

# Marsh Farm Futures Replacement with LED Lighting

## Electrical Services

Performance specification

JBC/TGK/2139/LED rev 2

# TENDER

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Issue Sheet

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# Table of Contents

|     |  |    |
|-----|--|----|
| 1   | Introduction .....                           | 1  |
| 1.1 | Luminaire Specifications .....               | 1  |
| 1.2 | Building Regulations.....                    | 2  |
| 2   | Existing Installations.....                  | 3  |
| 3   | Works Descriptions .....                     | 6  |
| 3.1 | Review of contractors proposals .....        | 6  |
| 3.2 | Programme .....                              | 6  |
| 3.3 | Standards of materials and workmanship ..... | 6  |
| 3.4 | Replacement of Luminaires .....              | 8  |
| 3.5 | Removal of redundant materials .....         | 9  |
| 3.6 | Commissioning.....                           | 9  |
| 3.7 | Controls.....                                | 9  |
| 4   | Schedule of suppliers and manufacturers..... | 10 |
| 5   | Schedule of Information.....                 | 11 |
| 6   | Tender breakdown .....                       | 12 |

# 1 Introduction

This performance specification is provided to enable quotations to cover the work required to replace lighting within Marsh Farm Futures Building with modern efficient LED Lighting.

The objective of the works is to achieve energy savings by using modern technology and controls.

Work shall be undertaken as a single phase.

The works comprise:

1. Review of records to establish programme of works for sequencing taking into consideration wiring circuitry so each circuit is completed in 1 attendance
2. Production of programme on area by area basis to allow tenants notice of when work is to be undertaken (allow for 2 meetings on site with landlord and tenants)
3. Provision of Risk Assessments and Method Statements
4. Provision of access/safety equipment
5. Removal and disposal of materials made redundant by these works
6. Installation of new replacement LED luminaires – including improved controls
7. Bringing new luminaires into working condition
8. Fixed wiring testing of modified circuits

## 1.1 Luminaire Specifications

Luminaires are to be selected to suit the ceiling construction/grids, with suitable IP ratings to suit ambient conditions.

The lighting manufacturer shall have BS EN ISO 9001:2008 and BS EN ISO 14001:2004 accreditation for quality and environmental management systems.

Luminaires shall be CE marked and conform to the following standards:-

- EN 55015 Limits and measurement of radio disturbance
- EN61547 Electromagnetic compatibility immunity requirements
- EN 61000-3-2 Limits for harmonic current emissions
- EN 60598-1 Luminaires: general requirements and tests
- EN 60598-2-1 Fixed general purpose luminaires
- EN 60598-2-22 Luminaires for emergency lighting

Where the luminaire employs a powder coat finish, it shall be full polyester and non-yellowing.

Luminaires shall be supplied with a suitably rated fused terminal block.

Only LED light sources (LED lamps) that have been tested in accordance with LM80-08:2008 shall be used. Test certificates should be provided upon request.

All LED modules shall be tested in accordance with IEC 62717.

Where practical, LED luminaires shall be fully serviceable where LED PCB's and electronic control gear are fully replaceable.

General interior luminaires shall:-

- have a life time of at least 60,000hrs L80/B10 where L80 represents a 20% reduction in light output at the rated life. B10 value indicates that 90% of the LEDs will be producing 80% light output at the rated life.
- have a minimum colour rendering index of Ra80.
- control gear power factor correction shall be  $\geq 0.9$



General exterior luminaires shall:-

- Have a life time of at least 60,000hrs L70/B10 where L70 represents a 30% reduction in light output at the rated life. B10 value indicates that 90% of the LEDs will be producing 70% light output at the rated life.
- have a colour rendering index of equal to or better than Ra60.
- colour variance between LEDs shall not be greater than 5 Macadam Ellipse Steps
- control gear power factor correction shall be  $\geq 0.9$

A five-year warranty shall be provided from a manufacturer which has an established history and track record.

