SERIES NG 1300
(11/03) ROAD LIGHTING COLUMNS AND BRACKETS, CCTV MASTS AND CANTILEVER MASTS

Contents

NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATIONS OF SCOTLAND, WALES AND NORTHERN IRELAND

Northern Ireland

# denotes a Clause or Sample Appendix which has a substitute National Clause or Sample Appendix for one or more of the Overseeing Organisations of Scotland, Wales or Northern Ireland.

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(11/03) ROAD LIGHTING COLUMNS AND BRACKETS, CCTV MASTS AND CANTILEVER MASTS

#NG 1301 General

1 (11/03) Standards BD 26 (DMRB 2.2), BD 83 (DMRB 2.2.12) and BD 88 (DMRB 2.2.13) are complementary to the Specification and include details of the acceptable materials and dimensional limitations.

The Specification includes design requirements since the Contractor is required to propose columns and brackets, CCTV masts and cantilever masts for traffic signals and/or speed cameras (hereafter called cantilever masts), which have been designed by the manufacturer; to design foundations for planted lighting columns/cantilever masts to meet the Overseeing Organisation's stated requirements, and to submit designs to the Overseeing Organisation for acceptance. This responsibility includes for the design of planted lighting column and cantilever masts foundations for each of the types of soil listed in Appendices 13/1 and 13/7 and where required, the design of foundations for columns and masts with flange plates.

2 (11/03) Electrical engineering requirements for lighting columns are given in Series 1400. Electrical engineering requirements for CCTV masts and for cantilever masts should be as described in Appendices 15/1 and 12/5 respectively.

3 Wall mounting bracket positions should be detailed on the Drawings. Details of the provision to be made for electrical services eg. ducting, conduits, junction boxes, etc. should be shown on the Drawings.

4 Where wall mounted brackets and fixtures are required, wayleaves, i.e. permission to fix, may be necessary.

5 The Contractor should ensure that the appropriate electricity suppliers have confirmed their approval to the clearances provided to overhead lines and provide evidence to the Overseeing Organisation that agreement has been reached in advance of installation.

6 (11/03) The information to be provided by the Overseeing Organisation at the time of inviting tenders should be given in Appendices 13/1, 13/4 and 13/7.

7 (11/03) Further advice is published in The Design Manual for Roads and Bridges (DMRB), Volumes 8, 9 and 10.

#NG 1302 (11/03) Design of Lighting Columns, Brackets, CCTV Masts, Cantilever Masts, Foundations, Anchorages and Attachment Systems

1 (11/03) The Contractor is required to submit to the Overseeing Organisation the design and check certificates as required by the technical approval scheme adopted by the Overseeing Organisation for the design of each lighting column, bracket, CCTV mast, cantilever mast, planted foundation, foundations for columns and cantilever masts with flange plates and their associated anchorages and attachment systems.

2 The Contractor should normally be made responsible for the design of wall mounted brackets and fixings. The wall on which mounted brackets are to be fixed should be checked to ensure that it is capable of carrying the additional loads and other forces that may be transmitted by the bracket.

Aesthetic Requirements

3 (05/01) The Contractor's designs of columns, masts and luminaires, including bracket arms, are to be submitted to the Landscape Architect of the Overseeing Organisation.

NG 1303 Data Sheets

1 (11/03) The information required on the completed Data Sheets is that which is necessary to ensure that the equipment being offered satisfies the requirements of both the Specification and Standards BD 26 (DMRB 2.2.1), BD 83 (DMRB 2.2.12) and BD88 (DMRB 2.2.13). Typical Standard Data Sheets are included in Appendices 13/2, 13/5 and 13/8 of these Notes for Guidance. The information provided by the Overseeing Organisation, including that in Appendices 13/1, 13/4 and 13/7 should be all that is necessary to enable the Contractor to complete the Data Sheets in accordance with the "Instructions for Completion of Data Sheets" shown in Appendices 13/3 and 13/9.

In completing and submitting the Data Sheets the Contractor confirms suitability of the columns, masts, housings, mountings and luminaires being offered.

Appendices 13/1, 13/4 and 13/7 should specify the date by which completed Data Sheets are to be submitted.

Where these are required at the time of tender this should be stated in Appendices 13/1, 13/4 and 13/7, and the information provided by tenderers should be sufficient to evaluate the tenders and suitability of equipment being offered.

Appendix 1/4 should list the Contractor's detail drawings which are to be submitted. Such drawings are normally submitted after the Contract is awarded unless there is good reason to specify otherwise. Drawings are usually required to give details unique to the scheme which can be of assistance to the highway authority, eg sizes and centres of foundation holding down bolts, etc. Drawings which show only general construction details are not usually required.

NG 1304 Identification and Location Markings

1 (05/01) The location marking required for each column and mast will vary throughout the country and instructions in the Contract should generally be agreed with the highway authorities concerned. The following should be specified:

(i) The direction in which the numbers should face.

(ii) The colour and background of the numbers.

(iii) The size of the numbers and distance above ground.

(iv) Method of marking eg. in paint or plastic, etc.

(v) Number of marks on each column and mast shafts (generally two for columns and masts on central reserve).

(vi) The mark which will enable a particular column/mast to be located.

(vii) Any distinctive system in order to highlight the location number at night.

