



ARCHDIOCESE OF MALTA

REFERENCE NUMBER:

01/2024

Tender for the Supply, Installation of New Exterior Lighting including the design and build of the replica paving elements, with the required cut-outs to seamlessly fit the proposed luminaires of St Helen Basilica in Birkirkara

Date Published:

22nd February 2024

Deadline for Submission:

15th March 2024 at
11:00am CEST

Tender Opening:

15th March 2024 at
11:30am CEST

Bid Bond requirements for this tender: *Not Applicable*

Archdiocese of Malta

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# SECTION 1 - INSTRUCTIONS TO TENDERERS

## 1. General Instructions

- 1 In submitting a tender, the tenderer accepts in full and in its entirety, the content of this tender document, including subsequent Clarifications issued by the Non Governmental Organisation (NGO), whatever the economic operator's own corresponding conditions may be, which through the submission of the tender is waived. Tenderers are expected to examine carefully and comply with all instructions, forms, contract provisions and specifications contained in this tender document. These Instructions to Tenderers complement the General Rules Governing Tenders for NGOs Version 1.2.

No account can be taken of any reservation in the tender in respect of the procurement documents; any disagreement, contradiction, alteration or deviation shall lead to the tender offer not being considered any further.

Prospective tenderers must submit their offer by depositing it in the tender box, located at Arċidjoċesi ta' Malta, Archbishop's Curia, St Calcedonius Square, Floriana FRN 1535 MALTA. Any references in the tender document or tender forms to uploading of tender documentation and forms is to be ignored. Tenderers must submit one original tender offer as well as a soft copy on a USB (soft copies of the tender offers submitted on CD are strictly not acceptable). Furthermore in the soft copy of the tender offer, Tenderers must submit the Bill of Quantities duly filled in, in excel format apart from a scanned copy of the filled in Bill of Quantities. It is important that the full tender bid package is provided in soft copy. Utilisation of the soft copy will be highly required throughout the evaluation process. Tender reference number and tender title must be clearly indicated on the sealed bid. Prospective tenderers take full responsible to submit their offer by the set tender submission deadline.

### Note:

Where in this tender document a standard is quoted, it is to be understood that the Contracting Authority will accept equivalent standards. However, it will be the responsibility of the respective bidders to prove that the standards they quoted are equivalent to the standards requested by the Contracting Authority.

- 1.2 The subject of this tender is:  
Lot 1 : Tender for the supply, delivery and commissioning only of luminaires and lighting control system for the exterior of St Helen Basilica in Birkirkara.  
Lot 2: Tender for the installation and testing of the electrical LV installation, luminaires and lighting control system for the exterior lighting scheme, including civil works in parvis to install in-ground luminaires, which works also involve the design and build of the replica paving elements, with the required cut-outs to seamlessly fit the proposed luminaires.
- 1.3 The place of acceptance of the works shall be the St Helen Basilica in Birkirkara, the time-limits for the execution of the contract shall be:  
Lot 1: 8 weeks  
Lot 2: 12 weeks
- 1.4 The Estimated Procurement Value for this Call for Tenders has been based on comprehensive research including appropriate financial analysis. In the context of this procurement, the Estimated Procurement Value, based on market research, is that of:  
Lot 1: €288,506 excluding VAT  
Lot 2: €218,865.90 excluding VAT.

The purpose of this value shall be the guidance of prospective bidders when submitting their offer and is not to be considered as a binding capping price.

Therefore, the published Estimated Procurement Value is not restrictive and final on the Contracting Authority. Economic Operators are free to submit financial offers above or below the Estimated Procurement Value. **However**, the Contracting Authority reserves the right to accept or reject Financial Offers exceeding the Estimated Procurement Value

- 1.5 This is a bill of quantities contract.
- 1.6 This call for tenders is being issued under an open procedure.
- 1.7 The beneficiary of this tender is **Arċidjoċesi ta' Malta, St Helen Basilica, Birkirkara.**
- 1.8 This tender is not a reserved contract.

## 2. Timetable

| 2.                                                                                                                                                                                                                                                             | DATE                           | TIME       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------|
| Clarification Meeting/Site Visit (Refer to Clause 6.1)                                                                                                                                                                                                         | 28 <sup>th</sup> February 2024 | 13.30 CEST |
| <p>Deadline for request for any additional information from the NGO</p> <p>Clarification requests should be addressed to: <i>NGOs e-mail address</i><br/> <a href="mailto:birkirkara.se.tender@maltadiocese.org">birkirkara.se.tender@maltadiocese.org</a></p> | 28 <sup>th</sup> February 2024 | 11:00 CEST |
| Last date on which additional information can be issued by the NGO                                                                                                                                                                                             | 4 <sup>th</sup> March 2024     | 17:00 CEST |
| Deadline for submission of tenders<br>(unless otherwise modified in terms of Clause 10.1 of the General Rules Governing Tendering for NGOs)                                                                                                                    | 15 <sup>th</sup> March 2024    | 11:00 CEST |
| <p>Tender Opening</p> <p>Tenderers are to leave their email address when submitting the tender and a TEAMS invitation will be sent to the bidders to connect should they wish to witness the tender opening session.</p>                                       | 15 <sup>th</sup> March 2024    | 11:30 CEST |
| * All times Central European Time (CET) / Central European Summer Time (CEST) as applicable                                                                                                                                                                    |                                |            |

### **3. Lots**

- 3.1 This tender is divided into lots. Tenderers may submit a tender for one or more lots as per below list:

**Lot 1: Tender for the supply, delivery and commissioning only of luminaires and lighting control system for the exterior of St Helen Basilica in Birkirkara**

**Lot 2: Tender for the installation and testing of the electrical LV installation, luminaires and lighting control system for the exterior lighting scheme, including civil works in parvis to install in-ground luminaires, which works also involve the design and build of the replica paving elements, with the required cut-outs to seamlessly fit the proposed luminaires.**

- 3.2 The tenderer must offer the whole of the quantity or quantities indicated for each lot. Under no circumstances will tenders for part of the quantities required be taken into consideration. Each lot may form a separate contract and the quantities indicated for different lots will be indivisible.
- 3.3 Contracts will be awarded lot by lot, in accordance with the award criteria at Article 6.

### **4. Variant Solutions**

- 4.1 Variant solutions are not permissible.

### **5. Financing**

- 5.1 The project is *financed through local funds*
- 5.2 The Contracting Authority of this tender is **Archdiocese of Malta**.

### **6. Clarification Meeting/Site Visit/Workshop**

- 6.1 A clarification meeting will be held on site as per date indicated in clause 2.

Meetings between economic operators and the CA, other than that provided in this clause during the tendering period are not permitted.

### **7. Selection and Award Requirements**

In order to be considered eligible for the award of the contract, economic operators must provide evidence that they meet or exceed certain minimum criteria described hereunder.

#### **(A) Eligibility Criteria**

Economic Operators are to complete the Eligibility Section through the ESPD and the necessary documents as follows: (Note 2)

- (i) No Bid Bond is required.
- (ii) Declare agreement, conformity and compliance with the General Rules Governing Tenders for NGOs. <sup>(Note 2A)</sup>
- (iii) Declare agreement, conformity and compliance with the provisions of the Statement on Conditions of Employment by completing and submitting the form with title Statement on Conditions of Employment. <sup>(Note 2A)</sup>
- (iv) Power of Attorney (if applicable) <sup>(Note 2A)</sup>
- (v) Data on Joint Venture/Consortium (where applicable) <sup>(Note 2A)</sup>
- (vi) Submission of the declaration form that stipulates that following signature of contract, the successful bidder, will provide evidence in respect of the requirements stipulated regarding Energy Efficiency through the Energy Efficiency Form (if applicable) <sup>(Note 2A)</sup> - Applicable for this tender

**(B) Exclusion (including Blacklisting) and Selection Criteria - information to be submitted through the completion of the following declaration forms:**

- (i) Declaration concerning exclusion grounds <sup>(Note 2A)</sup>
- (ii) Declaration concerning *Selection Criteria* <sup>(Note 2A)</sup>

### **(C) Technical Specifications**

- (i) Tenderer's Technical Offer in response to specifications. <sup>(Note 3)</sup>
  - Signing of the Declaration by the bidder <sup>(Note 3)</sup>, as included in the Works Tenderer Technical Offer Form attached.
- (ii) **Tenderer's Technical Offer** which shall consist of: <sup>(Note 3)</sup>

#### **For Lot 1 and Lot 2**

- a) Tender Technical Offer Declaration Form signed by the bidder <sup>(Note 3)</sup>. **(Note: Submission of an unsigned declaration form or a modified declaration form will automatically invalidate the tender bid).**
- b) **Literature** as per Form marked 'Literature List' to be submitted with the Technical offer at tendering stage.

**No changes to the information provided in the Literature submitted will be allowed. Literature submitted shall be rectifiable only in respect of any missing documents.** <sup>(Note 2A)-</sup>

#### **Technical Offer - For Lot 1 only**

Signing of the Declaration by the bidder <sup>(Note 3)</sup> as included in the Works Tenderer Technical Offer Form attached.

- **Declaration of Availability of after sales service and spare parts**
- **Guarantee against corrosion and equipment guarantee**
- An indicative **Workplan and Programme of Works** as outlined and described in the Works Tenderer Technical Offer Form attached <sup>(Note 3)</sup>.

#### **Technical offer For Lot 2 only**

- A detailed Method Statement clearly explaining the methodology to be employed in order how the cabling will be passed and fixed, and how the luminaires will be fixed in order to preserve the grade 1 monument as indicated in the tender specifications. <sup>(Note 3)</sup> The method statement should also incorporate the methodology to be employed to carry out the necessary (paving) works on the parvis.
- A Construction/Site Management Plan clearly outlining any scaffolding/access systems intended for use or other methods used to install the new lighting system, hoarding and protection, site storage, the use of machinery and equipment, and the human resources that the tenderer envisages to deploy on the site for the completion of the works in question. The plan may include drawings or sketches illustrating site dynamics and logistics. <sup>(Note 3)</sup>
- A Risk Assessment. A preliminary risk assessment and outline of the health and safety procedures that the tenderer intends to implement for the duration of the works. These documents shall act as a basis for more detailed reports prior to commencement of works by the winning bidder. <sup>(Note 3)</sup>
- A Gantt Chart Programme of Works as outlined in the Works Tenderer Technical Questionnaire. The implementation period for this tender is 30 weeks from order to start works. <sup>(Note 3)</sup>
- **Key Experts Form** accompanied by CVs of Key experts, copies of qualifications' certifications including warrants and licences, the Statement of Exclusivity and Availability Form, the Self-declaration form for Key Experts (relating to public employees - if applicable) and all other documentation as requested. <sup>(Note 2A)</sup>

The following Key Experts are required:

**Key Expert 1 - A Resident Site Manager** (MQF level 4 in related area of study) responsible for the works - to oversee and co-ordinate the works with the project supervisor of the project. He or she shall act as a single point contact for the duration of works.

**Key Expert 2 - A Warranted Electrical Engineer**, with an MQF Level 6 and having at least two years experience in similar projects .

**Key Expert 3 - Electrician Holding Licence B**, with an MQF level 4 in engineering studies and an electricians licence B, and having at least two year experience in similar projects.

**Key Expert 4 - An Accredited Occupational Health and Safety Officer.**

**Key Expert 5 - A Warranted Perit with a specialization in Conservation**, with an MQF level 7, and having at least two years experience in similar projects.

In addition, all Key Experts with qualifications other than those obtained from institutions of the Maltese Islands are required to present proof in the form of a letter from NCHFE (Note 2) stating the equivalence of the qualification(s) to the MQF level.



Where the letter mentioned is not included in the bid submission, the Contracting Authority will be requesting this letter during the evaluation process and failure to submit such letter will be considered as a non-compliance of the Key Expert in particular. Applications under process with NCHFE are not considered to satisfy this requirement. Prospective bidders and their Key Experts are encouraged to initiate the request to NCHFE early in the process of the preparation of the bid.

#### **(D) Financial Offer**

- (i) A financial offer is to be submitted by filling in the **Bill of Quantities**, and is to be calculated on the basis of **Delivered Duty Paid (DDP)<sup>2020</sup> (Grand Total)** for the **works** tendered. <sup>(Note 3)</sup>

#### **Notes to Clause 7:**

1. Tenderers will be requested to clarify/rectify, within five (5) working days from notification, the tender guarantee only in the following four circumstances: incorrect validity date, and/or incorrect value, and/or incorrect addressee and incorrect name of the bidder. Rectification in respect of the Tender Guarantee (Bid Bond) is free of charge.

2. A) Tenderers will be requested to either clarify/rectify any incorrect and/or incomplete documentation, and/or submit any missing documents within five (5) working days from notification.

3. No rectification shall be allowed. Only clarifications on the submitted information may be requested.

Request for Clarification and /or rectifications concerning a previous request dealing with the same shortcoming shall not be entertained.

### ***8. Tender Guarantee (Bid bond)***

- 8. No tender guarantee (bid bond) is required.

### ***9. Criteria for Award***

- 9. The sole award criterion will be the price. The contract will be awarded to the tenderer submitting the cheapest priced offer satisfying the administrative and technical criteria.

## SECTION 2 - EXTRACTS FROM THE PUBLIC PROCUREMENT REGULATIONS

### Part X of the Public Procurement Regulations

270. Any tenderer or candidate concerned, or any person, having or having had an interest or who has been harmed or risks being harmed by an alleged infringement or by any decision taken including a proposed award in obtaining a contract, a rejection of a tender or a cancellation of a call for tender after the lapse of the publication period, may file an appeal by means of an objection before the Review Board, which shall contain in a very clear manner the reasons for their complaints.

271. The objection shall be filed within ten calendar days following the date on which the NGO has by fax or other electronic means sent its proposed award decision or the rejection of a tender or the cancellation of the call for tenders after the lapse of the publication period.

272. The communication to each tenderer or candidate concerned of the proposed award or of the cancellation of the call for tenders shall be accompanied by a summary of the relevant reasons relating to the rejection of the tender as set out in regulation 242 or the reasons why the call for tenders is being cancelled after the lapse of the publication period, and by a precise statement of the exact standstill period.

273. The objection shall only be valid if accompanied by a deposit equivalent to 0.50 per cent of the estimated value set by the NGO of the whole tender or if the tender is divided into lots according to the estimated value of the tender set by the NGO for each lot submitted by the tenderer, provided that in no case shall the deposit be less than four hundred euro (€400) or more than fifty thousand euro (€50,000) which may be refunded as the Public Contracts Review Board may decide in its decision.

274. The Secretary of the Review Board shall immediately notify the Director and/or the NGO as the case maybe that an objection had been filed with his authority thereby immediately suspending the award procedure.

275. The NGO involved, as the case may be, shall be precluded from concluding the contract during the period of ten calendar days allowed for the submission of appeals. The award process shall be completely suspended if an appeal is eventually submitted.

276. The procedure to be followed in submitting and determining appeals as well as the conditions under which such appeals may be filed shall be the following:

- (a) any decision by the General Contracts Committee or the Special Contracts Committee or by the NGO shall be made public by affixing it to the notice-board of the same NGO as the case may be or by uploading it on Government's e-procurement platform prior to the award of the contract if the call for tenders is administered by the NGO;
- (b) the appeal of the complainant shall also be affixed to the notice-board of the Review Board and shall be communicated by fax or by other electronic means to all participating tenderers;
- (c) the NGO and any interested party may, within ten calendar days from the day on which the appeal is affixed to the notice-board of the NGO and uploaded where applicable on the Government's e-procurement platform, file a written reply to the appeal. These replies shall also be affixed to the notice-board of the Review Board and where applicable it shall also be uploaded on the Government's e-procurement platform;
- (d) within three working days of the publication of the replies, the Secretary of the Review Board shall prepare a report (the Analysis Report) analysing the appeal and any reply to it. This report shall be circulated to the persons who file an appeal and to all parties who submitted a reply to the appeal;
- (e) after the preparatory process is duly completed, the Director or the Head of the NGO shall forward to the Chairman of the Review Board all documentation pertaining to the call for tenders in question including files, tenders submitted, copies of deposit receipts and any motivated letter;

(f) The secretary of the board shall inform all the participants of the call for tenders, the NGO of the date or dates as the case maybe when the appeal will be heard;

(g) When the oral hearing is concluded, the Public Contracts Review Board, if it does not deliver the decision on the same day, shall reserve decision for the earliest possible date to be fixed for the purpose, but not later than six weeks from the day of the oral hearing:

Provided that for serious and justified reasons expressed in writing by means of an order notified to all the parties, the Public Contracts Review board may postpone the judgment for a later period.

(h) The secretary of the board shall keep a record of the grounds of each adjournment and of everything done in each sitting;

(i) After evaluating all the evidence and after considering all submissions put forward by the parties, the Review Board shall decide whether to accede or reject the appeal.

## SECTION 3 - SPECIAL CONDITIONS

These conditions amplify and supplement, if necessary, the General Conditions governing the contract. Unless the Special Conditions provide otherwise, those General Conditions remain fully applicable. The numbering of the Articles of the Special Conditions is not consecutive but follows the numbering of the Articles of the General Conditions. Other Special Conditions should be indicated afterwards.

For the purposes of contracts issued by NGOs, the term 'approval from the Central Government Authority' shall be substituted by the term 'approval by the Head responsible for that NGO'; Furthermore, any references to the Contracting Authority throughout the General Conditions shall be deemed to be referring to the NGO responsible for that procurement.

### Article 2: Law and language of the Contract

2.1 The Laws of Malta shall apply in all matters not covered by the provisions of the contract.

2.2 The language used shall be English.

### Article 3: Order of Precedence of Contract Documents

The contract is made up of the following documents, in order of precedence:

- (a) the Contract;
- (b) the Special Conditions;
- (c) the General Conditions;
- (d) the Contracting Authority's technical specifications and design documentation;
- (e) the Contractor's technical offer, and the design documentation (drawings);
- (f) the bill of quantities/financial bid (after arithmetical corrections)/breakdown;
- (g) the tender declarations in the Tender Response Format;
- (h) any other documents forming part of the contract.

Addenda have the order of precedence of the document they are modifying.

### Article 4: Communications

Further to the contents in the General Conditions, the communication details of the Contracting Authority are:

Archdiocese of Malta  
Archbishop's Curia, Saint Calcedonius Square, Floriana FRN 1535  
Tel: 2590 6400  
Email Address: [birkirkara.se.tender@maltadiocese.org](mailto:birkirkara.se.tender@maltadiocese.org)

Communications between the Contracting Authority and/or the Supervisor on one hand, and the Contractor on the other, shall be exclusively in writing and in the English language. Specific and standard procedures of communication (templates of request for information, contract submittal, site instructions, time of communication and for replies, frequency of meetings) shall be agreed among the Contracting Authority and the winning bidder within fifteen (15) days from the Commencement Date of the Contract, unless otherwise specified in these Special Conditions and in Section 4 - Technical Specifications.

### Article 5: Supervisor and Supervisor's Representative

- |     |                                                                                                                                                     |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 5.6 | The Contractor shall be responsible to provide all access necessary for verifying and inspecting the works carried out and the items being provided |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------|

## **Article 6: Assignment**

Requests from the contractor for a change in assignment will not be allowed except in the case of force majeure which results in the Contractor being unable to carry out the tasks assigned in the contract.

## **Article 8: Supply of Documents**

- 8.4** Any documents and drawings prepared by the Contractor are to be submitted for approval to the Contracting Authority and the Supervisor, the procedure being agreed to between the parties as indicated in Clause 4 of the Special Conditions.

## **Article 9: Access to Site**

- 9.1** In addition to sub clause 9.1 of the General Conditions, contractors may be required to suspend all or part of the works being carried out in order not to disturb any official function or activity held as indicated by the Contracting Authority. The contractor will be notified of such suspension of works at least 48 hours in advance and will not be eligible for compensation, apart from an extension of time.

- 9.5** The contractor is to note that access to the public/private buildings shall be maintained at all times and shall maintain pedestrian and vehicular access (where applicable) at all times.

To this effect, the contractor and his employees shall be required to abide by the instructions issued from time to time by personnel responsible for the security of the underlying/adjoining properties and shall ensure that all works are carried out without jeopardizing the security of the place.

## **Article 10: Assistance with Local Regulations**

- 10.3** The contractor is responsible for complying with local regulations at his expense to ensure the project is compliant with all the relevant local regulations.

## **Article 11: The Contractor's Obligations**

- 11.9** As per article 15.4 of the Special Conditions
- 11.11** Further to what is stated in the General Conditions, the requirements for Contractor's submissions are detailed in Section 4 Technical Specifications of this Tender.
- 11.14** Any delay to commence or progress with works caused by the Contractor's failure to provide, develop and update any of these documents to the satisfaction of the Supervisor and approving Authorities shall be at the Contractor's risk.
- 11.17** The Contractor, including all the subcontractors, has to comply with all the legislation and regulations concerning employment in Malta, especially the posting of Workers in Malta Regulations; and must liaise with the Department of Industrial and Employment Relations, Malta - DIER and Employment & Training Corporation - ETC, to notify about such workers, fill in the appropriate

forms and submit the required documentation; and must provide copies of such notification forms to the Contracting Authority.

- 11.20** The Contracting Authority and the Supervisor shall make available, where applicable, the tender drawings (and any subsequent revisions to such drawings) to the Contractor at the latter's request and well as any drawings required to carry out the works as the need arises. Any such drawings will remain the property of the Contracting Authority and the Contractor may not reproduce or communicate them to third parties except with the Contracting Authority's agreement.
- 11.21** Further to Article 11.2 in the General Conditions, the contractor shall deploy the necessary resources so as to maintain a good progress of work on the site and shall also, where necessary, undertake to perform works outside normal working hours, and on public holidays and weekends at no additional cost to the Contracting Authority, so as to ensure the completion of the Works within the required time-frame, in accordance with the Technical Requirements and with the Period of Execution.
- 11.22** Where applicable, the Contractor shall submit working and shop drawings, installation drawings, technical data, as-built drawings and other required information to the Supervisor when so requested and within the timeframes requested by the Supervisor. The Supervisor may liaise with the Consultant to approve or otherwise. In the case of technical information and data, the contractor shall allow a minimum of seven (7) days for the Supervisor to comment. The Supervisor may request any drawing and any other document submitted by the Contractor to be revised or replaced and the Contractor shall so revise or replace the document within the requested timeframe and at the Contractor's own expense.
- 11.23** The Contractor shall draw-up and submit all other documentation required as stipulated elsewhere in these Special Conditions, as specified in the Technical Specifications and as otherwise instructed by the Supervisor within the stipulated, specified or requested time frames.
- 11.24** The Contractor shall be obliged to follow any and all instructions issued by the Supervisor in relation to the Works in so far as these fall within the overall scope of the Contract.
- 11.25** The Contractor shall be obliged to ensure avoidance of disruption and inconvenience to the day to day business on and around the site, including the co-ordination with other contractors that may be engaged on or in the vicinity of the site, the free movement of traffic and pedestrians, except where this is absolutely unavoidable. In particular, the Contractor shall take all such precautions as may become necessary so as to avoid causing any damage to adjacent buildings or property, including public spaces, during the execution of the Works.
- 11.26** The Contractor shall also, in addition to the above, take any necessary action to ensure and maintain the health and safety of his employees, together with those of the employees of any other contractor engaged on or in the vicinity of the site, together with the general public and shall follow any relevant instructions and /or recommendations of the contractor's Health and Safety Offices and the Contracting Authority Project Supervisor to fulfil the obligations set out in the Legal Notice 281/2004 (SL 424.29)
- 11.27** In addition to other obligations arising under the Contract pertinent to the execution of the Works, the Contractor shall, following completion of same, fulfill all obligations during the Defects Liability Period as outlined in Article 58.6 of these Special conditions.

- 11.28 The Contractor shall not dismantle the scaffolding prior to the approval of the Contracting Authority's project supervisor. The contractor shall give the Contracting Authority's project supervisor at least one week notice to allow for a final inspection and the measurement of works
- 11.29 A suitable "housekeeping" programme shall be established before commencement of the project and be continuously implemented on the Site.
- 11.30 The Contractor will be available to attend regular site, management and progress meetings.
- 11.31 The contractor binds himself to adhere to the conditions imposed in the Planning Permit, that is, the approved drawings, document and conditions imposed in Planning permits as approved by the Planning Authority for this project. He also binds himself to follow all instructions given to him by the Superintendence of Cultural Heritage.