## 1.2 Building Regulations

The works shall be compliant with Building Regulations including **Approved Document L Volume 2, 2021 edition 53 L1(b), L2.**

**Excerpts from particularly relevant sections:**

**6.59** Any fixed lighting should achieve levels of illumination appropriate to the activity in the space. Spaces should not be over-illuminated. Lighting should be designed based on CIBSE's SLL Lighting Handbook or an equivalent design guide.

**NOTE:** For smaller spaces where total lighting power is likely to be low (toilets, store rooms etc.) there is no expectation that lighting calculations should be produced.

**6.60** Lighting should observe the following.

a. If it is general lighting, either:

- i. have an average luminaire efficacy of 95 luminaire lumens per circuit-watt
- ii. the Lighting Energy Numeric Indicator (LENI) method, following Appendix B.

b. If it is display lighting, any of the following:

- i. have an average light source efficacy of 80 light source lumens per circuit-watt
- ii. have a rated power usage no greater than 0.3W/m<sup>2</sup> in each space
- iii. the LENI method, following Appendix B.

c. For high excitation purity light sources, an average light source efficacy of 65 light source lumens per circuit-watt.

**6.61** General lighting and display lighting should be metered by one of the following methods.

- a. Dedicated lighting circuits with a kWh meter for each circuit.
- b. Local power meter coupled to or integrated in the lighting controllers of a lighting management system.
- c. A lighting management system that can both:
  - i. calculate the consumed energy
  - ii. make this information available to a building management system.

### **Lighting controls**

**6.62** Lighting controls in new and existing buildings should follow the guidance in the Building Research Establishment's Digest 498.

**6.63** Unoccupied spaces should have automatic controls to turn the general lighting off when the space is not in use (e.g. through presence detection). Occupied spaces should have automatic controls where suitable for the use of the space.

**6.64** General lighting in occupied spaces should have daylight controls (e.g. photo-switching and dimming) for parts of the space which are likely to receive high levels of natural light.

**6.65** Display lighting should be controlled on dedicated circuits that can be switched separately from those for lighting provided for general illuminance.



## 2 Existing Installations

This specification concerns itself with the replacement of lighting to achieve energy savings for the landlord and tenants.

The existing luminaire types are primarily as scheduled below;

| Type | Manufacturer | Model          | Lamps              |                        | Emergency | Areas  |
|------|--------------|----------------|--------------------|------------------------|-----------|--|
| A    | Thorn        | INDIQUAT<br>OP | 2x40W TC-L HF      | WL4                    |           | Presentation<br>spaces &<br>Dining                       |
| Ae   | Thorn        | INDIQUAT<br>OP | 2x40W TC-L HF      | WL4/3                  | E3TX      |  |
| A1   | Thorn        | INDIQUAT L+    | 2x40W TCL HF       | WL4 DSB                |           |  |
| A1e  | Thorn        | INDIQUAT L+    | 2x40W TCL HF       | WL4                    | E3TX D    |  |
| A2D  | Thorn        | INDIQUAT L+    | 2x40W TCL HFD      | WL6 DSB                |           |  |
| A2De | Thorn        | INDIQUAT L+    | 2x40W TC-L HFD     | WL6/3                  | E3TX      |  |
| C    | Thorn        | Chalice 190H   | 2x26W TC-DEL<br>HF |                        |           | WC's,<br>Circulation<br>spaces &<br>Servery              |
| Ce   | Thorn        | Chalice 190H   | 2x26W TC-DEL<br>HF | Combined HF & EM<br>SC | E3        |  |
| C1   | Thorn        | Chalice 190H   | 2x26W TC-DEL<br>HF |                        |           |  |
| D    | Thorn        | ?              |                    |                        |           | Wall mounted<br>reception,<br>staircase &<br>circulation |
| De   | Thorn        | ?              |                    |                        |           |  |
| F    | Thorn        | ?              |                    |                        |           | Offices  |
| Fe   | Thorn        | ?              |                    |                        |           |  |
| F1   | Thorn        | ?              |                    |                        |           |  |
| G    | Thorn        | ?              |                    |                        |           | Risers &<br>Stores/Plant                                 |
| Ge   | Thorn        | ?              |                    |                        |           |  |
| G2   | Thorn        | Impact         |                    |                        |           | Medical areas  |
| G2e  | Thorn        | Impact         |                    |                        |           |  |
| H    | Thorn        | ?              |                    |                        |           | Staircases   |
| He   | Thorn        | ?              |                    |                        |           |  |
| M    | Thorn        |                |                    |                        |           | Atrium<br>Luminaires                                     |