NG 1305 (05/01) Installation of Foundations, Anchorages and Attachment Systems

1 (11/03) The method of installation of planted root columns and cantilever masts can influence their performance. Planted columns and cantilever masts posts are backfilled over the full planting depth with either concrete in accordance with sub-Clause 1305.4 or earth backfill in accordance with sub-Clause 1305.5. A combination of concrete and earth backfill is not permitted as this may alter the stress distribution on the column and cantilever mast post.

2 (11/03) Examples of the evidence required by sub-Clause 1305.10(i) include:

(a) (11/03) the results of testing to BS 5080 and should be undertaken by an appropriate organisation accredited in accordance with sub-Clauses 105.3 and 105.4 for such test; or

(b) a Certificate from any UAEtc member together with the results of testing to the European Union of Agrément Directive for Assessment of Anchor Bolts MOAT No. 42 (adapted to include only anchorage types permitted by the Specification).

An example of the evidence required by sub-Clause 1305.10(ii) is the result of testing to Clause 5.4.2.5 of MOAT No 42 (adapted to include only anchorage types permitted by the Specification).

If the four week time period required by sub-Clause 1305.10 is unrealistic then the appropriate time period should be stated in Appendices 13/1, 13/4 and 13/7.

3 Failures of anchorages in drilled holes are known to occur due to either the lack of cleanliness of the hole or the excessive tolerances of the size of the hole. The manufacturer of the anchorage should give the maximum tolerance permitted and the evidence submitted in accordance with sub-Clause 1305.10 should show that the anchorages are satisfactory when installed in holes having these maximum tolerances.

4 (11/03) Where lighting columns, CCTV masts and cantilever masts are to be installed on bridge decks, columns and masts with flange plates should be used. Care should be taken to avoid damaging bridge deck waterproofing. Normally an anchorage and attachment system which avoids this problem should be used. In exceptional circumstances, where damage to the waterproofing is unavoidable, a compatible sealing system to prevent ingress of water and avoid corrosion should be used.

5 Where attachment systems are used, the bolts or nuts are to be tightened adequately in accordance with the manufacturer's instructions, to ensure that the attachment system does not work loose when subject to wind loading. In addition, it is important to ensure an adequate length of thread engagement.

6 Sealing of voids in anchorages, attachment systems and flange plates with a non-setting passive filler is important to prevent ingress of water and to avoid corrosion.

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NG 1306 Site Tests on Anchorages in Drilled Holes

1 The Contractor is responsible for carrying out Site tests and, where required, for designing the anchorages. Anchorages should be selected on behalf of the Overseeing Organisation to be tested within the frequency given in Appendix 1/5.

2 Where anchorages in drilled holes are designed by the Contractor, it should be established to the satisfaction of the Overseeing Organisation that the Contractor's calculations for the nominal tensile load have been correctly carried out and have been checked, before selecting the anchorages for testing.

3 The Contractor's test record documents should be included in the as-built records.

NG 1307 Materials and Surface Finishes

1 (11/03) The system of protection for steel columns, CCTV masts and cantilever masts is dependent upon the environment, utilizing the information given in Series NG 1900 and the requirements stated in Appendix 19/1.

2 (11/03) A suitable quality of the surface protection for temporary lighting columns and brackets, CCTV masts and cantilever masts should be specified in Appendix 19/1. The full requirements of Series 1900 for such lighting, CCTV masts and cantilever masts may not be necessary.

3 (05/01) Metal fixings to concrete columns should also comply with the requirements of Series 1300. No protection to the concrete is normally required.

NG 1309 (11/04) Amendments and Additions to BS 5649-2 : 1978 (AMD 3136, 1979) for Lighting Columns

1 (11/03) The amendments to Page 6 Clause 4 introduce the width of cable entry slot dimension 'X' which should be 75 mm for all columns of nominal height of 8 m or more and may be 50 mm for columns of lesser height. The value of 'X' should be stated in Appendix 13/1.

2 (11/05) The additional sub-clause 8.7.1.3 in Specification Clause 1309 specifies the material thickness tolerance. In the event of the thickness of the material supplied being outside the -5% tolerances but still being within the tolerances specified for steel in appropriate Euronorms as listed in BS EN 10025-1 and BS EN 10025-2, material may be used providing its actual certified yield strength is not less than the product of the ratio of nominal thickness to actual thickness and the specified nominal yield strength, ie:

$$\sigma_{Ya} \geq \frac{\sigma_{Yn} t_n}{t_a}$$

where

σ_{Ya} = actual certified yield strength

σ_{Yn} = nominal specified minimum yield strength in BS EN 10025-1 and BS EN 10025-2

t_n = nominal specified thickness

t_a = actual thickness

Note: A similar approach may be adopted in the case of aluminium.

NG 1310 (11/04) Amendments and Additions to BS EN 40-5 and BS EN 40-6 for Lighting Columns and Brackets, CCTV Masts and Cantilever Masts

Welding

1 (05/01) Prior to the anticipated start of manufacture of columns and masts, copies of the most recent certified destructive test reports covering those component types to be supplied under the Contract should be available for inspection.