### **Article 13: Performance Guarantee**

13.1 The Contractor shall, within 15 calendar days of receipt of the contract, sign and date the contract and return it together with an original copy of the Performance Guarantee to the Contracting Authority. The amount of the guarantee shall be 4% where the amount of the total contract value is between €10,000 and €500,000 exclusive of VAT. If the same Contractor has more than one contract with the Contracting Authority, then the Contractor will be allowed to submit a single bid bond in accordance with the schedule stipulated in the Tender Form.

13.3 The performance guarantee shall be in the format given in Section 5 and shall be provided in the form of a bank guarantee. It shall be issued by a bank in accordance with the eligibility criteria applicable for the award of the contract.

Furthermore, the Contracting Authority will not affect any payment to the Contractor until the performance guarantee has been submitted.

13.8 The performance guarantee shall be released within 30 days of the signing of the Provisional Acceptance Certificate including any snag lists.

### **Article 14: Insurance**

14.1.a Without any prejudice to Article 14.1 a, b, c of the General Conditions, the contractor is required to insure for the whole duration of the contract against risk of damage to the historic fabric of the building being restored through this contract for the amount of €235,000 per accident with the number of occurrences unlimited.

14.2 Without any prejudice to 14.1 a, b, c of the General Conditions, the contractor is required to insure for the whole duration of the contract for the amount of €1,500,000 per accident with the number of occurrences unlimited against each party's liability for any loss, damage, death or bodily harm, that may be caused to third parties, or to any person that is authorized to be on site at any given time, or any damages to property belonging to third parties, including loss of profits that may be sustained by third parties.

14.3 Amount per personal injury and unlimited occurrences as specified in Article 14.2 of the Special Conditions. The Contractor must submit the insurance policy within 20 calendar days from signing of the contract for the approval of the Contracting Authority. Failure to submit the policy within this timeframe will result in a daily penalty amounting to €250 per calendar

day until the insurance policy is submitted. Furthermore, the final insurance policy which is approved following the review by the Contracting Authority must be submitted within 7 calendar days from approval of the Contracting Authority. Failure to submit the approved final insurance documentation will result in a daily penalty of €250 per calendar day until said approved final insurance documentation is submitted.

#### **Article 15: Performance Programme (Timetable)**

**15.1** The Contractor shall provide a detailed Programme of Works.

**15.4** The Programme of Works shall be updated monthly or whenever required by the Supervisor, to be in line with the progress of the actual Works. The Programme of Works shall be accompanied by sufficient data and information together with all the necessary details of constructional plant, required labour force, etc. The Supervisor shall approve the Programme of Works within ten (10) working days from submission by the Contractor to the Supervisor. Should the Supervisor consider any alteration in or addition to the Programme of Works as submitted, the Contractor shall conform therewith without additional cost. Any changes to the Programme of Works shall be approved by the Contracting Authority.

#### **Article 17: Contractor's Drawings/Diagrams**

**17.1** The Contractor shall submit to the Supervisor for approval any drawings, documents, programme of works, technical literature, samples and /or models that the Supervisor may reasonably require for the performance of the contract within 5 working days from written request by the Supervisor or from date when meeting where minutes are taken.

#### **Article 18: Tender Prices**

**18.2** The contractor will ascertain that all the respective rates have included double handling, carting away and dumping fees

**18.3** The Contractor shall be deemed to have taken into account in his tender price all works, fees and costs that are necessary to complete the project and to fully hand over in operational condition.

#### **Article 19: Exceptional Risks**

**19.5** Further to the provisions of Article 19.5 of the General Conditions, if the Contractor is granted an extension of time in the implementation of the works, the Contractor cannot make a request for financial compensation for extension of time.

#### **Article 20: Safety on Site**

**20.2** Further to the provisions of the General Conditions, it is the obligation of contractors to carry out a suitable, sufficient and systematic assessment of all the occupational health and safety hazards which may be present at the place of work and the resultant risks involved concerning all aspects of the work activity.

**20.3** Further to the provisions of the General Conditions, it is also the duty of a contractor to cooperate with other employers, contractors and, or self-employed persons who share a common work place, on the implementation of Health and Safety provisions. The contractor or his designate shall co-ordinate necessary actions in matters which concern protective and preventive measures, and shall inform all on site as well as the Health and Safety Project Supervisor regarding any potential risks.



## **Article 21: Safeguarding Adjacent Properties**

21.1 Further to clause 21.1 of the General Conditions, the contractor shall liaise and co-operate with the appropriate Authorities and occupiers of adjoining land and buildings likely to be affected by the works, for all matters regarding access, monitoring, third party rights, and similar.

## **Article 22: Interference With Traffic**

22.3 The Contractor is responsible to obtain necessary permits that may be required if the works impact on traffic.

## **Article 23: Cables and Conduits**

23.3 The contractor shall be responsible for locating existing drains and services, and underground cables and pipes, for seeking instruction from the appropriate authorities as to how to deal with such services, and for carrying out any necessary work relating to deviations or protection, or any other works deemed necessary by the respective Utility or authority.

## **Article 25: Demolished Materials**

25.1 Demolition material unless indicated otherwise in the bills of quantities and by the supervisor in charge, shall become the property of the Contractor and the carting away and dumping charges are at the expense of the Contractor.

25.4 Further to article 25.4 of the General conditions, the contractor shall also take care to dispose of the waste material fully at his expenses and in an appropriate and environmentally friendly manner.

## **Article 26: Discoveries**

26.2 Further to provisions of Article 26.2 of the General Conditions, the Contractor shall observe the provisions set out in the Cultural Heritage Act 2002 (CAP 445) at all times.

26.3 Further to the provisions of Article 26.3 of the General Conditions, any in filled fissures, caverns, reservoirs/cisterns, hollows, Quaternary deposits, or other features of geological, geomorphological, hydrological, palaeontological interest which are discovered must be reported immediately to the Superintendence of Cultural Heritage. The contractor shall halt the works and follow all instructions given by the Supervisor to protect or to investigate further the discovery.

The Contractor shall co-ordinate and co-operate with the Supervisor appointed by the Contracting Authority with the Local Authorities at all times.

## **Article 28: Soil Studies**

28.1 As per General Conditions of the Contract

## **Article 30: Patents and Licences**

30.1 As per Article 30 of the General Conditions

## **Article 31: Commencement Date**

31.1 The Commencement Date for this contract shall be 1 week from the Order to Start Works. The performance of the contract is to commence on order to start works. The order

to start works will not be issued later than two (2) months from the last date of signature shown on contract.

No works however will be allowed to commence on site unless the Contractor has furnished the Contracting Authority with a certified true copy of the Insurance Policy together with all documentation related to Health and Safety as well as the performance guarantee.

## **Article 32: Period of Execution of Tasks**

32.1 The period of performance of this contract shall be:  
8 weeks from the commencement for Lot 1  
12 weeks from the commencement for Lot 2  
indicated in the Order to Start Works.

The contractor will be expected to commit sufficient resources to carry out works on more than one area at the same time, to guarantee the on time completion of all the Works as specified in this tender.

## **Article 33 Extension of the Period of Execution of Tasks**

33.4 Further to the provisions of Article 33 of the General Conditions, should the Contractor be granted an extension of the period of execution of the tasks that are the subject of this contract, the Contractor cannot make a claim for financial compensation for such extension in the period of execution of the tasks of the contract.

## **Article 34: Delays in Execution**

34.1 Any delay in performance from the approved programme of works for this contract, will be charged 0.1% of the contract value per calendar day of delay up to a maximum of 20% of the contract value.

Upon reaching the maximum penalty, the Contracting Authority reserves the right to terminate the contract and seek the services of a third party for the completion of works.

## **Article 35: Modification to the Contract**

35.8 The Contracting Authority has a right to increase or reduce works of a similar nature by a maximum of 25% of the contract value which have become necessary for the purpose of achieving the scope of the contract. These inter alia include the detection of unidentified works evident only once the interventions have commenced such as the extra conduits/cables needed to pass through alternative routes if positions or lighting intensity needs to be changed due to adjusting on site, or if areas where fittings to be fixed are found to be too friable to fix them to it, or as may be instructed by the Superintendence of Cultural Heritage since work is being carried out on a Grade 1 building. Such works would be resulting from close inspection of works accessible only upon erection of scaffolding or exposed during the course of the works. Works might also include further interventions necessary after taking up the existing parvis and may find some historic findings as may be instructed by Superintendence of Cultural Heritage.

35.9 The Contracting Authority will have the right to instruct additional works up to a maximum of 25% of the contract value which have become necessary for the purpose of achieving the scope of the contract. Such works would be resulting from close inspection of works accessible only upon erection of scaffolding or exposed during the course of works. These inter alia include works evident only once the interventions have commenced such as the conduits/cables needed due to fixing of fittings on other areas as some ledges/cornices are found to be too friable to take the fittings, the application of alternative treatment and utilization of other materials other than those envisaged in the tender specifications that may be required, or as may be instructed by the Superintendence of Cultural Heritage since work is being carried out on a Grade 1 building Works might also include further interventions necessary after taking up the existing parvis and may find some historic findings as may be instructed by Superintendence of Cultural Heritage.

35.11 The provisions provided for in Article 35.11 of the General Conditions shall not be applicable to this contract.

35.12 The provisions provided for in Article 35.12 of the General Conditions shall not be applicable to this contract.

35.13 The provisions provided for in Article 35.13 of the General Conditions shall not be applicable to this contract.

#### **Article 37: Work Register**

37.1 The Contractor shall maintain a Work Register (Work Diary) on the site, containing detailed daily reports in the template specified and/or approved by the Contractor's representative (either the Construction/Project Manager or the Site Manager) and approved by the Supervisor, including at least the following information:

- (a) weather conditions, interruptions of work owing to inclement weather, hours of work, number and type of workmen employed on the site, materials supplied, equipment in use, equipment not in working order, tests carried out in situ, samples dispatched, unforeseen circumstances, safety, health and welfare of persons and damage to property, progress of the Works, as well as progress of the Works orders given to the Contractor;
- (b) detailed statements of all the quantitative and qualitative elements of the work done and the supplies delivered and used, capable of being checked on the site and relevant in calculating payments to be made to the Contractor;
- (c) photographic records of the interventions including fixing of conduits and fittings in place on the various areas of the church, and during the excavation and laying of the new parvis paving

This Work Register shall be made on daily basis and take the form of a bound document with an original and two copies for each day. The original shall be filled out by the Contractor, who shall sign it, then reviewed by the supervisor, who shall add his comments, if necessary, and countersign it. One copy shall be kept by the supervisor for its own record.

Entries made in the work register as work progresses shall be signed by the Contractor and countersigned by the Supervisor or his representative. When the Supervisor reviews each page, he shall add his comments if necessary, to draw attention to deficiencies in the Works or to give warning of difficulties that may arise from the Contractors method of working. He may also instruct in this Work Register that work shall stop in certain circumstances and the Contractor shall take appropriate action immediately. Such instructions shall be followed up by Administrative Orders. If the Contractor objects, he shall communicate his views to the Supervisor within 15 days following the date on which the entry or the statements objected to are recorded. Should he fail to countersign or to submit his views within the period

allowed, the Contractor shall be deemed to agree with the notes shown in the register. The Supervisor may examine the work register at any time and may make or receive a copy of entries which he considers necessary for his own record.

#### **Article 38: Origin**

38.1 No derogation to the rules of origin is authorised.

#### **Article 39: Quality of Works and Materials**

39.2 All designs, components, materials, and restoration interventions/methodologies shall be submitted to the Supervisor for written preliminary technical approval, prior to their implementation or procurement. All requests and documentation must be submitted with 10 calendar days prior to execution of works on site.

#### **Article 40: Inspection and Testing**

40.2 As specified in the General Conditions.

#### **Article 42: Ownership of Plants and Materials**

42.2 All equipment, temporary works, plant and materials on site owned by the Contractor or by any company in which the Contractor has a controlling interest shall, for the duration of the execution of the works be:

- a) Vested in the Contracting Authority.

#### **Article 43: Payments: General Principles**

43.1 Payments will be made in Euro.

Payments shall be authorized by the Contracting Authority, and paid by the Treasury Department.

##### **For Lot 1**

| Payment Schedule                               |                                                                  |                       |
|------------------------------------------------|------------------------------------------------------------------|-----------------------|
| Payment on certification from Project Engineer | As per measured works                                            | 95% of contract value |
| Retention Monies                               | As per payment schedule in Clause 45.2 of the Special Conditions | 10% of contract value |

##### **For Lot 2**

| Payment Schedule               |                                                                  |                       |
|--------------------------------|------------------------------------------------------------------|-----------------------|
| Interim Payments               | As per measured works                                            | 85% of contract value |
| Payment on completion of works | As per measured works                                            | 10% of contract value |
| Retention Monies               | As per payment schedule in Clause 45.2 of the Special Conditions | 5% of contract value  |

43.3 As per General Conditions.

#### **Article 44: Pre-financing**

Not applicable.

#### **Article 45: Retention Monies**

45.2 The sum of money retained from the interim payments shall be of 5% for Lot 2 and 10% for Lot 1. This sum shall be paid upon submission of an equivalent retention bank guarantee (issued in the form provided in this tender document) by the Contractor to the Contracting Authority when issuing the Provisional Acceptance Certificate as specified in Article 57. The bank guarantee will be released upon issuing of the final acceptance of the works as per Article 58. The said retention guarantee shall be released only after the conditions requested under Art 58 are satisfied. The retention guarantee will be released within 45 days from when the Final Acceptance Certificate is issued.

#### **Article 46: Price Revision**

46.1 Tender prices are fixed and not subject to revision with the exception of that resulting from causes listed under Article 46.3 of the General Conditions.

46.3 As per General Conditions

#### **Article 47: Measurement**

47.2 The works shall be measured as detailed in the Bill of Quantities, and as specified in the appropriate clauses in the Technical Specifications - Section 4. The appointed contractor shall satisfy the Supervisor that the materials are such as specified or equivalent.

#### **Article 48: Interim Payments**

48.1 Interim Payments of sums due for the executed and provisionally accepted works shall be authorized by the Contracting Authority and payment will be issued against a valid invoice after works in accordance to quality and progress of works. The retention shall be released in accordance to Clause 45.2 of these special conditions. The Contractor shall submit his claim for progress payments to the Contracting Authority in writing. Such claims are to be supported by evaluation of the works executed and materials installed on site and show the value of the permanent works executed by him up to the end of the month. All claims shall be evaluated by the Contracting Authority in relation to the Bills of Quantities and Contract Rates and documentation produced by the Contractor and on the basis that such works have been executed in accordance with the Contract Documents and to the satisfaction of the Contracting Authority. Provided the Contracting Authority agrees with the statement, the relevant Payment Certificate will be issued.

#### **Article 50: Delayed Payments**

50.1 The Contracting Authority shall pay the contractor sums due within 60 days of the date on which an admissible payment is registered, in accordance with Article 43 of these Special Conditions. This period shall begin to run from the approval of these documents by the competent department referred to in Article 43.1 of these Special Conditions. These

documents shall be approved either expressly or tacitly, in the absence of any written reaction in the 30 days following their receipt accompanied by the requisite documents.

50.2 Once the deadline laid down in Article 50.1 has expired, the Contractor may, within two months of late payment, claim late-payment interest:

- at the rediscount rate applied by the issuing institution of the country of the Contracting Authority;  
on the first day of the month in which the deadline expired, plus two percentage points (2%). The late-payment interest shall apply to the time which elapses between the date of the payment deadline (exclusive) and the date on which the Contracting Authority's account is debited (inclusive).

#### **Article 56: Partial Acceptance**

Not applicable

#### **Article 57: Provisional Acceptance**

57.6 Further to the provisions of Article 57 of the General Conditions, the Provisional Acceptance Certificate can only be issued once all pending snags included in the relevant snag list are appropriately addressed by the Contractor and to the satisfaction of the Supervisor.

#### **Article 58: Maintenance Obligations**

58.6 Further to the provisions of Article 58 of the General Conditions, the contractor shall guarantee that works carried out through works specified in this tender document are adequately maintained for a period of 5 years from issuing of the Provisional Acceptance Certificate. The Contractor shall be responsible for **remedying, at his expense, defects and damages** during this period as specified in the General Conditions.

Any remedial works performed during the guarantee period of 5 years after completion of ALL works described in this contract) shall be carried out as specified in this document and approved by the Supervisor. The contractor shall be responsible for providing all suitable means, for obtaining all permissions, and lifting/ access platforms etc, and making all the necessary arrangements with all authorities concerned to carry out all the remedial works at any height levels at no extra cost to the Contracting Authority.

#### **Article 66: Dispute Settlement by Litigation**

If no settlement is reached within 120 days of the start of the amicable dispute-settlement procedure, each Party may seek:

- a) either a ruling from a national court, or
- b) an arbitration ruling, in the case where the parties, i.e. the Contracting Authority and the Contractor, by agreement decide to refer the matter to arbitration.

#### **Article 70: Further Additional Clauses**

70.1 The Supervisor will organise project management meetings (which may be held in person or on-line) and site meetings. The Contractor's representative must also attend these

meetings in order to review the arrangements of future work. The Supervisor shall record the business of these meetings and supply copies of the record to those attending the meeting and Contracting Authority. In the record, responsibilities for actions to be taken shall be in accordance with the contract.

The Contractor's Key Experts must also attend these meetings when requested by the Supervisor and/or the Contracting Authority. The Supervisor shall notify the Contractor of the requirement of a particular Key Expert's attendance at least three (3) days prior to the meeting. The Contractor shall become liable to a penalty of €100 (one hundred euro) for each occurrence in which a Key Expert fails to attend meetings. Such penalties will be deducted from the next interim payment due.

70.2 Following the issue of an administrative order by the Supervisor, the Contractor shall execute the administrative order within the specified deadline. Without prejudice to other penalties which may be due in terms of the Contract, if the Contractor fails to respect the specified deadline for the respective administrative order, Contractor shall be liable to a penalty for mere delay in execution of the administrative order in the amount of €100 (one hundred euro) for each calendar day following the deadline until Supervisor certifies the completion of the administrative order, which penalty shall be deducted from the next interim payment.

70.3 The Contractor shall be liable to a penalty of €2,000 (two thousand euro) if he fails to abide with any of the conditions of permits for works issued by ERA [Environment and Resources Authority], the PA [Planning Authority] and the BRO [Building Regulation Office] or any other Malta Government Authority and related to or in connection with this contract. This penalty shall be applied for each occurrence where the result of the non-compliance is irreversible. In case the effects and results of the non-compliance are reversible the contractor shall be liable to a penalty of €1,000 per calendar day commencing from the deadline set by the Supervisor to complete the remedial works. The reversibility of the breach of permit conditions shall be determined by the Supervisor. The penalties in this Article shall apply without prejudice to the other penalties that may be issued by the Planning Authority and/or other Governmental Entities. Penalties will be deducted with the next interim payment due.

70.4 The Contractor shall be liable to a penalty of €300 (three hundred euro) for each occurrence when the contractor fails to abide by good housekeeping. The project supervisor will issue an administrative order and failure to abide to such instructions will result in the application of the above mentioned penalty.

## SECTION 4 -SPECIFICATIONS/TERMS OF REFERENCE (Note 3)

**Note:**

Where in this tender document a standard is quoted, it is to be understood that the Contracting Authority will accept equivalent standards. However, it will be the responsibility of the respective bidders to prove that the standards they quoted are equivalent to the standards requested by the Contracting Authority.

# TECHNICAL SPECIFICATIONS

Tenderers bear sole liability for examining the tender documents with appropriate care, including those design documents available for inspection, any clarification notes to the tender documents issued during the tendering period and for obtaining reliable information with respect to conditions and obligations that may in any way affect the amount or nature of the tender or the execution of the works. In the event that a bidder is successful, no claim for alteration of the tender amount will be entertained on the grounds of errors or omissions in the obligations of the tenderer described above.

The bidder must provide all documents required by the provisions of the tender document. All such documents, without exception, must comply strictly with these conditions and provisions and contain no alterations made by the bidder.



## A A General Site Management Practice

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### **Liaison**

- A.1 The contractor shall liaise and co-operate with the project supervisor and architect and civil engineer in charge for all the matters regarding access, logistics, monitoring, and assistance during the execution of the works.

The contractor shall be responsible for all traffic management and road closures that are required for the hoisting of materials, scaffolding and equipment on the roof of the church. Permits and Wardens for these operations are the responsibility of the contractor.

No works will be carried out from Mid August to Beginning September due to the village feast. Moreover works on the main central part of the parvis also cannot happen during Holy Week activities.

### **Co-ordination of Services**

- A.2 The contractor shall co-ordinate with telecommunication companies the shifting of mobile telephone antennae and other equipment from the drum of the dome.

### **Access**

- A.3 The contractor shall take all the necessary steps to ensure that the roof of the parish church, external areas and access roads are left clean and tidy during all stages of the work, to the satisfaction of the Project supervisor in charge.

Moreover it is of utmost importance that access to the church needs to be permitted at all times and therefore, the works have to be phased in such a way to allow access through any one of the access doors of the church. Works within the central area of the parvis should be kept to a minimum and temporary provisions should be done in order to still allow access through the main doorway for funerals and marriages.

### **Method Statement and Programme of Works**

- A.4 Apart from the **Preliminary Method Statement and the Programme of Works** to be submitted by the bidder with the tender document, the successful bidder shall be required to submit **detailed Method Statement together with a Programme of Works, and Construction Management Plan** prior to commencement of works and monthly or as requested by the Contracting Authority's Supervisor. The **preliminary Method Statement** shall include a **Risk Assessment**, as referred to in this document. It shall also detail site logistics and plant locations. The Contractor shall consider the problems of access into the site, and in particular the needs to maintain access to the site for both visitors as well as other contractors and service utility personnel.

- A.5 The **detailed Programme of Works, (Gantt chart)** shall identify each activity, indicating the dates when works in their various phases would be undertaken, for approval of the Contracting Authority's Project supervisor in charge.

- A.6 The Programme of Works shall be updated monthly or whenever required by the Contracting Authority's project supervisor, to be in line with the progress of the actual Works. The Programme of Works shall be accompanied by enough data and information together with all the necessary details of constructional plant, required labour force, etc. Should the Contracting Authority's project supervisor consider any alteration in or addition to the Programme as submitted, the Contractor shall conform therewith without additional cost to the Director General (Works).

- A.7 The submission to and approval by the Project Supervisor of such Programme of Works or the furnishing of such particulars shall not relieve the Contractor of any of his/her duties or responsibilities under the Contract.

### **Housekeeping**

- A.8 Storage areas for materials, plant and construction waste shall be enclosed with secure hoarding; the different areas for materials, waste and staff facilities will also be fenced in for security, for the protection of the public, as well as to reduce, visual impact. Construction waste shall not be allowed to accumulate on the roof of the church and should be removed periodically. The contractor shall endeavour to locate the storage and stockpile areas on load bearing walls in order to avoid overloading onto the barrel-vaulted roof.
- A.9 Rainwater run-off shall be channelled to setting ponds that will allow the separation of the silt from the clear water. Sludge will be collected regularly using mobile suction pumps and will be deposited at an approval dumping site.
- A.10 The disposal of hazardous waste shall be carried out in accordance with procedures approved by the Environmental and Resources Authority (ERA). Any hazardous material shall be notified to the ERA and shall be transported in accordance with the relevant Maltese Legislation. Relevant hazardous wastes include, but are not limited to, petroleum tank bottom sludge, waste acidic or alkaline solutions, wastes containing metals, waste hydraulic, engine, or bilge oils, degreasing agents or solvents, discarded equipment containing PCBs or asbestos. Waste explosives, batteries and accumulators, soil, stone or construction and demolition waste containing dangerous substances, and insulation material containing asbestos.
- A.11 Sanitary waste during the construction phase shall be disposed of chemically.
- A.12 Burning of waste plastics, wood or any other material on site shall not be allowed.
- A.13 All activities producing dust shall be controlled, and measures such as spraying with water shall be used to ensure that the emitted dust is minimised. Dust-laden materials shall be removed from the site and transported through public thoroughfares, only after thorough watering before leaving the site. Dust covers, of appropriate material, properly secured along all sides, shall be used on all open-topped vehicles used for the transportation of rubbish or debris from the site.
- A.14 Wash-down facilities may need to be installed at the designated exit of the site of the works, to minimize any dust carried by construction vehicles on the public roads, unless it can be shown that the contractor can otherwise control the dust carried by his vehicles. Wash-down facilities shall normally consist of a power washer, surface gutters and a system of interconnected reservoirs underlying the washing area, so as to allow construction vehicles, leaving the site, to be washed-down. The water from the wash-down should flow through the gutters into the underground reservoirs, and clear water will overflow from one compartment into the next, depositing the silt load. A submersible pump will recycle the water from the last compartment and feed it to the power washer. Sludge will be collected regularly using mobile suction pump, mixed with the excavated debris to remove excess water, and disposed of with the same excavated material.
- A.15 All plant shall be operated with any relevant doors closed and shall be fitted with silencers and noise suppressors. All plant and site operations will be required to conform to local legislation, in particular, EN ISO 11690, EN 12096, EN 28662, EN ISO 10819, EN ISO 8662. The contractor shall select and utilise methods of working, and items of plant, so that the maximum measured ground vibrations do not exceed a peak particle velocity of 3mm per second at any occupied property, and 5mm per second at other properties, or any other values indicated by the relevant Authorities. Noise levels at the perimeter of the site shall not exceed 70dB, or the value indicated by the relevant Authorities.
- A.16 Any chemical drums that may need to be on site shall be stored on impervious surfaces in designated bunded areas. Oil tanks shall be similarly stored. The bunds shall have a capacity equal to 110% of the volume of the largest drum. Since the bunds are meant to cater for operational leakages and spills, this is considered as sufficient. The bunds shall have no drains, and provision shall be made for pumping out rainwater. Filling and vent pipe-work shall be located inside the bund. The bunds shall be available for inspection. Empty drums shall be stored in a similar fashion, in separate areas, and shall be safely disposed of in accordance with the arrangements made with the Environment Protection Department.
- A.17 Oil drip trays shall be used under small static plant, such as pumps and compressors. These trays shall be open to inspection and spent oil shall be disposed of in accordance with the arrangements made with the Environment and Resources Authority. Maintenance areas for the construction plant shall be indicated in the Contractor's Construction Management Plan. Disposal procedures shall be as instructed by the Environment Protection Department. The contractor shall be required to install settling ponds to stop oil-contaminated, or silt-laden, wastewater, (including rainwater), from finding its way into the surrounding roads.
- A.18 The contractor shall take all necessary procedures to control energy use on site. Site lighting shall be, as much as possible, low energy, or energy-efficient, light fixtures, and shall be downward pointing and shielded to avoid unnecessary light loss and light pollution.

