SPECIFICATION DOCUMENT

CLIENT ADDRESS

All Saints Church
Grayswood Rd
Grayswood
Haslemere
GU27 2DJ

PROJECT DETAILS

Design Practice: CES LLP
Project Number: 6485
Date: 19/05/2020

INDEX

SECTION 1 – DESIGN DOCUMENTATION

1.1 | INTRODUCTION

ABOUT CES

CES LLP have worked as electrical specialists in churches, heritage and historic buildings for over 25 years. Passionate about our business, we strive to work alongside our Client and their Architect to achieve the best possible outcome. We have extensive experience working on specialist sites which may need to remain both occupied and functioning during the works.

Our design team are actively involved with their local churches and have not only an appreciation of illuminating the architecture but also and understanding of the life of a church. We design our systems so that they are flexible, as the church building may be used for a variety of services / events, and with simplified controls so that anyone one can operate the lighting without specialist training.

We always strive to develop a good and close working relationship with the Client, Architect and any external Consultant. Our company's primary focus is always attention to detail for every project and we take great pride in carrying out the work to the highest possible professional standards. Your complete satisfaction is important to us, not only for the duration of the work but with any on-going maintenance and any electrical works.

Please look at our website, www.church-lighting.co.uk where you will see further information and can view pictures, videos and client testimonials from some of our previous projects. Please feel free to contact our other clients in your area for whom we have carried out similar electrical installations.

We specialise in designing lighting systems to work within listed and ancient buildings such that our installations are unobtrusive and in keeping with the architecture. Please note that our designs are valid for six months and may be subject to revision as LED and other technology develops. This design is subject to copyright© and shall not be used by a third person in full or in part without the express permission of CES LLP in writing. The Church is to supply the Asbestos report to all tendering parties prior to the commencement of the works.

1.2 | PROJECT BRIEF

THE CHURCH HISTORICAL CONTEXT

The history of the Church has been researched & studied and included within the concept stage of the design.

The history of the church can be found in https://allsaintsgrayswood.org/history/

LIGHTING REQUIREMENTS

The lighting requirements have been outlined in the client brief and statement of need.

ELECTRICAL REQUIREMENTS

The incoming electrical supply enters the church within the organ loft. The cut-out is 3 phase 100A TNS and only 2 single phases are in use.

The fuse board at the intake that supplies the tower clock & organ is to be replaced with a new 4-way 3phase D.B.

The fuse board within the Choir Vestry is to be replaced with new type.

A new lighting dimmer panel is to be installed within the Choir Vestry. The dimmer panel will supply all lighting to the church as detailed within this specification.

New wiring is required to all new lighting circuits. Wiring will be Mechanically protected type and run behind all the church roof panelling. The panelling is removeable and the roof void is of good size to hide cabling and connection boxes. See wiring layout and page 10 section 3.0 & page 13.

All small power is to remain; however, some new socket outlets are to be installed within the church and are identified on the layout drawing. Cabling to new sockets is to be sheathed MICC clipped direct following existing wiring routes.

The circuit to the clock mechanism is to be replaced with new FP200 cable following the existing route and using the old fixing screws. The clock D.B is to be replaced with switched spurs.

The organ supply is to be re-wired using the existing conduit.

All other existing circuits are to be retained and re-connected to the organ loft D.B.

New circuits will be RCBO protected.

DESIGN PROCESS

A final lighting scheme is designed considering a wide variety of different factors, many of which are addressed in this document. The areas of significance, areas of worship and areas of leading must be identified, along with this, the purpose and aims of the services that take place within the Church must be addressed. From this initial understanding discussions with the client take place to refine the design and ensure that the scheme is remaining within the initial Client brief.

These discussions will be based around various documentation, illustrations/visual representations, CAD drawings and demonstration evenings presented throughout the design process.

The lighting control points and methods will be decided, and the extent of desired control will be discussed, all CES LLP lighting schemes have simple control that is useable by everyone without the need for training.

DESIGN CONSIDERATIONS

The primary design considerations for this project are:

- The position of the new spotlights as the existing halogen lights are dominant and produce glare. New spotlights are to be less visually obtrusive and glare is to be reduced.
- To enhance the roof sections for the first time.
- To enhance the architectural features of the church for the first time.
- Where to conceal the electrical drivers and components.

1.3 DESIGN INTENT

EXECUTIVE SUMMARY

- The Lighting will be controlled from a MODE dimming system with 2 control plates located throughout the church (detailed location can be found on the layout drawing)
- A visitor's sensor will operate a selection of lights for a period of 20 minutes
- The Main church is to receive architectural LED spotlights mounted to the roof panels
- The Transept & Chancel are to receive architectural LED spotlights
- Accent lighting will be introduced in the form of Architectural LED spotlighting, these include
  - East Window
  - Reredos
  - Crib
  - Organ pipe angel figurine
  - Choir to Transept stone figurine
  - Saints above Pulpit & Lectern
- New sockets are to be installed throughout the Nave and Chancel, please see Power drawings for details
- New lighting in the Office, Porch, Choir Vestry & outer Vestry are to be included.