2 (05/01) Sample column/mast components and/or joints for destructive testing should be selected by a Welding Inspector certified by CSWIP or equivalent. Selection should be made taking into account the manufacturer's inspection reports, previous destructive test reports and observations of current production practice on similar column types. Samples should be selected on the basis that they represent the lower end of quality in the production batch. Particular attention should be given to any features which could adversely affect the true throat size or the mechanical properties of the materials or introduce stress raisers transverse to the member axis.

3 (11/03) For the purposes of defining lighting column types in 7.1.5, differences in either member cross-sectional shape, joint configuration or weld type, constitute a change in lighting column types. Variations in parent metal thickness or weld throat dimension from the specified sizes on the sample selected for destructive test may be included within the same lighting column types up to a limit of ± 40%.

4 (11/03) Sample components and/or joints selected for destructive testing should be indelibly marked and dispatched to a testing laboratory appropriately accredited in accordance with sub-Clauses 105.3 and 105.4 for weld testing.

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5 The following points should be considered when ascertaining the acceptability of components subject to destructive testing:

(a) (11/05) Each length of weld between weld ends or changes of direction should be sectioned at intervals not exceeding 100 mm. Circumferential welds should be sectioned on at least 2 diameters. Post seam welds should be sectioned at a minimum of 4 locations along their length. One side of each section should be ground, filed, linished or machined to a finish at least as smooth as that produced by a 120 grit paper to BS 871, so that the actual throat and leg dimensions can be measured and any discontinuities exposed. One nick break test in accordance with BS 709 on a length of weld of not less than 25 mm should be made for each joint type on each component. Additional sections and nick break tests may be required in cases of borderline acceptance. Non-conformances with the imperfection acceptance levels of BS EN ISO 15614-1 or BS EN ISO 15609-2, as appropriate should be recorded. Non-conformances with the requirements of 7.1.4 should be cause for rejection, except that in 7.1.4.2 the throat and leg dimensions should be the true rather than the apparent dimensions.

(b) One representative section from each joint type for each type of column should be prepared for macro-examination. A hardness survey should be done where any of the parent material thickness exceeds 20 mm. An additional macro-examination should be made of each non-conforming weld.

6 The results of the destructive tests including macrographs should be reported and a certified copy sent to the manufacturer. In the event of non-conformances being found the Contractor and manufacturer should be notified as soon as possible. The test specimens, uniquely identified by hard stamped marks should be returned to the manufacturer's works.

NG 1313 (05/01) Laminated Glass Fibre Reinforced Plastic (GFRP) Lighting Columns

Manufacture of GFRP Laminates

1 The internal surface of the column should not contain any dry patches but may show the presence of cracking in resin-rich layers or occasional bubbles. These do not affect the strength of the column and may be ignored.

2 The thickness of the column may vary step-wise along its length. Around the door area, additional reinforcement layers should generally be provided dependent on design requirements.

#NG SAMPLE APPENDIX 13/1: INFORMATION TO BE PROVIDED WHEN SPECIFYING LIGHTING COLUMNS AND BRACKETS

[Notes to compiler:]

1 *Appendix 13/1 should be specific and provide all the information which a tenderer will need in addition to information provided elsewhere in the documents;in order to submit a tender. Reference should be made in Appendix 13/1 to other relevant documents, eg drawings.*

2 *The requirements for each type of lighting column should include the following information as applicable:]*

(i) number of columns;

(ii) nominal height of column;

(iii) bracket projection, single or double: or whether post-top fitting;

(iv) luminaire weight and windage area and centres of application of the forces from the centroid of the column shaft;

(v) size, length and angle of luminaire fixing;

(vi) (11/04) location of column, ie terrain category, exposure coefficient ($Ce_{(z)}$), topography factor (f) and reference wind velocity speed ($V_{ref,0}$) as defined in BS EN 40-3-1;

(vii) height of installation above ground level, ie for lighting columns mounted on a structure or embankment the height of installation should include the nominal height of the column plus the height of the datum above the adjacent ground level;

(viii) type of column base, ie planted with or without base plate or column with flange plate;

(ix) list of columns with flange plates where the Contractor is to design the foundations, anchorages and attachment systems;

(x) (11/04) information on soil types for design in accordance with BS 5649-2 : 1978 Appendix B for individual or groups of columns;

(xi) requirements for backfilling if not to be Class 8 as described in sub-Clause 1305.5;

(xii) size and number of door openings, number of doors to be fitted with hinges or metal chains and direction doors are to face;

(xiii) size requirements for base compartments;

(xiv) (11/03) acceptable column materials and types in very exposed sites as defined in BD 26 (DMRB 2.2.1);

(xv) (05/01) provide information as required in Appendix 19/1;

(xvi) any specific requirements for aesthetic approval of lighting column and bracket combinations *[as agreed with the Regional Landscape Architect]*;

(xvii) (05/01) number of door keys if different from Clause 1311;

(xviii) identification and location markings;

(xix) requirements for wall mountings including fixings;

(xx) requirements for earthing *[see NG 1420]*;

(xxi) columns to be mounted on structures or in situations where there is a risk that a detached door could cause an accident if it fell onto the area below;

(xxii) (11/03) any other special requirements, eg dimension 'X' for cable entry slot width, signs and attachments in excess of BD 26 (DMRB 2.2.1) requirements;

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(xxiii) requirements of electricity supplier including warning notices regarding proximity to overhead power lines