A.19 The Contractor shall comply with and fulfil all obligations imposed by Article 19 of the Police Laws and shall give all notices, obtain all permits; pay all fees that may be lawfully demanded by Public Officers in respect of works and comply with all requirements of the Law and any Lawful Authority.

**Notice to authorities**

A.20 The contractor shall give all necessary notices to authorities concerned and shall allow them facilities for removing any fixtures, fittings, or services, which may belong to them.

**Heavy vehicles**

A.21 The use of heavy construction vehicles entering the centre of Birkirkara in connection with this project shall be limited to the minimum. Moreover it is important that closing of the piazza or traffic within this heavy trafficked area should be kept to the absolute minimum.

**Materials**

A.22 All materials and methods of construction shall be in the form and nature specified herein and/or as indicated in the drawings, to the satisfaction of the Contracting Authority's Project Supervisor-in-Charge. All materials and methods (except where otherwise stated) shall conform to the relevant British Standard Specification or its European equivalent.

**Samples and tests**

A.23 During the course of works, Project supervisor in charge reserves the right to take samples or carry out specialised tests on site. In specific cases, analysis/tests on samples elevated may take significant time to be completed, in which case, project supervisor in charge may request suspension of all or part of the activities being carried out by the contractor. Unless such tests/analysis are being carried out due to any negligence, bad workmanship, etc. from the contractor's side, the Contracting Authority or his/ her representative may opt to prolong the completion period as detailed in tender document. Should, however, the need for such tests arise due to any negligence, bad workmanship, etc. by the contractor, expenses incurred in the carrying of such tests will be deducted from payments due to the contractor. In the Period of Execution of the work the Contractor will have to factor in such tests.

**Works to be carried out by other entities/or contractors**

A.24 During the course of works, project supervisor may:

- a) Assign other contractors/personnel to contemporarily carry out works on other areas of the building not included in this tender document.
- b) Appoint personnel to carry out tests, etc. on any material within this tender as deemed necessary by the Project Supervisor in charge, on sections of the building covered by this tender document.
- c) In all cases, contractor will be expected to be co-operative and allow the use of his scaffolding and/or other facilities available on site for the efficient execution of the above-mentioned works. Same contractor will not be entitled to any compensation (financial or otherwise) for these services, etc.

**Clearance of site**

A.25 Each trade is to make good after itself and provision for such work shall be made in respective rates.

A.26 During the execution of the works, the Contractor shall keep the site reasonably free from all unnecessary obstruction and shall store or dispose of any Contractor's equipment and surplus materials and clear away and remove from the site any wreckage, rubbish or temporary works no longer required.

A.27 On completion of the Works, the Contractor shall clear away and remove from site all Contractor's equipment, surplus material, rubbish and temporary works of every kind, and leave such part of the site and works clean and in a workmanlike condition to the satisfaction of the Contracting Authority's Project supervisor in charge.

**Construction Management Plan**

A.28 The Construction Management Plan shall be compiled to show how access to the site will be managed, how security and safety of the buildings will be guaranteed, and how building material and building waste will be handled to ensure minimum impact. It will also detail site logistics and plant locations, and equipment etc. to be used in the execution of works indicating the contractor's endeavours to carry out the works requested by the Contracting Authority's Project Supervisor in charge.

A.29 The Contractor shall consider the problems of access into the site, and the existing physical site constraints the need to maintain safe vehicular and pedestrian access in and around the church.

It shall show in particular:

- The Access Plan - All site access points for workers, plant and machinery
- Storage areas for materials and plant and how this will be enclosed to avoid disturbance to the church users and pedestrians.
- A detailed Programme of Works, (Gantt chart), indicating the dates when works in their various phases would be undertaken and broken down into more detail for each activity of each phase, for approval of the Contracting Authority's Project supervisor in Charge.
- Adequate and suitable provision to reduce dust nuisance during all phases of the works.
- Protection measures for underlying building and adjoining building.
- Measures for the safety and continued operation of underlying existing activities.
- The location of disposal sites for material from demolition and excavation, and the means and routing of transport to disposal sites.
- The measures to be undertaken in adverse weather conditions.

The submission to and approval by the Contracting Authority's Project Supervisor in charge of such Programme or the furnishing of such particulars shall not relieve the Contractor of any of his/her duties or responsibilities under the Contract.

## **Health and Safety Provisions**

### **Safety Officer**

A.30 The Contractor shall appoint his safety officer to ensure compliance with Legal Notice 281/2004 (SL.424.29). The safety officer shall amongst other things implement all regulations and directions given in order to achieve the objectives of the Health and Safety Plan, as well as ensure the certification of scaffolding, hoists and any other equipment/machinery to be used on the site of works as fit for the intended works and immediately submit them to the Contracting Authority. The Contractor shall be obliged to immediately carry out any actions recommended by the Contracting Authority Project Supervisor. Continuous liaison and communication should be kept between the contractor's health and safety officer and the Project Supervisor ( health and safety officer) appointed by the Contracting Authority in order to have the best smooth project progress.

The Contracting Authority reserves the right to request the Contractor to substitute the appointed safety officer if in the opinion of the Contracting Authority he/she is not fulfilling his/her role properly.

### **General Hazards**

A.31 The following hazards have been identified:

- a) Electrocution from electricity services fixed to the various areas within the church or by the services and equipment being used and fixed on site of works;
- b) Workers falling from scaffolding, or from heights on existing buildings;
- c) Noise and dust production as a result of the works outlined in this document;
- d) Workers crushed by collapse of structures and/or scaffolding;
- e) Full or partial collapse of scaffolding due to adverse weather conditions.

- f) Church goers/ passersby injured by material falling from scaffolding or due to areas not adequately hoarded.

### **Risk Mitigation Measures**

A.32 The following measures are recommended to minimise risks on site:

- a) Clear delineation of plant movement areas;
- b) Double checks on possible existence of electrical cables - clear delineation of known services;
- c) Provision of sturdy work platforms/ scaffolding, and guide rails at unprotected edges of existing buildings;
- d) Creation of ramps and temporary access to any areas to avoid any tripping of the pedestrians.
- e) Use of plant with limited noise emission;
- f) Establishing clear procedural rules during overhead material handling to;
- g) Enforcement of hard hats.

### **Provisions for safe practice**

A.33 The following provisions shall be made, without limiting, in any way, other provisions that the Contractor may deem necessary in order to render the Site and the Work safe:

- a) Where there is an imminent danger to the safety of workers, the Contractor shall take immediate steps to stop the operation and evacuate workers as appropriate;
- b) **Secure fencing, to prevent unauthorised access to the active work areas;**
- c) A Notice, giving information on the specific hazards, and on the availability of emergency assistance, shall be clearly displayed in a position such that those working on site can read it as well as those affected by the Site;
- d) Routes for the movement of vehicular traffic around the place of work shall be clearly delineated. These routes shall be separated from the areas subject to overhead movements;
- e) Escape routes and means of escape shall always be kept clear;
- f) Existing services, both overhead and underground, within the work site and immediately surrounding the work site, shall be identified, the respective utility companies contacted for information and disconnected/made safe;
- g) Special attention shall be given to lifting, slewing and overhead handling operations to avoid public access areas;
- h) The Contractor shall take appropriate measures, or shall use the appropriate means and mechanical equipment, in order to avoid the need for the manual handling of loads by workers;
- i) All openings through which workers are liable to fall shall be kept effectively covered or fenced and marked in the most appropriate manner;
- j) Where natural lighting is not adequate to ensure safe working conditions, the Contractor shall provide adequate and suitable lighting, including portable lighting when appropriate, at the Site of work;
- k) Guard-rails and toe-boards shall be provided to protect workers from falling from elevated workplaces; alternatively, adequate safety nets or safety sheets shall be erected, made fast and maintained, or adequate safety harnesses shall be provided and used;
- l) Hoist shafts shall be enclosed with rigid panels or adequate fencing at ground level on all sides;
- m) The contractor shall be responsible for ensuring that all persons on the Site, whether the Contractor's employees or otherwise, wear the necessary personal protective clothing at all stages;

- n) The Contracting Authority's Engineer shall have the right to send away any of the Contractor's employees, or of his Sub-Contractors, or otherwise doing work on the site, if they do not comply with these requirements.

**Fire Outbreak**

A.34 The Contractor shall take all appropriate measures to:

- a) Avoid the risk of fire;
- b) Control quickly and efficiently any outbreak of fire;
- c) Bring about a quick and safe evacuation of persons.

**Protective Clothing and Equipment**

A.35 The Contractor shall provide the following:

- a) Safety helmets or hard hats to protect the head from injury resulting from falling or flying objects, or from striking against objects or structures.
- b) Goggles, a screen, a face shield or other suitable device when likely to be exposed to eye or face injury from airborne dusts or flying particles, dangerous substances, harmful heat, light or other radiation, and in particular during welding, flame cutting, or other hazardous work;
- c) Protective gloves and suitable protective clothing to protect hands or the whole body when exposed to heat radiation or while handling hot, hazardous or other substances such as poultice packs which might cause injury to the skin;
- d) Footwear of an appropriate type when employed at places where there is the likelihood of exposure to adverse conditions, or of injury from falling or crushing objects, hot or hazardous substances, sharp-edged tools or nails;
- e) Respiratory protective equipment, suitable for the working environment when workers cannot be protected against airborne dust, vapours or gases by ventilation or other means;
- f) Safety harnesses with independently secured lifelines where protection against falls cannot be provided by other appropriate means.
- g) Waterproof clothing and head coverings when working in adverse weather conditions.

**Storage of Materials**

A.36 The Contractor shall ensure:

- a) A safe, sufficient and suitable storage for flammable liquids, solids and gases such as ethyl silicates and/ or fuels.
- b) Storage areas for flammable liquids, solids and gases shall be rendered secure against trespassers.
- c) Smoking shall be prohibited and "No Smoking" notices or appropriate design and shape shall be prominently displayed in all spaces containing readily combustible or flammable materials.
- d) Combustible material such as scrap wood or plastics, oily/greasy waste, sawdust or packing material shall not be allowed to accumulate in places of work, but should be kept in closed metal containers in a safe place.

**Lifting Equipment**

A.37 The Contractor shall ensure:

- a) Any lifting gear or equipment intended for lifting shall not be loaded beyond its safe working load or loads as specified by the manufacturer.
- b) No person shall be raised, lowered or carried by a lifting appliance unless it is constructed, installed and used for that purpose, except in an emergency situation.
- c) Every platform or receptacle used for hoisting any loose material shall be so enclosed as to prevent the fall of any of the material.

- d) Any equipment with wheels, placed directly on a platform for raising or lowering, shall be so secured so that they cannot move, and the platform shall be enclosed as necessary to prevent the fall of the contents.

**‘Housekeeping’ Program**

A.38 The Contractor shall ensure:

- a) A suitable “housekeeping” programme shall be established and be continuously implemented on the Site.
- b) Areas within the Site, which are liable to become slippery, because of oil or other causes, shall be regularly cleaned up, or strewn with sand or sawdust.
- c) It shall include provisions for the proper storage of materials and equipment, and for the removal of scrap, waste and debris at appropriate intervals.
- d) Loose materials that are not required for use shall not be placed or allowed to accumulate on the site, to obstruct means of access to, and egress from, places of work and passageways.

**Machinery and Equipment**

A.39 The Contractor shall ensure:

- a) All manual tools, pneumatic tools, electrical tools, etc. shall be suitable for the work to be carried out, shall conform to approved standards and regulations, shall be safe and such that they can be operated without risk to health.
- b) They shall be provided with protective guards, shields or other devices as appropriate, which shall be maintained regularly, which shall be equipped, where applicable, with an extraction system which shall be as close as possible to any source of the dust, and which sucks away from the breathing zone, not through it, shall be fitted with shock absorbing materials, and be fitted with noise control protection devices at source to reduce as much as possible noise exposure.
- c) Only insulated or non-conducting tools shall be used on or near live electrical installations if there is any risk of electrical shock. Only non-sparking tools shall be used near or in the presence of flammable or explosive dust or vapour.
- d) Operating triggers on portable pneumatic tools shall be so placed as to minimize the risk of accidental starting of the machine, and so arranged as to close the air inlet valve automatically when the pressure of the operator’s hand is removed. Hose and hose connections for compressed-air supply to portable pneumatic tools shall be designed for the pressure and service for which they are intended, fastened securely to the pipe outlet, and equipped with a safety chain, as appropriate. Pneumatic shock tools shall be equipped with safety clips or retainers to prevent dies and tools from being accidentally expelled from the barrel. Pneumatic tools shall be disconnected from power and the pressure in hose lines released before any adjustments or repairs are made.
- e) Portable electric tools shall generally be used on reduced voltage to avoid as far as possible the risk of lethal shock. All electrical tools shall be earthed, unless they are “all insulated” or “double insulated” tools which do not require an earth. Earthing shall be incorporated in metallic cases, and as a safeguard against damaged cables, where wires enter the tool. Electric tools shall be fitted with protection guards that are regularly maintained for their effectiveness. Power cables to electrical tools shall be armoured and/or covered in thick flexible rubber, and socket outlets shall be of special design for outdoor use, and protected by a residual current circuit breaker.
- f) All electrical tools shall receive inspection and maintenance on a regular basis by a competent electrician, and complete records kept.
- g) The cables of portable electrical lighting equipment shall be of adequate size and characteristics for the power requirements and of adequate mechanical strength to withstand severe conditions in construction operations.

- h) All vehicles shall be of good design and construction, taking into account established ergonomic principles, particularly with reference to the seat; they shall be maintained in good working order, shall be used with due regard to health and safety, by workers who have received appropriate training.
- i) Where appropriate, earth-moving or materials-handling equipment shall be fitted with structures designed to protect the operator from being crushed should the machine overturn, and from falling material.
- j) All vehicles and earth-moving or materials-handling equipment shall be fitted with a plate indicating the gross laden weight; the maximum axle weight or, in the case of caterpillar equipment, ground pressure.
- k) Plant, machinery and equipment shall be switched off when not in use and isolated before any major adjustment, cleaning or maintenance is performed. Where trailing cables or hose pipes are used, they shall be kept as short as practicable, be mechanically protected and not be allowed to create a safety hazard.
- l) Mobile high-pressure compressor plants and equipment shall be examined, tested and certified annually by a mechanical Engineer having a warrant to practice his profession.
- m) Portable compressors shall be fitted with a double adjustable tow-bar and jockey wheel. When the plant/equipment is in operation, wheel chocks shall be installed. The wheels must be fitted with brakes that are operated automatically via a handbrake for parking purposes.
- n) Only competent persons shall operate and maintain such plant and equipment.

#### **Personnel**

A.37 The Contractor shall ensure:

- a) The Contractor shall assign workers only to employment for which they are suited by level of training, age, state of health and skill, and having ensured that the workers are fully aware of any risks to health or hazards connected with the work, and that they are trained in the precautions necessary to avoid accidents or injury to health. Such training shall be given in a language that is understandable to the workers. The training shall be sustained periodically and shall take into account any new or changed risks to the health and safety of the employees concerned.
- b) When the use of equipment is likely to involve a specific risk to the health or safety of workers, the Contractor shall take the measures necessary to ensure that:
- c) the use of equipment is restricted to those persons given the task of using it, and who have been adequately trained for the specific task;
- d) in the case of repairs, modifications, maintenance or servicing, only competent workers are specifically designated to carry out such work;
- e) all operators of construction equipment shall receive basic training as per Code of Practice provisions;
- f) drivers of heavy machinery shall have followed an approved course in relation to the equipment to be used or driven and be in possession of a valid license.

#### **Maintenance**

A.38 All equipment/plant shall be certified to be in a proper working order, and shall be operated by trained personnel.

#### **Noise Emissions**

A.39 The Contractor shall ensure:

- a) Noise emission levels from the plant/ equipment must conform to approved local standards, EN ISO 11690, Recommended practice for the design of low noise workplaces containing machinery - Part 1: Noise control strategies.
- b) The exhaust system from any engine used on site must be fitted with a residual silencer.



### **Cranes**

A.40

The Contractor shall ensure:

- a) All lifting equipment used on site shall be certified by a warranted Mechanical Engineer every six (6) months, in accordance with the regulations issued by the Occupational Health and Safety Authority.
- b) Copies of the certificates shall be sent to the Project Supervisor in charge/Project Manager before commencement of work and as necessary.
- c) Failure to comply or to update these certificates will lead to an automatic penalty.
- d) Further measures shall be taken to protect cranes against the effects of bad weather and lighting.

### **Temporary Electrical Installation**

A.41

Any temporary electrical installation on the Site shall meet the requirements of Enemalta and/or local legislation and in particular legal notices/regulations issued by the Ministry for Water and Energy.

A.42

Any temporary electrical installation shall be certified by an independent warranted electrical Engineer, every three (3) months, and the certificate shall be affixed in a prominent position next to the Main Temporary Switchboard.

## **B. General Outline of Works**

### **TECHNICAL SPECIFICATIONS FOR THE SUPPLY ONLY OF LUMINAIRES AND LIGHTING CONTROL SYSTEM FOR THE EXTERIOR LIGHTING OF ST. HELEN'S BASILICA**

#### **Main scope of works**

#### **Lot 1**

Tenderers bear sole liability for examining the tender documents with appropriate care, including those design documents available for inspection, any clarification notes to the tender documents issued during the tendering period and for obtaining reliable information with respect to conditions and obligations that may in any way affect the amount or nature of the tender or the execution of the works. In the event that a bidder is successful, no claim for alteration of the tender amount will be entertained on the grounds of errors or omissions in the obligations of the tenderer described above.

The bidder must provide all documents required by the provisions of the tender document. All such documents, without exception, must comply strictly with these conditions and provisions and contain no alterations made by the bidder.

## **Preamble**

### **TECHNICAL SPECIFICATIONS FOR THE SUPPLY ONLY OF LUMINAIRES FOR THE EXTERIOR LIGHTING OF ST HELEN'S BASILICA IN BIRKIRKARA.**

## **Preamble**

The work comprises the supply, delivery to site and commissioning only of luminaires and lighting control system for the exterior lighting scheme for St Helen's Basilica, Birkirkara.

### **Technical specifications for the supply and delivery of light fittings and luminaires**

The specifications shall be read in conjunction with the form of tender, instructions to tenderers, contract conditions, the drawings, and the bill of quantities, which together form the tender document.

All equipment quoted for in this tender shall be new and shall conform to the relevant MSA EN or BS, EN or IEC standards. Equipment to other standards may be considered subject to these being of equivalent or superior standard to the ones mentioned. The Tenderer must provide documentation to back such a claim to the satisfaction of the Engineer. Where reference to British Standards is made in these technical specifications, the equivalent standard applicable in the EU shall be acceptable.

All components, equipment and material falling under legal notices issued relative to the Quality Control Act (Cap.225) must be CE marked.

The following drawings are included in this tender document:

- 10570/01 - Lighting layout of the Church Plan
- 10570/02 - Lighting layout of the Church Façade
- 10570/03 - Lighting layout of the Left Side Elevation
- 10570/04 - Lighting layout of the Right Side Elevation
- 10570/05- Cable management system layout
- 10570/06 - DB Schedules and schematic
- 10570/07 - Typical Lighting Control Schematic

## Technical specifications for the supply only of luminaires

### ***1.01 Scope of works***

The work comprises the supply and delivery only of exterior luminaires to be installed for St. Helen's Basilica, Birkirkara, Malta.

The lighting system shall comprise a number of luminaires and a control system making up an architectural lighting scheme for the exterior of St. Helen's Basilica, Birkirkara.

Luminaires shall have uniform colour and compact / aesthetic design.

The Tenderers are invited to quote for light fittings which should conform to the following detailed technical specifications.

Preference shall be given to systems which incorporate energy conservation and environment friendly features namely, energy efficient lamps, protection against light pollution and glare control.

### ***1.02 Submittals***

Tenderers shall submit the following information together with their offer:

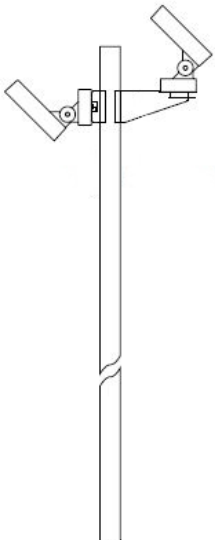
- Technical literature of all components of the lighting equipment
- Guarantee period
- Guarantee against corrosion

### 1.03 Luminaires

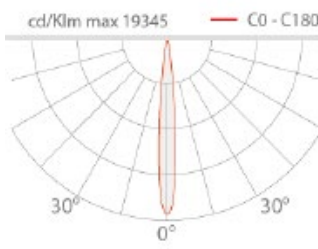
The lighting system shall comprise a number of luminaires and a control system making up an architectural lighting scheme for the exterior of St. Helen's Basilica in Birkirkara. The contractor shall be responsible for the supply of the luminaires as well as full technical coordination with the installer. The light fittings shall be handed over to the contracting authority fully assembled and ready for installation by the appointed contractor.