SCOPE OF WORK

After discussion with the client the project encompasses the following:

- Nave Lighting
- Transept Lighting
- Choir Lighting
- Service leading Lighting
- Chancel Lighting
- Sanctuary Lighting
- Porch Lighting
- Installation of a Dimming control system
- Removal of all redundant lighting and cabling

ESTIMATED RUNNING COSTS

CALCULATION	VALUE	
Total load	0.83	(kW)
Hours use per week	15	(h)
Estimated elec. cost	0.14p	(kWh)
Total per week	£1.74	
Total Running Cost Per Year	£90.63	

Estimated Existing Load	6.2kW
Estimated Existing running costs per annum	£677.04 (based on 15 hrs a week)

CALCULATIONS BASED ON LAMPS RUNNING AT FULL BRIGHTNESS.

MAINTENANCE AND HEALTH & SAFETY

All units have been selected to reduce maintenance works required by choosing from well-known suppliers using high quality LED and control products.

The new lighting system will be maintained using either:

- A treble combination ladder or step ladder used by a trained operative to remove track units or change pendant lamps so that they can be brought to a low level for repair or replacement.
- A light framed aluminium tower erected and operated by PASMA trained operatives to carry out any replacement works at high level.

A scaffold will not be required for maintenance.

The maximum working height at the church is 6.5m

1.4 | APPENDICES

A – LUMINAIRE SCHEDULE

B – LAYOUT DRAWINGS

DRAWING NO.	SIZE	TITLE
6485-01	A1	Lighting & Small Power Layout

C – ELECTRICAL CONDITIONING REPORT

1.5 | PARTICULAR SPECIFICATION

ITEMISED TENDER ITEMS

For Contractor reference when submitting prices for the tender. See Luminaire Schedule for quantities & location.

TENDER ITEM REF.	DETAIL
1.0	**Luminaires - Supply ONLY** All Luminaires, types, references, accessories & components are stated on the luminaire schedule & datasheets.
2.0	**Labour ONLY (Associated with tender item 1.0)** The Contractor shall allow adequate time and costs to complete the entire installation. There will be no acceptance of increased costs during the contract unless expected due to variations or extras. The Contractor to clarify costs for internal works and external works separately if applicable.
3.0	**Containment, Wiring, Accessories and Cabling (Associated with tender item 1.0 & 2.0)** All new wiring is to be taken behind the roof panels wherever possible. Many of the wooden panels are removable due to previous works in the church. Any new panels removed must be put back without any visual defect and made removable for future works. The Contractor shall include all containment and cable to complete the full installation, wiring method and type to be confirmed by the lighting designer. MICC sheathed cable is preferred throughout unless specified on layout drawing or by permission of the Architect/Lighting Designer. Wiring is to be carried out in a manner which is sympathetic to the historic nature of the building. Fixing to be secured in the mortar unless adequate reason for fixing into stonework and approved by Architect/Lighting Designer. All material such as: fixtures, distribution equipment, connection boxes, etc. to complete the installation as to the drawings and schedules. Contractor must allow for all items unless there is a variation or extras to the contract. FP200, SWA and singles in containment can be used if unseen and the wiring is not susceptible to vermin damage. Twin and Earth cable and Plastic fixing clips are never acceptable. Contractor to be responsible for electrical cable design (BS7671 18th Edition) and to supply description of proposed route with materials for any NEW cable routes. Written approval is required by Client/Architect/Lighting Designer before work is to commence. The contractor is to include the installation of main protection bonding to all incoming services as to BS7671 18th edition.
4.0	**Electrical Distribution Works – Supply and install** - To replace the Organ loft D.B with new 3Ph MEM3 type with RCBO protective devices. - To replace the Choir Vestry fuse board with new MEM3 type with RCBO protective devices. - Connection of all new and existing supplies; all existing to be tested to ensure compliance. - To provide suitable containment equipment. - To provide a minimum of 4 spare ways within the distribution board. - To provide class 1 & 2 surge protection device at the origin of installation. - The clock fuse board & wiring is to be replaced with FP200 following existing route and switched weatherproof spurs. - The organ supply is to be rewired using existing conduit system.

5.0	**Lighting Control System – Supply & install** - A MODE EDIN dimmer system to provide the following. - An electrical enclosure to suit the following. - A main isolation Switch. - 2 x DALI modules - 4 x RCBO devices - 1 x 10 button ICON plate in white finish with buttons labelled Scenes 1-8, on and off for the main entrance to the church (from porch) - 1 x On/Off button plate in antique bronze finish for the Choir Vestry - A visitor's sensor to be mounted by the church main entrance. - Ability to operate the lights and set the scenes using an IPAD. - Installation of a Router. - Installation of MODE own brand bus cable to suit the above.
6.0	**Small Power – Supply & install** Installation of power as described on the power layout drawing. All socket outlets to be metal clad unless stated otherwise on layout drawing. Heights to be confirmed and positions allocated by the clients and lighting designer before installation. Wiring to be carried out in MICC sheathed and all internal fixtures to be MK Metalclad plus type. External socket to be MK Masterseal plus twin type and isolated by a switched spur within the church as shown on the layout drawings. All other existing socket outlets are to be retained. All socket outlets circuits on the new Choir Vestry D.B to be protected by a 30mA RCBO.
7.0	**Health and Safety / CDM Regulations** The Contractor shall ensure that all works tendered are in accordance with the HSE Regulations and that all health and safety documentation required for this project are issued to the Lighting Designer and Client. The contract shall take the form of a simple contract with a Sole Contractor. As such CES LLP are not required to act as Principle Designer under the CDM Regulations. The Contractor shall include within his Tender everything necessary to comply with the CDM Regulations currently in force including the construction phase plan and all health and safety aspects on site.
8.0	**Testing and Commissioning** Contractor shall allow for testing of all the electrical installation and fixtures/controls. Testing should be carried out in accordance of BS7671 (18th Edition) and electrical installation certification shall be issued on completion. The Contractor shall allow for one extended evening of focusing (4 hours) and arranging for commissioning from the dimmer manufacturer.
9.0	**Focusing** To allow costs for two outside of hours focusing sessions. One for internal lighting and one for external.
10.0	**Operation and Maintenance Instruction Manual** The Contractor shall allow for the production and distribution of a comprehensive operation and maintenance Instruction Manual, as detailed in the General Specification.
11.0	**Access Equipment** The Contractor to state methods for access to all areas. (Area for Access Statement in Tender Return) The Contractor to clarify costs for internal works and external works separately.

