node

73	Control Charge Code	98 0000 1000 100
74	Control Wattage	0.5
75	Control Switch Regime	001
76	Control Manufacturer	Telensa
77	Control Model	N/A
78	LMMS Unit Reference	00001
79	Lamp Type	LED
80	Lamp Wattage	36
81	Lamp Charge Code	41 0051 0000 100
82	Lamp Circuit Wattage	41
83	Lamp Manufacturer	Cree
84	Lamp Warranty Period	6 years
85	Lamp Change Cycle	25 years
86	Lamp Clean Cycle	6 years
87	Maintenance Factor	0.79
88	Cut Out Type	cut out
89	Cut Out Fuses	One
90	Cut Out Manufacturer	Lucy
91	Cut Out Model	VX1
92	Attachment Type	Traffic Sign
93	Attachment Manufacturer	Signature
94	Attachment Size	600 mm
95	Attachment Diagram No	601
96	Attachment Diagram Description	Keep Left
97	Attachment Category	Regulatory
98	Bollard Type	N/A
99	Bollard Manufacturer	N/A
100	Bollard Aspects	N/A
101	Feeder Pillar Manufacturer	N/A
102	Private Cable ID	N/A
103	Cable Type	N/A
104	Cable Size	N/A mm
105	Cable Depth	N/A cm
106	In Duct	N/A Yes/No
107	Circuit Length	N/A number
108	Source	N/A
109	Destination	N/A
110	Joint Location	N/A
111	Joint Type	N/A
112	Cable Nodes	N/A
113	Starting X	N/A
114	Starting Y	N/A

115	Ending X	N/A
116	Ending Y	N/A
117	Festive Lighting Timer	No
118	Festive Lighting Sockets	No

Appendix 14/2 – Location of Lighting Units and Feeder Pillars

- Columns shall be sited at the rear of the footpath or grass verge except in locations where this is impractical. Where Columns cannot be sited at the rear of a Verge or Footway the designer shall seek approval from the Authority / Service Provider for any alternative locations.
- Site checks will always be made to ensure that when site conditions prevent optimum design positions being installed revised locations are still compliant with the relevant standards.
- The position of lighting units and feeder pillars will be shown on the drawing.
- The descriptions of lighting units to be used are detailed in Table 14/2/1

Table 14/2/1: Descriptions of lighting units to use

Road Class	Required Lighting Level	Column Height	Column Type	Bracket or Post Top	Lantern Type	Bowl	Lamp Size / Type
Strategic Route on the Strategic Route and Main Distributor Network	ME2	12m	CC5430	1.5m	WRTL AIRTRACE 2	FG	250w SON/TP
Main Distributor Routes on the Strategic Route and Main Distributor Network	ME3a	12m	CC5430	1.5m	WRTL AIRTRACE 2	FG	150W SON/TP
Secondary Distributor Routes on the Secondary Distributor Network	ME3c	10m	CC5430	1.5m	WRTL AIRTRACE 2	FG	150w SON/TP
Link Roads on the Link Road Network	S3	8m	CC5428	Post Top	STELA Square or Wide (350mA)	N/A	Up to 52 LED
Local Access Routes on the Local Access Road Network	S4	6m	CC5426	Post Top	STELA Square or Wide (350mA)	N/A	Up to 52 LED
Footpaths and cycle ways	S3 to S5	6m	CC5594	Post Top	STELA Square or Wide (350mA)	N/A	Up to 52 LED
City and District Centres	CE0 to CE4	up to 12m	To be agreed with Authority / Service Provider				

Notes

- Columns to be protected in accordance with Appendix 19/1.
- All streets shall be lit independently and should not take in to account any spill lighting as part of the calculation.
- Light Shields and Anti climb devices, if required, shall be provided by the developer

Appendix 14/4 – Electrical Equipment for Road Lighting

- Lanterns shall be selected from Table 14/2/1. Where a choice of luminaire wattages is available for a particular lighting category within table 14/2/1 the final selection will be based on: road widths, ease of maintenance and installation requirements. Luminaires shall be the same in any one street.
- Lantern bowls and refractors shall be U.V. stabilized.
- Lantern Photometric data in TM14 form shall be provided to the Planning Supervisor for inclusion in the Health and Safety File
- High pressure sodium lamps (SON-TP) shall comply with BS 6193 and International Standard IEC 662.
- SON-TP lamps, supplied by Philips or GE, shall be used for all new SON installations.

SON-TP lamps shall have the following minimum values of lumen output after 100 hours of operation:-

SON-TP	LUMENS
50W	4,500
70W	6,600
100W	10,000
150W	17,500
250W	33,000
400W	55,750

- All columns shall be wired in minimum 1.5 mm2 twin and CPC cable between the cut-out and lantern.
- Each lamp and photocell shall be indelibly marked with the date of installation.
- All photoelectric cell units shall have a Elexon 'Unmetered Supplies Operational Charge Code' and have an approved total circuit wattage equal to or less than 0.25w.
- Street lighting cut-outs shall be moulded from flame-retardant and vandal-resistant material such as A.B.S or similar and be sealed to prevent the ingress of moisture and dust (IP44 minimum).
- Within street lighting cut-outs all terminal blocks, pins and spring clips shall be made of brass and electroplated for temperature rise stability.
- Street lighting cut-outs shall house two fuses and a single neutral bridge mounted within a removable fuse carrier which, when removed, shall give double pole isolation to each fused outgoing circuit.

- Street lighting cut-outs shall incorporate two live and one neutral block for up to 2 x 25mm2 stranded copper or round aluminum conductors, and shall be securely fitted within the base compartment to feed a secondary or tertiary circuit.
- Outgoing live and neutral terminals in street lighting cut-outs shall have dedicated terminals for cables up to 6mm2.
- Cables shall enter and exit street lighting cut-outs at the bottom via 2 No. 20mm diameter rubber grommets within an internal A.B.S. plate. Where necessary a suitable cable entry box shall be provided with 3 No. 20mm diameter grommets fitted to ease cable termination. The cut-out shall comply with the requirements set out in BS 7671, 1992 and the Electricity at Work Regulations 1989.
- H.R.C. fuses shall comply with BS 1361.
- H.R.C. fuses shall comply with BS 88 -1 for street lighting cut-outs LST (TAG) type fuses with 38mm fixing centers.
- H.R.C. fuses to BS 88 - 2, type RH 440 volt.
- H.R.C. fuses to BS 1361, type 11 B.
- Cables, PVC insulated and PVC sheathed shall be manufactured to test requirements and dimensions for operation at voltages up to and including 600 volts to earth and 1000 volts between conductors and shall be in accordance with the British Standard BS 6004 for PVC cables (non armoured) for electric power and lighting. The following cable types and sizes shall commonly be used:-
  a) 1 5 sq mm 3c PVC cable

  b) 1.5, 2.5 or 6.0 sq mm 2c and ccp PVC cable
- PVC insulated Steel Wire Armored cable shall be in accordance with BS 5467.
- Flexible insulated sleeving shall be manufactured to BS 2846.
- A separate dedicated earth terminal block shall be fitted to the baseboard of each lighting column/sign pole, and shall be:-
  a) single pole, 5 way
  b) manufactured from brass and electro tin plated.
- The whole of the installation must be effectively earthed in accordance with BS 7671. Crimped connections are to be used where possible.
- Feeder pillars shall be manufactured from 3mm thick mild steel unless otherwise stated, have rounded corners of 17mm minimum radius, a fully lined door aperture to prevent ingress of rain or leverage of door by vandals, entry of cables via a 300mm minimum rooted base, stainless steel earthing terminal, non-hydroscopic backboard of 12mm minimum thickness and shall comply with IP34 of BS 5490.
- Feeder pillar doors shall be fabricated from 3mm thick mild steel and be flush fitting with 17mm radiused corner. The door shall be positively secured by two stainless steel threaded bolts.
- Feeder pillars and doors shall after drilling and fabrication be treated as specified in Appendix 19/1.