#### 1.03.1 Technical specifications for luminaires

##### Pole

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction and finish  | The pole should be made of steel with high resistance against corrosion. The surface should be treated for further protection through hot dip galvanisation. After which, a thorough painting process including polymerization to ensure high resistance against UV rays and any other rough weather conditions. The pole should come complete with an inspection door, terminal cable block, fuse, surge protection device and pole case cover. Any mounting accessories and internal wiring are to be included. |
| Dimensions               | Total height of pole: 8000mm-9300mm<br>Total diameter of buried base: 150mm-170mm<br>Total diameter of pole: 60mm-100mm<br>Thickness: 3mm-4mm                                                                                                                                                                                                                                                                                                                                                                     |
| Mounting                 | Ground recessed installation to a cement base. A bracket suitable for mounting the luminaire types to the pole shall be included.                                                                                                                                                                                                                                                                                                                                                                                 |
| Typical Pole arrangement |                                                                                                                                                                                                                                                                                                                                                                                                                                |

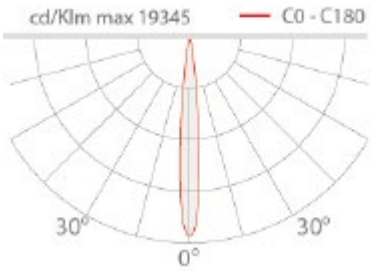

## Luminaire Type A1

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A recessed linear profile to illuminate the lower columns on the front facade of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                           |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Dimensions                         | Luminaire body height: 20mm-50mm<br>Luminaire body width: 20mm-50mm<br>Luminaire body length: 700mm-1000mm                                                                                                                                                   |
| LED power                          | 38-40W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Recessed                                                                                                                                                                                                                                                     |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK08 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Luminous efficacy                  | 98 lm/W or better                                                                                                                                                                                                                                            |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Insulation Class                   | II or better                                                                                                                                                                                                                                                 |
| Beam Width                         | 10° - 12°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |

Typical Luminaire



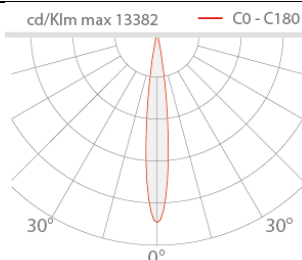

## Luminaire Type A2

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate the upper columns front facade of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                           |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 20mm-50mm<br>Luminaire body width: 20mm-50mm<br>Luminaire body length: 700mm-1000mm                                                                                                                                                   |
| LED power                          | 38-40W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK08 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Luminous efficacy                  | 98 lm/W or better                                                                                                                                                                                                                                            |
| Insulation Class                   | II or better                                                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Beam Width                         | 10° - 12°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |
| Typical Luminaire                  |                                                                                                                                                                          |

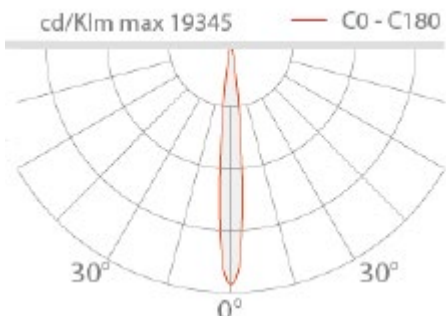




## Luminaire Type B

|                                    |                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A recessed uplighter to illuminate the main entrance of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                                                                                        |
| Construction and finish            | The body shall be made of technopolymer with heat dissipating properties. The outer trim shall be made of stainless steel. The screen shall be made from a minimum 10mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Dimensions                         | Luminaire body diameter: 120mm-160mm<br>Luminaire body depth: 80mm-120mm                                                                                                                                                                                                                                                         |
| LED power                          | 14W-16W                                                                                                                                                                                                                                                                                                                          |
| Control                            | DALI                                                                                                                                                                                                                                                                                                                             |
| Mounting type                      | Recessed                                                                                                                                                                                                                                                                                                                         |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                                                                                                   |
| Impact protection                  | IK08 or better                                                                                                                                                                                                                                                                                                                   |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                                                                                            |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                                                                                     |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                                                                                        |
| Luminous efficacy                  | 90 lm/W or better                                                                                                                                                                                                                                                                                                                |
| Insulation Class                   | II or better                                                                                                                                                                                                                                                                                                                     |
| Lifetime/ Lumen maintenance        | 50 000h L95 B10 or better                                                                                                                                                                                                                                                                                                        |
| Beam Width                         | 12° - 14°                                                                                                                                                                                                                                                                                                                        |
| Polar diagram                      |                                                                                                                                                                                                                                               |
| Typical Luminaire                  |                                                                                                                                                                                                                                               |

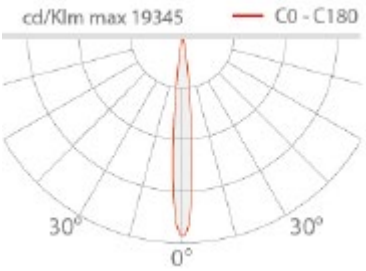

## Luminaire Type C

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate details on the front facade of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                              |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 20mm-50mm<br>Luminaire body width: 20mm-50mm<br>Luminaire body length: 1100mm-1600mm                                                                                                                                                  |
| LED power                          | 63-65W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface mounted                                                                                                                                                                                                                                              |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK 08 or better                                                                                                                                                                                                                                              |
| Insulation Class                   | II or better                                                                                                                                                                                                                                                 |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Luminous efficacy                  | 100 lm/W or better                                                                                                                                                                                                                                           |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Beam Width                         | 10° - 12°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |

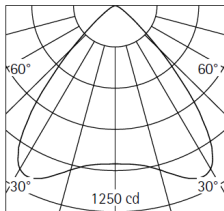

Typical Luminaire



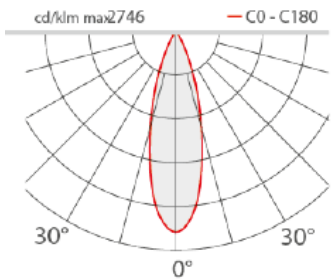

## Luminaire Type D

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate the coloumn on the side facade of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                           |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 20mm-50mm<br>Luminaire body width: 20mm-50mm<br>Luminaire body length: 700mm-900mm                                                                                                                                                    |
| LED power                          | 38-40W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK 08 or better                                                                                                                                                                                                                                              |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation Class                   | II or better                                                                                                                                                                                                                                                 |
| Luminous efficacy                  | 61 lm/W or better                                                                                                                                                                                                                                            |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Beam Width                         | 10° - 12°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |
| Typical Luminaire                  |                                                                                                                                                                          |

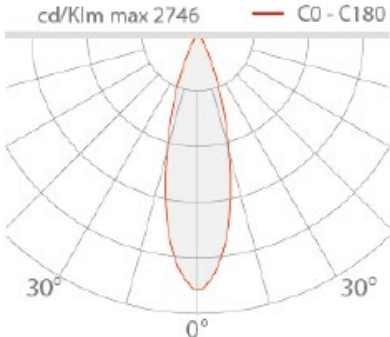
## Luminaire Type E

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted projector to illuminate the small cupolas on the side of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                                                                                                                                      |
| Tilt/Rotation                      | Luminaire body to have 0-90° tilt capability and 360° rotation relative to luminaire base.                                                                                                                                                                                                                                                                                                        |
| Construction and finish            | The body shall be made of corrosion resistant cast aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone.                                                                      |
| Dimensions                         | Luminaire body height: 200mm-250mm<br>Luminaire body length: 120mm-180mm<br>Luminaire base: 100mm-200mm                                                                                                                                                                                                                                                                                           |
| LED power                          | 24W-26W                                                                                                                                                                                                                                                                                                                                                                                           |
| Control                            | DALI                                                                                                                                                                                                                                                                                                                                                                                              |
| Dimming function                   | Dimmable from 0-100%                                                                                                                                                                                                                                                                                                                                                                              |
| Mounting type                      | Surface mounted                                                                                                                                                                                                                                                                                                                                                                                   |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                                                                                                                                                                    |
| Insulation Class                   | Class II or better                                                                                                                                                                                                                                                                                                                                                                                |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                                                                                                                                                             |
| Colour Rendering Index             | 90 or better                                                                                                                                                                                                                                                                                                                                                                                      |
| Standard deviation colour matching | 1.5 or less                                                                                                                                                                                                                                                                                                                                                                                       |
| Luminous efficacy                  | 67 lm/W or better                                                                                                                                                                                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance        | L90/B10 $\geq$ 50000h or better                                                                                                                                                                                                                                                                                                                                                                   |
| Beam Width                         | 82° - 84°                                                                                                                                                                                                                                                                                                                                                                                         |
| Polar diagram                      |  <p>The polar diagram illustrates the light distribution of the luminaire. It features a semi-circular grid with radial lines representing beam angles. Key angles marked include 30°, 60°, and 82°. A central peak is labeled '1250 cd', indicating the maximum candela output at the center of the beam.</p> |
| Typical Luminaire                  |  <p>A photograph of the Luminaire Type E, showing its surface-mounted design. The luminaire has a rectangular body with a mounting plate and a lens assembly. It is shown in a dark environment, highlighting its form and finish.</p>                                                                         |

## Luminaire Type F

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate details on the front and side facades of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                    |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 60mm-80mm<br>Luminaire body width: 30mm-50mm<br>Luminaire body length: 600mm-800mm                                                                                                                                                    |
| LED power                          | 22-24W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress protection                 | IP65 or better                                                                                                                                                                                                                                               |
| Impact Protection                  | IK08 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation class                   | II or better                                                                                                                                                                                                                                                 |
| Luminous efficacy                  | 110 lm/W or better                                                                                                                                                                                                                                           |
| Lifetime/ Lumen maintenance        | 50000h L85 B10 or better                                                                                                                                                                                                                                     |
| Beam Width                         | 29° - 31°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |
| Typical Luminaire                  |                                                                                                                                                                          |

## Luminaire Type G

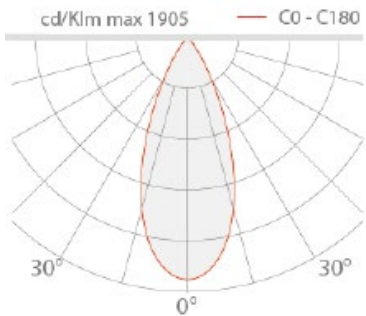

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A recessed linear profile to illuminate details on the front and side facades of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                           |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 60mm-80mm<br>Luminaire body width: 30mm-50mm<br>Luminaire body length: 1400mm-1600mm                                                                                                                                                  |
| LED power                          | 63-65W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Recessed                                                                                                                                                                                                                                                     |
| Ingress protection                 | IP65 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation class                   | II or better                                                                                                                                                                                                                                                 |
| Luminous efficacy                  | 110 lm/W or better                                                                                                                                                                                                                                           |
| Lifetime/ Lumen maintenance        | 50000h L85 B10 or better                                                                                                                                                                                                                                     |
| Beam Width                         | 29° - 31°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |



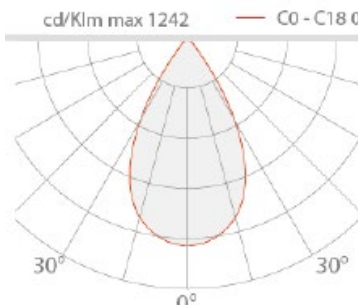

Typical Luminaire



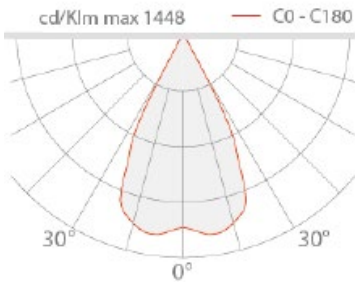

## Luminaire Type H

|                                    |                                                                                                                                                                                                                           |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted spot luminaire to illuminate the architectural details on the upper part of the front façade of the church. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass.                                                          |
| Tilt                               | Luminaire to have 0-190° tilt capability                                                                                                                                                                                  |
| Dimensions                         | Luminaire body height: 80mm-100mm<br>Luminaire body diameter: 80mm-90mm                                                                                                                                                   |
| LED power                          | 14-16W                                                                                                                                                                                                                    |
| Control                            | DALI                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                           |
| Ingress of protection              | IP66 or better                                                                                                                                                                                                            |
| Impact protection                  | IK09 or better                                                                                                                                                                                                            |
| Insulation Class                   | Class II or III                                                                                                                                                                                                           |
| Colour temperature                 | 3000K                                                                                                                                                                                                                     |
| Colour Rendering Index             | 90 or better                                                                                                                                                                                                              |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance        | 50000h L95 B10 or better                                                                                                                                                                                                  |
| Beam Width                         | 41°-43°                                                                                                                                                                                                                   |
| Polar diagram                      |                                                                                                                                        |
| Typical Luminaire                  |                                                                                                                                        |

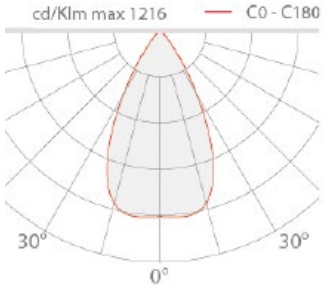

## Luminaire Type I

|                                    |                                                                                                                                                                                                                           |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted spot luminaire to illuminate the architectural details on the upper part of the front façade of the church. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass.                                                          |
| Tilt                               | Luminaire to have 0-190° tilt capability                                                                                                                                                                                  |
| Dimensions                         | Luminaire body height: 80mm-100mm<br>Luminaire body diameter: 80mm-85mm                                                                                                                                                   |
| LED power                          | 14-16W                                                                                                                                                                                                                    |
| Control                            | DALI                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                           |
| Ingress of protection              | IP66 or better                                                                                                                                                                                                            |
| Impact protection                  | IK09 or better                                                                                                                                                                                                            |
| Insulation Class                   | Class II or III                                                                                                                                                                                                           |
| Colour temperature                 | 3000K                                                                                                                                                                                                                     |
| Colour Rendering Index             | 90 or better                                                                                                                                                                                                              |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance        | 50000h L95 B10 or better                                                                                                                                                                                                  |
| Beam Width                         | 57° -59°                                                                                                                                                                                                                  |
| Polar diagram                      |                                                                                                                                        |
| Typical Luminaire                  |                                                                                                                                        |

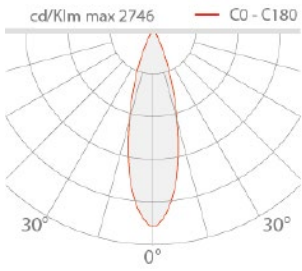

## Luminaire Type J

|                                    |                                                                                                                                                                                                                              |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted spot luminaire to illuminate the architectural details of the bell towers and upper part of the church façade. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass.                                                             |
| Tilt/Rotation                      | Luminaire body to have 0-90° tilt capability and 360° rotation relative to luminaire base.                                                                                                                                   |
| Dimensions                         | Luminaire body height: 70mm-90mm<br>Luminaire body diameter: 30mm-50mm<br>Luminaire base diameter: 30mm-50mm                                                                                                                 |
| LED power                          | 4W - 6W                                                                                                                                                                                                                      |
| Control                            | DALI                                                                                                                                                                                                                         |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                              |
| Ingress of protection              | IP66 or better                                                                                                                                                                                                               |
| Impact protection                  | IK07 or better                                                                                                                                                                                                               |
| Insulation Class                   | Class II or III                                                                                                                                                                                                              |
| Colour temperature                 | 3000K                                                                                                                                                                                                                        |
| Colour Rendering Index             | 90 or better                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                    |
| Lifetime/ Lumen maintenance        | 50 000h L90 B10 or better                                                                                                                                                                                                    |
| Beam Width                         | 53° - 55°                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                           |
| Typical luminaire                  |                                                                                                                                           |

## Luminaire Type K

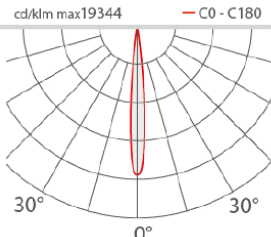
|                                    |                                                                                                                                                                                          |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted spot luminaire to illuminate the architectural details of the bell towers. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass.                         |
| Tilt                               | Luminaire to have 0-190° tilt capability                                                                                                                                                 |
| Dimensions                         | Luminaire body height: 100mm-120mm<br>Luminaire body diameter: 100mm-120mm                                                                                                               |
| LED power                          | 24W-26W                                                                                                                                                                                  |
| Control                            | DALI                                                                                                                                                                                     |
| Mounting type                      | Surface Mounted                                                                                                                                                                          |
| Ingress of protection              | IP66 or better                                                                                                                                                                           |
| Impact protection                  | IK08 or better                                                                                                                                                                           |
| Colour temperature                 | 3000K                                                                                                                                                                                    |
| Colour Rendering Index             | 90 or better                                                                                                                                                                             |
| Insulation Class                   | Class II or III                                                                                                                                                                          |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                |
| Lifetime/ Lumen maintenance        | 50 000h L95/B10 or better                                                                                                                                                                |
| Beam width                         | 54-56°                                                                                                                                                                                   |
| Polar diagram                      |                                                                                                       |
| Typical Luminaire                  |                                                                                                       |

## Luminaire Type L

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate the cupola. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                                                                                                                                                                                                                                                                                                                               |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays.                                                                                                                                                                                                                                                                                                   |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Dimensions                         | Luminaire body height: 60mm-80mm<br>Luminaire body width: 30mm-40mm<br>Luminaire body length: 900mm-1000mm                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| LED Power                          | 15-17W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Ingress protection                 | IP65 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Impact Protection                  | IK06 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Insulation class                   | Class II or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Luminous efficacy                  | 75 lm/W or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Lifetime/ Lumen maintenance        | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Beam width                         | 29° -31°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Polar diagram                      |  <p>cd/Klm max 2746 — CO - C180</p> <p>30° 0° 30°</p> <p>The polar diagram illustrates the beam spread of the luminaire. It features a semi-circular grid with radial lines representing beam angles. A red line indicates the beam spread, which is centered at 0° and extends to approximately 30° on both sides. The text 'cd/Klm max 2746' is at the top, and 'CO - C180' is written below it. The angles 30°, 0°, and 30° are marked at the bottom of the diagram.</p> |
| Typical Luminaire                  |  <p>The image shows a black, linear luminaire fixture. It has a long, rectangular body with a series of small, square light sources along its length. The fixture is mounted on a black, L-shaped bracket. A small, cylindrical component, likely a control gear or sensor, is attached to the side of the fixture. The background is white.</p>                                                                                                                            |



## Luminaire Type M

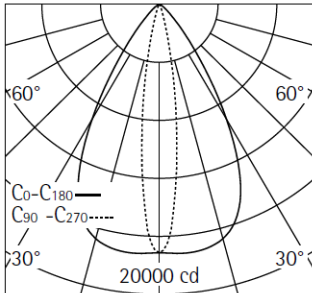

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate the windows. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                            |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 60mm-80mm<br>Luminaire body width: 30mm-40mm<br>Luminaire body length: 600mm-700mm                                                                                                                                                    |
| LED power                          | 22-24W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress protection                 | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK08 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation class                   | II or better                                                                                                                                                                                                                                                 |
| Luminous efficacy                  | 110 lm/W or better                                                                                                                                                                                                                                           |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Beam Width                         | 10° - 12°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |



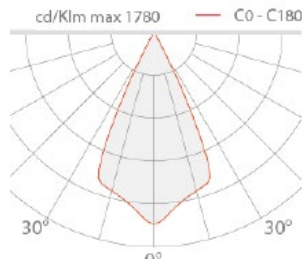
Typical Luminaire



## Luminaire Type N

|                             |                                                                                                                                                                                                                                                                                                                              |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                 | A surface mounted frame projector to illuminate the cupola. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                                                                                            |
| Construction and finish     | The body shall be made of corrosion resistant cast aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone. |
| Tilt/Rotation               | Luminaire body to have 0-90° tilt capability and 360° rotation relative to luminaire base.                                                                                                                                                                                                                                   |
| Dimensions                  | Luminaire body height: 350mm - 400mm<br>Luminaire body width: 280mm - 320mm<br>Luminaire base diameter: 140mm - 160mm                                                                                                                                                                                                        |
| LED power                   | 72-73W                                                                                                                                                                                                                                                                                                                       |
| Control                     | DALI                                                                                                                                                                                                                                                                                                                         |
| Mounting type               | Surface Mounted                                                                                                                                                                                                                                                                                                              |
| Ingress protection          | IP65 or better                                                                                                                                                                                                                                                                                                               |
| Colour temperature          | 3000K                                                                                                                                                                                                                                                                                                                        |
| Colour Rendering Index      | 90 or better                                                                                                                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                                    |
| Beam Width                  | C0-C180: 15° -17°<br>C90-C270: 60° -62°                                                                                                                                                                                                                                                                                      |
| Polar diagram               |                                                                                                                                                                                                                                           |
| Typical Luminaire           |                                                                                                                                                                                                                                           |

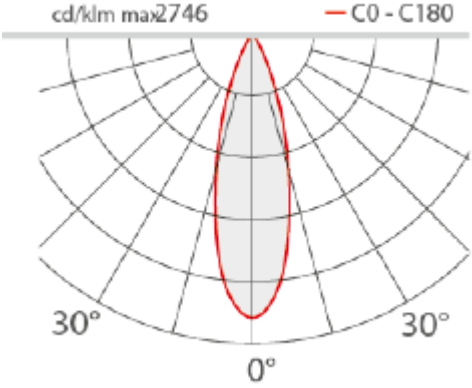
## Luminaire Type O

|                                    |                                                                                                                                                                         |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted frame projector to illuminate the top part of the cupola. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass.        |
| Tilt/Rotation                      | Luminaire body to have 0-90° tilt capability and 360° rotation relative to luminaire base.                                                                              |
| Dimensions                         | Luminaire body height: 90mm-100mm<br>Luminaire body diameter: 50mm-70mm<br>Luminaire base diameter: 50mm-70mm                                                           |
| LED power                          | 13-15W                                                                                                                                                                  |
| Control                            | DALI                                                                                                                                                                    |
| Mounting type                      | Surface Mounted                                                                                                                                                         |
| Ingress protection                 | IP66 or better                                                                                                                                                          |
| Impact protection                  | IK08 or better                                                                                                                                                          |
| Insulation class                   | Class II or III                                                                                                                                                         |
| Colour temperature                 | 3000K                                                                                                                                                                   |
| Colour Rendering Index             | 90 or better                                                                                                                                                            |
| Standard deviation colour matching | 3 or less                                                                                                                                                               |
| Lifetime/ Lumen maintenance        | 50 000h L95 B10 or better                                                                                                                                               |
| Beam Width                         | 49° -51°                                                                                                                                                                |
| Polar diagram                      |                                                                                      |

Typical Luminaire



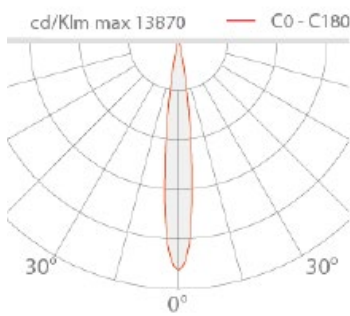

## Luminaire Type P

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate the cupola. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                             |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 60mm-80mm<br>Luminaire body length: 600mm-700mm<br>Luminaire body width: 30mm-50mm                                                                                                                                                    |
| LED power                          | 22-24W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress protection                 | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK08 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation Class                   | Class II or better                                                                                                                                                                                                                                           |
| Luminous efficacy                  | 110lm/W or better                                                                                                                                                                                                                                            |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Beam Width                         | 29° - 31°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                          |

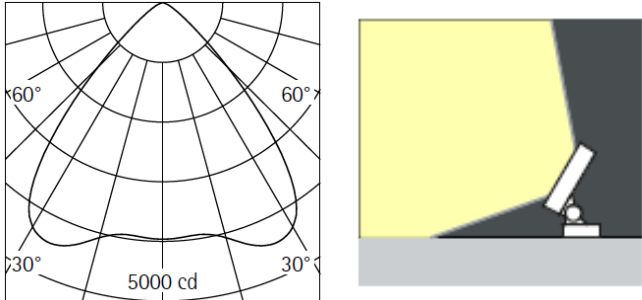
Typical Luminaire



## Luminaire Type Q

|                                    |                                                                                                                                                                  |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted spot luminaire to illuminate the cupola pillars. The light fitting shall be complete with control gear, mounting and anti-glare accessories.   |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass. |
| Tilt/Rotation                      | Luminaire body to have 0-90° tilt capability and 360° rotation relative to luminaire base.                                                                       |
| Dimensions                         | Luminaire body height: 80mm -100mm<br>Luminaire body diameter: 50mm - 70mm<br>Luminaire base diameter: 50mm - 70mm                                               |
| LED power                          | 13-15W                                                                                                                                                           |
| Control                            | DALI                                                                                                                                                             |
| Mounting type                      | Surface Mounted                                                                                                                                                  |
| Ingress of protection              | IP66 or better                                                                                                                                                   |
| Impact protection                  | IK08 or better                                                                                                                                                   |
| Insulation Class                   | Class II or III                                                                                                                                                  |
| Colour temperature                 | 3000K                                                                                                                                                            |
| Colour Rendering Index             | 90 or better                                                                                                                                                     |
| Standard deviation colour matching | 3 or less                                                                                                                                                        |
| Lifetime/ Lumen maintenance        | 50 000h L95 B10 or better                                                                                                                                        |
| Beam Width                         | 12° - 14°                                                                                                                                                        |
| Polar diagram                      |                                                                               |
| Typical Luminaire                  |                                                                               |