Preferred range of luminaires

| Thorn preferred Range |                 |                  |                  |                   |              |
|-----------------------|-----------------|------------------|------------------|-------------------|--------------|
| <b>BETA 3</b>         | <b>Chalice3</b> | <b>Aquaforce</b> | <b>Katona</b>    | <b>Chalice 74</b> | <b>Punch</b> |
| Offices               | WC's            | Stores/Plant     | Staircases       | Reception (spot)  | Medical      |
| Presentation areas    | Circulation     | Risers           | Reception (wall) |                   |              |
|                       |                 | Fun Factory      |                  |                   |              |
|                       |                 | Kitchen          |                  |                   |              |
|                       |                 |                  |                  |                   |              |
| <b>HiPak</b>          |                 |                  |                  |                   |              |
| Atrium                |                 |                  |                  |                   |              |

| Thorlux preferred Range |                  |                       |            |              |                  |
|-------------------------|------------------|-----------------------|------------|--------------|------------------|
| <b>Radiance</b>         | <b>G3</b>        | <b>A-Line</b>         | <b>DOT</b> | <b>Clara</b> | <b>Mina-S</b>    |
| Offices                 | WC's             | Stores/Plant          | Staircases | Reception    | Reception (spot) |
| Presentation areas      | Circulation      | Risers                |            |              |                  |
|                         |                  | Fun Factory (50)+(17) |            |              |                  |
|                         |                  | Kitchen               |            |              |                  |
|                         |                  |                       |            |              |                  |
| <b>Kanby Zip</b>        | <b>ComboSeal</b> |                       |            |              |                  |
| Medical                 | Atrium           |                       |            |              |                  |

| Dextra preferred Range |             |               |                           |                  |                     |
|------------------------|-------------|---------------|---------------------------|------------------|---------------------|
| <b>MOD Office</b>      | <b>BTEC</b> | <b>Typhon</b> | <b>Amenity Decorative</b> | <b>Planum</b>    | <b>Protec Micro</b> |
| Offices                | WC's        | Stores/Plant  | Staircases                | Reception (wall) | Reception (spot)    |
| Dining                 | Circulation | Risers        |                           |                  |                     |
| Presentation areas     |             | Fun Factory   |                           |                  |                     |
|                        |             | Kitchen       |                           |                  |                     |
|                        |             |               |                           |                  |                     |
| <b>Element Surface</b> | <b>Capo</b> |               |                           |                  |                     |
| Medical                | Atrium      |               |                           |                  |                     |



Number of luminaires is estimated as below;

| <b>Ground Floor</b>  |                 |                  |
|----------------------|-----------------|------------------|
| <b>Area</b>          | <b>Standard</b> | <b>Emergency</b> |
| Presentation areas   | 72              | 25               |
| Office/Admin areas   | 46              | 16               |
| WC's/Showers/Utility | 27              | 16               |
| Dining               | 14              | 4                |
| Circulation          | 43              | 39               |
| Store/Plant          | 7               | 7                |
| Risers               |                 |                  |
| Fun Factory          | 50              | 17               |
| Kitchen              | 6               | 2                |
| Servery              | 3               | 1                |
| Staircases           | 4               | 3                |
| Reception (wall)     | 4               |                  |
| Reception (spots)    | 6               |                  |
| Medical              | 40              | 16               |

| <b>First Floor</b>   |                 |                  |
|----------------------|-----------------|------------------|
| <b>Area</b>          | <b>Standard</b> | <b>Emergency</b> |
| Presentation areas   | 114             | 50               |
| Office/Admin areas   | 114             | 53               |
| WC's/Showers/Utility | 30              | 17               |
| Circulation          | 37              | 37               |
| Store/Plant          |                 | 7                |
| Risers               |                 |                  |
| Atrium               | 8               |                  |
| Kitchenette          | 6               | 3                |
| Staircases           |                 | 5                |