Appendix 14/5 – Electrical Equipment for Traffic Signs

- Lanterns shall conform to Table 12/1 (or equivalent) and the recommendations of the Traffic Sign Manual and be designed to fulfil the requirements of that document.
- Lanterns shall comply with BS 873.
- All sign lanterns and bollards shall be lit using energy efficient, low maintenance LED light sources
- All illuminated sign lanterns and bollard bases shall have an Elexon 'Unmetered Supplies Operational Charge Code' and have approved total circuit wattage equal to or less than 7w.
- All illuminated traffic signs and bollards shall be fitted with a control device (infra red for illuminated bollards) to switch the light source on or off at the appropriate times in accordance with Table G – Lighting periods.

APPENDIX 14/70 – Electrical Inspection and Testing Procedures Associated with New, Upgraded, Rewired or Refurbished Installations

1. General

- The following procedures shall be undertaken for all new, upgraded, rewired or refurbished road lighting or sign lighting installations. The testing of the internal wiring within road lighting and sign lighting columns shall be performed as an integral part of the installation process. All inspection and testing must be so arranged to ensure that no danger to persons or property, or damage to equipment can occur even if the circuit tested is defective.
- All testing shall be in accordance with the requirements of BS7671 for electrical installations.

2. Base Compartment Electrical Earthing

- Carry out all electrical earthing in the base compartment in accordance with the specification including column door, column shaft and fitting of dedicated earth block together with a main earth conductor that should be prepared ready for connecting to the incoming electricity supply.

3. Visual Inspection of Internal Wiring

- Visually inspect to ascertain that no damage has occurred to any cable during the above installation process, rectifying any faults or damage by complete replacement prior to proceeding to the electrical testing as set out below.

4. Electrical Test Equipment

- All test equipment shall be permanently marked with a unique identification number. The Contractor shall keep calibration certificates at the intervals recommended by the equipment manufacturer. If requested the Contractor shall furnish the Authority with copies of the above calibration certificates.

5. Electrical Testing of Internal Wiring

- The Electrical testing described below must be carried out, such that immediately after installation the equipment can be deemed to be electrically safe and ready for connection to a suitable electricity supply.

6. Continuity of Conductors

- The continuity of all conductors shall be tested in accordance with the requirements of BS7671.

7. Insulation Resistance

- Insulation resistance shall be tested in accordance with the requirements of BS7671.

8. Final Assembly of Lanterns and further Visual Inspection of Internal Wiring

- After the above tests are completed and assuming that the results are satisfactory the cable may be permanently connected and a final visual check for polarity and security of electrical connections made prior to the lantern being fully assembled complete with

lamp and photo electric cell unit. The Contractor shall leave in the base compartment a "tag" as specified in Appendix 14/71 marked, with indelible ink, to indicate the readings from the insulation resistance and continuity tests for internal wiring.

9. Electricity Supply

- It is appreciated that in most cases where the lighting or sign column is to be provided with a direct District Network Operator (DNO) service there will not be an electrical supply installed in the lighting or sign column at this stage of the works. The Contractor shall in these circumstances complete the above checks and leave the installation in a state compliant with item 14.70.8. Subsequent completion of the test results as detailed below will be required once the DNO supply has been installed.

10. Local Authority owned Underground Cabling Systems

- Where electricity supplies for street furniture are not derived directly from a DNO service, underground cabling together with associated switchgear and fusing arrangements shall be inspected and tested in accordance with BS7671 and the results recorded as detailed in Appendix 14/71.

11. Visual inspection including

I. connections of conductors - for polarity, loose termination's, excessive removal of conductor insulation resulting in bare conductors protruding from terminations,

II. appropriate identification of conductors such as switch wires from photo-electric cell units;

III. verification that the installed equipment is as designed and specified in the contract and on the drawings including Cable types and cross sectional areas;

IV. presence of barriers to meet IP2X to provide protection against direct contact,

V. presence of appropriate types and sizes of earthing and bonding conductors with mechanically and electrically sound connections,

VI. appropriately rated protective devices,

VII. labeling of circuit fuses and isolators,

VIII. adequate access to equipment to facilitate safe and practical maintenance

IX. presence of 'Danger 415V' notices where applicable

X. presence of appropriate devices for isolation and switching.

12. Continuity and Polarity of Conductors

- The continuity and polarity of all conductors within the underground cabling system shall be tested in accordance with BS7671. The results of the above tests shall be recorded on Certificate type A as per the sample illustrated in Appendix 14/71.

13. Insulation Resistance

- The insulation resistance of all underground cables shall be carried out in accordance with the requirements of BS7671.

14. Polarity

- This shall be visually checked on both the incoming supply and the fused side of the terminals and tested with a polarity tester.

15. Earth Fault Loop Impedance

- Earth fault loop impedance tests shall be carried out in accordance with the requirements of BS7671 and all test results recorded on a “Certificate type A” as detailed in Appendix 14/71.
- Where these tests are carried out on local authority owned underground cables, the highest value recorded within each circuit must be recorded on ‘Certificate Type B” together with the location at which this ‘highest’ reading was taken. This reading must be taken into account when determining the type and rating of the protective device intended to protect the circuit and must be such that the magnitude of current flowing under fault conditions would be sufficient to provide disconnection within 5 seconds.

16. Type and Rating of Protective Device

- The contractor will ensure that an appropriate type and rating of fuse or other protective device is fitted to the circuit giving due regard to:-
- Discrimination
- Protection of the equipment and all associated wiring
- Starting currents associated with discharge lighting where applicable
- The results of the foregoing tests.

17. Unsatisfactory Results and Non-compliance

- In the event of any test result failing to comply, that test and all those preceding, the results of which may have been influenced by the fault indicated, shall be repeated after the fault has been rectified
- No installation shall be connected to a live electrical source unless the person carrying out the inspection and testing is entirely satisfied that the complete installation complies with the requirements of BS7671. In the event that the installation is deemed to contravene these regulations the person carrying out the inspection and testing shall take all reasonable steps to ensure that the installation cannot be commissioned by any other persons.
- Such steps may include :-
- double or triple pole and neutral isolation from any live source;
- locking off of isolators;
- removal of fuse links;
- disconnection of main tails;
- labelling adjacent to the incoming supply terminals using such wording as “THIS INSTALLATION HAS BEEN DEEMED TO CONTRAVENE THE WIRING REGULATIONS AND MUST NOT BE CONNECTED”.

18. Commissioning

- Only when the Contractor is entirely satisfied that the installation is mechanically and electrically safe shall he energise any underground cabling system and/or lighting/sign column or bollard and check that the equipment is functioning correctly.

19. Certification

- The Contractor shall provide a separate Electrical Inspection and Testing Certificate “Type A” for each lighting column or sign pole as per sample illustrated in Appendix 14/71. Each certificate will be bear a unique number.
- The Contractor shall provide a separate Electrical Inspection and Testing Certificate “Type B” for each local authority owned underground circuit as per sample illustrated in Appendix 14/71. Each certificate will bear a unique number.