## Luminaire Type R


|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Description                 | A surface mounted projector to illuminate architectural details of the back part of the church. The light fitting shall be complete with control gear, mounting and anti-glare accessories.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Construction and finish     | The body shall be made of corrosion resistant cast aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Tilt/Rotation               | Luminaire body to have 0-90° tilt capability and 300° rotation relative to luminaire base.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| Dimensions                  | Luminaire body height: 410mm - 430mm<br>Luminaire body width: 300mm - 400mm<br>Luminaire base diameter: 140mm - 160mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| LED power                   | 96-97W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| Control                     | DALI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| Dimming range               | 1%-100%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| Mounting type               | Surface Mounted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
| Ingress protection          | IP65 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| Colour temperature          | 3000K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Colour Rendering Index      | 90 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  |
| Binning                     | 1.5 or less                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Lifetime/ Lumen maintenance | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| Beam Width                  | 83° -85°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| Polar diagram               |  <p>The polar diagram on the left shows a beam spread of 83° to 85°, with a central beam width of 5000 cd. The beam spread is indicated by a 60° angle on the left and a 30° angle on the right. The beam spread is also indicated by a 60° angle on the left and a 30° angle on the right. The beam spread is also indicated by a 60° angle on the left and a 30° angle on the right.</p> <p>The illustration on the right shows a surface-mounted projector illuminating a wall. The beam spread is indicated by a 60° angle on the left and a 30° angle on the right. The beam spread is also indicated by a 60° angle on the left and a 30° angle on the right. The beam spread is also indicated by a 60° angle on the left and a 30° angle on the right.</p> |  |



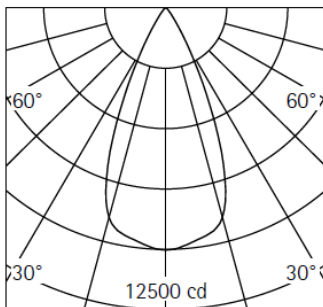
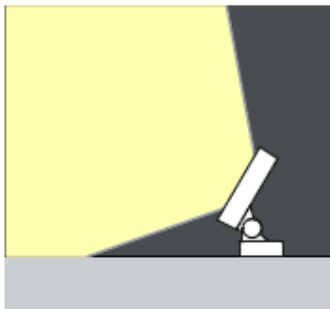

Typical Luminaire




## Luminaire Type S

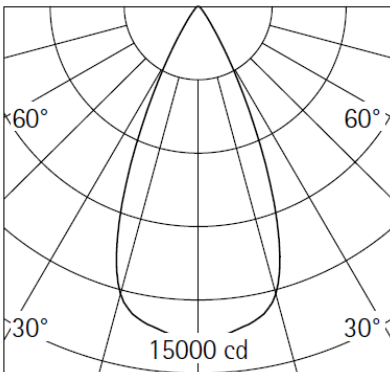


|                             |                                                                                                                                                                                                        |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                 | A surface mounted linear profile made of aluminum to illuminate the central top part of the church façade. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Dimensions                  | Luminaire body length: 2500mm -3000mm<br>Luminaire body diameter: 20mm - 40mm                                                                                                                          |
| LED power                   | 16-20W/m                                                                                                                                                                                               |
| Control                     | DALI                                                                                                                                                                                                   |
| Mounting type               | Surface Mounted                                                                                                                                                                                        |
| Ingress protection          | IP65 or better                                                                                                                                                                                         |
| Colour temperature          | 3000K                                                                                                                                                                                                  |
| Colour Rendering Index      | 90 or better                                                                                                                                                                                           |
| Lifetime/ Lumen maintenance | 60 000h L70 B50 or better                                                                                                                                                                              |
| Typical Luminaire           |                                                                                                                      |

## Luminaire Type X

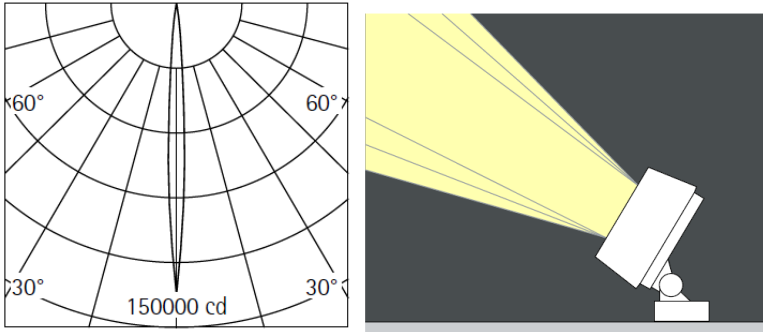
|                             |                                                                                                                                                                                                                                                                                                                              |  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Description                 | A pole mounted projector to illuminate side of the church. The light fitting shall be complete with control gear, mounting and anti-glare accessories.                                                                                                                                                                       |  |
| Construction and finish     | The body shall be made of corrosion resistant cast aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone. |  |
| Tilt/Rotation               | Luminaire body to have 0-90° tilt capability and 300° rotation relative to luminaire base.                                                                                                                                                                                                                                   |  |
| Dimensions                  | Luminaire body height: 350mm - 400mm<br>Luminaire body width: 280mm - 320mm<br>Luminaire base diameter: 140mm - 160mm                                                                                                                                                                                                        |  |
| LED power                   | 72W-73W                                                                                                                                                                                                                                                                                                                      |  |
| Control                     | DALI                                                                                                                                                                                                                                                                                                                         |  |
| Dimming function            | Dimmable from 1-100%                                                                                                                                                                                                                                                                                                         |  |
| Mounting type               | Pole mounted                                                                                                                                                                                                                                                                                                                 |  |
| Degree of protection        | IP65 or better                                                                                                                                                                                                                                                                                                               |  |
| Colour temperature          | 3000K                                                                                                                                                                                                                                                                                                                        |  |
| Colour Rendering Index      | 90 or better                                                                                                                                                                                                                                                                                                                 |  |
| Lifetime/ Lumen maintenance | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                                    |  |
| Beam width                  | 45° -47°                                                                                                                                                                                                                                                                                                                     |  |
| Polar diagram               |                                                                                                                                                       |  |
| Typical Luminaire           |                                                                                                                                                                                                                                           |  |
| Pole Details                |                                                                                                                                                                                                                                                                                                                              |  |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction and finish  | The pole should be made of steel with high resistance against corrosion. The surface should be treated for further protection through hot dip galvanisation. After which, a thorough painting process including polymerization to ensure high resistance against UV rays and any other rough weather conditions. The pole should come complete with an inspection door, terminal cable block, fuse, surge protection device and pole case cover. Any mounting accessories and internal wiring are to be included. |
| Dimensions               | Total height of pole: 8000mm-9300mm<br>Total diameter of buried base: 150mm-170mm<br>Total diameter of pole: 60mm-100mm<br>Thickness: 3mm-4mm                                                                                                                                                                                                                                                                                                                                                                     |
| Mounting                 | Ground recessed installation to a cement base. A bracket suitable for mounting the luminaire types to the pole shall be included.                                                                                                                                                                                                                                                                                                                                                                                 |
| Typical Pole arrangement |                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Luminaire Type Y

|                             |                                                                                                                                                                                                                                                                                                                              |  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Description                 | A surface/pole mounted projector to illuminate the sides and façade of the church. The light fitting shall be complete with control gear, mounting and anti-glare accessories.                                                                                                                                               |  |
| Construction and finish     | The body shall be made of corrosion resistant cast aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone. |  |
| Tilt/Rotation               | Luminaire body to have 0-90° tilt capability and 300° rotation relative to luminaire base.                                                                                                                                                                                                                                   |  |
| Dimensions                  | Luminaire body height: 400mm - 450mm<br>Luminaire body width: 300mm - 400mm<br>Luminaire base diameter: 140mm - 160mm                                                                                                                                                                                                        |  |
| LED power                   | 96W-97W                                                                                                                                                                                                                                                                                                                      |  |
| Control                     | DALI                                                                                                                                                                                                                                                                                                                         |  |
| Dimming function            | Dimmable from 1-100%                                                                                                                                                                                                                                                                                                         |  |
| Mounting type               | Surface/Pole Mounted                                                                                                                                                                                                                                                                                                         |  |
| Degree of protection        | IP65 or better                                                                                                                                                                                                                                                                                                               |  |
| Colour temperature          | 3000K                                                                                                                                                                                                                                                                                                                        |  |
| Colour Rendering Index      | 90 or better                                                                                                                                                                                                                                                                                                                 |  |
| Lifetime/ Lumen maintenance | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                                    |  |
| Beam Width                  | 45° - 47°                                                                                                                                                                                                                                                                                                                    |  |
| Polar diagram               |                                                                                                                                                       |  |
| Typical Luminaire           |                                                                                                                                                                                                                                           |  |

## Luminaire Type Z

|                             |                                                                                                                                                                                                                                                                                                                         |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                 | A surface mounted projector to illuminate the church façade architectural details. The light fitting shall be complete with control gear, mounting and anti-glare accessories.                                                                                                                                          |
| Construction and finish     | The body shall be made of corrosion resistant aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone. |
| Tilt/Rotation               | Luminaire body to have 0-90° tilt capability and 300° rotation relative to luminaire base.                                                                                                                                                                                                                              |
| Dimensions                  | Luminaire body height: 350mm - 400mm<br>Luminaire body diameter: 280mm - 350mm<br>Luminaire base diameter: 140mm - 160mm                                                                                                                                                                                                |
| Control                     | DALI                                                                                                                                                                                                                                                                                                                    |
| Dimming function            | Dimmable from 1-100%                                                                                                                                                                                                                                                                                                    |
| LED Power / Supply voltage  | 32W-33W                                                                                                                                                                                                                                                                                                                 |
| Mounting type               | Surface mounted                                                                                                                                                                                                                                                                                                         |
| Colour temperature          | 3000K                                                                                                                                                                                                                                                                                                                   |
| Colour rendering index      | 90 or better                                                                                                                                                                                                                                                                                                            |
| Ingress protection          | IP65 or better                                                                                                                                                                                                                                                                                                          |
| Beam Width                  | 5° -7°                                                                                                                                                                                                                                                                                                                  |
| Lifetime/ Lumen maintenance | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                               |
| Polar diagram               |                                                                                                                                                                                                                                     |

Typical Luminaire



## Luminaire accessories

The St. Helen's Basilica surroundings requires luminaires which are compatible a high degree of visual comfort. Any accessories shall be of the same proprietary brand and compatible with the luminaires forming part of this project. The colour of these accessories shall be black, grey or white depending on the colour of the body.

### 1.03.2 Guarantee

The Tenderer shall provide a manufacturer' warranty over each and every luminaire and shall clearly indicate the period of validity of the guarantee in the attached form. Such a guarantee shall be for a **minimum of 5 years excluding consumables**. The guarantee shall not impose any limit whatsoever on the utilisation time (hours of use) or the number of ON/OFF switching cycles during the guarantee period.




## **1.04 Lighting control system**

### **1.04.1 Wireless lighting control module**


|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description        | <p>Wireless lighting control module to interface Bluetooth Low Energy (BLE) system with the hardwired DALI system.</p> <p>Bluetooth controllable, wireless interface enabled, 2-channel, 0-10V/DALI controller. The module should allow for the control one or two 0-10V controllable LED drivers. It should also allow for any configurations to a DALI LED driver or sensor. The module can be controlled via a compatible application.</p> <p>The module should incorporate a standalone DALI output, allowing for connections with any LED drivers with DALI interface.</p> |
| Control            | Via application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Range              | Minimum of 50m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Ingress protection | IP20 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Input              | Voltage range: 100-240 VAC<br>Frequency: 50-60 Hz<br>Max. mains current: 35 mA<br>No-load standby power: < 0,5 W                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Channel 1 output   | Output voltage, 0-10V: 0-10 VDC, max. 7 mA (sinking)<br>Output voltage, DALI: 12 VDC, max. 20 mA (sourcing)<br>Maximum number of drivers: 1 driver or 1 sensor/push button                                                                                                                                                                                                                                                                                                                                                                                                      |
| Channel 2 output   | Output voltage, 0-10V: 0-10 VDC, max. 7 mA (sinking)<br>Output voltage, relay control: 12 VDC, max. 100 mA (sourcing)<br>Maximum number of drivers: 1                                                                                                                                                                                                                                                                                                                                                                                                                           |

### **1.04.2 Range extension module**

|             |                                                                                        |
|-------------|----------------------------------------------------------------------------------------|
| Description | Range extension module to increase the range of the Bluetooth Low Energy mesh network. |
|-------------|----------------------------------------------------------------------------------------|

|                    |                                                                                    |
|--------------------|------------------------------------------------------------------------------------|
| Typical Module     |  |
| Network            | Bluetooth Mesh Technology                                                          |
| Range              | Minimum of 50m                                                                     |
| Ingress protection | IP20 or better                                                                     |
| Input              | Operating voltage: 230 VAC<br>Frequency: 50 Hz                                     |

### 1.04.3 Remote access Gateway

|                             |                                                                                                                                                                                                                                         |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                 | A BLE-gateway allowing for remote access and control of the Bluetooth low energy interface through Ethernet or wifi. Can be used for remote diagnostics, network monitoring or remote control of up to two wireless interface networks. |
| Dimensions                  | 100mm-150mm (length)<br>25mm-30mm (height)<br>100mm-150mm (width)                                                                                                                                                                       |
| Typical gateway device      |                                                                                                                                                      |
| Range                       | Minimum of 30m                                                                                                                                                                                                                          |
| Memory                      | 2GB DDR3 or better                                                                                                                                                                                                                      |
| Wifi standard               | IEEE 802.11 b/g/n, 2.4G                                                                                                                                                                                                                 |
| Operating Relative Humidity | 10% to 95%                                                                                                                                                                                                                              |
| Operating Temperature       | 0° to 50° C                                                                                                                                                                                                                             |
| Embedded multi-media card   | 8GB EMMC<br>or better                                                                                                                                                                                                                   |
| Processor                   | QDSP6 v5 core at up to 691 MHz                                                                                                                                                                                                          |

### 1.04.4 DALI master controller

The DIN rail DALI master controller shall be a central controller to control DALI controllers/drivers and configure DALI input devices on the DALI line. Each DALI channel

shall be able to automatically assign and manage addresses of at least 64 control devices. It shall include the following features:

- Each DALI channel enables to set up a minimum of 8 DALI scenes
- Enables to set up to 256 timer tasks
- Designed with PC configuration software tool - enables to configure and read parameters of the master and control devices

#### **1.04.5 0/1-10V - DALI controller**

The 0/1-10V-DALI controller shall serve as an interface between 0/1-10V luminaires and the DALI network. This will convert the analogue 0/1-10V control signals into DALI and provide an address to a group of non-DALI luminaires to be dimmed according to the selected lighting scene.

#### **1.04.6 Wireless scene selector and control switch**

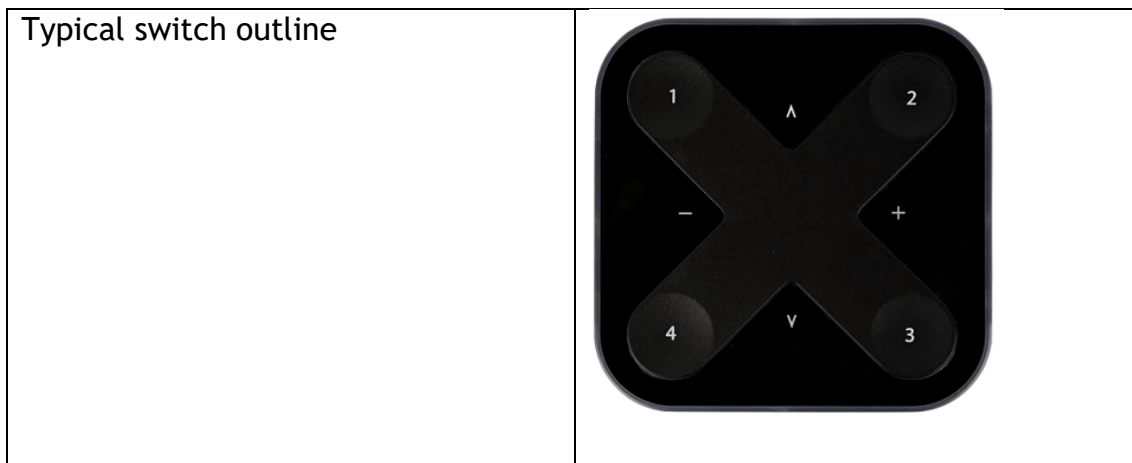
The switch shall have a range of at least 45m in open air and shall consist of a battery powered wireless user interface that shall provide selection of different pre-programmed lighting scenes and also control of individual or group luminaries. The scenes shall be configured via a compatible application. Other features provided by the switch shall include: dimming.

The mentioned application shall be freely available on any android or IOS device and shall be compatible with the luminaires forming part of this project. It shall be a user-friendly application with an intuitive menu system. The technology shall allow the user to store a selected colour temperature, dimming level or colour, besides the creation of time-based scenes and animations. It shall also allow circadian scenes to be created allowing automatic colour temperature adjustment depending on the time of the day.

A mounting bracket/wall mounting plate shall be provided with the wireless switch.

Moreover, the wireless switch shall have the following characteristics:

|                                            |                                                       |
|--------------------------------------------|-------------------------------------------------------|
| Dimensions                                 | 90-100mm (length), 90-100mm (height), 10-13mm (depth) |
| Wireless Range                             | 45 m minimum                                          |
| Colour                                     | White or black (to be determined at a later stage)    |
| Number of selectable pre-programmed scenes | minimum of 4 different scenes per switch              |
| Battery lifetime                           | 2 years minimum                                       |



#### ***1.04.7 Setting up of luminaires and programming***

Following the completion of the installation works, the Contractor carrying out the installation works shall carry out physical pan and tilt adjustments of all the luminaires under the direction of the Engineer. The supplier shall also be present for this exercise and shall be responsible for the setting up of the lighting control system including the setting up of the DALI and Bluetooth wireless interface, programming the respective brightness level and/or chromaticity, depending on the type of luminaire. This shall be followed by full programming of the various scenes as instructed by the Employer.

#### ***1.04.8 Lighting trials and supervision of installation of luminaires***

The supplier of the luminaires is to attend on site meetings with the installer, as required during the installation of the luminaires in order to carry out supervision of the works, explain the wiring configuration, assembly and installation of the luminaires. In this regard, the supplier shall be responsible for the full technical coordination with the contractor carrying out the installation of the luminaires.

Full scale lighting trials shall be carried out by the supplier of the luminaires in order to determine the exact quantity, type and position of luminaires required. During these trials, the luminaire arrangement may be altered as and when required.

The lighting trials shall take place after sunset. Each of these sessions shall have a duration of up to 3 hours.

The rates quoted by the Contractor for the lighting trials shall be deemed to include all expenses incurred by the contractor including but not necessarily limited to, travel and accommodation, sustenance, travel allowances, wages, overheads and taxes.

#### **1.04.9 Training**

The Contractor shall provide full training to the Client's nominated personnel. The duration of the training shall be 4 hours minimum and shall cover maintenance of the lighting system as well as the use of the control application on android or iOS devices. Topics to be covered in relation to the application shall include but not necessarily limited to:

- control of individual luminaires or groups
- programming of scenes
- programming of wireless devices such as switches
- animations
- schedules
- accounts
- gateways

## **Lot 2**

**TECHNICAL SPECIFICATIONS FOR THE INSTALLATION AND TESTING ONLY OF LUMINAIRES AND LIGHTING CONTROL SYSTEM FOR THE EXTERIOR LIGHTING OF ST. HELEN'S BASILICA**

## Preamble

Tender for the installation and testing of the electrical LV installation, luminaires and lighting control system for the exterior lighting scheme of St Helen Basilica in Birkirkara, Malta, including the civil works related to in-ground luminaires which also require the design and build of the replica paving elements (with the required cut-outs to seamlessly fit the proposed luminaires).

**The work comprises installation and testing of the electrical LV installation, luminaires and lighting control system for the exterior lighting scheme of St Helen Basilica in Birkirkara, Malta, including the civil works related to in-ground luminaires which also require the design and build of the replica paving elements (with the required cut-outs to seamlessly fit the proposed luminaires).**

The electrical LV shall supply power and lighting to the relevant areas forming part of this project and shall include all necessary switchgear, enclosures, wiring, cable management systems, luminaires, accessories and all necessary equipment and labour to make a complete and functional system.

The successful bidder shall be responsible for the installation of the luminaires.

The specifications shall be read in conjunction with the instructions to tenderers, contract conditions, the drawings and the bill of quantities, which together form the tender document.

All equipment quoted for in this tender shall be new and shall conform to the relevant MSA EN or BS, EN or IEC standards. Equipment to other standards may be considered subject to these being of equivalent or superior standard to the ones mentioned. The Tenderer must provide documentation to back such a claim to the satisfaction of the Engineer. Where reference to British Standards is made in these technical specifications, the equivalent standard applicable in the EU shall be acceptable.

All components, equipment and material falling under legal notices issued relative to the Quality Control Act (Cap.225) must be CE marked.

All equipment and installation shall be guaranteed for a minimum period of 24 months against faulty workmanship and materials. If during this period any parts or equipment have to be changed, the guarantee on that part shall be renewed for another year from date of replacement.

Works also include **the design and build of the replica paving elements, with the required cut-outs to seamlessly fit the proposed luminaires.**

#### Parvis works

The works involve the careful removal of the composite paving of the parvis, mostly the dark border, to prepare trench/pipework/sleeves for the installation of the in-ground luminaires to be installed around the perimeter of the church

The works involve **the design and build of the replica paving elements, with the required cut-outs to seamlessly fit the proposed luminaires.**

The contractor shall liaise with the contracting authority, in order to be able to take over the luminaires to be installed within this lot, and will be responsible for the equipment when given to them and also be responsible that no damage is done to same until fixed and commissioned.

#### Parvis works

The works involve the careful removal of the composite paving of the parvis, mostly the dark border, to prepare trench/pipework/sleeves for the installation of the in-ground luminaires to be installed around the perimeter of the church.

The works involve the design and build of the replica paving elements, with the required cut-outs to seamlessly fit the proposed luminaires.

No existing paving elements shall be modified and extra elements shall be stored by the client.

The in-ground luminaires shall be installed in pre-cast manholes, including a drainage layer, isolated by a geo-textile, as per instructions and strictly following the manufacturer's specifications.

The works have to be carried out carefully, as per approved method statement, under the guidance and supervision of the statutory stakeholders, and representatives therefor, to ensure that no damage is incurred to the historic paving in the parvis to be retained/restored.

The Contractor/s shall bear sole liability for examining the tender documents with appropriate care, including those design documents available for inspection, any clarification notes to the tender documents issued during the tendering period and for obtaining reliable information with respect to conditions and obligations that may in any way affect the amount or nature of the tender or the execution of the works. In the event that a bidder is successful, no claim for alteration of the tender amount will be entertained on the grounds of errors or omissions in the obligations of the tenderer described above.

The works must be carried out as directed/agreed with the Superintendence of Cultural Heritage and other statutory stakeholders.

The bidder must provide all documents required by the provisions of the tender document. All such documents, without exception, must comply strictly with these conditions and provisions and contain no alterations made by the bidder.



The following drawings are included in this tender document:

- 10570/01 - Lighting layout of the Church Plan
- 10570/02 - Lighting layout of the Church Façade
- 10570/03 - Lighting layout of the Left Side Elevation
- 10570/04 - Lighting layout of the Right Side Elevation
- 10570/05- Cable management system layout
- 10570/06 - DB Schedules and schematic
- 10570/07 - Typical Lighting Control Schematic

# SPECIFICATIONS FOR ELECTRICAL LV AND ELV SERVICES

## Preamble

### 1. Workmanship

Except where otherwise stated, workmanship is to the relevant MSA EN or BS, EN or IET standards. Workmanship shall be of a high standard throughout. The contractor shall ensure that the standard of finish demanded by this contract is achieved. Branded materials shall be assembled, constructed and joined in accordance with the manufacturer's instructions and recommendations.

### 2. Fixing to the Building Structure

Light fixings to brick, concrete or other masonry materials shall be by means of correctly sized screws fitted into plastic or metal expanding plugs located in correctly sized holes drilled in the structure. Light fittings to cavity constructions shall be by gravity or spring toggles, or expanding rubber sleeve fitted on to screws.

Slow speed rotary drills as recommended by the manufacturer of fixing device shall be used to carefully drill all holes. The Engineer shall not use percussion type boring devices and shot fired fixings without approval in writing.

In all cases the particular type and size of fixing device used shall be in accordance with the manufacturer's recommendations having regard to the application and the load to be carried by the fixing device.

### 3. Testing and commissioning

All the works provided as part of the contract shall be inspected and commissioned in accordance with the relevant MSA EN or BS, EN or IET standards to the satisfaction of the Engineer. All installations shall be inspected and tested in sections as the work proceeds and on completion as complete systems and it shall be noted that the Engineer may require inspecting or testing any equipment during erection.

All tests shall be arranged in co-operation with the Engineer and he shall be given prior notice of the time, location and nature of the test. No test shall be considered valid unless the Engineer is present. All necessary skilled and unskilled labour shall be provided for attendance duties before, during and after the test.