3 Latest date by which completed Data Sheets shall be provided. *[This date should generally be not earlier than 2 weeks after the date of award of Contract; however, there may be special reasons to advance this date, such as when there is a requirement for lighting columns of high aesthetic standard. This date may sometimes be better determined after the award of Contract based on the Contractor's programme and his reasonable lead-times for approval and procurement. 1303.1]*

APPENDIX 13/2 (05/01)
(SPECIFICATION FOR HIGHWAY WORKS)
TYPICAL LIGHTING COLUMN AND BRACKET DATA - SHEET 1

Name of Manufacturer:	Column Reference No.	
	Revision No.	
	Date	

NAME OF CONTRACT

Part A General

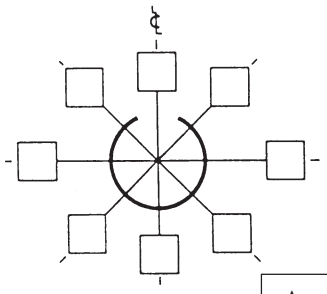
Column nominal height	(m)
Column material	
Material design strength	(N/mm^2)
No. of door openings	
Door opening size - Height	(mm)
- Width	(mm)

Cross-section of base compartment

Height (mm)	Width (mm)	Depth (mm)

Acceptable positions of bracket arms relative to door position

Door Opening



Any

Manufacturer's drawing ref. no.

(11/03) Corrosion protection (steel columns only) - basic system type (sub-Clauses 1911.9 and 1911.10)

(11/04) Reference Wind Velocity $V_{ref,o}$ as defined in BS EN 40-3-1 m/s

Details of signs and attachments allowed for in the design Area (mm^2), Eccentricity (mm), Height

- additional sacrificial steel thickness, above that needed in the design, from the bottom of the column to at least 250 mm above the anticipated ground level (mm)

Part B Foundation Data

Planted base — Planting depth (m)

Standard Soil Type Factor G		
630	390	230

Diameter of concrete surround (if any)

(1103) Flange plate

Bolt hole centres	Bolt Hole diameter	Design load/bolt
(mm)	(mm)	(N)

Relevant forces and moments at ground level

Line of action of max. moment relating to door opening

NOTE: For flange plates with slotted holes a diagram shall be included with this Data Sheet.

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APPENDIX 13/2 (05/01)
(SPECIFICATION FOR HIGHWAY WORKS) TYPICAL LIGHTING COLUMN AND BRACKET DATA - SHEET 2

(11/03) **Part C Acceptable Luminaires**

Luminaire: Maximum Characteristics

			(11/04) Terrain Categories as defined in BS EN 40-3-1				
			I	II	III	IV	
		Luminaire Max Wt (kg)	(11/04) Maximum Windage Area (m^2) for Terrain Categories as defined in BS EN 40-3-1				
	Luminaire Connection						
Post Top Column	Diameter	Length					

Single Arm Bracket Column:	Luminaire Lever Arm (mm)	
	Due to wt. of luminaire	Due to windage on luminaire

Bracket Projection (m)	Ref No.	Drawing No.	Material		Luminaire Fixing Angle	Luminaire Connection		Luminaire Maximum Wt (kg)	(11/04) Maximum Windage Area (m^2) for Terrain Categories as defined in BS EN 40-3-1				
			Grade	Design Strength (N/mm^2)		Diameter (mm)	Length (mm)						

Double Arm Bracket Column:	Luminaire Lever Arm (mm)	
	Due to wt. of luminaire	Due to windage on luminaire

Bracket Projection (m)	Ref No.	Drawing No.	Material		Luminaire Fixing Angle	Luminaire Connection		Luminaire Maximum Wt (kg)	(11/04) Maximum Windage Area (m^2) for Terrain Categories as defined in BS EN 40-3-1				
			Grade	Design Strength (N/mm^2)		Diameter (mm)	Length (mm)						

Part D Certification

It is certified that the information given in this Data Sheet has been obtained in accordance with Departmental Standard BD 26 (DMRB 2.2.1) and the Specifications.

Signed on behalf of the Contractor ..... Date .....

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APPENDIX 13/3 (05/01) INSTRUCTIONS FOR COMPLETION OF LIGHTING COLUMN AND BRACKET DATA SHEETS

General

1 When information is not required a dash shall be inserted in the appropriate boxes.

2 Where a Data Sheet is amended it shall be given a new revision number with a date.

3 The revision numbers shall be consecutive letters of the alphabet, commencing with "A".

4 The date of the revision shall agree with the date of the Contractor's signature.

5 The column, or bracket material shall be steel, aluminium, reinforced or prestressed concrete, glass fibre reinforced plastic or any other suitable material.

6 The material design strength shall be the minimum specified in the design. Where more than one material is used values for all materials shall be given.

7 All relevant entries shall be made on the Data Sheet before the document is certified by the Contractor.

Column Data

8 (11/04) The column nominal height shall be selected from clause 2 or 3 of BS 5649-2 : 1978 as appropriate.

9 The number of door openings shall agree with the manufacturer's drawing.

10 The cross-section of the base compartment shall be indicated by a dimensioned diagram/sketch.

11 The acceptable positions of bracket arms relative to the door position shall be indicated on the diagram. Where all positions are acceptable the box noted "ANY" shall be ticked.