Appendix 14/71 – ELECTRICAL INSPECTION & TESTING CERTIFICATE TYPE A

Certificate Number:
Location
Scheme Title

Column/Sign/Bollard/Feeder Pillar Number	Taken from Drawing No:	No attached to Street Furniture

Test Equipment Manufacturer, Model and Unique Identification Number	Visual Inspection – Inspector's Comments
d.c Ohmmeter	
Insulation Resistance Meter	
Earth Fault Loop Impedance Meter	
Polarity Tester	

Test Results

Internal Wiring

Continuity of Conductors

Earth Continuity	Impedance to column door	Ohms
	Impedance to column shaft	Ohms
Continuity of Conductors within multicore PVC insulated cable		
	Phase to Earth	Ohms
	Neutral to Earth	Ohms
Insulation Resistance of multicore PVC Cable		
	Phase to Earth	MegaOhms
	Neutral to Earth	MegaOhms
	Phase to Neutral	MegaOhms

Incoming Electricity Supply

	Direct DNO Service		Local Authority Underground Circuit	
	Single Phase and Neutral	Three Phase and Neutral	Single Phase and Neutral	Three Phase and Neutral
Polarity				
Earth Fault Loop Impedance Ze.				
	Red Phase		Red Phase	
	Yellow Phase		Yellow Phase	
	Blue Phase		Blue Phase	
Continuity on Underground Circuit				
	Phase to Earth			
	Neutral to Earth			

Red Phase to Earth
Yellow Phase to Earth
Blue Phase to Earth

Signed Date
On behalf of
Position in Company

Appendix 14/71 – ELECTRICAL INSPECTION & TESTING CERTIFICATE TYPE B

Certificate Number:
Scheme Title
Scheme Drawing Number
District Network Operator Service Located at (Column/Sign/Feeder Pillar No)

Circuit Controlling:-	Position Numbers from Drawing	Numbers attached to Street Furniture

Test Equipment Manufacturer, Model and Unique Identification Numbers:- Visual Inspection Inspector's Comments
Insulation Resistance meter
Earth Fault Loop Impedance Meter
Polarity Tester

Test Results				
Insulation Resistance	Single Phase & Neutral Circuit		Three Phase & Neutral Circuit	
	Phase to Earth	Megaohms	Red Phase to Earth	MegaOhms
	Neutral to Earth	Megaohms	Yellow Phase to Earth	MegaOhms
	Phase to Neutral	Megaohms	Blue Phase to Earth	MegaOhms
			Neutral to Earth	Megahms
			Red Phase to Yellow Phase	Megohms
			Red Phase to Blue Phase	Megohms
			Yellow Phase to Blue Phase	Megohms
			Red Phase to Neutral	MegaOhms
			Yellow Phase to Neutral	MegaOhms
			Blue Phase to Neutral	MegaOhms
Polarity				

External Earth Loop Impedance Ze	Single Phase & Neutral Service		Three Phase & Neutral Service	
Measured at DNO Service		Ohms	Red Phase	Ohms
			Yellow Phase	Ohms
			Blue Phase	Ohms

Highest Value of Earth Loop Impedance	Single Phase & Neutral Service	Measured at Position Number	Three Phase & Neutral Service	
Measured in Circuit	Ohms		Red Phase	Ohms
			Yellow Phase	Ohms
			Blue Phase	Ohms

Signed Date
On behalf of
Position in Company

Appendix 14/71

CONTINUITY READINGS	
Impedance to Column Door	
Impedance to Column Shaft	
Impedance to Phase to Earth	
Impedance to Neutral to Earth	
Test for external Earth Loop Impedance Carried out by: Name	Date
Tests for Continuity & Insulation Resistance Carried out by: Name	Date
External Loop Impedance	
INSULATION RESISTANCE	
Phase to Earth	
Neutral to Earth	
Phase to Neutral	

Self Adhesive Label manufactured by Foil Blocked Process or using 100% Lightfast Ink Material – 90 microns gauge Matt White Vinyl with permanent adhesive.

CONTINUITY READINGS	
Impedance to Column Door	
Impedance to Column Shaft	
Impedance to Phase to Earth	
Impedance to Neutral to Earth	
Test for external Earth Loop Impedance Carried out by: Name	Date

PVC INSULATED AND SHEATHED 2 CORE AND EARTH CABLE

Tests for Continuity & Insulation Resistance Carried out by: Name	Date
External Loop Impedance	
INSULATION RESISTANCE	

Phase to Earth	
Neutral to Earth	
Phase to Neutral	

Appendix 19/1 – Protection of Steelwork Against Corrosion

Surface Treatment of the Lighting Columns and Signposts

All new Lighting Columns, brackets and Illuminated Traffic Signs shall have a factory applied surface protection as specified in table 19/1/1 over their entire length. In addition the internal and external surfaces of the roots of all Lighting Columns and Illuminated Traffic Sign posts will be protected at the factory to a height of 250 mm above ground level by the application of a two pack epoxy glass flake protective coating, Amercoat 4560 GF, or equivalent, on top of the galvanising. Specified requirements are shown below in Table 19/1.

Colour of Columns for Lighting and Illuminated Traffic Signs

The paint colour shall be confirmed by the Authority unless otherwise directed by the Service Provider. Lighting Columns shall be chosen from one of the following approved colours and will be consistent with lighting columns already installed in the area:

- grey (to BS 18B25);
- black
- light green (to BS 12C39);
- dark green (to BS381C Ref 227);
- dark blue (to BS 20C40); and
- red (to BS 04D45).

All Illuminated Traffic Sign posts shall be black.

Table 19/1/1 – Protection requirements for lighting columns, sign posts and feeder pillars

1. Contract Title: **AMERON FULL PSX INC., GF ROOT INT'L & EXT'L**		Struct. No: **LIGHTING COLUMNS**		Grid Ref: **N/A**	2. Date of Issue of Documents to Tenderers:
3. Environment and Accessibility: **INLAND: DIFFICULT ACCESS**					4. Required Durability of System:- Please refer to Paint manufacturers warranty/guarantee statement.
5. Paint System to be Applied over: **GALVANISE TO BS EN ISO 1461**					
6. Details	**1st Coat Internal & External to 250mm Above Ground.**	**2nd Coat Internal to 250mm Above Ground& External Overall.**	**3rd Coat Internal & External to 250mm Above Ground.**	**4th Coat External Upper Section to Ground Level & Overlapping 3rd. Coat down to C/Slot**	
Description	**T WASH**	**AMERCOAT 71 PRIMER**	**AMERCOAT 4560 GLASS FLAKE.**	**AMERCOAT PSX 700 POLYSILOXANE FINISH**	

1. Contract Title: **AMERON FULL PSX INC., GF ROOT INT'L & EXT'L**			Struct. No: **LIGHTING COLUMNS**	Grid Ref: **N/A**	2. Date of Issue of Documents to Tenderers:
Colour	**COLOUR N/A**	**GREY OR RED OXIDE**	**BLACK**	**BS4800 – 18 B 25**	
Brand Name and ref No.	**AMERCOAT 59 TW OR EQUIVALENT**	**AMERCOAT 71**	**AMERCOAT 4560 GF**	**AMERCOAT PSX 700 – 18 B 25**	
Where applied	**IN SHOP**	**IN SHOP**	**IN SHOP**	**IN SHOP**	
How applied	**BRUSH WASH COAT**	**AIRLESS SPRAY**	**AIRLESS SPRAY**	**A.SPRAY**	
Min dry film thickness(mdft)	**N/A μm**	**50 μm**	**300 μm**	**100-125 μm**	
Min wet film thickness					

SECTION A

Information supplied to the Developer / Designer

- Birmingham City Council Development Specification for Street Lighting Works

SECTION B

Information to be supplied by the Designer / Developer

Stage 1 – Preliminary Design Approval

- Table 13/72/5a Typical Outline Design Sheet

Notes :-

1. At the preliminary design stage the developer / designer shall submit to the Authority an 'Outline Design Summary Sheet'. Detailed design work shall not commence until the Authority have agreed the outline design requirements. This will include :-

- Lighting Class requirements
- Lighting Sources
- Equipment type
- Any key information that has influenced the solution.

Stage 2 – Detailed Design Approval

The following information shall be provided to the Authority by the designer / developer:-

- Electronic copy of the scheme proposals in AutoCad format
- 2 paper copies of the design proposals
- Designer Risk Assessments
- An electronic copy of the lighting design calculations in lighting reality
- Design Summary sheet (table 13/72/5b)
- Sign schedules sheet
- Private cable Network design information (where applicable)
- Column and bracket details (Appendix 13/2)
- Design Certificate

The Service Provider will carry out a review of the design under the Maintenance Accessibility Service and provide a report back to the authority detailing any parts of the design which require amending to allow accrual into the PFI project.