Defects occurring at any time during the test shall be made good and a complete re-test shall be carried out, all at no extra cost. Where failure during a test, inspection or

commissioning process results in damage to the building fabric and/or services not provided as part of this contract, or requires subsequent builders' work then these items shall be made good at no extra cost.

No section of the works shall be in any way concealed prior to testing and inspection and subsequent concealment where applicable shall only take place following written authority from the Engineer.

All necessary facilities, measuring and recording instruments for inspection/testing and commissioning are to be calibrated as necessary before use. The Engineer reserves the right to call for a demonstration of the accuracy of any instrument used.

All systems shall be commissioned only after inspection and testing procedures have demonstrated the integrity of the system.

#### **4. Instruction of Employers Staff**

The employer's staff will be instructed in the operation and maintenance of the installations by qualified personnel, who shall be fully conversant with the operations and maintenance procedures required for all systems, and where necessary specialist sub-contractor staff shall be made available to enable complete instructions to be given.

All installations shall be demonstrated in full working order together with the procedures to be adopted in the event of system malfunction and the manner in which plant outputs or control settings can be adjusted.

#### **5. Maintenance and Record Drawings**

The contractor shall provide a thorough and easily understandable operation and maintenance manual which should enable non-technical staff to operate the system on a day to day basis and the management staff to plan for and execute routine maintenance.

The contractor shall provide drawings to the scales not less than those used for tendering purposes. These drawings shall show plans and schematics as the engineer may consider necessary to show all required information clearly.

The contractor shall prepare and submit As Fitted Drawings consisting of three sets of prints and one copy on CD ROM.

## 1.0 Technical Specifications for Electrical Installation

### ***1.01 Scope of works***

*The work comprises the installation and testing only of exterior luminaires and lighting control system to be installed for the St. Helen's Basilica, Birkirkara, Malta.*

The electrical low voltage installation shall supply power and lighting services to the relevant locations forming part of this project and shall include all necessary switchgear, enclosures, wiring, cable management systems, luminaires, accessories and all necessary equipment and labour to make a complete and functional system.

*The successful bidder shall also be responsible for the supply of the luminaries, delivery to site, installation, testing and commissioning.*

Any ground trenching works shall also be carried out by contractor.

### ***1.02 Submittals***

Prior to acceptance of the proposed system and equipment, the Contractor shall submit together with his quotation a description of the equipment and its components as offered together with all relevant manufacturer's catalogues, illustrations and diagrams. All relevant technical and descriptive literature shall be in English. Literature shall be supplied for the following:

- H07RN-F cables
- Multicore XLPE/PVC cable (RAL9001 colour)
- Multicore XLPE/LSZH
- Distribution board
- Switchgear
- Heavy-duty, free-standing GRP cabinet
- Earth electrode and inspection pit
- Cable fixing equipment
- Pull boxes
- T-shaped cable connectors

### ***1.03 Regulations and standards***

The installation shall conform to the following regulations and standards:

- Electricity Supply Regulations issued by Enemalta Corporation including amendments.
- IET Wiring Regulations "Requirements for Electrical Installations" - 18<sup>th</sup> Edition including amendments.
- BSI Standards as specified or their equivalent.

### ***1.04 Electrical supply***

The electrical supply shall be 230V ( $\pm 10\%$ ), 50 Hz, single phase, street lighting supply system.

### ***1.05 Wiring system***

Wiring from the distribution boards to the exterior luminaires for the church shall be carried out in H07RN-F cable in galvanized steel conduit along the wall to the pull box and then through the underground PE conduit or XLPE/PVC (RAL9001) cable, as specified on technical drawings. On the other hand wiring between the distribution boards is to be carried out in H07RN-F cables installed on cable trays.

Cable sizing shall be as indicated in distribution board and consumer unit schedules.

Cables with single strand conductors or with an overall conductor c.s.a. of less than 1.5sqmm shall NOT be used.

Loop connections shall only be made in accessible boxes or accessories.

Continuous cable runs only shall be used. Jointing of cables is not allowed.

Rates quoted shall include terminations, glands and bushes etc. as required.

Wiring insulation shall have the following colour coding:

#### Single phase circuits:

- Phase: brown
- Neutral: blue
- Protective conductor: green and yellow

#### DC wiring between DALI driver and light fitting

- DC+: red
- DC-: black

## **1.06Cables**

### **1.06.1 Single core cables**

Single core cables shall conform to BS 7919 and shall have plain annealed and stranded copper conductor and PVC insulation, 300/500V grade.

### **1.06.2 Multicore XLPE/PVC cables**

The cable shall have the following features:

- Insulation - XLPE
- Core Identification - Each single core shall have coloured insulation common throughout the whole installation.
- Conductor - Class 5 flexible copper conductor conforming to BE EN 60228
- Construction - The cores shall be constructed in concentric layer.
- Bedding - PVC
- Colour - RAL 9001
- UV stabilised

### **1.06.3 Multicore XLPE/LSZH cables**

The cable shall have the following features:

- Insulation - XLPE
- Core Identification - Each single core shall have coloured insulation common throughout the whole installation.
- Conductor - Class 5 stranded Copper conductor.
- Construction - The cores shall be constructed in concentric layer.
- Bedding - LSZH

### **1.06.4 Multicore H07RN-F cable**

Multicore H07RN-F cable shall comply with BS EN 50525-2-21. The cable shall be designed to provide high flexibility and have the capacity to withstand weather and harsh environments. Appropriate adaptors shall be used wherever the cable enters or exits a metal or plastic enclosure. The cable shall have the following features:

- Conductor: Class 5 flexible copper conductor conforming to BE EN 60228
- Insulation: EPR Type EI4 conforming to BS EN 50363
- Sheath: PCP Type EM2 conforming to BE EN 50363
- Voltage Rating: 450V / 750V
- Operating Temp.: -15°C to +60°C (when flexed)

#### **1.06.5 T-shaped connectors**

Connection of the luminaire cable to the corresponding circuit shall be carried out by means of proprietary T-connectors. The connectors shall be of polymer construction, compact in size, complete with compression type grommets for cable entry, and an IP rating of IP68. The connectors shall be of the dry type. Resin or gel filled type connectors shall not be accepted.

#### **1.06.6 Cabling Methods**

Where it is necessary to make direct connections between circuit cables and flexible cords, these shall be affected by means of fixed base connectors situated in the conduit outlet box. No conductor used shall have a smaller cross-sectional area than 1.5mm<sup>2</sup>. Flexible cord smaller than 0.50mm<sup>2</sup> shall not be used.

#### **1.06.7 Cable Termination Kit**

All cables shall be adequately terminated using cable glands, earth tags, in accordance with cable manufacturers' recommendations and current codes of practice and standards. The gland shall be neatly covered using a cable shroud that normally forms part of the termination kit.

#### **1.06.8 Cable Lugs**

All sizes of cables shall be adequately terminated using cable lugs.

#### **1.06.9 Cable Cleats**

Cable cleats shall be of the hook and clamp type consisting of two dissimilar halves made of reinforced nylon. The units shall be of appropriate size for the cables. Fixing centres shall be in accordance with cable manufacturers' recommendations and current codes of practice.

#### **1.06.10 Cable Identification**

All main and sub-main cables shall be identified at their points of termination and along the routes at a distance of not more than 10 meters.

Additionally, where cables change direction or pass through walls, floors, ceilings, etc, an identification label shall be provided; note where access cannot be obtained to both sides of an obstruction simultaneously (e.g. at a wall) the cable shall be labelled on both sides of the obstruction.

The label shall be fixed securely to the outer cable sheathing and shall contain the following information:

- Cable reference number
- Origin of cable
- Destination of cable
- Cable type, number of cores and CSA in mm<sup>2</sup>.

## ***1.07Cable Management***

### **1.07.1 General**

For conduit installations, adequate draw in boxes shall be installed to ensure that cables can be replaced with ease. The price of such boxes shall be deemed to have been included in the price of the relevant power or lighting points.

Any off-sets, bends, routing around beams, etc of the cable management systems shall be deemed to have been included in the tendered rate and no claims for extra cost to this effect will be accepted.

Chases for conduits are to be neatly cut and holes neatly drilled by mechanical means. Chases are to be made in horizontal or vertical runs only. Horizontal chases are to be kept to a minimum.

Vertical chases of conduit adjacent to doors or other openings shall not be nearer than 200mm from these openings.

Special attention shall be given by the Contractor to the number of cables installed in conduit or trunking in order ensure that conduit and trunking space factors shall not be exceeded. In any case conduit with a diameter less than 20mm shall NOT be used.

Cables for LV and ELV installations shall be kept separate and under no circumstances shall they be drawn through the same conduit.

During the course of the works, the Contractor shall blank off all the installed recessed boxes and conduit ends in order to minimize the ingress of debris and dirt.

### **1.07.2 Galvanised steel conduit and fittings**

Galvanised steel conduit and fittings shall conform to BS 4607 and shall be of medium gauge. Conduit will be jointed and terminated using appropriate components as supplied by the conduit manufacturer. Saddle supports are to be at 1.5m intervals and outdoor installations shall be rendered watertight. Conduit lengths shall be electrically continuous and bonded to the main earth terminal. However, conduit cannot serve as a means of earthing for any circuit.

### **1.07.3 Galvanised steel cable tray**

Cable tray shall be of perforated 1.5mm sheet steel construction with a flanged height of 50mm and width as indicated on drawings. Cable tray shall be hot-dipped galvanised after forming and shall be adequately supported to avoid sagging. Brackets and fixtures are to be included in the tendered rates for cable tray.

Tees, bends, reducers and any other fittings shall be supplied by manufacturers.

Contractor manufactured fittings shall NOT be accepted.

Only manufacturer supplied galvanised brackets / fixtures shall be used. Offsets, tees, bends, reducers and any other fitting required shall also be supplied by manufacturer and shall be proprietary. Contractor produced fittings shall not be accepted. Proprietary brackets and fittings shall be deemed to have been included in the tendered rates. Channel support systems will not be accepted.



For runs across the roof, the cable tray shall be installed in the horizontal position and shall include cable tray cover. The cable tray shall be installed on proprietary galvanised steel u channel bolted to solid rubber mounting with a minimum height of 50mm.

Example of cable tray floor mount



The engineer may request that for certain sections of cable tray, the proprietary U channel is anchored to pre-cast solid concrete slabs having a thickness of 60mm instead of the rubber mountings. The supply of bricks/stone slabs shall be included in the tendered rate for cable tray.

The tray shall be electrically continuous and bonded to the main earth terminal however it cannot be used as a means of earthing for any circuit.

All cables installed on cable trays shall be secured to the tray using cable ties.

#### **1.07.4 PVC conduit and fittings**

PVC conduit and fittings shall conform to BS 4607 and shall be of medium gauge. Conduit shall be jointed and terminated utilising the appropriate components as supplied by the conduit manufacturer. No contractor manufactured fittings or joints shall be utilised. Surface run conduit shall be adequately supported with allowance for expansion and contraction under normal working temperature variations. Saddle supports (where required) are to be at 1 metre intervals.

PVC conduit which shall run under floor paving and shall be connected to pull boxes as shown on the drawings.

Each pipe length shall be jointed using appropriate sockets supplied by the manufacturer and bonded using PVC cement. As soon as these pipes are laid, the contractor shall apply a covering of cement mortar along the entire length of all pipes to ensure protection against accidental damage. The cost of this covering shall be included in the rates quoted for the pipework.

#### 1.07.5 Cable tie plug anchor with eyelet

The cable tie plug is to be used together with a suitable cable tie to make it possible to bundle and fix cables easily. It is to be installed by inserting it into a drilled hole and is to provide a secure anchor due to its dowel lamellae. It is to be made of durable materials such as stainless steel grade 316 and UV resistant PVC. Moreover, the materials shall be selected such that no damage to the stone masonry is incurred over time.

Examples of cable tie plug anchor with eyelet



#### 1.07.6 Stainless steel cable ties

Cable ties shall be suitable for installation in harsh conditions and manufactured from grade 316 stainless steel. These are to feature a ladder design and are to work on a ratchet system. The cable ties must have a width of not more than 9.5mm and a minimum tensile strength of 400N.

Example of stainless steel cable tie



#### **1.07.7 Draw in boxes**

Heavy, duty PVC draw in boxes complete with tight fitting cast iron cover shall be installed as shown on the drawings. The draw in boxes shall be complete with 25mm diameter, 1m deep vertical drain installed on the bottom of the box. The contractor shall be responsible for the boring of the hole to accommodate the drain and setting out the work to ensure that the surface of the box coincided with the finished paving level. After setting out, the contractor shall secure each box in an appropriate manner in order to avoid accidental movement of the box from the set position.

#### **1.07.8 Junction boxes**

Thermosetting GRP junction boxes with cover suitable for surface mounting. The junction boxes shall have a minimum ingress protection of IP67 and a minimum impact resistance of IK10. Where necessary, the junction box shall be sized to house the LED driver, PSU and/or a terminal block connector as required. Any accessories required for installation of the junction boxes shall be provided by the contractor.

#### **1.07.9 Builder's work**

The Tenderer is to include in his rates for chasing, holes in reinforced concrete or structural members etc. required for the proper execution of the works. Holes in reinforced concrete or structural members shall only be made after approval by the Engineer or Architect in charge.

All holes shall be made good with appropriate material in order to ensure that the integrity of the fire barrier is maintained. Such making good shall be deemed to have been included in the tendered rates.

### ***1.08 Distribution and control switchgear***

The distribution and control switchgear consists of a number of distribution boards to be located as shown on the drawings.

#### **1.08.1 Distribution boards**

The distribution boards to be located indoor shall consist of a robust PVC enclosure with, DIN mounting rails and shrouded earth and neutral busbars of sufficient capacity to accommodate each individual circuit separately. The enclosures shall be rated to at least IP41 and shall be sized to accommodate all necessary switchgear but shall have outgoing module capacity as indicated in drawings. Care should be taken to avoid warping of the enclosure during installation. Unused ways shall be blanked off and cable entry shall be made using appropriate glands.

RCD's where installed, shall have Type A tripping characteristics and shall conform to BS IEC 1008-2-2:1990.

Miniature circuit breakers are to comply with BS EN 60898-1:2003+A13:2012 and are to provide short circuit and overcurrent protection.

RCBO's where installed, shall have Type A tripping characteristics and shall conform to BS EN 61009.

Short circuit rating for incoming MCB's shall be 10kA minimum. Short circuit rating for outgoing MCB's shall be 6kA minimum.

MCB's for lighting and small power shall have a type C tripping characteristic.

Unused ways shall be blanked off.

#### **1.08.1.1 Transient over voltage protection module**

A transient over-voltage protection module shall be installed in the distribution boards (high protection level) in order to protect all the circuits in the following modes:

- Phase to earth
- Phase to neutral
- Neutral to earth

The module shall have a visual status indicator in the form of flags or similar for:

- Full protection
- Reduced protection indicating that module needs to be replaced
- No protection indicating that the module is no longer effective in protecting against transient over-voltages.

The module which shall be installed in the main distribution board shall be Type II / III and shall conform to the following minimum specifications:

- Leakage current: <250 $\mu$ A
- Short circuit withstand capability: 25kA

#### **Type 2**

- Nominal discharge current  $I_n$ : 20kA for an 8/20 $\mu$ s waveform
- Let through voltage at  $I_n$ : 900V
- Maximum discharge current  $I_{max}$ : 80kA (per phase)

#### **Type 3**

- Let through voltage at  $U_{OC}$  of 6kV  
1.2/50 $\mu$ s and  $I_{SC}$  of 3kA 8/20 $\mu$ s: 600V

Installation of module shall be carried out in strict accordance with manufacturer's instructions. For this reason the contractor shall provide manufacturer's installation instructions to the Engineer prior to installation.

#### **1.08.2 Distribution boards at roof level**

The distribution board shall consist of a thermosetting GRP enclosure with DIN mounting rails and back plate, as required, shrouded earth and neutral busbars of sufficient capacity

to accommodate each individual circuit separately. The enclosures shall be rated to at least IP66 and shall be sized to accommodate all necessary switchgear and control gear. Care should be taken to avoid warping of the enclosure during installation. Unused ways shall be blanked off and cable entry shall be made using appropriate glands.

RCD's where installed, shall have Type A tripping characteristics and shall conform to BS IEC 1008-2-2:1990.

Miniature circuit breakers are to comply with BS EN 60898-1:2003+A13:2012 and are to provide short circuit and overcurrent protection.

RCBO's where installed, shall have Type A tripping characteristics and shall conform to BS EN 61009.

Short circuit rating for incoming MCB's shall be 10kA minimum. Short circuit rating for outgoing MCB's shall be 6kA minimum.

MCB's for lighting and small power shall have a type C tripping characteristic.

Unused ways shall be blanked off.

### **1.08.3 Demarcation box (for street lighting supplied circuits)**

The demarcation box shall consist of a heavy-duty thermosetting GRP lockable enclosure with DIN mounting rails and shrouded earth and neutral busbars of sufficient capacity to accommodate each individual circuit separately. The enclosures shall be rated to at least IP66 and shall be sized to accommodate all necessary switchgear and control gear. Care should be taken to avoid warping of the enclosure during installation. Unused ways shall be blanked off and cable entry shall be made using appropriate glands.

RCD's where installed, shall conform to BS IEC 1008-2-2:1990. shall have Type A tripping characteristics and shall conform to BS IEC 1008-2-2:1990.

Miniature circuit breakers are to comply with BS EN 60898-1:2003+A13:2012 and are to provide short circuit and overcurrent protection.

RCBO's where installed, shall have Type A tripping characteristics and shall conform to BS EN 61009.

Short circuit rating for incoming MCB's shall be 10kA minimum. Short circuit rating for outgoing MCB's shall be 6kA minimum.

MCB's for lighting and small power shall have a type C tripping characteristic. Unused ways shall be blanked off.

### ***1.09 Heavy duty GRP cabinet***

A heavy-duty GRP cabinet rated to at least IP 65 shall be sized to accommodate the distribution board. The cabinet shall be complete with a lockable, hinged door (padlock shall not be accepted) and shall be of the free-standing type. Approximate dimensions are 0.75m x 0.5m x 0.35m. The concrete hollow base for the cabinet shall also be included within the scope of works.

The keys shall be handed to the client upon commissioning of the equipment. The enclosure shall include a permanent engraved label bearing a warning sign indicating the presence of dangerous voltage inside.

#### ***1.010      Earthing and bonding***

Ground earthing shall be by means of earth electrodes located as shown in the drawings and connected by 16sqmm copper conductors and appropriate clamps. Electrodes shall be made of solid copper, at least 2.4m long and with a minimum diameter of 16mm. The head of the electrode shall be housed in a precast or moulded inspection box with adequate cover installed flush at finished floor level. Earth electrodes shall be installed at a minimum distance of 4m from each other.

### **1.011      *Luminaires and lamps***

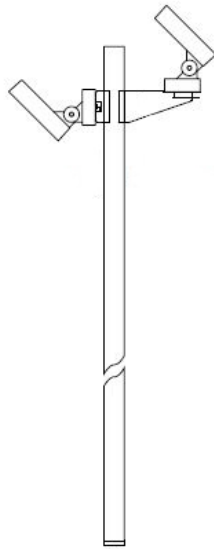
The lighting system shall comprise a number of luminaires and a control system making up an architectural lighting scheme for the exterior of St. Helen's Basilica. The contractor shall be responsible for the installation only of the luminaires and light fittings in accordance to the manufacturer's instructions. The contractor shall also be responsible for the supply of sundries, fixing bolts, cabling, connectors and any other material required for the installation of the light fittings and to make a complete functional circuit and will be responsible for the equipment when given to them and also be responsible that no damage is done to same until fixed and commissioned. The contractor shall liaise with the contracting authority, in order to be able to take over the luminaires to be installed within this lot.

#### **1.03.1    Technical specifications for luminaires (for installation purposes only)**

##### **Pole**

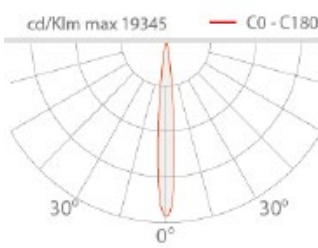
|                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction and finish | The pole should be made of steel with high resistance against corrosion. The surface should be treated for further protection through hot dip galvanisation. After which, a thorough painting process including polymerization to ensure high resistance against UV rays and any other rough weather conditions. The pole should come complete with an inspection door, terminal cable block, fuse, surge protection device and pole case cover. Any mounting accessories and internal wiring are to be included. |
| Dimensions              | Total height of pole: 8000mm-9300mm<br>Total diameter of buried base: 150mm-170mm<br>Total diameter of pole: 60mm-100mm<br>Thickness: 3mm-4mm                                                                                                                                                                                                                                                                                                                                                                     |
| Mounting                | Ground recessed installation to a cement base. A bracket suitable for mounting the luminaire types to the pole shall be included.                                                                                                                                                                                                                                                                                                                                                                                 |

Typical Pole  
arrangement





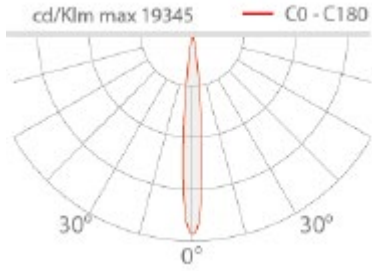
## Luminaire Type A1

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A recessed linear profile to illuminate the front facade of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Dimensions                         | Luminaire body height: 20mm-50mm<br>Luminaire body width: 20mm-50mm<br>Luminaire body length: 700mm-1000mm                                                                                                                                                   |
| LED power                          | 38-40W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Recessed                                                                                                                                                                                                                                                     |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK08 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Luminous efficacy                  | 98 lm/W or better                                                                                                                                                                                                                                            |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Insulation Class                   | II or better                                                                                                                                                                                                                                                 |
| Beam Width                         | 10° - 12°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |

Typical Luminaire



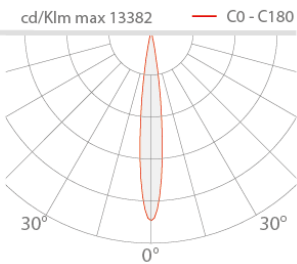

## Luminaire Type A2

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate the front facade of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                         |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 20mm-50mm<br>Luminaire body width: 20mm-50mm<br>Luminaire body length: 700mm-1000mm                                                                                                                                                   |
| LED power                          | 38-40W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK08 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Luminous efficacy                  | 98 lm/W or better                                                                                                                                                                                                                                            |
| Insulation Class                   | II or better                                                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Beam Width                         | 10° - 12°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |

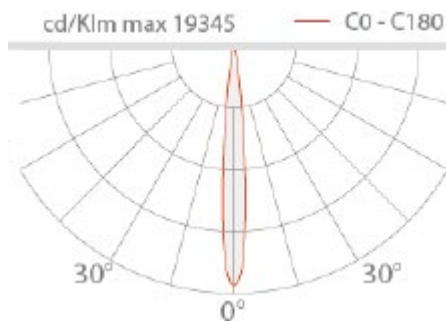
Typical Luminaire



## Luminaire Type B

|                                    |                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A recessed uplighter to illuminate the main entrance of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                                                                                        |
| Construction and finish            | The body shall be made of technopolymer with heat dissipating properties. The outer trim shall be made of stainless steel. The screen shall be made from a minimum 10mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Dimensions                         | Luminaire body diameter: 120mm-160mm<br>Luminaire body depth: 80mm-120mm                                                                                                                                                                                                                                                         |
| LED power                          | 14W-16W                                                                                                                                                                                                                                                                                                                          |
| Control                            | DALI                                                                                                                                                                                                                                                                                                                             |
| Mounting type                      | Recessed                                                                                                                                                                                                                                                                                                                         |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                                                                                                   |
| Impact protection                  | IK08 or better                                                                                                                                                                                                                                                                                                                   |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                                                                                            |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                                                                                     |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                                                                                        |
| Luminous efficacy                  | 90 lm/W or better                                                                                                                                                                                                                                                                                                                |
| Insulation Class                   | II or better                                                                                                                                                                                                                                                                                                                     |
| Lifetime/ Lumen maintenance        | 50 000h L95 B10 or better                                                                                                                                                                                                                                                                                                        |
| Beam Width                         | 12° - 14°                                                                                                                                                                                                                                                                                                                        |
| Polar diagram                      |                                                                                                                                                                                                                                               |
| Typical Luminaire                  |                                                                                                                                                                                                                                               |