12.0	**Builders works** The Contractor is to complete the following list of builders works - Repair of old drilled holes when cables and fixtures have been removed. - Repair of any drilled holes for new cable routes. - Reinstallation of all removed roof panels which are concealing electrical components or LED drivers and make them removable for future maintenance and testing. **All items to be discussed by the Architect/Lighting Designer /Client prior to works being carried out**
13.0	**Contingency Sum** A sum of £1,000.00 should be added as contingency to protect the Client.

For reference when tendering item 1. Quantity and breakdown table can be found in the luminaire schedule.

PHOTOS OF ROOF PANELS	
Notes: CONNECTION BOXES, WIRING & DRIVERS TO BE LOCATED BY REMOVABLE ROOF PANELS	
	
Existing removable panel	Void behind panels Area used to bring new wiring & install connection boxes etc.
	
Covering Wooden Piece to conceal panel edges. This covering piece is easily removed and will be fixed with small zinc screws so that maintenance in the future is possible without damaging any of the wooden ceiling.	Covering Wooden Piece to conceal central panel joins. This covering piece is easily removed and will be fixed with small zinc screws so that maintenance in the future is possible without damaging any of the wooden ceiling.

LOCATION: West & Centre Nave

Notes:

IN BLACK FINISH

Ref:DA

Ref: AA-W

Ref:AC

DRIVERS MOUNTED BEHIND BOTTOM PANEL (Highlighted)

LOCATION: Nave East	
Notes:	

DRIVERS MOUNTED BEHIND BOTTOM PANEL

FITTINGS LOCATED ON EAST FACE OF BEAM

Ref: AA-W (downlight)

Ref:AD (Lectern)

Ref:AB (Central Position)

Ref:AC (uplighter)

LOCATION: Choir South

Notes:

DRIVERS MOUNTED BEHIND PANEL

Ref: AA-M (Downlighters)

Ref: CA (Saints)

LOCATION: Choir North			
Notes:			
	DRIVERS MOUNTED BEHIND PANEL		
			 Ref: AA-M (downlighters)  Ref:AC (uplighter)  Ref: CA (Saints)

LOCATION: Chancel South	
Notes:	

FITTINGS LOCATED ON EAST FACE OF BEAM

DRIVERS MOUNTED BEHIND BOTTOM PANEL

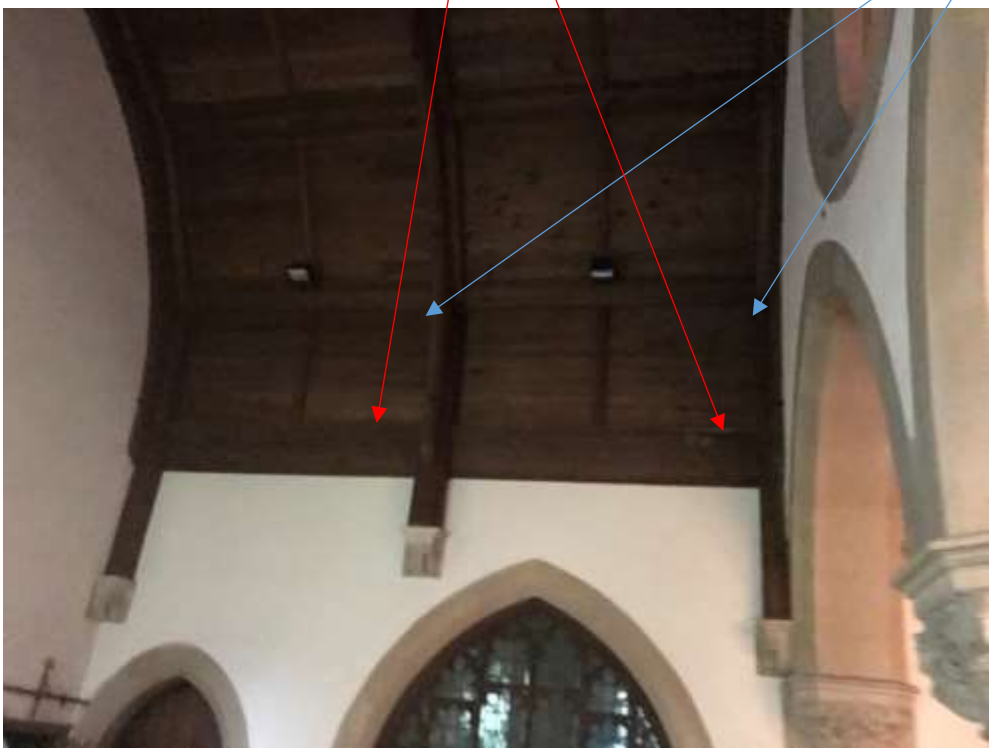
Ref: AD (Altar)