12 Where concrete is necessary around the planted base in accordance with sub-Clauses 1305.3 and 1305.4 the minimum diameter shall be entered.

13 For flange bases all forces and moments used in the design of the foundations, anchorages and attachment systems shall be given.

14 The corrosion protection system used on the column when new shall be recorded. Where additional steel is provided for sacrificial purposes the amount shall be recorded.

15 (05/01) The signs and attachments surface area, eccentricity from the centre line of the column to the centre of area of the sign and height above ground level to the centre of area of the sign shall be stated.

Bracket Data

16 (05/01) The luminaire lever arms, weight and maximum windage area quoted shall be based on the most adverse loading on the bracket when it is attached to any of the columns quoted in the compatible column sections.

(Note: The luminaire lever arms are the horizontal distances from the centre of gravity of the luminaire and, if applicable, the centroid of the windage surface area to the end of the bracket joint).

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(05/01) NG SAMPLE APPENDIX 13/4: INFORMATION TO BE PROVIDED WHEN SPECIFYING CCTV MASTS

[Notes to compiler:

1 Appendix 13/4 should be specific and provide all the information which a tenderer will need in addition to information provided elsewhere in the documents, in order to submit a tender. Reference should be made in Appendix 13/4 to other relevant documents, e.g. drawings.

2 *The requirements for each type of CCTV mast should include the following information as applicable:]*

(i) number of masts;

(ii) nominal height of masts;

(iii) type of camera mounting;

(iv) camera and housing weight and windage area and centres of application of the forces from the centroid of the column shaft;

(v) (11/03) size, length and angle of camera mounting;

(vi) (11/03) location of mast, i.e. National Grid Reference;

(vii) (11/03) effective wind speed, V_e (m/s) as defined in Institution of Lighting Engineers Technical Report 7: 2000 Edition;

(viii) (11/03) height of installation above ground level, i.e. for CCTV masts mounted on a structure or embankment the height of installation should include the nominal height of the mast plus the height of the datum above the adjacent ground level;

(ix) (11/03) list of masts with flange plates where the Contractor is to design the foundations, anchorages and attachment systems;

(x) (11/03) size and number of door openings, number of doors to be fitted with hinges or metal chains and direction doors are to face;

(xi) (11/03) size requirements for base compartments;

(xii) (11/03) acceptable mast materials;

(xiii) (11/03) acceptable corrosion protection treatments, as Appendix 19/1;

(xiv) (11/03) any specific requirements for aesthetic approval of CCTV masts *[as agreed with the Regional Landscape Architect or with the Overseeing Organisation]*;

(xv) (11/03) number of door keys if different from Clause 1311;

(xvi) (11/03) identification and location markings;

(xvii) (11/03) requirements for earthing *[see NG 1420]*;

(xviii) (11/03) masts to be mounted on structures or in situations where there is a risk that a detached door could cause an accident if it fell onto the area below;

(xix) (11/03) any other special requirements, eg details of special attachments to the CCTV masts;

(xx) (11/03) requirements of electricity supplier including warning notices regarding proximity to overhead power lines.

3 (11/03) Latest time by which complete Data Sheets shall be provided. *[This date should generally be not earlier than 2 weeks after the date of award of Contract; however, there may be special reasons to advance this date, such as when there is a requirement for CCTV masts of high aesthetic standard. This date may sometimes be better determined after the award of Contract based on the Contractor's programme and his reasonable lead-times for approval and procurement. 1303.1]*

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(05/01) # APPENDIX 13/5
(SPECIFICATION FOR HIGHWAY WORKS)
TYPICAL CCTV MAST DATA

Name of Manufacturer:	Mast Reference No.	
	Revision No.	
	Date	

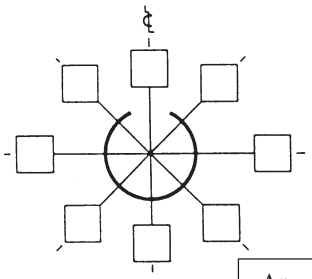
NAME OF CONTRACT

Part A - General

Mast nominal height		(m)
Mast material		
Material design strength		(N/mm^2)
No. of door openings		
Door opening size - Height		(mm)
- Width		(mm)

Acceptable positions of bracket arms relative to door position

Door Opening



Any

Manufacturer's drawing ref. no.

Cross-section of base compartment	Height (mm)	Width (mm)	Depth (mm)

Attachments	Area (mm^2)	Eccentricity (mm)	Height (mm)

(11/03) Design Information (as defined in the Institution of Lighting Engineers Technical Report No. 7: 2000)

(11/03)

Effective wind speed, V_e m/s

Response factor (β) Size reduction factor (ä)

Corrosion protection - (11/03) basic system type (sub-Clauses 1911.9 and 1911.10)

Details of signs and attachments allowed for in the design Area (mm^2), Eccentricity (mm), Height (mm)

Part B - Foundation Data

Flange base

Bolt hole centres (mm)	Hole diameter (mm)	Design load/bolt (N)

Relevant forces and moments at ground level

Line of action of max. moment relating to door opening

Note: For flange plates with slotted holes a diagram shall be included with this data sheet

Part C - Acceptable CCTV Cameras, Housings and Mountings

Mounting Reference No.		Drawing No.	
Material grade		Material design strength	(N/mm^2)
Combined CCTV Camera, Housing and Mounting Maximum Weight			(kg)
CCTV Camera, Housing and Mounting Maximum Windage Areas			(m^2)
Lever arm of CCTV Camera, Housing and Mounting		- due to weight	(m)
		- due to windage	(m)

Part D - Certification

(11/03) It is certified that the information given in this Data Sheet has been obtained in accordance with the requirements of Departmental Standard BD 83 (DMRB 2.2.12) and Specification.