The contractor is to provide a cost for the areas and number highlighted in yellow above only at this stage as they are considered to be those luminaires most in use and therefore able to offer the best value in achieving energy reduction by use of highest efficiency lighting.

Where additional not standard luminaires have been installed since original occupation these are to remain in place and contractor quotations sought if more efficient luminaires can be sourced.

A/Ae/A1/A1e Thorn INDIQUAT dimensions are 597X597 X 90mm deep – all electronic control fixed output – 90W  
A2D & A2De Thorn INDIQUAT dimensions are 597X597 X 90mm deep – all digital dimming – 88W  
C/Ce/C1 Thorn Chalice dimensions are 205dia x 100mm – 58W

The work requires to submission of tenders together with submission for proposed luminaire replacements to enable quality checks on manufacturers proposed.





### 3 Works Descriptions

The works include the following activities which are to be undertaken and completed as part of the work herein specified.

#### 3.1 Review of contractors proposals

The contractor is to check record drawings to establish the circuitry and to check loads on each circuit remain within capacity of the protective devices.

Technical data sheets for each luminaire together with samples are to be provided for the client to review prior to ordering of the luminaires.

Items being checked on luminaire manufacturers include;

- 5 year warranty
- Compliance with BS 4533. Quality Control to BS EN ISO 9001:2015
- Environmental management systems to BS EN ISO 1400:2015
- In house printed circuit board production
- Rated life (hours)
- Fire retardant diffusers
- Flicker free high frequency control gear
- LENI number indicator

Preference will be given to Thorlux, Trojan, Dextra and Thorn products

The contractor shall produce risk assessments and method statements in order that the impact of the work upon building users can be confirmed.

#### 3.2 Programme

The contractor is to put together a programme of works allowing rooms/areas to be completed in 1 day.

The programme is to be discussed with the client to agree dates when access will be available allowing sufficient time for tenants to be advised and to make alternative work arrangements if necessary.

#### 3.3 Standards of materials and workmanship

The Installation(s) shall comply with the standards of good practice and workmanship generally acknowledged in the relevant industry and only labour qualified by trade test or of accepted grade for the particular works shall be employed.

The intent of the works is to re-use existing conduit systems only.

The whole of the work shall be executed in accordance with the seventeenth edition of the Regulations for the Electrical Equipment of Buildings BS 7671: 2008 and any amendments issued by the Institution of Electrical Engineers. The following regulations shall also apply where relevant, for all materials to be supplied and all work carried out:

- a) British Standards and British Standard Code of Practice issued by the British Standards Institution.
- b) The Electricity Supply Regulations.
- c) CIBSE Code of Practice for Interior and Exterior Lighting
- d) Electricity at Works Act.
- e) Construction Design Management Regulations



- f) The requirements of the Local Fire Prevention Officer and Building Control.
- g) The requirements of the Regional Electricity Company.
- h) Building Regulations.
- i) Health and Safety at Work Act, 1974 (1989).
- j) National Inspection Council for Installation Contractors Standards for Installation.
- k) The Electromagnetic Compatibility Regulations.
- l) All European Commission Directives and Acts of Parliament. DDA, Building Regulations Approved Document Part M and BS8300

#### *RCDs*

Residual Current Devices shall be in accordance with BSEN 61008 and IEC 1008 with a sensitivity of 30mA unless specified alternatively in the Particular Specification.