Stage 3 – Application for Accrual into the BCC Highways Maintenance and Management PFI

The following information shall be provided by the developer / designer to enable the Apparatus to be considered for Accrual into the Birmingham City Council Street Lighting Project:-

- As built drawings (Both electronically in AutoCad format and 1 number paper copy)
- Individual point data sheets (table 14/1/1)
- Electrical Inspection and Testing Certificate Type A (Appendix 14/71)
- Electrical Inspection & Testing Certificate Type B
- Manufactures data sheets

TYPICAL DRAWINGS

- With reference to Table A13/1/2

  1 - Dwg No. CC5426 : 6M post top model

  2 - Dwg No. CC5428rev01 : 7M & 8M post top

  3 - Dwg No. CC5429 : 10M post top model

  4 - Dwg No. CC5430 : 10M -12M single arm column model

  5 - Dwg No. CC5431 : 10M 12M single arm column - festive etc model

  6 - Dwg No. CC5432 : 10M 12M double arm column model

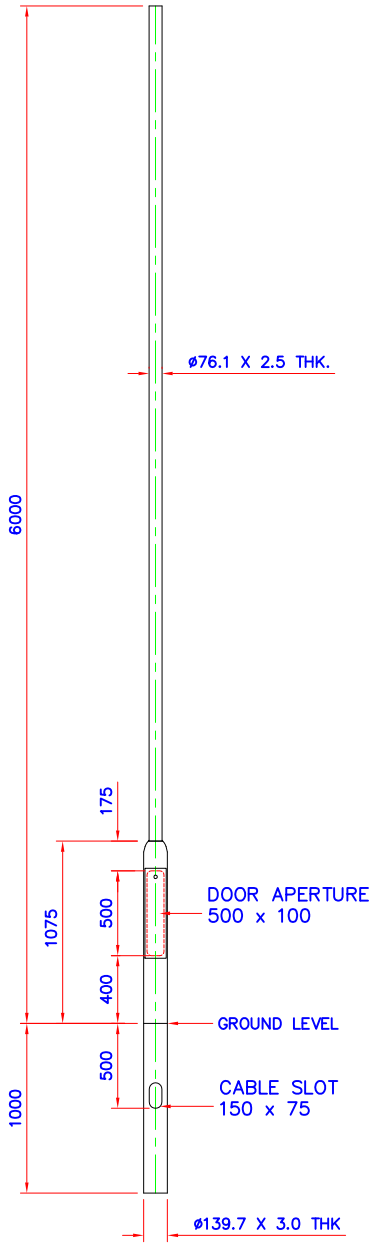
  7 - Dwg No. CB0136 : 0.3M - span drop over cowhorn for dia 76 top column

Rev. 00

DRG. No. CC5426

DO NOT SCALE

ALL DIMENSIONS IN MILLIMETRES
UNLESS STATED OTHERWISE
IF IN DOUBT ASK



Design Specification:-

Design Standards.	: BS EN 40.3.1, BS EN 40.3.3, PD6547 & BD94/07 (Fatigue).
Design Life.	: 30 year.
10min. Mean Wind Velocity.	: 22 m/s.
Terrain Category.	: III.
Max. Altitude.	: 132m.

ACCEPTABLE LANTERNS:-

Philips Mini Iridium SGS 451
Philips Mini Iridium SGS 452
WRTL Stela Square
WRTL Stela Wide
WRTL Stela Long
WRTL Mini Arc (Vital)
WRTL Air Trace 1
WRTL Arc 80 ASR

Signs and Other Attachments.

Sign Weight.	: 5.0 Kg.
Sign Area.	: 0.5 m2.
Sign Offset Distance	: Upto 0.3 m.

Recommended Foundations in accordance with PD6547:2004+A1:2009.

Column Height	Planting Depth	O/turning Moment	Concrete Diameter For Ground Factor:-		
			G = 690	G = 390	G = 230
--	--	--	--	--	--
6m	1.0m	3.56 KNm	0 mm	0 mm	185 mm

Diameter of Concrete Surround is Calculated For the Full Planting Depth.

REV.	DESCRIPTION	BY	CHK'	DATE
00	ISSUED FOR INFORMATION/APPROVAL	WW	--	12/03/10

FINISH: GALV TO BS EN 1461 & FINISHED TO OUTPUT SPECIFICATION

MATERIAL: EN 10219 | WEIGHTS: 6M: 46.5 Kg.

TITLE: 6M ø139/76 POST TOP TUBULAR COLUMN
BIRMINGHAM P.F.I.

SCALE: NTS

Sht. 1 of 1

DRAWN: BS8888. TOL: BS EN 40-2.

	NAME	DATE
DRAWN	WW	12/03/10
CHK'D/APP'D	--	--

valmont STAINTON
TS17 9LT
TEL No.: 01642 766242
FAX No.: 01642 765509

DRG. No. CC5426 Rev. 00

Rev. 01

DRG. No. CC5428

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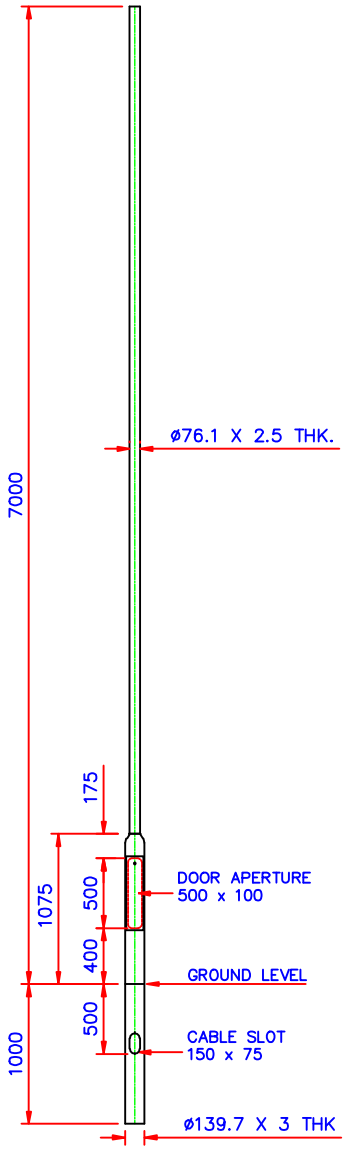

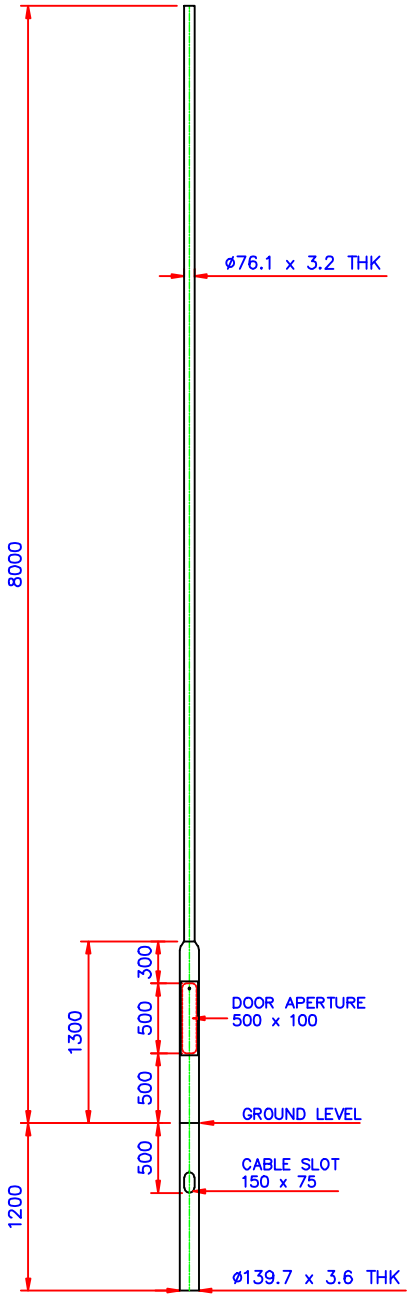

Design Specification:-

Design Standards.	: BS EN 40.3.1, BS EN 40.3.3, PD6547 & BD94/07 (FATIGUE).
Design Life.	: 30 year.
10min. Mean Wind Velocity.	: 22 m/s.
Terrain Category.	: III (7m), II (8m).
Max. Altitude.	: 132m.