Ref: DA (Saints)

Ref: AA-M (downlighters)

Ref: AC (uplighters)

Ref: CA (reredos

LOCATION: Chapel			
Notes:			
	DRIVERS MOUNTED BEHIND BOTTOM PANEL		 Ref: AA-M (downlighters)
			

LOCATION: Chancel East Window	
Notes:	

DRIVERS MOUNTED BEHIND BOTTOM PANEL

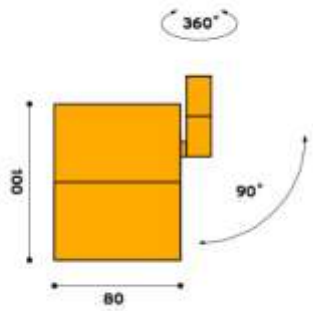
Ref: EA (East Window)

SCHEDULE OF CHANNELS

	Channel No.	Channel Description
General Lighting	G01	Nave Rear Downlights
	G02	Nave Centre Downlights
	G03	Nav e Front Downlights
	G04	Choir (2 North, 1 South)
	G05	Aisle (1 South)
	G06	Chancel
	G07	Chapel/Transept
Service leading	S01	Concert Position
	S02	High Altar
	S03	Pulpit front
	S04	Lectern front
	S05	Lectern reading plate
Feature Lighting	F01	Nave Uplighters
	F02	Chancel Uplighters
	F03	Angle Stone
	F04	Angel Organ
	F05	Saints
	F06	Crib
	F07	Reredos
	F08	Sanctuary Wall
	F09	E.Window
	F10	Font
Local Lighting	L01	Porch
	L02	Choir Vestry
	L03	Outer Vestry
	L04	Office
	L05	Kitchenette cupboard light
	L06	Pulpit Light refurbishment

LUMINAIRE DATA SHEET | LUMINAIRE REF:

AA-W, AA-M, AB, AC, AD



	AA-W	AA-M	AB	AC	AD
Code	Basis Cylinder Spotlight				
Wattage	25W			18W	10W
CRI (Colour Rendering Index)	>97				
Colour Temperature	3000K			1800-2700K	3000K
Beam Angle	58°	38°	15°	35°	10°
Dimming Type	DALI				
Luminaire Colour	Black				
Fitting Type	F502				
Accessory	Honeycomb (all) + Opal diffuser (AC)				
Material	Aluminium				

ADDITIONAL INFORMATION:

Driver concealed on wall plate behind panelling

1.5m flex length

Basis Lighting Limited
Units 3-4
The Dove Centre
109 Bartholomew Road
London NW5 2BJ
020 7284 2040
sales@basislighting.com

LUMINAIRE DATA SHEET | LUMINAIRE REF:

AE

	
Code	Basis MR16 Knuckle
Wattage	10W
CRI (Colour Rendering Index)	>97
Colour Temperature	2700K
Beam Angle	10°
Dimming Type	DALI
Luminaire Colour	Black
Fitting Type	F502
Accessory	Honeycomb
Material	Aluminium
ADDITIONAL INFORMATION: Driver concealed on wall plate behind panelling 1.5m flex length	

Basis Lighting Limited
Units 3-4
The Dove Centre
109 Bartholomew Road
London NW5 2BJ
020 7284 2040
sales@basislighting.com

LUMINAIRE DATA SHEET | LUMINAIRE REF:

AF

Code	Basis LED tape
Wattage	10
CRI (Colour Rendering Index)	>90
Colour Temperature	2700K
Beam Angle	Wide
Dimming Type	Mains
Fitting Type	Self-adhesive tape

ADDITIONAL INFORMATION:

Remote Driver and rotary dimmer to be positioned within Pulpit

Contractor to measure length on site before order

Basis Lighting Limited
Units 3-4
The Dove Centre
109 Bartholomew Road
London NW5 2BJ
020 7284 2040
sales@basislighting.com

basislighting

LUMINAIRE DATA SHEET | LUMINAIRE REF:

BA

Code	2055133
Wattage	20W
CRI (Colour Rendering Index)	<80
Colour Temperature	3000K
Beam Angle	Wide
Dimming Type	DALI
Luminaire Colour	Glass
Fitting Type	Suspended
Material	Metal / Glass

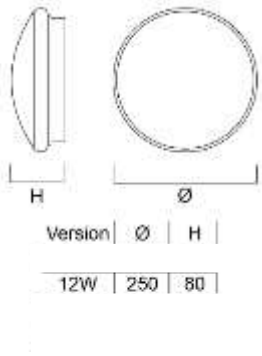
ADDITIONAL INFORMATION:

Feilo Sylvania UK Limited
Incorporating Concord
Longbow House
14-20 Chiswell Street
London EC1Y 4TW
0800 4402478
info@feiloylvania.com

Concord

LUMINAIRE DATA SHEET | LUMINAIRE REF:

BB



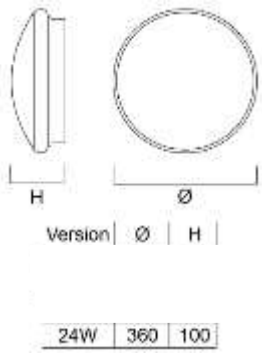
Code	43281
Wattage	12W
CRI (Colour Rendering Index)	<80
Colour Temperature	3000K
Beam Angle	Wide
Dimming Type	Non
Luminaire Colour	White
Fitting Type	Surface
Accessory	-
Material	Aluminium
ADDITIONAL INFORMATION:	

Feilo Sylvania UK Limited
Incorporating Concord
Longbow House
14-20 Chiswell Street
London EC1Y 4TW
0800 4402478
info@feiloylvania.com

Concord

LUMINAIRE DATA SHEET | LUMINAIRE REF:

BC



Code	43283
Wattage	24W
CRI (Colour Rendering Index)	<80
Colour Temperature	3000K
Beam Angle	Wide
Dimming Type	Non
Luminaire Colour	White
Fitting Type	Surface
Accessory	-
Material	Aluminium
ADDITIONAL INFORMATION:	

Feilo Sylvania UK Limited
Incorporating Concord
Longbow House
14-20 Chiswell Street
London EC1Y 4TW
0800 4402478
info@feiloylvania.com

Concord

LUMINAIRE DATA SHEET | LUMINAIRE REF:

CA

Code	Radiant Micro
Wattage	3.5w
CRI (Colour Rendering Index)	>80
Colour Temperature	3000K
Beam Angle	Narrow
Dimming Type	DALI
Luminaire Colour	White
Fitting Type	Surface Mounted
Emergency Type	N/A
Material	Aluminium

ADDITIONAL INFORMATION:

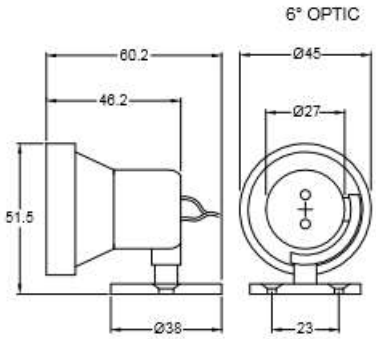
For full details of specified item see Lighting Equipment Schedule

Radiant Architectural Lighting Limited
10 Broadbent Close
20-22 Highgate High Street
London N6 5JW
0208348 9003
david@radiantlights.co.uk

RADIANT
ARCHITECTURAL LIGHTING

LUMINAIRE DATA SHEET | LUMINAIRE REF:

DA



Code	LED-O
Wattage	2W
CRI (Colour Rendering Index)	>90
Colour Temperature	2700K
Beam Angle	6°
Dimming Type	DALI
Luminaire Colour	Black
Fitting Type	Adjustable Bracket
Accessory	Anti-Glare Snoot
Material	Aluminium

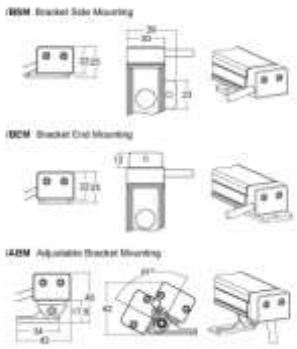
ADDITIONAL INFORMATION:

1m flex length

Driver concealed on wall plate behind panelling

LUMINAIRE DATA SHEET | LUMINAIRE REF:

EA



Code	LD38
Wattage	24W
CRI (Colour Rendering Index)	>90
Colour Temperature	2700K
Beam Angle	Elliptical
Dimming Type	DALI
Luminaire Colour	Black
Fitting Type	Adjustable Bracket
Accessory	Anti-Glare Guard
Material	Aluminium

ADDITIONAL INFORMATION:

1m flex length

Driver concealed on wall plate behind panelling

20 Bourne End Ind Park
Crayford
Kent
DA1 4BZ
01322 527629
light@lightgraphix.co.uk

LightGraphix
Creative Lighting Solutions

END OF DATA SHEET SECTION

2.1 | GENERAL SPECIFICATION

General

This document will be governed by and construed in accordance with English Law.
The electrical installation shall be to a good standard compliant with the Specification and the Drawings and all installation work and testing shall be undertaken by an NICEIC registered or equally approved Contractor.

Definitions

Client	This shall be the person(s) or Contract Administrator nominated by the Church with authority to issue instructions and variations to the Contract.
Lighting consultant or designer	This shall be CES LLP in general and the designer allocated to this contract in particular.
Contractor	This shall be the electrical company submitting a tender for the work specified herein.
Contractor or electrical contractor	This shall be the successful Contractor to whom the contract is awarded
Simple contract	A simple contract shall be a considered binding agreement in writing under a common-law tort whereby one party (the Contractor) agrees to provide an installation, goods and / or services (the Specification) to a second party (the Client) for an agreed sum within an agreed timeframe.
Engineer	shall refer to the Electrical Designer or persons authorised by the Electrical Designer or Client.
Contractor	shall refer to the Electrical Installer.
Plant	shall mean cables, luminaires, switchgear, apparatus, materials, articles and things of all kinds incorporated in the Works.
Works	shall mean all Plant to be provided and work to be done by the Contractor.
Specification	shall mean this General Specification, together with the Particular Specification and the Tender Drawings and, subject to the Engineer's approval, the completed schedules as annexed hereto.
The term 'provide' and its derivatives	shall mean the design procurement, delivery, installation, testing and commissioning of the Works, inclusive of such ancillary services as inspection and witnessed testing at the places of manufacture, workshop and site painting, handling on site, site trials, and of all such other services as are noted in the Specification or reasonably necessary for the safe, reliable and efficient completion of the Works.