Signed on behalf of the Contractor: Date:

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(05/01) APPENDIX 13/6: INSTRUCTIONS FOR COMPLETION OF CCTV MAST DATA SHEETS

General

1 When information is not required a dash shall be inserted in the appropriate boxes.

2 Where a Data Sheet is amended it shall be given a new revision number with a date.

3 The revision numbers shall be consecutive letters of the alphabet, commencing with "A".

4 The date of the revision shall agree with the date of the Contractor's signature.

5 The mast shall be steel.

6 The material design strength shall be the minimum specified in the design. Where more than one material is used values for all materials shall be given.

7 All relevant entries shall be made on the Data Sheet before the document is certified by the Contractor.

Mast Data

8 (11/03) The mast nominal height shall be as defined in BD 83 (DMRB 2.2.12), clause as appropriate.

9 The number of door openings shall agree with the manufacturer's drawing.

10 The cross-section of the base compartment shall be indicated by a dimensioned diagram/sketch.

11 The acceptable positions of the mounting relative to the door position shall be indicated on the diagram. Where all positions are acceptable the box noted "ANY" shall be ticked.

12 For flange bases all forces and moments used in the design of the foundations, anchorages and attachment systems shall be given.

13 The corrosion protection system used on the column when new shall be recorded. Where additional steel is provided for sacrificial purposes the amount shall be recorded.

14 The signs and attachments surface area, eccentricity from the centre line of the mast to the centre of area of the sign and height above ground level to the centre of area of the sign shall be stated.

(11/03) Equipment Data

15 The lever arms, weight and maximum windage area quoted for the CCTV camera with associated mountings and housings shall be based on the most adverse loading when it is attached to any of the masts quoted in the compatible mast sections.

(Note: The lever arms are the horizontal distances from the centre of gravity of the CCTV camera with associated mounting and housing and, if applicable, the centroid of the windage surface area to the centreline of the mast.)

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(11/03) NG SAMPLE APPENDIX 13/7: INFORMATION TO BE PROVIDED WHEN SPECIFYING CANTILEVER MASTS

[Notes to compiler:

1 *Appendix 13/7 should be specific and provide all the information which a tenderer will need in addition to information provided elsewhere in the documents, in order to submit a tender. Reference should be made in Appendix 13/7 to other relevant documents, e.g. drawings.*

2 *The requirements for each type of cantilever mast should include the following information as applicable:]*

(i) number of cantilever masts;

(ii) nominal height and projection of cantilever masts;

(iii) type of traffic signal or camera mounting;

(iv) traffic signal or camera weight and windage area and centres of application of the forces from the centroid of the column shaft;

(v) size and length of traffic signal or camera;

(vi) location of cantilever mast, i.e. exposure coefficient ($Ce_{(z)}$), topography factor (f) and reference wind velocity ($V_{ref,0}$);

(vii) height of installation above ground level, i.e. for cantilever masts mounted on a structure or embankment the height of installation should include the nominal height of the cantilever mast plus the height of the datum above the adjacent ground level;

(viii) type of cantilever mast base, i.e. planted with or without base plate or cantilever mast with flange plate;

(ix) list of cantilever masts with flange plates where the Contractor is to design the foundations, anchorages and attachment systems;

(x) (11/04) information on soil types for design in accordance with BS 5649-2: 1978 (AMD 3136, 1979) Appendix B for individual or groups of columns;

(xi) requirements for backfilling if not to be Class 8 as described in sub-Clause 1305.5;

(xii) size and number of door openings, number of doors to be fitted with hinges or metal chains and direction doors are to face;

(xiii) size requirements for base compartments;

(xiv) acceptable column materials and types in very exposed sites as defined in BD 88 (DMRB 2.2.13);

(xv) provide information as required in Appendix 19/1

(xvi) any specific requirements for aesthetic approval of cantilever masts *[as agreed with the Regional Landscape Architect or with the Overseeing Organisation];*

(xvii) number of door keys if different from Clause 1311;

(xviii) identification and location markings;

(xix) requirements for earthing *[see NG 1420]*;

(xx) cantilever masts to be mounted on structures or in situations where there is a risk that a detached door could cause an accident if it fell onto the area below;

(xxi) any other special requirements, eg. dimension 'X' for cable entry slot width, signs and attachments in excess of BD 88 (DMRB 2.2.13) requirements;

(xxii) requirements of electricity supplier including warning notices regarding proximity to overhead power lines

3 Latest date by which completed Data Sheets shall be provided. *[This date should generally be not earlier than 2 weeks after the date of award of Contract; however, there may be special reasons to advance this date, such as when there is a requirement for cantilever masts of high aesthetic standard. This date may sometimes be better determined after the award of Contract based on the Contractor's programme and his reasonable lead-times for approval and procurement. 1303.1]*