ACCEPTABLE LANTERNS:-

Philips Mini Iridium SGS 451
Philips Iridium SGS 252 (8m only)
Philips Iridium SGS 253
Philips Iridium SGS 254 (8m only)
WRTL Stela Wide
WRTL Mini Arc (Vital)
WRTL Air Trace 1
WRTL Air Trace 2 (8m only)
WRTL Arc 80 ASR

Signs and Other Attachments.

Sign Weight.	: 5.0 Kg.
Sign Area.	: 1 m2.
Sign Offset Distance	: Upto 0.3 m.

Recommended Foundations in accordance with PD6547:2004+A1:2009.

Column Height	Planting Depth	O/turning Moment	Concrete Diameter For Ground Factor:- G = 690	G = 390	G = 230
7m	1.0m	5.20 KNm	0 mm	184 mm	311 mm
8m	1.2m	7.79 KNm	0 mm	160 mm	271 mm

Diameter of Concrete Surround is Calculated For the Full Planting Depth.

REV.	DESCRIPTION	BY	CHK'	DATE
01	8M POST TOP DESIGN UPDATED	HM	--	12/04/10
00	ISSUED FOR INFORMATION/APPROVAL	WW	--	12/3/10

FINISH: GALV TO BS EN 1461 & FINISHED TO OUTPUT SPECIFICATION

MATERIAL: EN 10219 | WEIGHTS: 7M: 53 Kg. 8M: 73 Kg.

TITLE: 7M & 8M – ø139/76 POST TOP TUBULAR COLUMN BIRMINGHAM P.F.I.

SCALE: NTS

Sht. 1 of 1

DRAWN: BS8888. TOL: BS EN 40-2.

	NAME	DATE
DRAWN	WW	12/3/10
CHK'D/APP'D	--	--

valmont STAINTON
TS17 9LT
TEL No.: 01642 766242
FAX No.: 01642 765509

DRG. No. CC5428 Rev. 01

Rev. 00

DRG. No. CC5429

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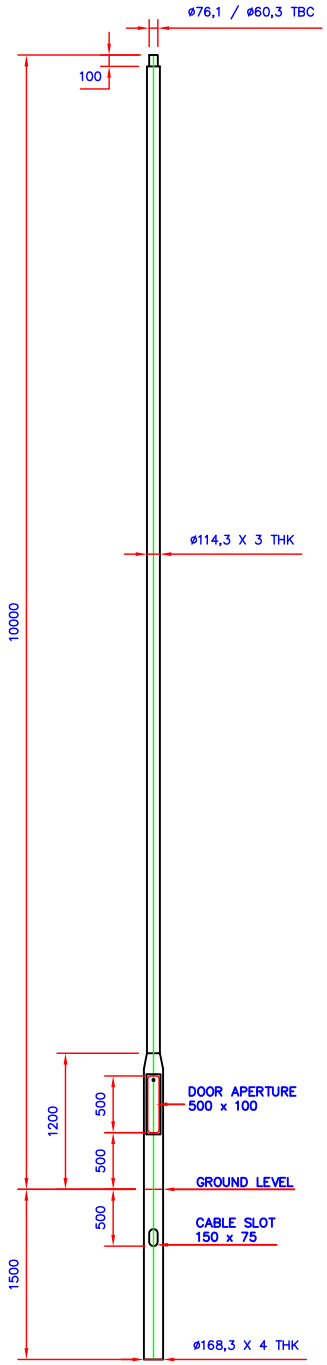

Design Specification:-

Design Standards.	: BS EN 40.3.1, BS EN 40.3.3, PD6547 & BD94/07 (Fatigue).
Design Life.	: 30 year.
10min. Mean Wind Velocity.	: 22 m/s.
Terrain Category:	: II.
Max. Altitude.	: 132m.

Acceptable Lanterns:

Philips Iridium SGS 253
Philips Iridium SGS 254
WRTL Air Trace 1
WRTL Air Trace 2
WRTL Arc 80 ASR

Signs and Other Attachments.

Sign Weight.	: 15 Kg.
Sign Area.	: 2.0 m2.
Sign Offset Distance	: Upto 0.3 m.

Recommended Foundations in accordance with PD6547:2004+A1:2009.

Column Height	Planting Depth	O/turning Moment	Concrete Diameter For Ground Factor:-		
			G = 690	G = 390	G = 230
--	--	--	--	--	--
10m	1.5m	13.89 KNm	0 mm	0 mm	248 mm

Diameter of Concrete Surround is Calculated For the Full Planting Depth.

00	ISSUED FOR INFORMATION / APPROVAL	WW		12/03/10
REV.	DESCRIPTION	BY	CHK'	DATE
MATERIAL: EN10219	FINISH: GALV TO BS EN 1461			WEIGHT: 122kg

TITLE: 10M ø168/114 POST TOP TUBULAR COLUMN
BIRMINGHAM P.F.I.

SCALE: NTS

Sht. 1 of 1

DRAWN: BS8888. TOL: EN40-2

	NAME	DATE
DRAWN	WW	12/03/10
CHK'D/ APP'D		/ /

valmont STAINTON
TS17 9LT
TEL No.: 01642 766242
FAX No.: 01642 765509

DRG. No. CC5429 Rev. 00

Rev. 00

DRG. No. CC5430

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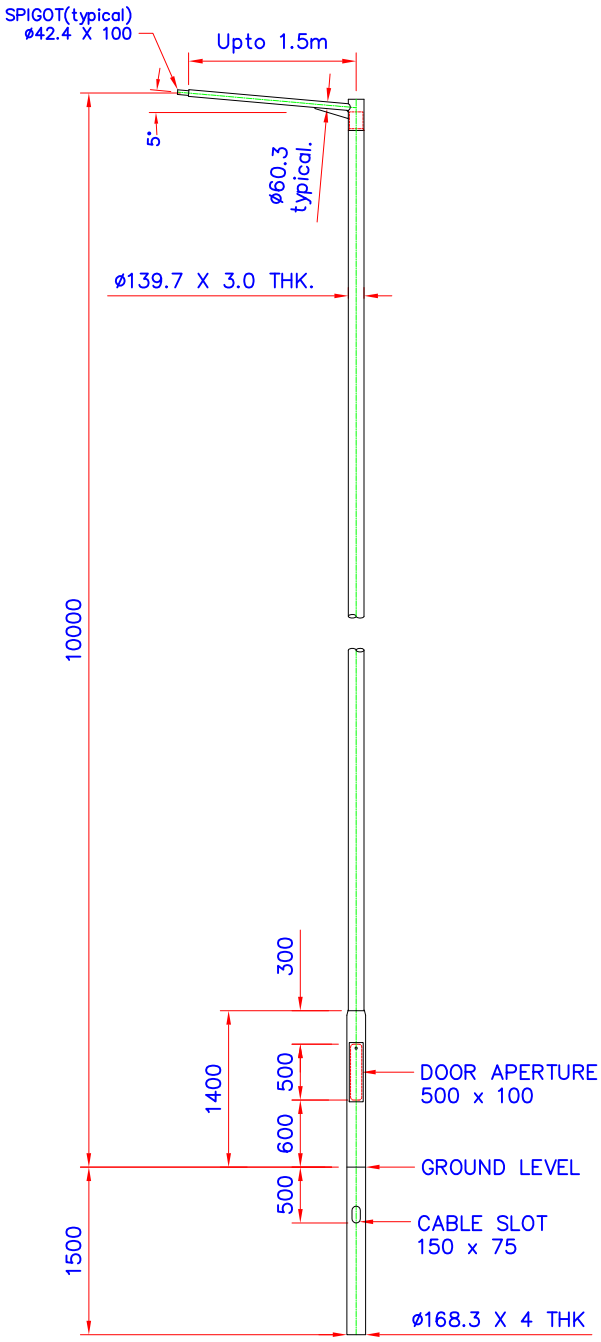