General Design

The Contractor shall ensure the compatibility of wiring in conjunction with fittings and control systems specified.
The Specification and Tender Drawings are to be read together and in the event of any discrepancy the order of precedence shall be: -

- Tender Drawings
- Particular Specification
- General Specification

If doubt exists, the matter should be referred to the Engineer whose decision shall be final.
The Tender Sum shall be deemed to include all items of works or labour not specifically mentioned herein but which may be necessary for a complete and comprehensive installation

Workmanship, Material & Provisions of Everything Necessary

The workmanship afforded, and materials used throughout the Contract shall be the best available and commensurate with the standards generally required for work in the sector in question. In addition, they shall take account of the existing installations on the Site and the overall operational requirements.

The Plant shall, as far as possible, be of United Kingdom or European Union origin, design and manufacture.
Plant that is specified in the Specification by a manufacturer's name and/or type designation, shall be specifically purchased and used in the Works unless otherwise approved

Compliance with Specifications, Regulations and Standards

The Works shall be installed in accordance with the manufacturers' instructions. The Works shall comply with the 'Council of Care for Churches' and 'Principals of Conservation Practice' as set out by English Heritage. The Works shall comply with Environmental Guidelines, Restrictions and Directives.
The installation shall also comply with all relevant statutory instruments, regulations and standards current at the date of tender (unless otherwise indicated) and in particular with the following: -
Factories Act 1961
Electricity at Work Regulations 1989
IET Regulations for Electrical Installations (BS7671 18th Edition)
UK Waste Electrical and Electronic Equipment (WEEE) Regulations
The Building (Amendment) Regulations 2001 & Building Regulations 2000
All Statutory Regulations
Latest editions of British Standards, Codes of Practice, EMC Regulations, EN Standards, IEC Standards and internationally approved and recognised Standards insofar as they are applicable.

Record Drawings

On completion of the installation the Contractor shall provide all necessary drawings and diagrams of the 'as installed' works as are required for record and the care, maintenance, repair, etc. purposes and these shall include, insofar as is reasonably relevant to the Works.

All drawings to be supplied in PDF format.

Arrangement drawing of each complete installation to a scale of not less than 1:50.

Detailed schematic and wiring diagrams for the electrical and electronic equipment and control, together with terminal marking schedules etc.

Cable schedules and diagrams for cable, wiring etc. installations if relevant.

The foregoing drawings may include those submitted and approved as Working Drawings and revised in accordance with the site modifications.

Two prints of each drawing shall be submitted to the Engineer for approval, and upon approval, the following copies shall be supplied to the Engineer's instructions: -

One copy: on disk AutoCAD Release 16 or above should be available upon request.

Two copies: full size paper prints - minimum A3 size included in the O&MI Manuals

The Works shall only be considered to be complete when the full requirements of this clause have been met.

Operating & Maintenance Instruction Manual

The Contractor shall prepare a comprehensive Operating and Maintenance Instruction Manual and shall obtain from the manufacturers of all equipment supplied under his contract and equipment supplied by Others, all the instruction manuals necessary for the correct maintenance and operation of that equipment. The manual shall include a complete diagram of all internal and external electrical and other services connections with a parts list identifying all components.

The Manuals shall be comprehensive and prepared in accordance with the requirements of BS 4899 and as a minimum include the following:

- Introduction and General Description
- Installation Description
- Equipment Schedules
- Commissioning and Test Certificates
- Health & Safety Statement and Procedures
- Routine Maintenance Procedures
- Manufacturers' Information
- Spares Requirements
- Record Drawings
- Warranty and Maintenance Agreements

The Contractor shall submit two copies of the Operation and Maintenance Instruction Manual for all of the electrical services for review by the Engineer not less than four weeks before final testing and commissioning.

A certificate of Practical Completion will not be issued until the final copies of the O&MI Manual has been provided.

Commissioning

Not less than two weeks before the commencement of any commissioning works, the Contractor shall submit a method statement for review by the Engineer.

All commissioning shall be undertaken after testing and in accordance with the requirements of the Specification, and with any special requirements of the manufacturer of the systems supplied.

Tests and Certificates

Tests shall be carried out periodically by the Contractor during the course of construction and/or manufacture of the Works. Test instruments shall be provided and operated by the Contractor whose personnel shall be competent and fully conversant in the use of the instruments. They shall be correctly calibrated and certified for the limits of accuracy required, and the Contractor shall provide the Engineer with evidence that the instruments have been calibrated by an approved authority not more than three months prior to being used. Should the Engineer consider the instrument to be suspect, the Contractor shall have the instrument recalibrated by an authorised standardising laboratory at his own expense.

All cables shall be insulation tested after installation, but before connection, at 500 volts between conductors and between conductors and earth.

When the Contractor considers that the works or part of the works is complete, he shall carry out Tests on Completion in the manner required for witnessed site tests and prove compliance with the Specification to his own satisfaction.