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(11/03) **APPENDIX 13/8**

(SPECIFICATION FOR HIGHWAY WORKS) TYPICAL CANTILEVER MAST DATA - SHEET 1

Name of Manufacturer:	Cantilever Mast Reference No.
	Revision No.
	Date

NAME OF CONTRACT

Part A - General

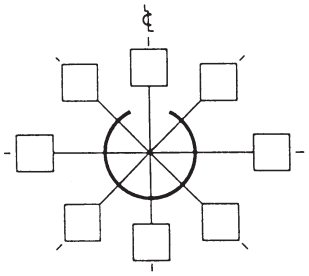
Column nominal height		(m)
Cantilever projection		(m)
Column material		
Material design strength		(N/mm²)
No. of door openings		
Door opening size	- Height	(mm)
	- Width	(mm)

Cross-section of base compartment

Height (mm)	Width (mm)	Depth (mm)

Acceptable positions of outreach arms relative to door position

Door Opening



Any	

Manufacturer's drawing ref. no.	

(11/04) Design Information as defined in BS EN 40-3-1

Reference wind velocity, ($V_{ref,0}$)	m/s	Exposure Coefficient $Ce_{(z)}$			
Response factor (β)		Size reduction factor (ä)		Topography factor (f)	

Corrosion protection - basic system type (sub-Clauses 1911.9 and 1911.10)	
Details of signs and attachments allowed for in the design Area (mm²), Eccentricity (mm), Height (mm)	
- additional sacrificial steel thickness, above that needed in the design, from the bottom of the column to at least 250mm above the anticipated ground level	(mm)

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(11/03) **APPENDIX 13/8**

(SPECIFICATION FOR HIGHWAY WORKS) TYPICAL CANTILEVER MAST DATA - SHEET 2

Part B - Foundation Data

Planted base — Planting depth: (m)

	Standard Soil Type Factor G		
	630	390	230
Diameter of concrete surround (if any)			

Flange plate

Bolt hole centres	Bolt hole diameter	Design load/bolt
(mm)	(mm)	(N)

Relevant forces and moments at ground level

Line of action of max. moment relating to door opening

Note: For flange plates with slotted holes a diagram shall be included with this data sheet

Part C - Acceptable Traffic Signals or Speed Cameras, Housings and Mountings

Mounting Reference No. — Drawing No.

Material grade — Material design strength (N/mm^2)

Combined Traffice Signal or Speed Camera, Housing and Mounting Maximum Weight (kg)

Traffic Signal or Speed Camera, Housing and Mounting Maximum Windage Areas (m^2)

Lever arm of Traffice Signal or Speed Camera, Housing and Mounting - due to weight (m)

- due to windage (m)

Part D - Certification

It is certified that the information given in the Data Sheet has been obtained in accordance with Departmental Standard BD 88 (DMRB 2.2.13) and the Specification.

Signed on behalf of the Contractor: Date:

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(11/03) NG SAMPLE APPENDIX 13/9: INSTRUCTIONS FOR COMPLETION OF CANTILEVER MASTS DATA SHEETS

General

1 When information is not required a dash shall be inserted in the appropriate boxes.

2 Where a Data Sheet is amended it shall be given a new revision number with a date.

3 The revision numbers shall be consecutive letters of the alphabet, commencing with "A".

4 The date of the revision shall agree with the date of the Contractor's signature.

5 The material design strength shall be the minimum specified in the design.

6 All relevant entries shall be made on the Data Sheet before the document is certified by the Contractor.

Cantilever Mast Data

7 (11/04) The cantilever mast nominal height shall be selected from clause 2 or 3 of BS 5649-2 : 1978 (AMD 3136, 1979) as appropriate.

8 The number of door openings shall agree with the manufacturer's drawing.

9 The cross-section of the base compartment shall be indicated by a dimensioned diagram/sketch.

10 The acceptable positions of the outreach arms relative to the door position shall be indicated on the diagram. Where all positions are acceptable the box noted "ANY" shall be ticked.

11 Where concrete is necessary around the planted base in accordance with sub-Clauses 1305.3 and 1305.4 the minimum diameter shall be entered.

12 For flange bases all forces and moments used in the design of the foundations, anchorages and attachment systems shall be given.

13 The corrosion protection system used on the cantilever mast when new shall be recorded. Where additional steel is provided for sacrificial purposes the amount shall be recorded.

14 The signs and attachments surface area, eccentricity from the centre line of the cantilever mast to the centre of area of the sign and height above ground level to the centre of area of the sign shall be stated.

Equipment Data

15 The lever arms, weight and maximum windage area quoted for the traffic signal or speed camera with associated mountings and housings shall be based on the most adverse loading when it is attached to any of the masts quoted in the compatible mast sections.

(Note: The lever arms are the horizontal distances from the centre of gravity of the traffic signal or speed camera with associated mounting and housing and, if applicable, the centroid of the windage surface area to the centreline of the mast.)

NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATION OF NORTHERN IRELAND

NG 1301NI General

1 (11/03) Standards BD 26 (DMRB 2.2), BD83 (DMRB 2.2.12) and BD 88 (DMRB 2.2.13) are complementary to the Specification and include details of the acceptable materials and dimensional limitations.