In general, the combined RCB/MCB to BSEN 61009 and IEC 1009 are preferred

#### *Contactors*

Contactors shall comply with BS5424, Part 1 and have a rating in accordance with 'uninterrupted duty' and 'Utilisation Category AC1' unless otherwise specified in the Particular Performance Specification.

Contactors shall be:

- 1) Totally enclosed in metal cases with hinged and or bolted covers and be complete with earthing terminals externally and internally.
- 2) Modular DIN rail mounting type with ventilation single way inserts between each contactor.
- 3) Modular enclosure to be mounted as part of associated distribution board where applicable.

Contactors shall be of the air break type of uninterrupted rating and sized suitably for inductive circuits.

All contactors shall be fitted with arc shields and magnetic blowouts. Contacts shall be of the self-cleaning type and easily removable and be designed such as to prevent welding in.

All operating coils of contactors shall be designed to operate on AC current and coils circuits shall be protected by a suitable MCB or integral fuse.

Means of isolation shall be provided to isolate all primary supplies and secondary circuits to contactors.

Relays shall be interchangeable and of the plug-in type with equal numbers of normally open and normally closed contacts of rating adequate for their operating duties.

#### *Cables*

All cables shall be low smoke zero halogen.

For any final sub-circuit and controls circuitry, no cable having a cross sectional area of less than 1.5mm<sup>2</sup> shall be used.

In the absence of any specific cable rating in the Schedules, the current rating of any cable shall not be less than that of the fuse or circuit breaker protecting the cable. In determining the compliance with above requirement the contractor will take into account all factors that would have a de-rating factor on the cable.

Polyvinylchloride Insulated (PVC Insulated):-

Insulated cables shall normally be drawn into conduit or trunking. Particular care shall be taken to ensure that the operating conditions are such that they are not installed in positions of ambient temperature greater than those laid down in the current edition of the IET Regulations. No single stranded conductors shall be used.

Cables shall be coloured in accordance with the current IET Regulations.



### *Flexible cables*

Flexible cables and cords shall be rated in accordance with the current IEE Regulations and shall be of the types to suit the temperature conditions and for portable appliances shall be circular formation waterproofed sheathed overall.

All apparatus having flexible cables entering via entries shall be fitted with Strain Relief Grips of appropriate sizes to prevent undue strain being put upon conductors.

### 3.4 Replacement of Luminaires

The work includes for the replacement of all fluorescent lighting within the premises with new LED products of modern quality and appearance.

The number of luminaires to be included within the works are indicated in the tables of luminaires identified in Section 2 of this specification.

The contractor is advised that the height of luminaires in the Atrium and in the fun factory is approximately 7.3m

Other area ceiling heights are approximately 3.0m

Suitable access equipment to all areas to allow the contractor to undertake the works is to be the responsibility of the contractor.

### *Lighting generally*

Luminaires shall be assembled and installed in accordance with the respective manufacturers' instructions/recommendations, in the positions and mounting heights specified.

The luminaires shall be cleaned free of dust and dirt after completion of the installation. Where dirt, dust, corrosion or other conditions cause imperfections in the luminaires, they shall be replaced.

The minimum cross-sectional area of any flexible core to be employed as a final connection to a single luminaire shall be 0.75mm<sup>2</sup>

The Electrical Contractor shall ensure that the methods of suspension for luminaires are electrically and mechanically sound and designed to remove any possible twisting or distortion to the luminaire. The contractor shall provide all necessary additional supports as may be required.

Breakjoint rings of approved colour shall be provided for all suspended luminaires and fluorescent batten luminaire where the batten is of insufficient width to comply cover the conduit box and its associated clearance hole in the ceiling.

The metalwork of all luminaires shall be effectively bonded to the earthing system in accordance with Chapter 54 of the IEE Regulations together with any extraneous conductive material to which the luminaire is attached.

Care shall be taken to ensure that the internal wiring of luminaires and the cable of any fixed wiring system shall not be in contact within high temperature areas in luminaires.