Subsequently, and prior to commencement of the maintenance period, the Contractor shall carry out witnessed site tests in the presence of the Engineer, or his representative to demonstrate compliance with the Specification. Tests shall be in accordance with the IET Regulations for Electrical Installations, BS7671 18th Edition, Fire Detection and Alarms BS 5839 Part 1, Emergency Lighting BS 5266 Part 1 and Lightning Protection BS 6651 as appropriate. As many of these tests as, in the opinion of the Engineer, are practicable shall be carried out consecutively.

Within fourteen days following witnessed tests of part or the whole of the works, the Contractor shall forward to the Engineer, a typed Inspection Certificate which shall be in the form set out in the British Standards and shall clearly indicate the results of all the tests carried out, together with any defects or omissions revealed by the inspection.

After final inspection and acceptance of the works, or part of the works, the Contractor shall issue Completion Certificates, which shall take the form set out in the British Standard. The Certificates shall be completed in duplicate, signed by the Contractor and endorsed by the Engineer in whose presence the inspections and tests were made.

Publications & Photography

CES LLP are deemed to have the right to produce articles and photographs for internal and external publications of the design & installation unless the client objects in writing before the end of the contract.

2.2 | DESIGN RISK ASSESSMENT

- Construction (Design and Management) Regulation 2015 will apply to this contract.
- The Client will fulfil his duties as the Client.
- The Lighting Designer will fulfil his duties as Principal Designer (unless Contract is for a Sole Contractor).
- The Contractor will be required to fulfil his duties as Principal Contractor (unless Contract is for a Sole Contractor).
- This document includes a Designer's Risk Assessment which forms the basis of the installation for the Tender Stage Health and Safety Plan.
- The Contractor will be required to fulfil his duties under the Health and Safety legislation in force and the HSE Regulations and CDM 2015 Regulations.

2.3 TABLE 1 | SEVERITY LEVELS AND DEFINITIONS

DESCRIPTION	*CODE*	*DEFINITION*
Terminal Risk	A	Likelihood or possibility of resulting in a fatality
Severe Risk	B	Likelihood or possibility of resulting in a severe injury counting as a disability
Major Risk	C	Likelihood or possibility of resulting in a major injury requiring six weeks or more off work
Minor Risk	D	Likelihood or possibility of resulting in a minor injury requiring less than one week off work
Minimal Risk	E	Likelihood or possibility of resulting in a very minor injury requiring no more than one day off work

TABLE 2 | LIKELIHOOD AND DEFINITIONS

DESCRIPTION	*CODE*	*DEFINITION*
Probable	A	Likely to occur during the average site program
Possible	B	50% likelihood of occurring during an average program
Improbable	C	Extremely unlikely to occur during an average program

TABLE 3 | RISK RATING MATRIX

	LIKELIHOOD OF EVENT		
SEVERITY OF EVENT	Probable A	Possible B	Improbable C
Terminal Risk A	**Very High**	**High**	**High**
Severe Risk B	**High**	**High**	**Medium**
Major Risk C	**High**	**Medium**	**Low**
Minor Risk D	**Medium**	**Low**	**Low**
Minimal Risk E	**Low**	**Low**	**Very Low**

TABLE 4 | RISK DEFINITIONS

VERY HIGH	Situation requiring immediate plan of action
HIGH/MEDIUM	Situation to be addressed at earliest practical opportunity
LOW/VERY LOW	Situation to be considered as part of normal procedures

REF	IDENTIFICATION OF RISK PRE-CONSTRUCTION PHASE – GENERIC RISKS	PRE-CONTROL RISK ESTIMATE			CONTROL MEASURES	PRIMARY RESPONSIBILITY	RESIDUAL RISK ESTIMATE		
		S	L	R			S	L	R
1.01	Inadequate Client Brief	D	B	L	Principal Designer to work with Client to produce an adequate Client Brief including Health and Safety issues	Client	E	C	VL
1.02	Inadequate Pre-Construction Information	D	B	L	Principal Designer to work with Client to produce an adequate Pre-Construction Pack including Health and Safety issues	Client	E	C	VL
1.03	Inadequate co-ordination with other Designers	D	B	L	Principal Designer to Liaise with other Designers to ensure complimentary designs including Health and Safety issues and oversee all the designs	Principal Designer	E	C	VL
1.04	Inadequate communication with the Principal Contractor	D	B	L	Principal Designer to set up lines and means of communication with the Principal Contractor and other parties including requests for information, documented responses as well as Health and Safety issues	Principal Designer	E	C	VL
1.05	Inadequate Health and Safety File	D	B	L	Principal Designer to set up the Health and Safety File covering relevant Health and Safety issues	Principal Designer	E	C	VL
1.06	Design Phase	C	C	L	The design has been prepared with due regard for the Client Brief, other designs, correct lighting levels and operation, safety and maintenance – no deviation from the design shall be taken without written approval of the designer	Principal Designer	C	E	VL
1.07									
1.08									