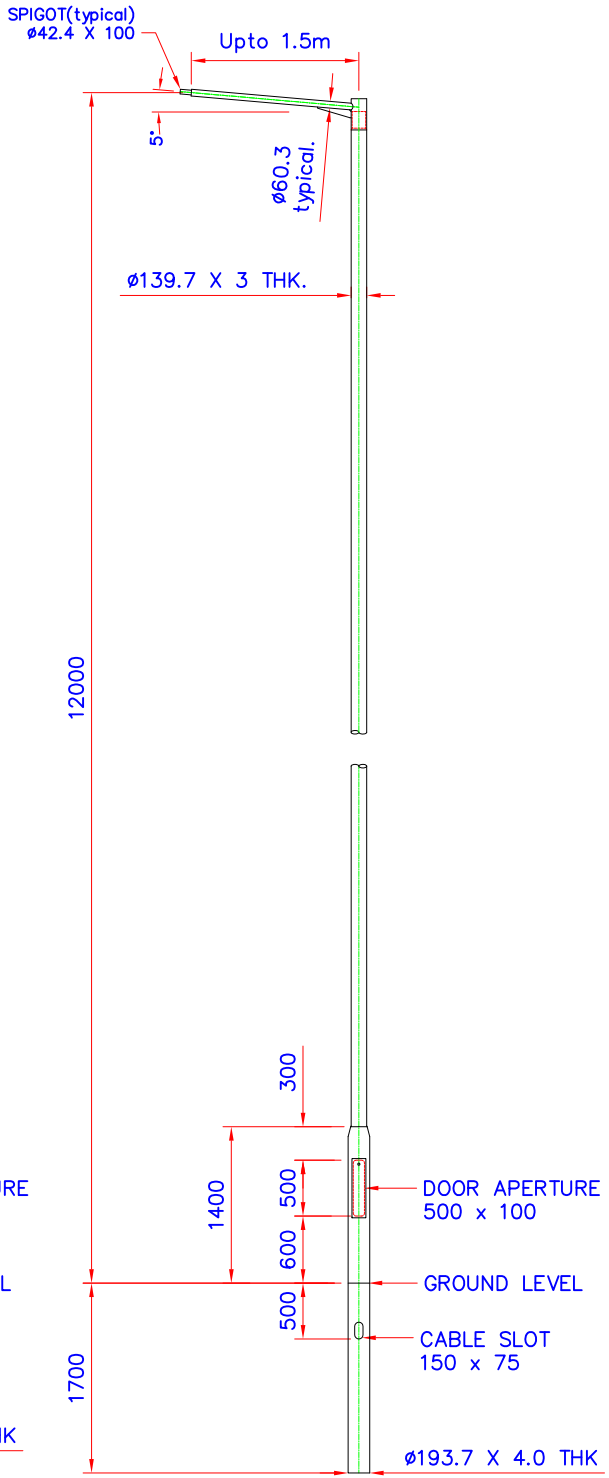

Design Specification:-

Design Standards.	: BS EN 40.3.1, BS EN 40.3.3, PD6547 & BD94/07 (Fatigue).
Design Life.	: 30 year.
10min. Mean Wind Velocity.	: 22 m/s.
Terrain Category.	: II.
Max. Altitude.	: 132m.

Acceptable Lanterns:-

Philips Iridium SGS 253
Philips Iridium SGS 254
WRTL Air Trace 1 (10m only)
WRTL Air Trace 2
WRTL Arc 80 ASR (10m only)

Signs and Other Attachments.

Sign Weight.	: 15.0 Kg.
Sign Area.	: 2.0 m2.
Sign Offset Distance	: Upto 0.3 m.

Recommended Foundations in accordance with PD6547:2004+A1:2009.

Column Height	Planting Depth	O/turning Moment	Concrete Diameter For Ground Factor:- G = 690	G = 390	G = 230
10m	1.5m	14.12 KNm	0 mm	0 mm	252 mm
12m	1.7m	19.28 KNm	0 mm	0 mm	235 mm

Diameter of Concrete Surround is Calculated For the Full Planting Depth.

REV.	DESCRIPTION	BY	CHK'	DATE
00	ISSUED FOR INFORMATION/APPROVAL	WW	--	12/3/10

FINISH: GALV TO BS EN 1461 & FINISHED TO OUTPUT SPECIFICATION

MATERIAL: EN 10219 | WEIGHTS: 10M: 146 Kg. 12M: 179 Kg. – NOT INC BRACKET

TITLE: 10M ø168/139 & 12M ø193/139 SINGLE ARM TUBULAR COLUMN BIRMINGHAM P.F.I.

SCALE: NTS

Sht. 1 of 1

DRAWN: BS8888. TOL: BS EN 40-2.

	NAME	DATE
DRAWN	WW	12/3/10
CHK'D/APP'D	--	--

valmont STAINTON
TS17 9LT
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FAX No.: 01642 765509