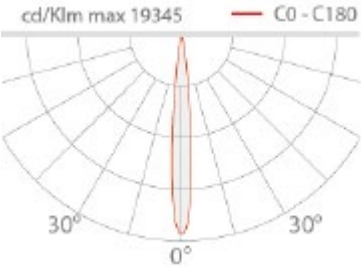
## Luminaire Type C

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate details on the front facade of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                              |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 20mm-50mm<br>Luminaire body width: 20mm-50mm<br>Luminaire body length: 1100mm-1600mm                                                                                                                                                  |
| LED power                          | 63-65W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface mounted                                                                                                                                                                                                                                              |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK 08 or better                                                                                                                                                                                                                                              |
| Insulation Class                   | II or better                                                                                                                                                                                                                                                 |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Luminous efficacy                  | 100 lm/W or better                                                                                                                                                                                                                                           |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Beam Width                         | 10° - 12°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |

Typical Luminaire



## Luminaire Type D

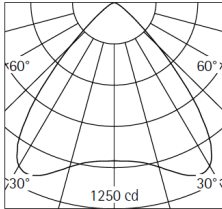

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate the coloumn on the side facade of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                           |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 20mm-50mm<br>Luminaire body width: 20mm-50mm<br>Luminaire body length: 700mm-900mm                                                                                                                                                    |
| LED power                          | 38-40W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK 08 or better                                                                                                                                                                                                                                              |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation Class                   | II or better                                                                                                                                                                                                                                                 |
| Luminous efficacy                  | 61 lm/W or better                                                                                                                                                                                                                                            |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Beam Width                         | 10° - 12°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |



Typical Luminaire

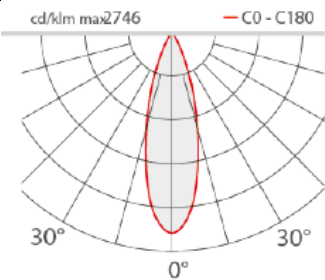


## Luminaire Type E

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted projector to illuminate the small cupolas on the side of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                                                                                                                                              |
| Tilt/Rotation                      | Luminaire body to have 0-90° tilt capability and 360° rotation relative to luminaire base.                                                                                                                                                                                                                                                                                                                |
| Construction and finish            | The body shall be made of corrosion resistant cast aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone.                                                                              |
| Dimensions                         | Luminaire body height: 200mm-250mm<br>Luminaire body length: 120mm-180mm<br>Luminaire base: 100mm-200mm                                                                                                                                                                                                                                                                                                   |
| LED power                          | 24W-26W                                                                                                                                                                                                                                                                                                                                                                                                   |
| Control                            | DALI                                                                                                                                                                                                                                                                                                                                                                                                      |
| Dimming function                   | Dimmable from 0-100%                                                                                                                                                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface mounted                                                                                                                                                                                                                                                                                                                                                                                           |
| Ingress of protection              | IP65 or better                                                                                                                                                                                                                                                                                                                                                                                            |
| Insulation Class                   | Class II or better                                                                                                                                                                                                                                                                                                                                                                                        |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                                                                                                                                                                     |
| Colour Rendering Index             | 90 or better                                                                                                                                                                                                                                                                                                                                                                                              |
| Standard deviation colour matching | 1.5 or less                                                                                                                                                                                                                                                                                                                                                                                               |
| Luminous efficacy                  | 67 lm/W or better                                                                                                                                                                                                                                                                                                                                                                                         |
| Lifetime/ Lumen maintenance        | L90/B10 ≤50000h or better                                                                                                                                                                                                                                                                                                                                                                                 |
| Beam Width                         | 82° - 84°                                                                                                                                                                                                                                                                                                                                                                                                 |
| Polar diagram                      |  A polar diagram showing the beam spread and candela distribution. The diagram is a semi-circle with a vertical center line. The beam spread is indicated by two arcs at 60° and 30° from the center line. The candela distribution is shown by a series of concentric arcs, with the outermost arc labeled '1250 cd'. |
| Typical Luminaire                  |  A photograph of the luminaire, showing a black, rectangular body mounted on a silver-colored base. The body has a square lens with a grid pattern. The base is a simple, rectangular block.                                                                                                                           |



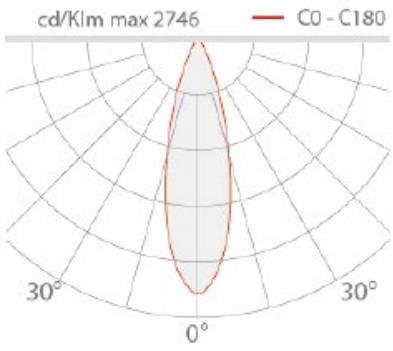

## Luminaire Type F

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate details on the front facade of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                              |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 60mm-80mm<br>Luminaire body width: 30mm-50mm<br>Luminaire body length: 600mm-800mm                                                                                                                                                    |
| LED power                          | 22-24W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress protection                 | IP65 or better                                                                                                                                                                                                                                               |
| Impact Protection                  | IK08 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation class                   | II or better                                                                                                                                                                                                                                                 |
| Luminous efficacy                  | 110 lm/W or better                                                                                                                                                                                                                                           |
| Lifetime/ Lumen maintenance        | 50000h L85 B10 or better                                                                                                                                                                                                                                     |
| Beam Width                         | 29° - 31°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                           |

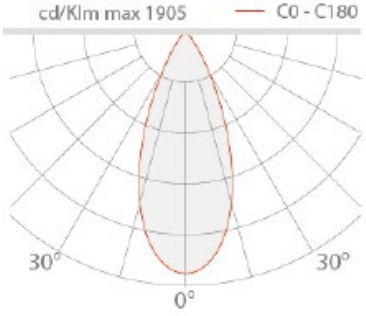



### Luminaire Type G

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A recessed linear profile to illuminate details on the front and side facades of the church. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                           |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 60mm-80mm<br>Luminaire body width: 30mm-50mm<br>Luminaire body length: 1400mm-1600mm                                                                                                                                                  |
| LED power                          | 63-65W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Recessed                                                                                                                                                                                                                                                     |
| Ingress protection                 | IP65 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation class                   | II or better                                                                                                                                                                                                                                                 |
| Luminous efficacy                  | 110 lm/W or better                                                                                                                                                                                                                                           |
| Lifetime/ Lumen maintenance        | 50000h L85 B10 or better                                                                                                                                                                                                                                     |
| Beam Width                         | 29° - 31°                                                                                                                                                                                                                                                    |

|                   |                                                                                                                                        |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Polar diagram     |  <p>cd/Klm max 2746 — C0 - C180</p> <p>30° 0° 30°</p> |
| Typical Luminaire |                                                      |

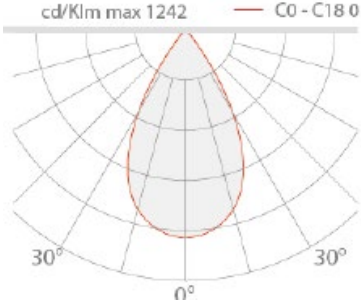

## Luminaire Type H

|                                    |                                                                                                                                                                                                                           |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted spot luminaire to illuminate the architectural details on the upper part of the front façade of the church. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass.                                                          |
| Tilt                               | Luminaire to have 0-190° tilt capability                                                                                                                                                                                  |
| Dimensions                         | Luminaire body height: 80mm-100mm<br>Luminaire body diameter: 80mm-90mm                                                                                                                                                   |
| LED power                          | 14-16W                                                                                                                                                                                                                    |
| Control                            | DALI                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                           |
| Ingress of protection              | IP66 or better                                                                                                                                                                                                            |
| Impact protection                  | IK09 or better                                                                                                                                                                                                            |
| Insulation Class                   | Class II or III                                                                                                                                                                                                           |
| Colour temperature                 | 3000K                                                                                                                                                                                                                     |
| Colour Rendering Index             | 90 or better                                                                                                                                                                                                              |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance        | 50000h L95 B10 or better                                                                                                                                                                                                  |
| Beam Width                         | 41° -43°                                                                                                                                                                                                                  |
| Polar diagram                      |                                                                                                                                        |
| Typical Luminaire                  |                                                                                                                                        |

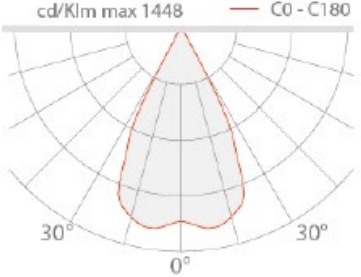

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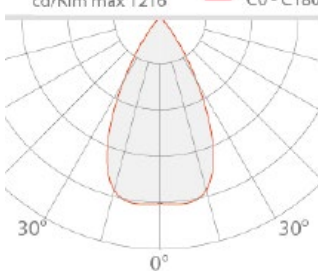

## Luminaire Type I

|                                    |                                                                                                                                                                                                                           |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted spot luminaire to illuminate the architectural details on the upper part of the front façade of the church. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass.                                                          |
| Tilt                               | Luminaire to have 0-190° tilt capability                                                                                                                                                                                  |
| Dimensions                         | Luminaire body height: 80mm-100mm<br>Luminaire body diameter: 80mm-85mm                                                                                                                                                   |
| LED power                          | 14-16W                                                                                                                                                                                                                    |
| Control                            | DALI                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                           |
| Ingress of protection              | IP66 or better                                                                                                                                                                                                            |
| Impact protection                  | IK09 or better                                                                                                                                                                                                            |
| Insulation Class                   | Class II or III                                                                                                                                                                                                           |
| Colour temperature                 | 3000K                                                                                                                                                                                                                     |
| Colour Rendering Index             | 90 or better                                                                                                                                                                                                              |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance        | 50000h L95 B10 or better                                                                                                                                                                                                  |
| Beam Width                         | 57° -59°                                                                                                                                                                                                                  |
| Polar diagram                      |                                                                                                                                        |
| Typical Luminaire                  |                                                                                                                                        |

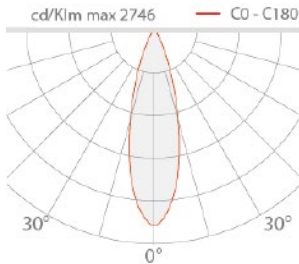
## Luminaire Type J

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted spot luminaire to illuminate the architectural details of the bell towers and upper part of the church façade. The light fitting shall be complete with control gear, mounting and anti-glare accessories.                                                                                                                                                                                                                                                                                                              |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass.                                                                                                                                                                                                                                                                                                                                                                          |
| Tilt/Rotation                      | Luminaire body to have 0-90° tilt capability and 360° rotation relative to luminaire base.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Dimensions                         | Luminaire body height: 70mm-90mm<br>Luminaire body diameter: 30mm-50mm<br>Luminaire base diameter: 30mm-50mm                                                                                                                                                                                                                                                                                                                                                                                                                              |
| LED power                          | 4W - 6W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Control                            | DALI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Ingress of protection              | IP66 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Impact protection                  | IK07 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Insulation Class                   | Class II or III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Colour Rendering Index             | 90 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance        | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Beam Width                         | 53° - 55°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Polar diagram                      |  <p>cd/Klm max 1448 — C0 - C180</p> <p>30° 0° 30°</p> <p>The polar diagram illustrates the beam spread of the luminaire. It features a semi-circular grid with radial lines representing beam angles. A red line outlines the beam spread, which is wider at the top (0°) and tapers towards the sides (30°). The text 'cd/Klm max 1448' is at the top, and 'C0 - C180' is at the top right. The angles 30°, 0°, and 30° are marked at the bottom.</p> |
| Typical luminaire                  |  <p>A 3D rendering of the Luminaire Type J, showing a cylindrical body mounted on a base. The body is white with a black lens. The base is also white and has a mounting hole.</p>                                                                                                                                                                                                                                                                     |

## Luminaire Type K

|                                    |                                                                                                                                                                                          |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted spot luminaire to illuminate the architectural details of the bell towers. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass.                         |
| Tilt                               | Luminaire to have 0-190° tilt capability                                                                                                                                                 |
| Dimensions                         | Luminaire body height: 100mm-120mm<br>Luminaire body diameter: 100mm-120mm                                                                                                               |
| LED power                          | 24W-26W                                                                                                                                                                                  |
| Control                            | DALI                                                                                                                                                                                     |
| Mounting type                      | Surface Mounted                                                                                                                                                                          |
| Ingress of protection              | IP66 or better                                                                                                                                                                           |
| Impact protection                  | IK08 or better                                                                                                                                                                           |
| Colour temperature                 | 3000K                                                                                                                                                                                    |
| Colour Rendering Index             | 90 or better                                                                                                                                                                             |
| Insulation Class                   | Class II or III                                                                                                                                                                          |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                |
| Lifetime/ Lumen maintenance        | 50 000h L95/B10 or better                                                                                                                                                                |
| Beam width                         | 54-56°                                                                                                                                                                                   |
| Polar diagram                      | <p>cd/Klm max 1216 — C0 - C180</p>                                                                    |
| Typical Luminaire                  |                                                                                                       |

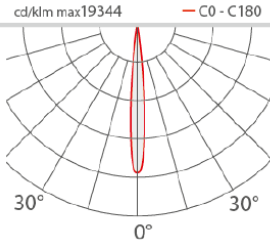

## Luminaire Type L

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate the cupola. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                             |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 60mm-80mm<br>Luminaire body width: 30mm-40mm<br>Luminaire body length: 900mm-1000mm                                                                                                                                                   |
| LED Power                          | 15-17W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress protection                 | IP65 or better                                                                                                                                                                                                                                               |
| Impact Protection                  | IK06 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation class                   | Class II or better                                                                                                                                                                                                                                           |
| Luminous efficacy                  | 75 lm/W or better                                                                                                                                                                                                                                            |
| Lifetime/ Lumen maintenance        | 50 000h L90 B10 or better                                                                                                                                                                                                                                    |
| Beam width                         | 29°-31°                                                                                                                                                                                                                                                      |
| Polar diagram                      |                                                                                                                                                                           |

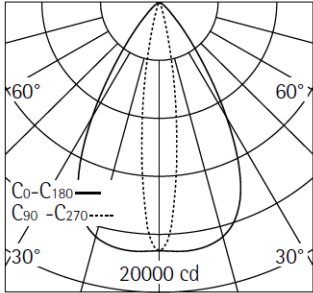

|                   |                                                                                    |
|-------------------|------------------------------------------------------------------------------------|
| Typical Luminaire |  |
|-------------------|------------------------------------------------------------------------------------|

## Luminaire Type M

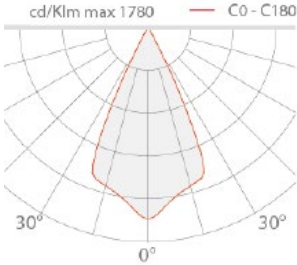
|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate the windows. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                            |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 60mm-80mm<br>Luminaire body width: 30mm-40mm<br>Luminaire body length: 600mm-700mm                                                                                                                                                    |
| LED power                          | 22-24W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress protection                 | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK08 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation class                   | II or better                                                                                                                                                                                                                                                 |
| Luminous efficacy                  | 110 lm/W or better                                                                                                                                                                                                                                           |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Beam Width                         | 10° - 12°                                                                                                                                                                                                                                                    |

|                   |                                                                                                                                         |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Polar diagram     |  <p>cd/klm max.19344 — C0 - C180</p> <p>30° 0° 30°</p> |
| Typical Luminaire |                                                       |

## Luminaire Type N

|                             |                                                                                                                                                                                                                                                                                                                              |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                 | A surface mounted frame projector to illuminate the cupola. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                                                                                            |
| Construction and finish     | The body shall be made of corrosion resistant cast aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone. |
| Tilt/Rotation               | Luminaire body to have 0-90° tilt capability and 360° rotation relative to luminaire base.                                                                                                                                                                                                                                   |
| Dimensions                  | Luminaire body height: 350mm - 400mm<br>Luminaire body width: 280mm - 320mm<br>Luminaire base diameter: 140mm - 160mm                                                                                                                                                                                                        |
| LED power                   | 72-73W                                                                                                                                                                                                                                                                                                                       |
| Control                     | DALI                                                                                                                                                                                                                                                                                                                         |
| Mounting type               | Surface Mounted                                                                                                                                                                                                                                                                                                              |
| Ingress protection          | IP65 or better                                                                                                                                                                                                                                                                                                               |
| Colour temperature          | 3000K                                                                                                                                                                                                                                                                                                                        |
| Colour Rendering Index      | 90 or better                                                                                                                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                                    |
| Beam Width                  | C0-C180: 15° -17°<br>C90-C270: 60° -62°                                                                                                                                                                                                                                                                                      |
| Polar diagram               |                                                                                                                                                                                                                                           |
| Typical Luminaire           |                                                                                                                                                                                                                                           |

## Luminaire Type O

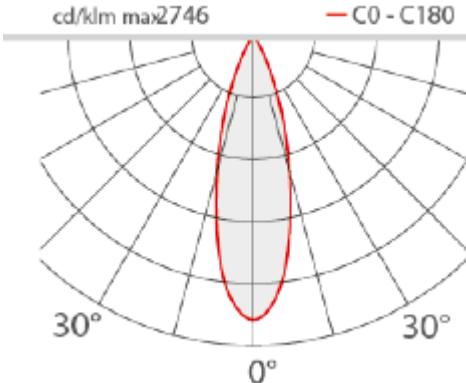
|                                    |                                                                                                                                                                         |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted frame projector to illuminate the top part of the cupola. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass.        |
| Tilt/Rotation                      | Luminaire body to have 0-90° tilt capability and 360° rotation relative to luminaire base.                                                                              |
| Dimensions                         | Luminaire body height: 90mm-100mm<br>Luminaire body diameter: 50mm-70mm<br>Luminaire base diameter: 50mm-70mm                                                           |
| LED power                          | 13-15W                                                                                                                                                                  |
| Control                            | DALI                                                                                                                                                                    |
| Mounting type                      | Surface Mounted                                                                                                                                                         |
| Ingress protection                 | IP66 or better                                                                                                                                                          |
| Impact protection                  | IK08 or better                                                                                                                                                          |
| Insulation class                   | Class II or III                                                                                                                                                         |
| Colour temperature                 | 3000K                                                                                                                                                                   |
| Colour Rendering Index             | 90 or better                                                                                                                                                            |
| Standard deviation colour matching | 3 or less                                                                                                                                                               |
| Lifetime/ Lumen maintenance        | 50 000h L95 B10 or better                                                                                                                                               |
| Beam Width                         | 49° -51°                                                                                                                                                                |
| Polar diagram                      |                                                                                      |



Typical Luminaire



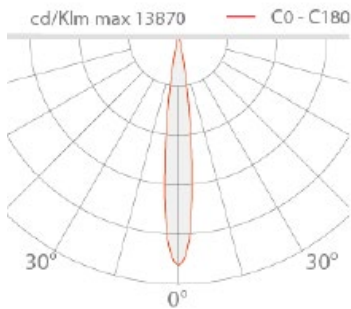
## Luminaire Type P

|                                    |                                                                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted linear profile to illuminate the cupola. The light fitting shall be complete with necessary mounting, control gear and anti-glare accessories.                                                                                             |
| Construction and finish            | The body shall be made of corrosion resistant aluminum. The screen shall be made from a minimum 4mm thick tempered, transparent and extra clear glass, resistant against knocks and scratches. Any seals shall guarantee maximum resistance against UV rays. |
| Tilt                               | Luminaire to have 0-90° tilt capability                                                                                                                                                                                                                      |
| Dimensions                         | Luminaire body height: 60mm-80mm<br>Luminaire body length: 600mm-700mm<br>Luminaire body width: 30mm-50mm                                                                                                                                                    |
| LED power                          | 22-24W                                                                                                                                                                                                                                                       |
| Control                            | 0/1-10V                                                                                                                                                                                                                                                      |
| Mounting type                      | Surface Mounted                                                                                                                                                                                                                                              |
| Ingress protection                 | IP65 or better                                                                                                                                                                                                                                               |
| Impact protection                  | IK08 or better                                                                                                                                                                                                                                               |
| Colour temperature                 | 3000K                                                                                                                                                                                                                                                        |
| Colour Rendering Index             | 80 or better                                                                                                                                                                                                                                                 |
| Standard deviation colour matching | 3 or less                                                                                                                                                                                                                                                    |
| Insulation Class                   | Class II or better                                                                                                                                                                                                                                           |
| Luminous efficacy                  | 110lm/W or better                                                                                                                                                                                                                                            |
| Lifetime/ Lumen maintenance        | 50 000h L85 B10 or better                                                                                                                                                                                                                                    |
| Beam Width                         | 29° - 31°                                                                                                                                                                                                                                                    |
| Polar diagram                      |                                                                                                                                                                          |

Typical Luminaire



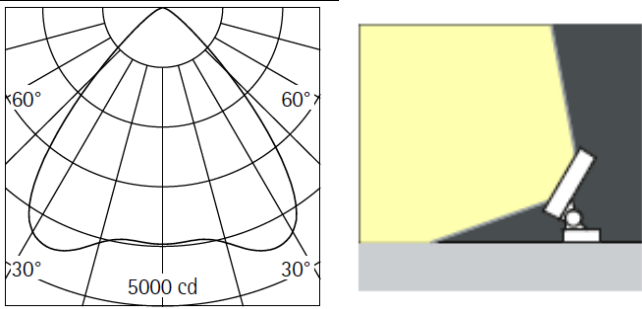
## Luminaire Type Q

|                                    |                                                                                                                                                                  |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                        | A surface mounted spot luminaire to illuminate the cupola pillars. The light fitting shall be complete with control gear, mounting and anti-glare accessories.   |
| Construction and finish            | The body shall be made of corrosion resistant aluminium, finished in white, grey or black with a screen serigraphed, transparent and tempered extra clear glass. |
| Tilt/Rotation                      | Luminaire body to have 0-90° tilt capability and 360° rotation relative to luminaire base.                                                                       |
| Dimensions                         | Luminaire body height: 80mm -100mm<br>Luminaire body diameter: 50mm - 70mm<br>Luminaire base diameter: 50mm - 70mm                                               |
| LED power                          | 13-15W                                                                                                                                                           |
| Control                            | DALI                                                                                                                                                             |
| Mounting type                      | Surface Mounted                                                                                                                                                  |
| Ingress of protection              | IP66 or better                                                                                                                                                   |
| Impact protection                  | IK08 or better                                                                                                                                                   |
| Insulation Class                   | Class II or III                                                                                                                                                  |
| Colour temperature                 | 3000K                                                                                                                                                            |
| Colour Rendering Index             | 90 or better                                                                                                                                                     |
| Standard deviation colour matching | 3 or less                                                                                                                                                        |
| Lifetime/ Lumen maintenance        | 50 000h L95 B10 or better                                                                                                                                        |
| Beam Width                         | 12° - 14°                                                                                                                                                        |
| Polar diagram                      |                                                                               |

Typical Luminaire



## Luminaire Type R

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                 | A surface mounted projector to illuminate architectural details of the back part of the church. The light fitting shall be complete with control gear, mounting and anti-glare accessories.                                                                                                                                                                                                                                                                                                                                                                                                               |
| Construction and finish     | The body shall be made of corrosion resistant cast aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone.                                                                                                                                                                                                                                                                              |
| Tilt/Rotation               | Luminaire body to have 0-90° tilt capability and 300° rotation relative to luminaire base.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Dimensions                  | Luminaire body height: 410mm - 430mm<br>Luminaire body width: 300mm - 400mm<br>Luminaire base diameter: 140mm - 160mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| LED power                   | 96-97W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Control                     | DALI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Dimming range               | 1%-100%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Mounting type               | Surface Mounted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Ingress protection          | IP65 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Colour temperature          | 3000K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Colour Rendering Index      | 90 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Binning                     | 1.5 or less                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Lifetime/ Lumen maintenance | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Beam Width                  | 83° -85°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Polar diagram               |  <p>The polar diagram on the left shows a beam spread of 83° to 85°, with a peak intensity of 5000 cd. The beam spread is indicated by two 60° angles from the center line, and the peak intensity is marked at the center. The beam spread is also indicated by two 30° angles from the center line. The beam spread is also indicated by two 30° angles from the center line.</p> <p>The illustration on the right shows the luminaire mounted on a surface, projecting a wide, flat beam of light onto a wall.</p> |

Typical Luminaire

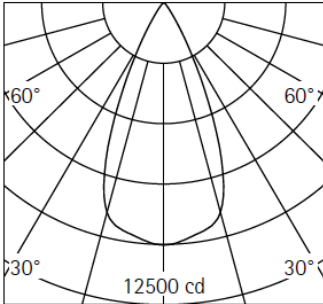
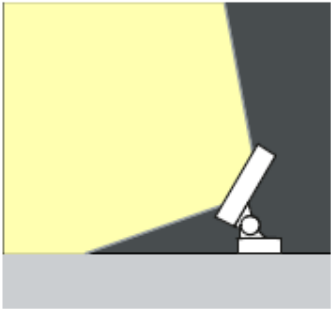