The Specification includes design requirements since the Contractor is required to propose columns and brackets, CCTV masts and cantilever masts for traffic signals and/or speed cameras (hereafter called cantilever masts), which have been designed by the manufacturer; to design foundations for planted lighting columns/cantilever masts to meet the Overseeing Organisation's stated requirements, and to submit designs to the Overseeing Organisation for acceptance. This responsibility includes for the design of planted lighting column and cantilever masts foundations for each of the types of soil listed in Appendices 13/1 and 13/7 and where required, the design of foundations for columns and masts with flange plates.

2 (11/03) Electrical engineering requirements for lighting columns are given in Series 1400. Electrical engineering requirements for CCTV masts and for cantilever masts should be as described in Appendices 15/1 and 12/5 respectively.

3 Wall and wood pole mounting bracket positions should be detailed on the Drawings. Details of the provision to be made for electrical services eg ducting, conduits, junction boxes, etc. should be shown on the Drawings.

4 Where wall or wood pole mounted brackets and fixtures are required, wayleaves, i.e. permission to fix, may be necessary.

5 The Contractor should ensure that the appropriate electricity suppliers have confirmed their approval to the clearances provided to overhead lines and provide evidence to the Overseeing Organisation that agreement has been reached in advance of installation.

6 (11/03) The information to be provided by the Overseeing Organisation at the time of inviting tenders should be given in Appendices 13/1, 13/4 and 13/7.

7 (11/03) Further advice is published in The Design Manual for Roads and Bridges (DMRB), Volumes 8, 9 and 10.

NG 1302NI (11/03) Design of Lighting Columns, Brackets, CCTV Masts, Cantilever Masts, Foundations, Anchorages and Attachment Systems

1 (11/03) The Contractor is required to submit to the Overseeing Organisation the design and check certificates as required by the technical approval scheme adopted by the Overseeing Organisation for the design of each lighting column, bracket, CCTV mast, cantilever mast, planted foundation, foundations for columns and cantilever masts with flange plates and their associated anchorages and attachment systems.

2 The Contractor should normally be made responsible for the design of wall and wood pole mounted brackets and fixings. The wall or wood pole on which mounted brackets are to be fixed should be checked to ensure that it is capable of carrying the additional loads and other forces that may be transmitted by the bracket.

Aesthetic Requirements

3 (05/01) The Contractor's designs of columns, masts, cameras and luminaires, including bracket arms, are to be submitted to the Overseeing Organisation.

NG SAMPLE APPENDIX 13/1NI: INFORMATION TO BE PROVIDED WHEN SPECIFYING LIGHTING COLUMNS AND BRACKETS

[Notes to compiler:

1 *Appendix 13/1 should be specific and provide all the information which a tenderer will need in addition to information provided elsewhere in the documents, in order to submit a tender. Reference should be made in Appendix 13/1 to other relevant documents, eg. drawings.*

2 *The requirements for each type of lighting column should include the following information as applicable:]*

(i) number of columns;

(ii) nominal height of column;

(iii) bracket projection, single or double: or whether post-top fitting;

(iv) luminaire weight and windage area and centres of application of the forces from the centroid of the column shaft;

(v) size, length and angle of luminaire fixing;

(vi) (11/04) location of column, ie terrain category, exposure coefficient ($Ce_{(z)}$), topography factor (f) and reference wind velocity ($V_{ref,0}$) as defined in BS EN 40-3-1;

(vii) height of installation above ground level, ie for lighting columns mounted on a structure or embankment the height of installation should include the nominal height of the column plus the height of the datum above the adjacent ground level;

(viii) type of column base, i.e. planted with or without base plate or column with flange plate;

(ix) list of columns with flange plates where the Contractor is to design the foundations, anchorages and attachment systems;

(x) (11/04) information on soil types for design in accordance with BS 5649-2: 1978 (AMD 3136, 1979) Appendix B for individual or groups of columns;

(xi) requirements for backfilling if not to be Class 8 as described in sub-Clause 1305.5;

(xii) size and number of door openings, number of doors to be fitted with hinges or metal chains and direction doors are to face;

(xiii) size requirements for base compartments;

(xiv) (11/03) acceptable column materials and types in very exposed sites as defined in BD 26 (DMRB 2.2.1);

(xv) (05/01) provide information as required in Appendix 19/1;

(xvi) any specific requirements for aesthetic approval of lighting column and bracket combinations *[as agreed with the Overseeing Organisation]*;

(xvii) (05/01) number of door keys if different from Clause 1311;

(xviii) identification and location markings;

(xix) requirements for wall mountings including fixings;

(xx) requirements for wood pole mountings including fixings;

(xxi) requirements for earthing *[see NG 1420]*;

(xxii) columns to be mounted on structures or in situations where there is a risk that a detached door could cause an accident if it fell onto the area below;

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(xxiii)(11/03) any other special requirements, eg. dimension 'X' for cable entry slot width, signs and attachments in excess of BD 26 (DMRB 2.2.1) requirements;

(xxiv) requirements of electricity supplier including warning notices regarding proximity to overhead power lines.

3 Latest date by which completed Data Sheets shall be provided. *[This date should generally be not earlier than 2 weeks after the date of award of Contract; however, there may be special reasons to advance this date, such as when there is a requirement for lighting columns of high aesthetic standard. This date may sometimes be better determined after the award of Contract based on the Contractor's programme and his reasonable lead-times for approval and procurement. 1303.1]*