DRG. No. CC5430 Rev. 00

Rev. 00

DRG. No. CC5431

DO NOT SCALE

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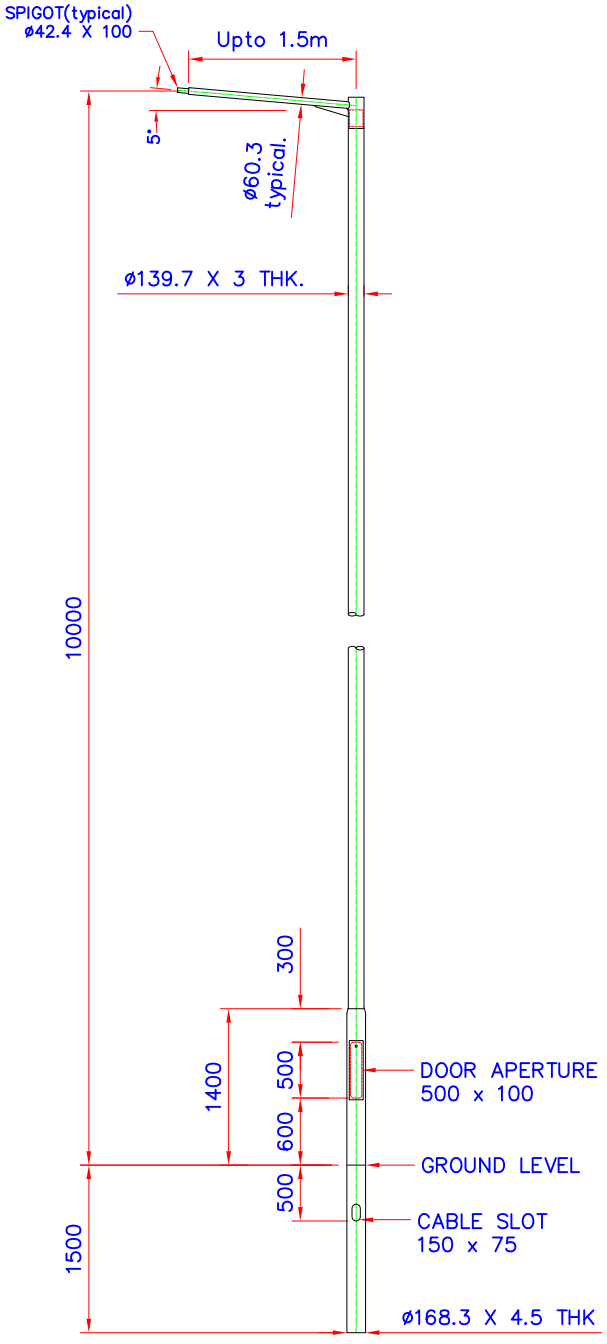
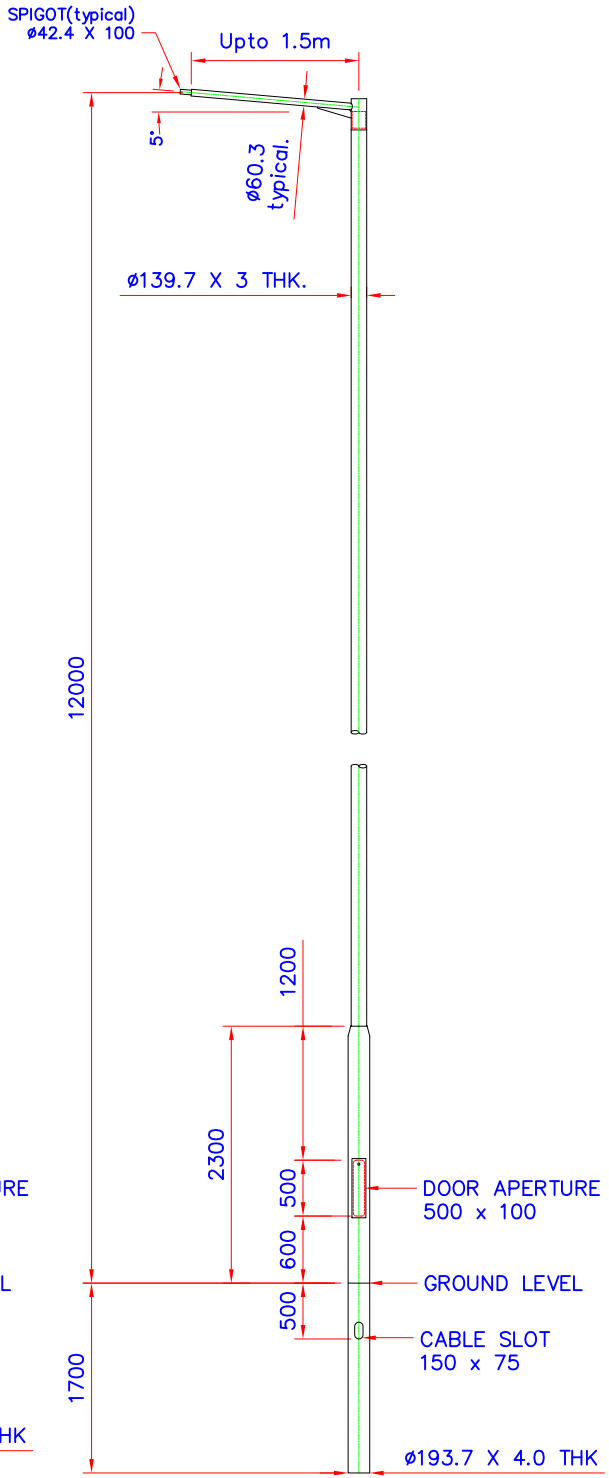




Design Specification:-

Design Standards.	: BS EN 40.3.1, BS EN 40.3.3, PD6547 & BD94/07 (Fatigue).
Design Life.	: 30 year.
10min. Mean Wind Velocity.	: 22 m/s.
Terrain Category.	: II.
Max. Altitude.	: 132m.

Acceptable Lanterns:
Philips Iridium SGS 253
Philips Iridium SGS 254
WRTL Air Trace 1 (10m only)
WRTL Air Trace 2
WRTL Arc 80 ASR (10m only)

Signs and Other Attachments.

Festive Dec'n Centre Height A.G.L.	: 5.0 m.
Festive Dec'n Weight.	: 20 Kg.
Festive Dec'n Area.	: 1.3 m2.
Festive Dec'n Offset Distance.	: N/A.

Recommended Foundations in accordance with PD6547:2004+A1:2009.

Column Height	Planting Depth	O/turning Moment	Concrete Diameter For Ground Factor:- G = 690	G = 390	G = 230
10m	1.5m	16.30 KNm	0 mm	171 mm	290 mm
12m	1.7m	20.97 KNm	0 mm	0 mm	255 mm

Diameter of Concrete Surround is Calculated For the Full Planting Depth.

REV.	DESCRIPTION	BY	CHK'	DATE
00	ISSUED FOR INFORMATION/APPROVAL	WW	--	12/3/10

FINISH: GALV TO BS EN 1461 & FINISHED TO OUTPUT SPECIFICATION
MATERIAL: EN 10219 WEIGHTS: 10M: 152 Kg. 12M: 187 Kg. – NOT INC BRACKET
TITLE: 10M ø168/139 & 12M ø193/139 SINGLE ARM TUBULAR COLUMN COLUMNS FOR FESTIVE DECORATIONS: BIRMINGHAM P.F.I.
SCALE: NTS
Sht. 1 of 1
DRAWN: BS8888. TOL: BS EN 40-2.