## Luminaire Type S

|                             |                                                                                                                                                                                                        |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                 | A surface mounted linear profile made of aluminum to illuminate the central top part of the church façade. The light fitting shall be complete with control gear, mounting and anti-glare accessories. |
| Dimensions                  | Luminaire body length: 2500mm -3000mm<br>Luminaire body diameter: 20mm - 40mm                                                                                                                          |
| LED power                   | 16-20W/m                                                                                                                                                                                               |
| Control                     | DALI                                                                                                                                                                                                   |
| Mounting type               | Surface Mounted                                                                                                                                                                                        |
| Ingress protection          | IP65 or better                                                                                                                                                                                         |
| Colour temperature          | 3000K                                                                                                                                                                                                  |
| Colour Rendering Index      | 90 or better                                                                                                                                                                                           |
| Lifetime/ Lumen maintenance | 60 000h L70 B50 or better                                                                                                                                                                              |
| Typical Luminaire           |                                                                                                                      |

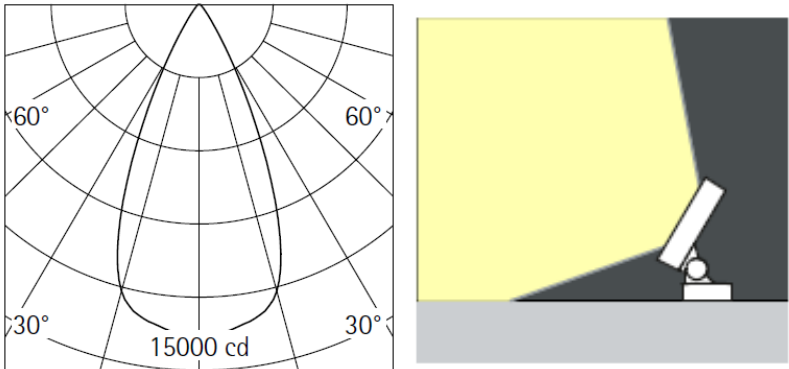


## Luminaire Type X

|                             |                                                                                                                                                                                                                                                                                                                              |  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Description                 | A pole mounted projector to illuminate side of the church. The light fitting shall be complete with control gear, mounting and anti-glare accessories.                                                                                                                                                                       |  |
| Construction and finish     | The body shall be made of corrosion resistant cast aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone. |  |
| Tilt/Rotation               | Luminaire body to have 0-90° tilt capability and 300° rotation relative to luminaire base.                                                                                                                                                                                                                                   |  |
| Dimensions                  | Luminaire body height: 350mm - 400mm<br>Luminaire body width: 280mm - 320mm<br>Luminaire base diameter: 140mm - 160mm                                                                                                                                                                                                        |  |
| LED power                   | 72W-73W                                                                                                                                                                                                                                                                                                                      |  |
| Control                     | DALI                                                                                                                                                                                                                                                                                                                         |  |
| Dimming function            | Dimmable from 1-100%                                                                                                                                                                                                                                                                                                         |  |
| Mounting type               | Pole mounted                                                                                                                                                                                                                                                                                                                 |  |
| Degree of protection        | IP65 or better                                                                                                                                                                                                                                                                                                               |  |
| Colour temperature          | 3000K                                                                                                                                                                                                                                                                                                                        |  |
| Colour Rendering Index      | 90 or better                                                                                                                                                                                                                                                                                                                 |  |
| Lifetime/ Lumen maintenance | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                                    |  |
| Beam width                  | 45° -47°                                                                                                                                                                                                                                                                                                                     |  |
| Polar diagram               |                                                                                                                                                       |  |
| Typical Luminaire           |                                                                                                                                                                                                                                           |  |

| Pole Details             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction and finish  | The pole should be made of steel with high resistance against corrosion. The surface should be treated for further protection through hot dip galvanisation. After which, a thorough painting process including polymerization to ensure high resistance against UV rays and any other rough weather conditions. The pole should come complete with an inspection door, terminal cable block, fuse, surge protection device and pole case cover. Any mounting accessories and internal wiring are to be included. |
| Dimensions               | Total height of pole: 8000mm-9300mm<br>Total diameter of buried base: 150mm-170mm<br>Total diameter of pole: 60mm-100mm<br>Thickness: 3mm-4mm                                                                                                                                                                                                                                                                                                                                                                     |
| Mounting                 | Ground recessed installation to a cement base. A bracket suitable for mounting the luminaire types to the pole shall be included.                                                                                                                                                                                                                                                                                                                                                                                 |
| Typical Pole arrangement |                                                                                                                                                                                                                                                                                                                                                                                                                                 |

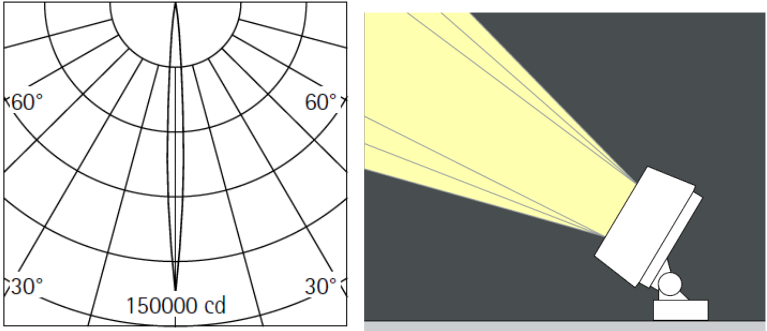

## Luminaire Type Y

|                             |                                                                                                                                                                                                                                                                                                                              |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                 | A surface/pole mounted projector to illuminate the sides and façade of the church. The light fitting shall be complete with control gear, mounting and anti-glare accessories.                                                                                                                                               |
| Construction and finish     | The body shall be made of corrosion resistant cast aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone. |
| Tilt/Rotation               | Luminaire body to have 0-90° tilt capability and 300° rotation relative to luminaire base.                                                                                                                                                                                                                                   |
| Dimensions                  | Luminaire body height: 400mm - 450mm<br>Luminaire body width: 300mm - 400mm<br>Luminaire base diameter: 140mm - 160mm                                                                                                                                                                                                        |
| LED power                   | 96W-97W                                                                                                                                                                                                                                                                                                                      |
| Control                     | DALI                                                                                                                                                                                                                                                                                                                         |
| Dimming function            | Dimmable from 1-100%                                                                                                                                                                                                                                                                                                         |
| Mounting type               | Surface/Pole Mounted                                                                                                                                                                                                                                                                                                         |
| Degree of protection        | IP65 or better                                                                                                                                                                                                                                                                                                               |
| Colour temperature          | 3000K                                                                                                                                                                                                                                                                                                                        |
| Colour Rendering Index      | 90 or better                                                                                                                                                                                                                                                                                                                 |
| Lifetime/ Lumen maintenance | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                                    |
| Beam Width                  | 45° - 47°                                                                                                                                                                                                                                                                                                                    |
| Polar diagram               |                                                                                                                                                                                                                                          |

|                   |                                                                                   |
|-------------------|-----------------------------------------------------------------------------------|
| Typical Luminaire |  |
|-------------------|-----------------------------------------------------------------------------------|

## Luminaire Type Z

|                             |                                                                                                                                                                                                                                                                                                                         |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                 | A surface mounted projector to illuminate the church façade<br>The light fitting shall be complete with control gear, mounting and anti-glare accessories.                                                                                                                                                              |
| Construction and finish     | The body shall be made of corrosion resistant aluminum with a double powder coating finish. The fitting shall be grey or black in colour. The mounting plate shall be made of polymer and lenses shall be made of optical polymer. The head shall be fitted with a non-reflective safety glass with an anti-glare cone. |
| Tilt/Rotation               | Luminaire body to have 0-90° tilt capability and 300° rotation relative to luminaire base.                                                                                                                                                                                                                              |
| Dimensions                  | Luminaire body height: 350mm - 400mm<br>Luminaire body diameter: 280mm - 350mm<br>Luminaire base diameter: 140mm - 160mm                                                                                                                                                                                                |
| Control                     | DALI                                                                                                                                                                                                                                                                                                                    |
| Dimming function            | Dimmable from 1-100%                                                                                                                                                                                                                                                                                                    |
| LED Power / Supply voltage  | 32W-33W                                                                                                                                                                                                                                                                                                                 |
| Mounting type               | Surface mounted                                                                                                                                                                                                                                                                                                         |
| Colour temperature          | 3000K                                                                                                                                                                                                                                                                                                                   |
| Colour rendering index      | 90 or better                                                                                                                                                                                                                                                                                                            |
| Ingress protection          | IP65 or better                                                                                                                                                                                                                                                                                                          |
| Beam Width                  | 5° -7°                                                                                                                                                                                                                                                                                                                  |
| Lifetime/ Lumen maintenance | 50 000h L90 B10 or better                                                                                                                                                                                                                                                                                               |


|                   |                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Polar diagram     |  <p>The polar diagram on the left shows a light distribution pattern with a central peak and concentric arcs. It is labeled with angles of 60°, 30°, and 150000 cd. To the right, a 3D illustration shows a white spotlight fixture emitting a yellow beam of light onto a dark surface.</p> |
| Typical Luminaire |  <p>A photograph of a black, cylindrical spotlight fixture mounted on a base. The fixture has a large, dark lens and is shown from a three-quarter perspective.</p>                                                                                                                           |

## **1.012      *Lighting control system***


### **1.04.1    *Wireless lighting control module***

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description        | <p>Wireless lighting control module to interface Bluetooth Low Energy (BLE) system with the hardwired DALI system.</p> <p>Bluetooth controllable, wireless interface enabled, 2-channel, 0-10V/DALI controller. The module should allow for the control one or two 0-10V controllable LED drivers. It should also allow for any configurations to a DALI LED driver or sensor. The module can be controlled via a compatible application.</p> <p>The module should incorporate a standalone DALI output, allowing for connections with any LED drivers with DALI interface.</p> |
| Control            | Via application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Range              | Minimum of 50m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Ingress protection | IP20 or better                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Input              | Voltage range: 100-240 VAC<br>Frequency: 50-60 Hz<br>Max. mains current: 35 mA<br>No-load standby power: < 0,5 W                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Channel 1 output   | Output voltage, 0-10V: 0-10 VDC, max. 7 mA (sinking)<br>Output voltage, DALI: 12 VDC, max. 20 mA (sourcing)<br>Maximum number of drivers: 1                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Channel 2 output   | Output voltage, 0-10V: 0-10 VDC, max. 7 mA (sinking)<br>Output voltage, relay control: 12 VDC, max. 100 mA (sourcing)<br>Maximum number of drivers: 1                                                                                                                                                                                                                                                                                                                                                                                                                           |

### **1.04.2    *Range extension module***

|                    |                                                                                        |
|--------------------|----------------------------------------------------------------------------------------|
| Description        | Range extension module to increase the range of the Bluetooth Low Energy mesh network. |
| Typical Module     |      |
| Network            | Bluetooth Mesh Technology                                                              |
| Range              | Minimum of 50m                                                                         |
| Ingress protection | IP20 or better                                                                         |
| Input              | Operating voltage: 230 VAC<br>Frequency: 50 Hz                                         |

### 1.04.3 Remote access Gateway

|                             |                                                                                                                                                                                                                                        |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description                 | A BLE-gateway allowing for remote access and control of the Bluetooth low energy interface through Ethernet or wifi. Can be used for remote diagnostics, network monitoring o remote control of up to two wireless interface networks. |
| Dimensions                  | 100mm-150mm (length)<br>25mm-30mm (height)<br>100mm-150mm (width)                                                                                                                                                                      |
| Typical gateway device      |                                                                                                                                                     |
| Range                       | Minimum of 30m                                                                                                                                                                                                                         |
| Memory                      | 2GB DDR3 or better                                                                                                                                                                                                                     |
| Wifi standard               | IEEE 802.11 b/g/n, 2.4G                                                                                                                                                                                                                |
| Operating Relative Humidity | 10% to 95%                                                                                                                                                                                                                             |
| Operating Temperature       | 0° to 50° C                                                                                                                                                                                                                            |
| Embedded multi-media card   | 8GB EMMC<br>or better                                                                                                                                                                                                                  |
| Processor                   | QDSP6 v5 core at up to 691 MHz                                                                                                                                                                                                         |

#### **1.04.4 DALI master controller**

The DIN rail DALI master controller shall be a central controller to control DALI controllers/drivers and configure DALI input devices on the DALI line. Each DALI channel shall be able to automatically assign and manage addresses of at least 64 control devices. It shall include the following features:

- Each DALI channel enables to set up a minimum of 8 DALI scenes
- Enables to set up to 256 timer tasks
- Designed with PC configuration software tool - enables to configure and read parameters of the master and control devices

#### **1.04.5 0/1-10V - DALI controller**

The 0/1-10V-DALI controller shall serve as an interface between 0/1-10V luminaires and the DALI network. This will convert the analogue 0/1-10V control signals into DALI and provide an address to a group of non-DALI luminaires to be dimmed according to the selected lighting scene.

#### **1.04.6 Wireless scene selector and control switch**

The switch shall have a range of at least 45m in open air and shall consist of a battery powered wireless user interface that shall provide selection of different pre-programmed lighting scenes and also control of individual or group luminaires. The scenes shall be configured via a compatible application. Other features provided by the switch shall include: dimming.

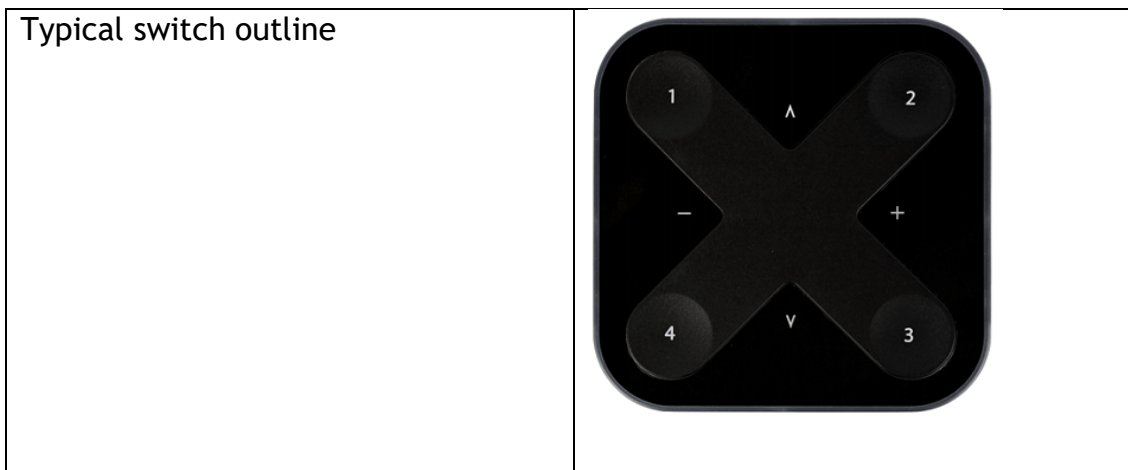
The mentioned application shall be freely available on any android or IOS device and shall be compatible with the luminaires forming part of this project. It shall be a user-friendly application with an intuitive menu system. The technology shall allow the user to store a selected colour temperature, dimming level or colour, besides the creation of time-based scenes and animations. It shall also allow circadian scenes to be created allowing automatic colour temperature adjustment depending on the time of the day.

A mounting bracket/wall mounting plate shall be provided with the wireless switch.

Moreover, the wireless switch shall have the following characteristics:

|                                            |                                                       |
|--------------------------------------------|-------------------------------------------------------|
| Dimensions                                 | 90-100mm (length), 90-100mm (height), 10-13mm (depth) |
| Wireless Range                             | 45 m minimum                                          |
| Colour                                     | White or black (to be determined at a later stage)    |
| Number of selectable pre-programmed scenes | minimum of 4 different scenes per switch              |
| Battery lifetime                           | 2 years minimum                                       |





#### **1.11.6      *Lighting Trials***

The supplier of the luminaires is to attend on site meetings with the installer, as required during the installation of the luminaires in order to carry out supervision of the works, explain the wiring configuration, assembly and installation of the luminaires. In this regard, the supplier shall be responsible for the full technical coordination with the contractor carrying out the installation of the luminaires.

Full scale lighting trials shall be carried out by the supplier of the luminaires in order to determine the exact quantity, type and position of luminaires required. During these trials, the luminaire arrangement may be altered as and when required.

The lighting trials shall take place after sunset. Each of these sessions shall have a duration of up to 3 hours.

The rates quoted by the Contractor for the lighting trials shall be deemed to include all expenses incurred by the contractor including but not necessarily limited to, travel and accommodation, sustenance, travel allowances, wages, overheads and taxes.

#### **1.11.7      *Installation***

Once the exact lighting configuration has been determined, the electrical contractor shall carry out the installation. Such works shall be carried out over a period not exceeding 2 months from the order to start works.

#### **1.11.8      *Setting up of luminaires and programming,***

Following the completion of the installation works, the Contractor carrying out the installation works shall carry out physical pan and tilt adjustments of all the luminaires under the direction of the Engineer. The supplier shall also be present for this exercise and shall be responsible for the setting up of the lighting control system including the

setting up of the DALI and Bluetooth wireless interface, programming the respective brightness level and/or chromaticity, depending on the type of luminaire. This shall be followed by full programming of the various scenes as instructed by the Employer.

#### **1.11.9 Training**

The Contractor shall provide full training to the Client's nominated personnel. The duration of the training shall be 4 hours minimum and shall cover maintenance of the electrical system as well as familiarization with the various circuits supplying the lighting system as well as the use of the control application on android or iOS devices. Topics to be covered in relation to the application shall include but not necessarily limited to:

- control of individual luminaires or groups
- programming of scenes
- programming of wireless devices such as switches
- animations
- schedules
- accounts
- gateways

#### **1.12 Labels and Charts**

The Contractor shall provide a printed chart giving details of each circuit, in all distribution boards and consumer units. The chart shall be enclosed in a transparent plastic envelope attached to the inside of the door of the consumer unit or distribution board.

Labels shall be made of white plastic, with 5mm high engraved letters and figures coloured red for warning labels and black where informative. Labels are to be fixed by means of screws and not adhesives.

Consumer units and distribution boards in the meter room are to be marked with clear engraved letters and figures coloured black. The marking shall consist of DB number for the distribution boards.

A plastic label with clear engraved letters and coloured red shall also be installed at the main earth terminal and shall read:

**"SAFETY ELECTRICAL CONNECTION - DO NOT REMOVE"**

#### **1.13 Inspection and testing.**

The Contractor shall be responsible for the testing of the electrical installation as recommended in the IET Wiring Regulations "Requirements for Electrical Installations" - 18<sup>th</sup> Edition including amendments. In this regard, the Contractor shall furnish test certificates to the Engineer, on request.

The Contractor shall also be responsible for submitting the application to Enemalta for the provision of the electricity supply service. The Contractor shall include for the

provision of drawings and schematics as well as the inspection and test Certificates for each individual service as required by Enemalta.

#### **1.14 Commissioning and testing**

On completion of the works, the Contractor shall carry out full scale testing and commissioning of all installations to demonstrate their performance to the satisfaction of the Engineer.

#### **1.15 Operating and maintenance instructions**

On completion of all works and prior to handing over, the Contractor shall provide a complete set of operating and maintenance manual comprising of the following (where applicable):

- General description of the installation, indicating the manner of working of each system, forming part of the works.
- Full instructions for starting up, operating and shutting down each individual assembly of equipment.
- Instructions as to the frequency and full requirements of routine and regular preventive maintenance necessary to maintain the equipment in a good working condition. This information is to be supplemented by the Manufacturer's Maintenance Instructions for all equipment.
- A recommended spare parts list including current price of each part, the manufacturer's address and local stockist /agent.
- Wiring diagram of the system and equipment.
- Three sets of "as fitted" drawings and one soft copy.

## **1.16 Maintenance Schedule**

### **Scope of Works**

The Contractor shall be responsible for servicing and preventive maintenance of the lighting system and the testing of the electrical LV installation as detailed in these schedules and to the full satisfaction of the Client.

The Contractor shall provide everything necessary, including materials and equipment for the proper execution of the works according to the true intent and meaning, of the servicing and maintenance of equipment referred to in these schedules.

The Contractor shall be responsible for the safe working conditions of his employees and sub-contractors. Any worker found to be working without the use of safety equipment will be asked to leave the premises immediately. Any delay that incurs on the programme resulting from these actions shall be to the Contractors full liability.

This includes all aspects of safety including shoes, hard hats and harnesses.

The Contractor shall be required to execute the works in total agreement with the Client in advance and as per the works schedules as attached herewith.

The Contractor shall appoint a competent person who will be responsible for the execution of the works on the premises and he will be the contact person for any call outs, which fall outside the scope of this agreement and which shall be charged at the specific rates included in this agreement.

The Contractor shall be responsible to clear away off the premises any debris, waste material and the like on a regular basis and to keep the site clean and tidy at all times. Failing which this will be carried out by the Client; all costs incurred resulting from the same shall be the Contractors liability and shall be deducted from the amount due to the Contractor.

The Contractor shall safeguard and protect any areas of finished works as completed by the Client, any damage resulting from the Contractors failure to protect these areas shall be to the Contractors full liability and all costs incurred to rectify these damages shall be deducted from the amount due to the Contractor.

The Contractor shall be liable for and shall indemnify the Client against any expense, liability, loss, claim or proceedings whatsoever arising at law in respect of personal injury to or death of any person working on the site in direct connection with the Contract Works and arising out of or in course of, or caused by the carrying out of these Contract works.

The Contractor will provide all his own working light and power extension leads, he shall arrange for the transportation of all materials and equipment throughout the premises.

This service agreement is valid for a period of 5 (five) years.

### **Callouts**

Callouts shall have a lead time of 24 hours.

## PREVENTIVE MAINTENANCE SCHEDULE FOR THE LIGHTING SYSTEM AND THE ELECTRICAL LV SYSTEM INSTALLATION

| PREVENTIVE MAINTENANCE PROCEDURE - LIGHTING SYSTEM AND ELECTRICAL LV INSTALLATION                                                                                                                                  | MAINTENANCE FREQUENCY |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------|
|                                                                                                                                                                                                                    | EVERY SIX MONTHS      | EVERY YEAR |
| Check for any faulty light fittings and replace any faulty units with identical light fittings. (Light fittings to be free issued by the contracting authority)                                                    | X                     |            |
| Cleaning of all light fittings forming part of the exterior lighting scheme.                                                                                                                                       | X                     |            |
| Check for corrosion and report if necessary.                                                                                                                                                                       | X                     |            |
| Checking the fixing of each light fitting and securing as required.                                                                                                                                                | X                     |            |
| Check and tighten the electrical connections to the light fittings.                                                                                                                                                |                       | X          |
| Check all equipotential bonding connections.                                                                                                                                                                       |                       | X          |
| Check and tighten electrical connections within the distribution boards and junction boxes forming the electrical LV installation.                                                                                 |                       | X          |
| IRT survey to check for any hot spots.                                                                                                                                                                             |                       | X          |
| Check for any overheating or discolouring of cable insulation.                                                                                                                                                     |                       | X          |
| Test the earth fault loop impedance at each distribution board.                                                                                                                                                    |                       | X          |
| Check and tighten earth electrodes connections and measure resistance.                                                                                                                                             |                       | X          |
| Check residual current devices and test trip times.                                                                                                                                                                |                       | X          |
| Check all circuit breakers manually to confirm 'break and make' function.                                                                                                                                          |                       | X          |
| Prepare report recording all the above indicated tests including photographic records. Report shall also include any recommendations for replacement. Report shall be endorsed by a warranted electrical engineer. |                       | X          |

Table 1- Maintenance Schedule - Electrical Systems

## **SECTION 5 - SUPPLEMENTARY DOCUMENTATION**

### ***5.1 - Draft Contract Form***

### ***5.2 - Glossary***

### ***5.3 - Specimen Performance Guarantee***

### ***5.4 - Specimen Pre-financing Guarantee***

### ***5.5 - Specimen Retention Guarantee***

### ***5.6 - General Conditions of Contract***

The full set of General Conditions for Works Contracts is included in the tender package.

It is hereby construed that the tenderers have availed themselves of these general conditions, and have read and accepted in full and without reservation the conditions outlined therein, and are therefore waiving any standard terms and conditions which they may have.

These general conditions will form an integral part of the contract that will be signed with the successful tenderer/s.