REF	IDENTIFICATION OF RISK CONSTRUCTION PHASE PLAN – GENERIC RISKS	PRE-CONTROL RISK ESTIMATE			CONTROL MEASURES	PRIMARY RESPONSIBILITY	RESIDUAL RISK ESTIMATE		
		S	L	R			S	L	R
2.01	General operations	C	C	L	Provision of operatives' clothing with company logo and Personal Protective Equipment (PPE) – compliance with CDM 2015 Regulations, the Health and Safety Policy and Site Rules in force – compliance with the Principal Contractors' instructions	Principal Contractor	C	E	VL
2.02	Working around children and vulnerable adults (occupied sites)	C	C	L	Operatives to undergo and carry current Disclosure and Baring Service (DBS) documentation checks	Principal Contractor	C	E	VL
2.03	Welfare	C	C	L	Operatives to comply with Company Health and Safety Plan requirements on welfare and any site provisions in force	Principal Contractor	C	E	VL
2.04	Slips and trips	C	A	H	Operatives to comply with Company Health and Safety Plan requirements on good site housekeeping	Principal Contractor	B	C	L
2.05	Lifting and carrying	C	A	H	Operatives to comply with Company Health and Safety Plan on manual lifting and carrying and the correct equipment for heavier loads	All	B	C	L
2.06	Working at heights	A	B	H	Operatives to comply with Company Health and Safety Plan requirements on scaffolding, towers and ladders including mechanical lifts - users and equipment to be certificated	All	C	D	L
2.07	Objects falling from height	B	B	H	Operatives to comply with Company Health and Safety Plan requirements. Contractor to ensure toe boards are fitted to all platforms and scaffolds – hard hats to be used by all working under or near high level working - all equipment and materials to be carefully handled at high level with secondary or safety lines if necessary including all lifting operations - no lone working	All	C	C	L
2.08	Working in confined spaces	A	B	H	Operatives to comply with Company Health and Safety Plan requirements on confined spaces working	All	C	D	L
2.09	Contaminated water	A	C	H	Operatives to be aware of the dangers of Leptospirosis and to observe basic hygiene requirements	All	D	C	L

2.10	Task lighting	C	B	M	Operatives to ensure adequate lighting using either existing lighting or festoon lighting supplemented with task lighting	All	E	C	VL
2.11	Plant and equipment	B	B	H	Operatives to comply with Company Health and Safety Plan for the use of the correct tools, plant and equipment in accordance with good working practice, all tools, plant and equipment to be certified safe to use	All	D	C	L
2.12	Working with electricity	A	A	VH	Operatives to comply with Company Health and Safety Plan and only qualified and certified staff to work with electrical services	All	C	C	L
2.13	Working in ancient and listed buildings	D	A	M	Operatives shall take all necessary care and provide a reasonable protection of existing ancient fabric and artefacts – all valuable and vulnerable items to be removed by the client before the works commence	All	E	B	L
2.14	Co-ordination with other services and contractors	E	B	L	Operatives to actively engage in co-ordinating their works with those of other contractors under the leadership of the Architect or Principal Contractor	Principal Contractor	E	C	VL
2.15									
2.16									

REF	IDENTIFICATION OF RISK OPERATION /MAINTENANCE	PRE-CONTROL RISK ESTIMATE			CONTROL MEASURES	PRIMARY RESPONSIBILITY	RESIDUAL RISK ESTIMATE		
		S	L	R			S	L	R
3.01	Maintenance Schedules and Logs	D	A	M	Plant to be maintained in accordance with the Manufacturers' recommendations and a log kept of the services carried out	Contractor	E	B	L
3.02	Spares	D	A	M	An adequate schedule of spares to be kept – spares with long lead in deliveries to be scheduled in advance or kept on site	Contractor	E	B	L
3.03	Specialist Contractors	D	A	M	Contracts to be placed with Specialist Contractors as required	Contractor	E	B	L
3.04	Emergency Lighting	C	B	M	Emergency lighting tests to be carried out as required by the latest Regulations and a log kept of the inspections carried out	All	E	C	VL
3.05	Electrical Testing and Periodic Inspection Report	A	A	VH	Electrical Testing and Periodic Inspection Reports to be carried out by qualified engineers and at a frequency as required by the manufacturers or insurance companies	Contractor	C	C	L
3.06	Lifting and carrying	C	A	H	Operatives to comply with Company Health and Safety Plan on manual lifting and carrying and the correct equipment for heavier loads	Contractor	B	C	L
3.07	Working at heights	A	B	H	Operatives to comply with Company Health and Safety Plan requirements on scaffolding, towers and ladders including mechanical lifts - users and equipment to be certificated	Contractor	C	D	L
3.08	Objects falling from height	B	B	H	Operatives to comply with Company Health and Safety Plan Requirements Contractor to ensure toe boards are fitted to all platforms and scaffolds – hard hats to be used by all working under or near high level working - all equipment and materials to be carefully handled at high level with secondary or safety lines if necessary including all lifting operations - no lone working	All	C	C	L
3.09	Task lighting	C	B	M	Operatives to ensure adequate lighting using either existing lighting or festoon lighting supplemented with task lighting	Contractor	E	C	VL

3.10	Plant and equipment	B	B	H	Operatives to comply with Company Health and Safety Plan for the use of the correct tools, plant and equipment in accordance with good working practice, all tools, plant and equipment to be certified safe to use	Contractor	D	C	L
3.11	Working with electricity	A	A	VH	Operatives to comply with Company Health and Safety Plan and only qualified and certified staff to work with electrical services	Contractor	C	C	L
3.12	Working in ancient and listed buildings	D	A	M	Operatives shall take all necessary care and provide a reasonable protection of existing ancient fabric and artefacts – all valuable and vulnerable items to be removed by the client before the works commence	All	E	B	L
3.13									
3.14									
3.15									
3.16									
3.17									

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