	NAME	DATE
DRAWN	WW	12/3/10
CHK'D/APP'D	--	--

valmont STAINTON
TS17 9LT
TEL No.: 01642 766242
FAX No.: 01642 765509

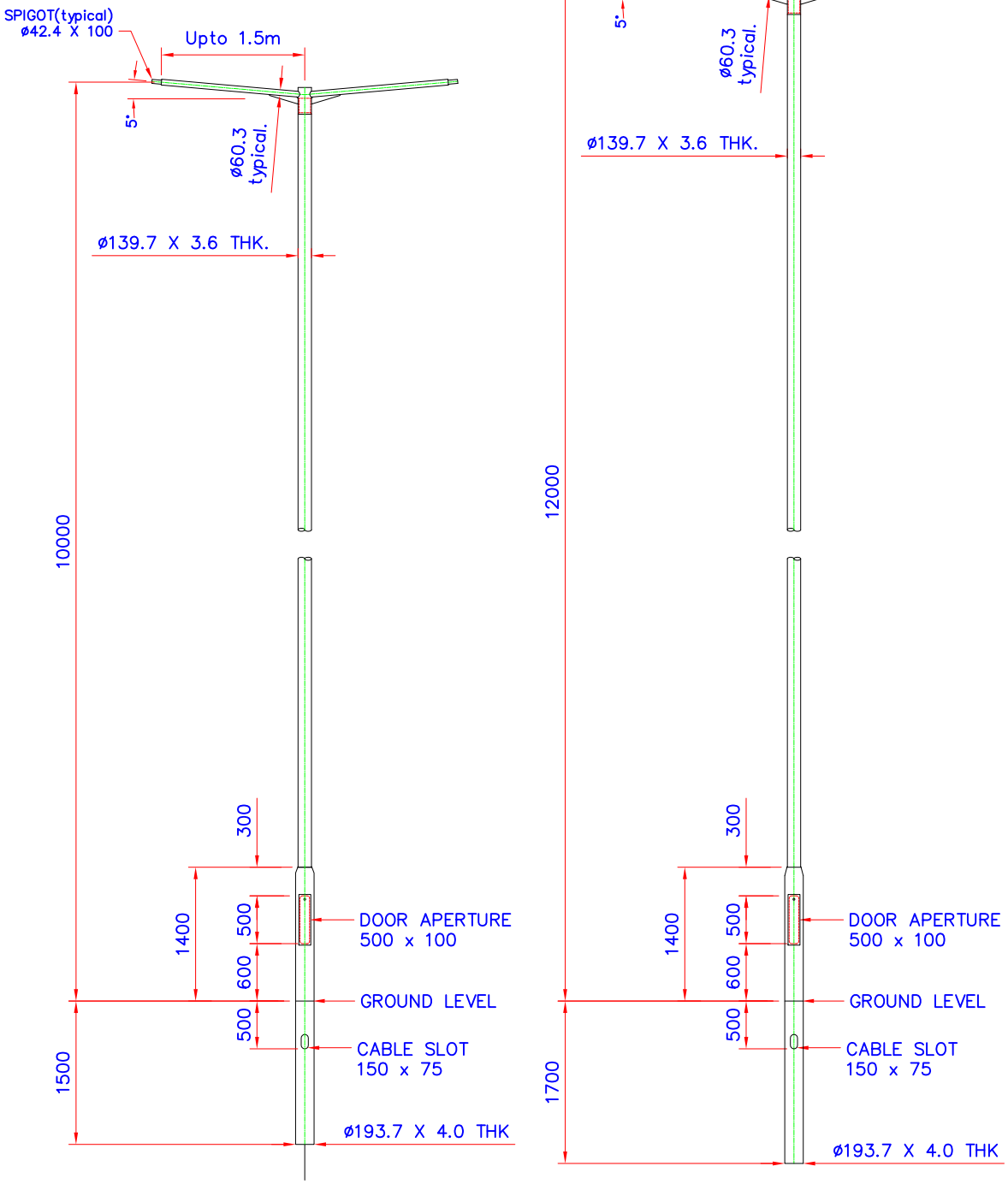
DRG. No. CC5431 Rev. 00

Rev. 00

DRG. No. CC5432

DO NOT SCALE

ALL DIMENSIONS IN MILLIMETRES
UNLESS STATED OTHERWISE
IF IN DOUBT ASK



Design Specification:-

Design Standards.	: BS EN 40.3.1, BS EN 40.3.3, PD6547 & BD94/07 (Fatigue).
Design Life.	: 30 year.
10min. Mean Wind Velocity.	: 22 m/s.
Terrain Category.	: II.
Max. Altitude.	: 132m.

Acceptable Lanterns:-

Philips Iridium SGS 253
Philips Iridium SGS 254
WRTL Air Trace 1 (10m only)
WRTL Air Trace 2
WRTL Arc 80 ASR (10m only)

Signs and Other Attachments.

Sign Weight.	: 15.0 Kg.
Sign Area.	: 2.0 m2.
Sign Offset Distance	: Upto 0.3 m.

Recommended Foundations in accordance with PD6547:2004+A1:2009.

Column Height	Planting Depth	O/turning Moment	Concrete Diameter For Ground Factor:- G = 690	G = 390	G = 230
10m	1.5m	17.02 KNm	0 mm	0 mm	303 mm
12m	1.7m	22.90 KNm	0 mm	0 mm	279 mm

Diameter of Concrete Surround is Calculated For the Full Planting Depth.

REV.	DESCRIPTION	BY	CHK'	DATE
00	ISSUED FOR INFORMATION/APPROVAL	WW	--	12/3/10

FINISH: GALV TO BS EN 1461 & FINISHED TO OUTPUT SPECIFICATION

MATERIAL: EN 10219 | WEIGHTS: 10M: 178 Kg. 12M: 207 Kg. – NOT INC BRACKET

TITLE: 10M ø193/139 & 12M ø193/139 DOUBLE ARM TUBULAR COLUMN BIRMINGHAM P.F.I.

SCALE: NTS

Sht. 1 of 1

DRAWN: BS8888. TOL: BS EN 40-2.

	NAME	DATE
DRAWN	WW	12/3/10
CHK'D/APP'D	--	--

valmont STAINTON
TS17 9LT
TEL No.: 01642 766242
FAX No.: 01642 765509

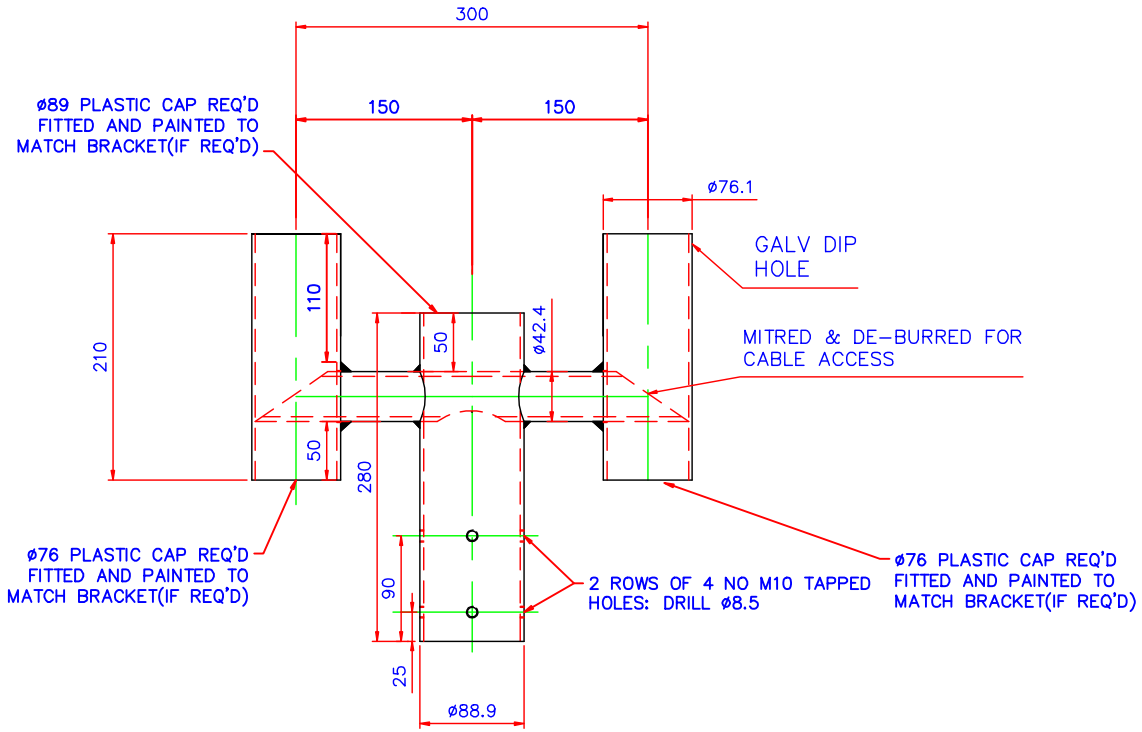
DRG. No. CC5432 Rev. 00

Rev. 01

DRG. No. CB0136

ALL DIMENSIONS IN MILLIMETRES
UNLESS STATED OTHERWISE
IF IN DOUBT ASK

DO NOT SCALE



FINISH: GALVANIZED TO BS EN ISO 1461 – FINISH TO ORDER.

REV.	DESCRIPTION	BY	CHK'	DATE
01	SPAN WAS 600 – NOW 300	HM	--	16/6/10
00	ISSUED FOR INFORMATION	HM	--	15/6/10

MATERIAL: S235/355	FINISH: AS ABOVE	WEIGHT: 5.5 Kg.
TITLE: ø89/76 DROP OVER COWHORN BRACKET 0.5M PROJECTION(1.0M SPAN).		SCALE: NTS Sht. 1 of 1

DRAWN: BS8888. TOL: EN40-2	NAME	DATE	valmont STAINTON TS17 9LT TEL No.: 01642 766242 FAX No.: 01642 765509
DRAWN	HM	15/6/10	
CHK'D/ APP'D	--	--	DRG. No. CB0136 Rev. 01