### *Emergency Lighting*

Luminaires shall be self-contained, non-maintained as per the schedule provided with integral batteries providing 3 hours duration. Luminaires shall be served from unswitched supply from the local lighting circuit.



### 3.5 Removal of redundant materials

All materials made redundant by the works shall be removed from site at the cost of the contractor appointed to undertake the work including all licenses necessary for disposal of any waste.

### 3.6 Commissioning

The contractor shall bring the lighting into operation at the end of each work period.

At completion lighting levels achieved in each room shall be recorded.

The contractor shall arrange with the clients engineer to attend to have demonstrated to them the achievements of the systems to meet the required criteria.

### 3.7 Controls

Switch Control of lighting shall remain as currently installed.

Presence sensors shall be replaced to meet current Building Regulations for occupancy and daylight sensing.



## 4 Schedule of suppliers and manufacturers

The contractor shall include for the procurement of equipment as in the schedule of manufacturers below to ensure that a required level of quality is provided.

The contractor is encouraged to submit details of any cost savings that could be achieved via using suppliers of a similar quality with their tender submission.

Should the contractor divert from the supplier listed the contractors shall ensure that the performance of the alternative equipment matches or exceeds that specified. The contractor shall allow for any associated design work arising from the change of equipment.

| Preferred Manufacturer Names | Element  | Contact Details  |
|------------------------------|----------|--|
| Thorn Lighting               | Lighting | Durhamgate<br>Spennymoor<br>County Durham DL16 6HL                           |
| Thorlux Lighting             | Lighting | Merse Road<br>North Moons Moat<br>Redditch<br>Worcs B98 9HH                  |
| Dextra group                 | Lighting | Brickfields Business Park<br>Gillingham<br>Dorset SP8 4PX                    |
| Trojan Lighting              | Lighting | Unit 2 Sandwash Close<br>Rainford Industrial Estate<br>St Helens<br>WA11 8LY |



## 5 Schedule of Information

### Drawings

| Drawing No                           | Title                                | Scale     |
|--------------------------------------|--------------------------------------|-----------|
| Phase Building Services Ltd Drawings |                                      |           |
| 9047/E/100                           | Ground Floor Lighting (sheet 1 of 4) | 1:50 @ A0 |
| 9047/E/101                           | Ground Floor Lighting (sheet 2 of 4) | 1:50 @ A0 |
| 9047/E/102                           | Ground Floor Lighting (sheet 3 of 4) | 1:50 @ A0 |
| 9047/E/103                           | Ground Floor Lighting (sheet 4 of 4) | 1:50 @ A0 |
| 9047/E/104                           | First Floor Lighting (sheet 1 of 3)  | 1:50 @ A0 |
| 9047/E/105                           | First Floor Lighting (sheet 2 of 3)  | 1:50 @ A0 |
| 9047/E/106                           | First Floor Lighting (sheet 3 of 3)  | 1:50 @ A0 |
| 9047/E/110                           | Ground Floor Lighting                | 1:50 @ A1 |
| 9047/E/111                           | First Floor PCT Lighting             | 1:50 @ A1 |

These drawings are not yet available electronically in a clean condition but can be viewed on site in the O&M manuals.

Marked copies are available with the tender document.



## 6 Tender breakdown

The tenderer is to complete the breakdown table as laid out below. Contractors are to identify and exclusions and costs options in the blank cells for the client to consider that may be required for the satisfactory conclusion of the works

| Item | Work description  | Cost   |
|------|---|--------|
| 1    | Review of tender against records and as installed                 |        |
| 2    | Work programming  |        |
| 3    | Risk assessment and method statements                             |        |
| 4    | Access Equipment  |        |
| 5    | Lighting replacement (Circulation and WC areas only) incl testing |        |
| 6    | Removal of all redundant materials                                |        |
| 7    | Demonstrations to client's engineers                              |        |
|      | Sub-Total   |        |
| a    | Contingency sum   | 500.00 |
|      | Total   |        |

VAT to be excluded from above sums

